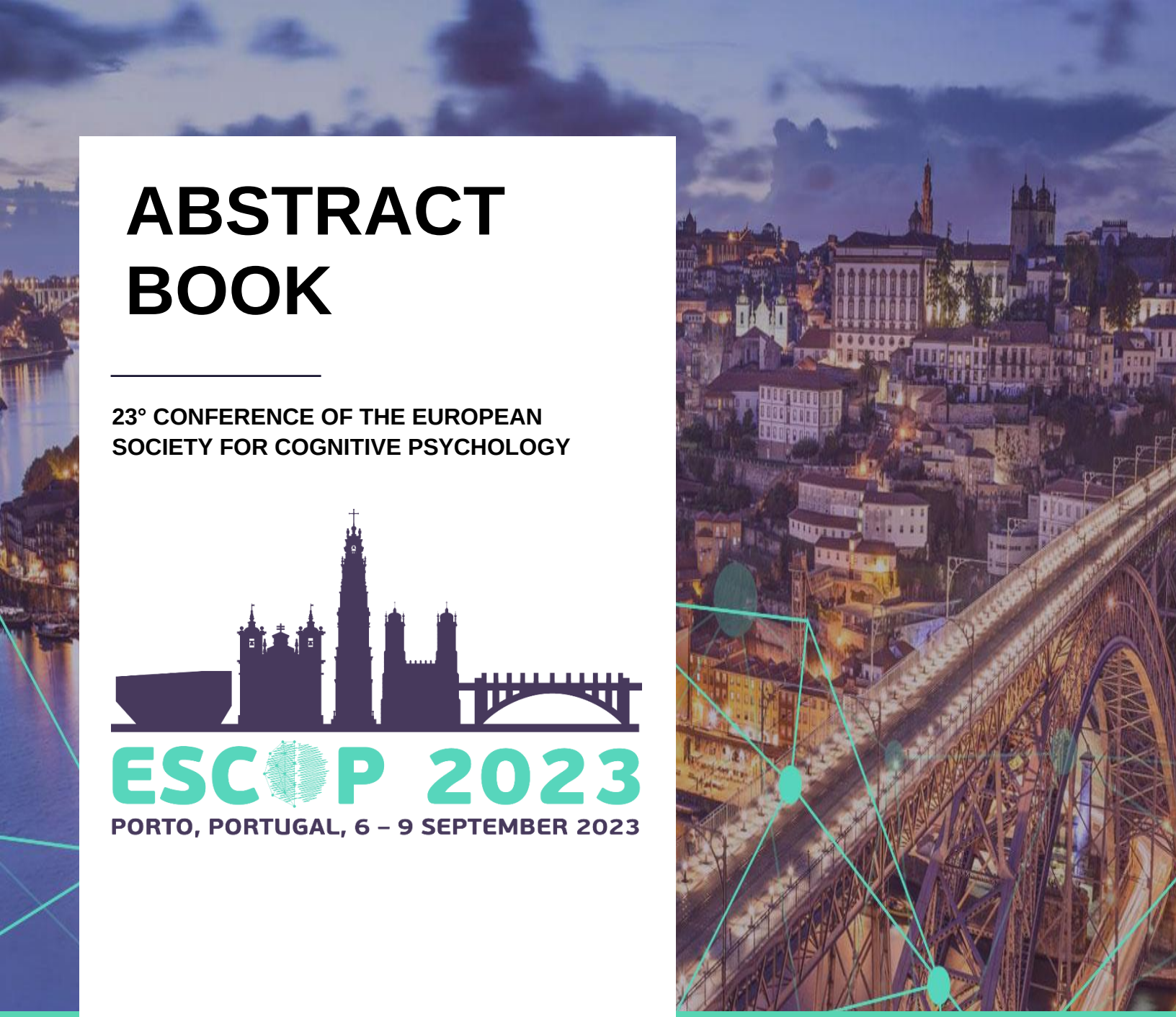


ABSTRACT BOOK

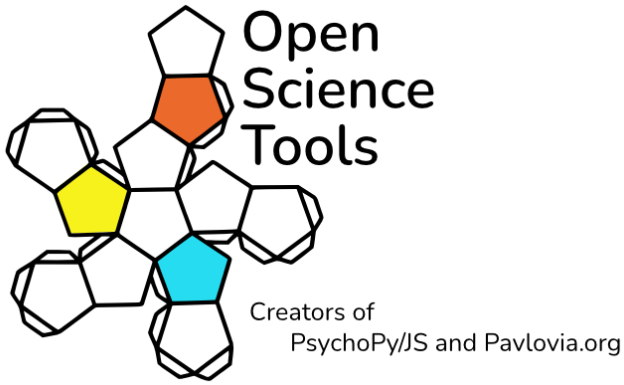
23° CONFERENCE OF THE EUROPEAN SOCIETY FOR COGNITIVE PSYCHOLOGY

ESCOP 2023

PORTO, PORTUGAL, 6 – 9 SEPTEMBER 2023

Faculty of Psychology and Education Sciences
University of Porto

Our Sponsors



Welcome Address ESCOP's President

Dear delegates,

Welcome to the 23rd Conference of the European Society for Cognitive Psychology, here in Porto, Portugal!

Organizing an ESCoP conference is always a challenging, time-consuming, and long-term project. This time was even more challenging than usual, as in the aftermath of the COVID pandemic it remained unclear for a long time whether the previous edition in Lille could be held in 2022 or would need to be postponed to 2023. It thus remained unsure whether Alessandra Souza and her team would need to organize the Porto edition in 2023 or 2025. To accomplish the flexibility this situation asked for, ESCoP and the organizers decided to keep this edition relatively small (although, as you will see, there are still almost 800 presentations in total!). Alessandra and her team did an amazing job in putting together this edition and have a wonderful conference in store for us. It will take place in the Faculty of Psychology and Education, but with the opening events in the amazing Casa da Música in downtown Porto.

As you can see in the program, there are many events to look forward to in the coming days. On Wednesday, after the conference opening in Casa da Música, Jonathan Grainger will deliver the Broadbent lecture. Further plenary talks will be given by Bertelson award winner Eliana Vassena and by invited keynote speaker Dorthe Berntsen. Additionally, there are 36 symposia, spanning many domains of cognitive psychology, with two parallel symposia sessions on Thursday, Friday, and Saturday, daily parallel sessions with regular talks and – a new format this year – Blitz talks, and three poster sessions. In total, we look forward to 360 talks, 40 blitz talks, and 386 posters.

There are also many very interesting satellite events on Wednesday morning and afternoon at the Faculty of Psychology and Education. These focus on topics such as citizen science, (ERC) grant writing advice, and statistics and methods. There is a Women in Cognitive Science event that focuses on career transitions inside and outside academia. Of course, next to the scientific program there is ample time to socialize with old and new friends! There is an opening reception on Wednesday, a conference dinner at famous Port winemaker Casa Ferreira on Friday, and a farewell cocktail on Saturday. Additionally, check out the social event on Thursday! And if (although I find this hard to imagine) you get tired of all the great science being presented at ESCoP – the beautiful city of Porto is there for you to discover!

I look much forward this meeting. I wish you all a very interesting, productive, successful, and pleasant conference. I have many good memories of every ESCoP I've attended. I hope that likewise ESCoP Porto will one you will never forget!

Rob Hartsuiker
President of ESCoP

Welcome Address from the Organizers

Dear ESCOP delegates

It is with immense pleasure that we welcome you to Porto!

The Faculty of Psychology and Education Sciences of the University of Porto, and the Neurocognition and Language group, are delighted to host this major event of cognitive psychology in Europe. This is the first time ESCOP is being held in Porto and only the second time it comes to Portugal - the first time was in Lisbon, nearly 30 years ago (in 1994), for its 7th edition. Porto is the second largest city in Portugal with 1.7 million inhabitants. Its historical center has been awarded *World Heritage Site* in 1996 by UNESCO. The city was built along the banks of the Douro River. It is filled with historical sites, restaurants, and bars. On the other side of the river, it is Vila Nova de Gaia which houses the Port wine cellars, a major city attraction. This is the location that will proudly host our conference dinner. We hope you can enjoy the city with its many attractions during your stay. Therefore, in addition to an impressive lineup of workshops, keynotes, talks, blitz-talks, and posters, we have arranged several opportunities to socialize and network in beautiful venues such as Casa da Música (opening reception on Wednesday), the Jazz/Blues Club HotFive (Thursday's social event), Casa Ferreirinha (conference dinner on Friday), and also at the conference venue (closing reception on Saturday).

As for the scientific program, the scientific committee, with the help of over 60 reviewers, worked hard at assessing and selecting contributions to appear in this edition. The program is filled with contributions from a broad range of topics in cognitive psychology: from learning to language, attention, memory, motor control, numerical and embodied cognition, aging and child development, decision making, and much more. We hope this will provide an overview of the current state-of-the-art research in Europe and beyond. This edition counts with ca. 360 talks, distributed in 36 symposia and 36 sessions, and over 380 posters. A novelty of ESCOP 2023 is the blitz-talks: 5-min presentations that will allow you to quickly get the main take-home message of exciting new findings. Make sure to attend one of the 5 blitz-talk sessions distributed along the conference days that will host a total of 40 presentations. Finally, we have an exciting lineup of keynotes to finish the program of three of the four conference days.

We also have some stimulating pre-conference workshops and panel discussions for the delegates arriving early on Wednesday. You can sharpen your methodological skills by learning to program online experiments (Online Tools team), learning how to use neurophysiological methods (ANT Neuro team), fitting cognitive models to your data (workshop by Frischkorn and Popov), or getting the first steps in using R (workshop by Ferreira & Nunes). Alternatively, you could focus on learning more about opportunities beyond an academic career (WISC panel), how to include citizen science in your research projects (workshop by Sales et al), or getting a more detailed view of the ERC funding scheme (with two great sessions).

We hope ESCOP 2023 will provide you with manyfold opportunities to brush up on your research skills and knowledge, network, develop new research ideas, and, above all, enjoy yourself.

Alessandra S. Souza, São Luís Castro, & Rui Alves, on behalf of the organizing committee

Committees

Organizing Committee

Alessandra S. Souza (head)
São Luís Castro
Rui Alves
Selene Vicente
Teresa Jacques
Nuno Sobrinho
Ana Mesquita
Mariana Silva
João Vieira
Theresa Kalchhauser
Sofia Magalhães
Catarina Marques
Mariana Carrito
Sara Félix
Ana Magalhães
Patricia Figueireido
Francisca Bismarck
Sónia Santos
Eda Melin Develioglu
Matilde Barroso
Raquel Rabelo
Rita Silva

Any questions to the organizing committee can be directed to org.escop2023@fpce.up.pt

Scientific Committee

Alessandra S. Souza (head), University of Porto
Alexandra Reis, University of Algarve
Ana Raposo, University of Lisbon
Catarina Hipakka, University of Azores
César Lima, University Institute of Lisbon
Fernando Barbosa, University of Porto
Fernando Ferreira Santos, University of Porto
Nuno Gaspar, University of Porto
Pedro B. Albuquerque, University of Minho
Rui Alves, University of Porto
São Luís Castro, University of Porto
Selene Vicente, University of Porto
Tânia Fernandes, University of Lisbon
Teresa Limpo, University of Porto
Candice Morey, ESCOP Board, Cardiff University
Davide Crepaldi, ESCOP Board, Scuola Internazionale Superiore di Studi Avanzati

Reviewers

We would like to thank our colleagues that helped us with the review of the abstracts submitted to the conference.

Agnes Rosner, *Leibniz Universität Hannover*
Alessandra S. Souza, *University of Porto*
Alexandra Reis, *University of Algarve*
Alodie Rey-mermet, *UniDistance Suisse*
Ana Isabel Vieira, *University of Porto*
Ana Mesquita, *University of Porto*
Ana Raposo, *University of Lisbon*
Andrea Kiesel, Albert-Ludwigs-Universität Freiburg
Anna-Lena Schubert, Johannes Gutenberg- Universität Mainz
Beatrice Kuhlmann, Universität Mannheim
Beatriz Bermúdez-Margaretto, *Universidad de Salamanca*
Ben Kowialiewski, *University of Zurich*
Betina van Helversen, *Universität Bremen*
Candice Morey, *Cardiff University*
Caro Hautekiet, *University of Geneva*
Catarina Hipakka, *University of Azores*
César Lima, *University Institute of Lisbon*
Christopher Fitamen, *University of Fribourg*
Claudia von Bastian, *Sheffield University*
Davide Crepaldi, *Scuola Internazionale Superiore di Studi Avanzati*
Eda Mizrak, *Sheffield University*
Elke Lange, *Max Planck Institute for Empirical Aesthetics*
Evie Vergauwe, *University of Geneva*
Fernando Barbosa, *University of Porto*
Fernando Ferreira Santos, *University of Porto*
Filipe Loureiro, *University of Aveiro*
Gidon Frischkorn, *University of Zurich*
Hannah Daves, *University of Zurich*
Henrik Singmann, *University College London*
Hsuah-Yu Lin, *Universität Bremen*
Isabel Santos, *University of Aveiro*
Joana Arantes, *University of Minho*
Jorge Almeida, *University of Coimbra*
Josefa Pandeirada, *University of Aveiro*
Kim Uittenhove, *University of Geneva*
Klaus Oberauer, *University of Zurich*
Lea Bartsch, *University of Zurich*
Marco Steinhauser, *Katholische Universität Eichstätt*
María Jesus Maraver, *University of Granada*

Mariana Carrito, *University of Porto*
Miriam Gade, *Medical School Berlin*
Naomi Langerock, *University of Geneva*
Nora Turoman, *University of Geneva*
Nuno Gaspar, *University of Porto*
Nuno Sá Teixeira, *University of Aveiro*
Nuno Sobrinho, *University of Porto*
Pedro B. Albuquerque, *University of Minho*
Peter Schepherdson, *University of Akueyri*
Philipp Musfeld, *University of Zurich*
Robert Hartsuiker, *Ghent University*
Rui Alves, *University of Porto*
São Luís Castro, *University of Porto*
Susana Silva, *University of Porto*
Tânia Fernandes, *University of Lisbon*
Teresa Jacques, *University of Porto*
Teresa Limpo, *University of Porto*
Tilo Strobach, *MSH Medical School Hamburg*
Vanessa Loaiza, *University of Essex*
Ven Popov, *University of Zurich*
Yoav Kessler, *Ben-Gurion University of the Negev*

Conference Venue

The conference will take place in the **Faculty of Psychology and Education Sciences** of the University of Porto (**FPCEUP**).

Address: Alfredo Allen, 4200-135 Porto, Portugal (GPS: 41.175300, -8.604572).

FPCEUP began its activity in 1980. It is a reference in training and research in the fields of Psychology and Education Sciences. It houses two research centers (one for Psychology and another one for Education Sciences) that are funded by the Portuguese National Science Foundation. It also comprised various other structures (laboratories and observatories) that create the conditions for the development of research in various fields, favoring the early contact of the students with research activities. FPCEUP has over 2000 degree-based training students, and about 120 teaching and PhD research staff. The Psychology Department has laboratories in Neuroscience and Language, Neuropsychophysiology, Experimental Psychology, Social Psychology, Human Sexuality, and Psychosocial rehabilitation. Among these, three laboratories conduct research in cognitive psychology: The Speech Lab, the Experimental Psychology Lab, and the Laboratory of Neuropsychophysiology.

FPCEUP is located ca. 15 km from the main airport in Porto (Aeroporto Sá Carneiro), and ca. 3 km away from the Porto city center. With easy access by metro, bus or car, researchers will have ample opportunity to appreciate the city of Porto.

The conference venue has 12 bathrooms, four per floor. There are fountains to fill water bottles throughout the faculty (usually placed next to the bathrooms).

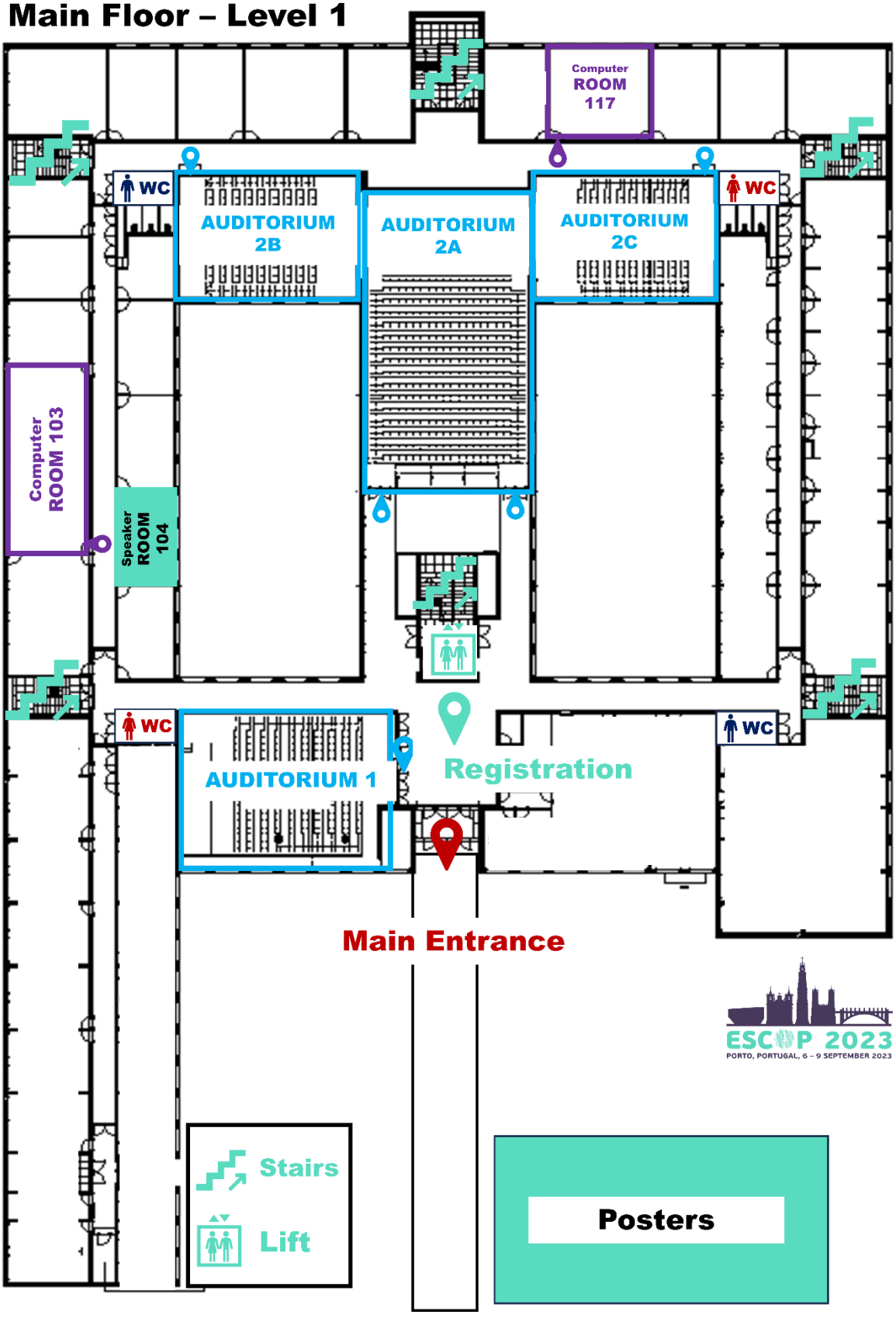
There are 6 stairs to move between floors and 4 lifts. The conference will take place in the four auditoriums (which can be accessed from the main floor – Level 1 – and down floor – Level 0) of the FPCEUP. We will also have sessions in large rooms on the upper floor (Level 2).

Some of the workshops will take place in the computer rooms on the first floor.

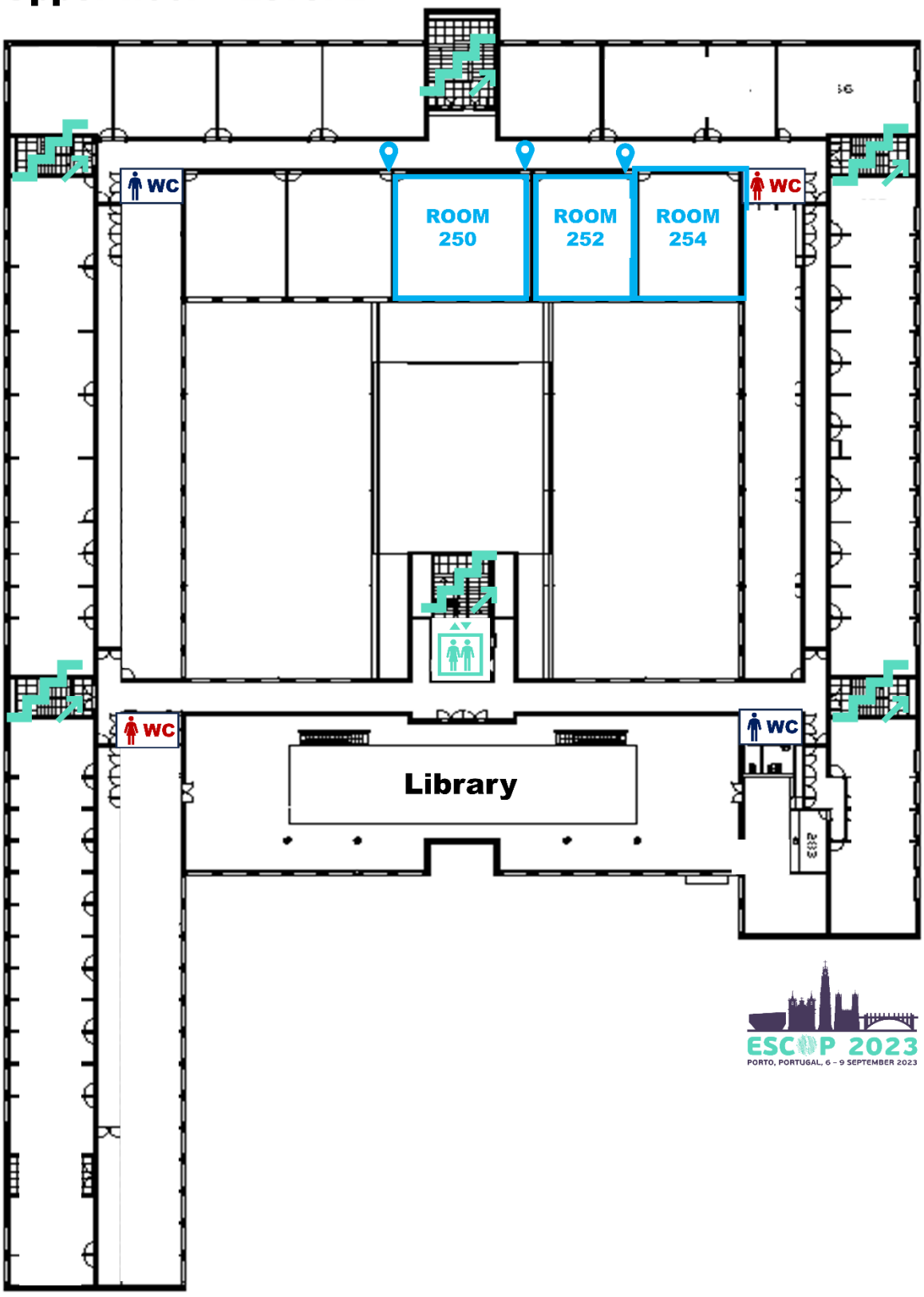
Our printing service is located in the lower level floor. If you have sent your poster to printing at the venue, you can retrieve it from 9h00 to 12h00 and 13h00 to 18h00.

Floor plans indicating the locations of the relevant facilities are provided on the following pages.

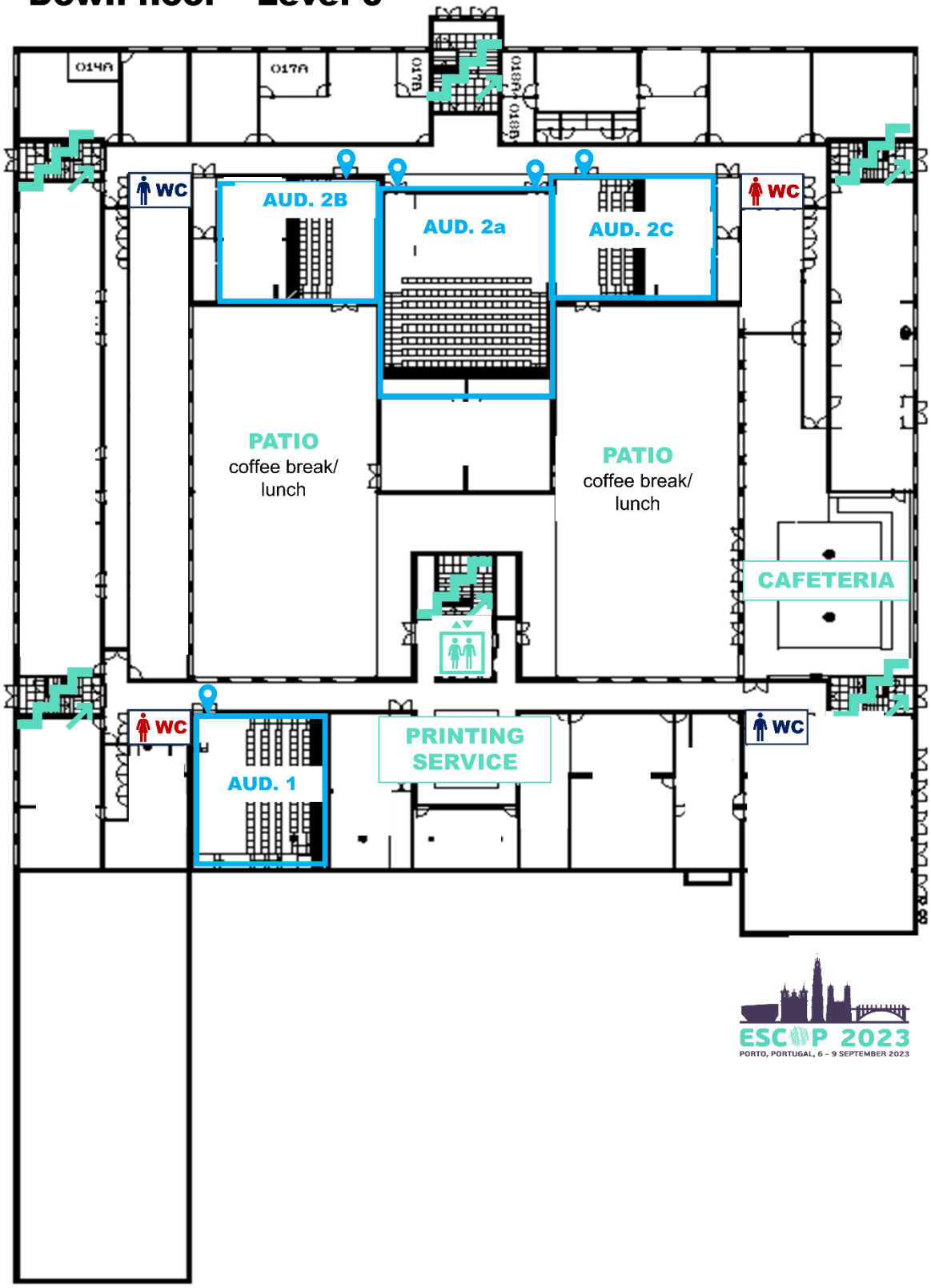
Main Floor – Level 1



Upper floor – Level 2



Down floor – Level 0

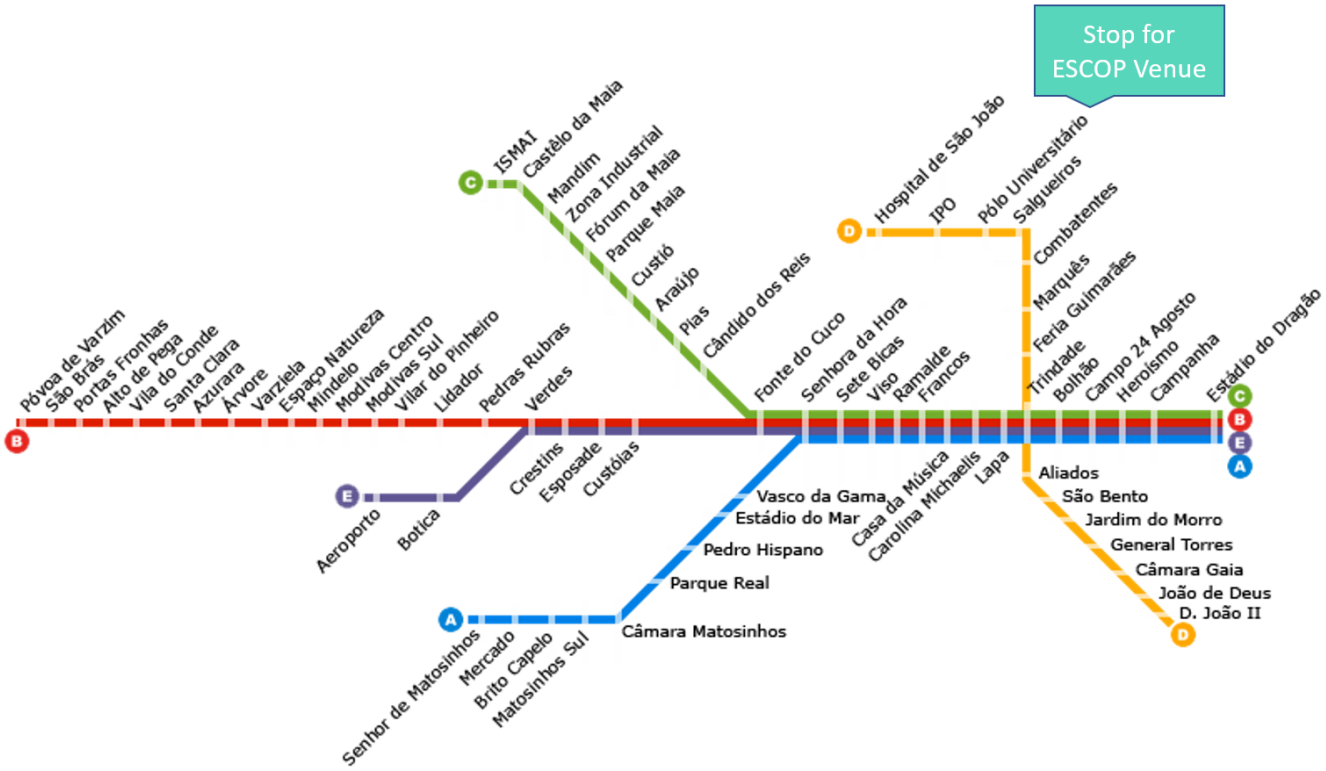


Arrival

Reaching the conference venue

By metro

Leave at the station 'POLO UNIVERSITÁRIO' from the Yellow Line. The conference site (Faculty of Psychology and Education Sciences, FPCEP) will be on your left.



By Bus

Day (6h00 - 1h00)

Stop: Pólo Universitário (Metro)

803: Boavista > Rio Tinto (Esc. Secundária)

Stop: Faculdade de Economia

204: Hospital de São João > Foz
300: Circular Hospital S. João > Aliados
301: Circular Sá da Bandeira > Hospital de São João

Stop: Igreja de Paranhos

603: Marquês > Maia

Dawn (1h00 - 4h30)

Stop: Cemitério de Paranhos

11M: Circular Hospital de São João > Coimbrões

By Car

The best way to find FPCEUP is to follow the signs to Paranhos/Hospital de São João. If you're coming from VCI, exit at "Paranhos/Hospital" and turn right at the traffic lights by the Church of Paranhos. You will be at Rua do Dr. Manuel Pereira da Silva. A few meters ahead, you will see the Bus Station 'Polo Universitário'. Turn left and FPCEUP will be on your left.

If you're coming from the Circunvalação Road (EN12), continue until you reach S. João Hospital and turn right at the traffic lights at the Portuguese Oncology Institute (IPO) (Rua António Berbardino Almeida). Continue straight and then turn left on the 2nd street. When you reach the Metro Station 'Polo Universitário', FPCEUP will be on your right.

At the Conference

Speaker Ready Room

All speakers are invited to send their paper presentations to the conference organizer prior to the meeting. Speakers can check their presentation in the **speaker-ready room** (**Room 104**, 1st floor). All presentations should be prepared in Power-Point or PDF. It will not be possible to use personal computers or to upload presentations directly at the computer in the session room. Access to an online folder will be provided two-weeks before the conference for uploading of the files of the talks.

Internet Access

Wi-fi access will be provided during the conference. Researchers can also use eduroam to connect to the internet.

UPorto WIFI at the conference venue:
Username: ESCOP
Password: ESCOP2023

Mobile App

You can use the conference App to check the program at all times.
To access the Vertcom App, just flash the QR code on your smartphone or download the app from one of the available stores:
Apple: https://itunes.apple.com/us/app/vertcom-event-com/id1421096605?l=es&ls=1&mt=8
Androïd: https://play.google.com/store/apps/details?id=es.infobox.eventos.app39Vertcom
Open the Vertcom App and select the event ESCOP 2023. Enjoy!

Coffee breaks and Lunch

During the coffee breaks, coffee, tea, water, juice, and snacks will be served on the patio and gardens. Lunch will be served at the same locations. No lunch will be provided on Wednesday, September 6. Participants attending the pre-conference events can have lunch at the cafeteria or the restaurants in the neighborhood.

Smoking

Smoking is only allowed in the outside.

Wardrobe

Researchers can leave their luggage on the last day of the conference in the **speaker-ready** room (**Room 104, 1st floor**) which will also serve as the wardrobe. We will make the effort to keep it protected, but we do not accept any liability for your property.

Emergency Phone Numbers

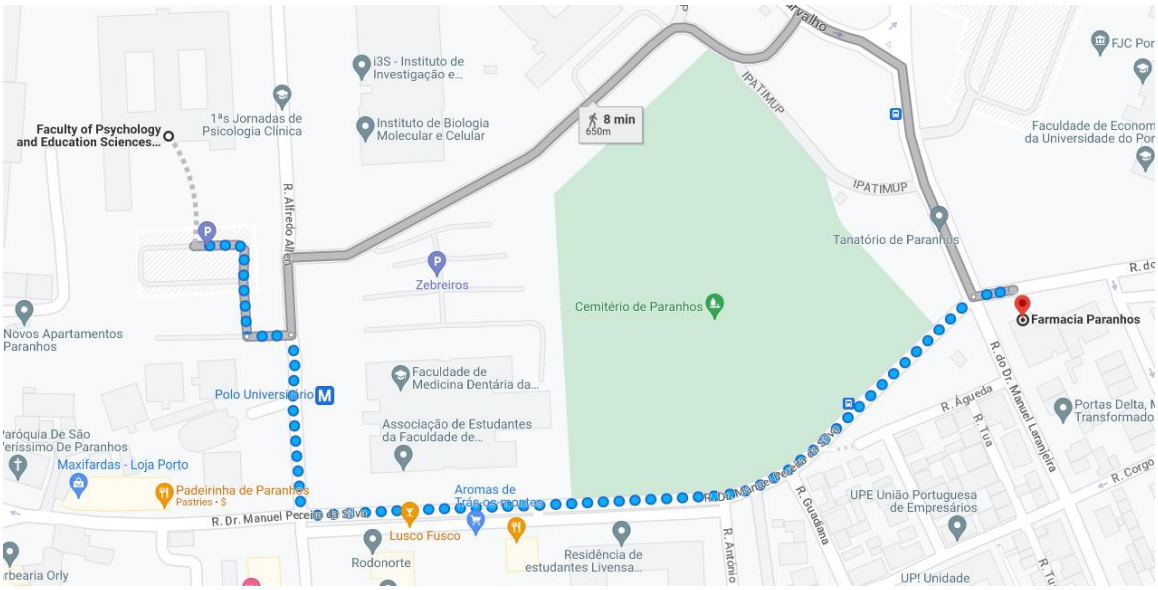
Emergency line	112
Police	(+351) 22 20 92 000
Firefighters	(+351) 22 50 73 700
National Health Service	(SNS) 808 24 24 24
FPCEUP security	(+351) 93 60 79 120

Pharmacy

The closest pharmacy to the conference venue is:
Farmácia de Paranhos
+ (351) 225 400 358
Opening hours: 9 am to 10 pm (Monday to Sunday)
farmaciaparanhos@gmail.com

Rua Actor Ferreira da Silva 395
4200-302 Paranhos

The pharmacy is ca. 550 m by feet (as illustrated in the map below).



Information for Talks and Posters

The official language of the meeting is English.

Symposia and Talk Sessions

Symposium and session chairs are asked to strictly keep to the schedule of the sessions to allow attendees to switch between sessions. **Symposium** and **regular talks** are allocated a 20-min time slot (15-min presentation followed by a 5-min discussion). **Blitz-talks** are allocated a 10-min time slot (5-min presentation followed by a 5-min discussion).

Chairs are encouraged to keep the time for the presenters and to organize the question round. Symposium and session chairs will be provided with large numbers printed to inform presenters about their remaining time (5 min, 3 min, 1 min).

For most sessions, we appointed a session chair from among the speakers in the session. If you have been appointed as the session chair but you would rather not do it (or for some reason is not able to), please contact the organization (org.escop2023@fpce.up.pt).

Poster Presentations

Poster presenters are asked to prepare their poster in portrait format (DIN A0 size, equivalent to a maximum of 84 cm width x 119 cm height). Posters can be printed at the conference venue. Authors of posters are encouraged to send their poster in pdf format to editorialfpceup@gmail.com indicating the name of the event, their name, and the date on which they will retrieve the poster. The estimated cost is less than 15 euros.

There will be three poster sessions, one on each day of September 07-09, from 10:40 to 12:00. There is a number assigned to each poster (see poster session schedule). The number of your poster indicates the board where you should hang it. Please hang your poster in the morning to give interested colleagues the possibility to view it throughout the day. During the scheduled poster session, the presenting author is expected to be available for questions and discussions. We also recommend the preparation of handouts or QR codes for making the poster available to the attendees. Finally, we kindly ask the presenters to remove their posters by 19:00 pm to allow presenters of the next day to hang their posters the next morning.

Social events

Opening Reception at Casa da Música – September 6, 2023

The conference will start officially with a session at Casa da Música. We will have the opening, first keynote and welcome reception at this location. **The opening reception is free for all registered participants.**

Address: Av. da Boavista 604-610, 4149-071 Porto

It is not obligatory to retrieve your materials at the Registration Desk before attending this session. Participants arriving late at Porto can go directly to Casa da Música and get access to the session with their regular documents (ID or Passport).

Casa da Música

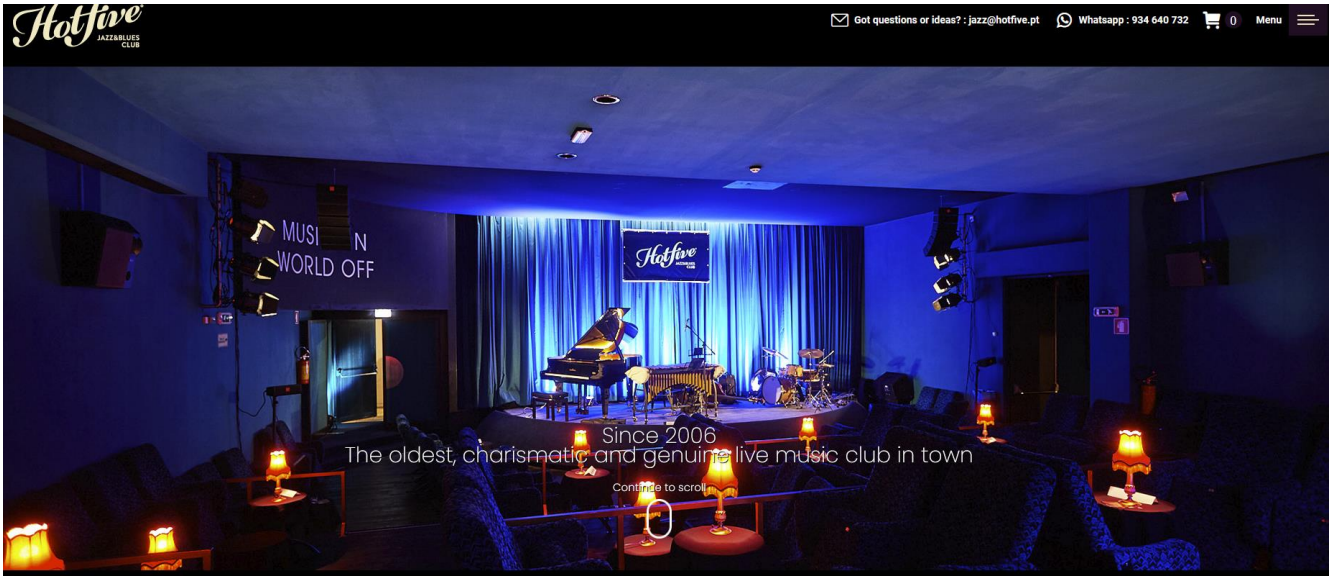
Sala Surgia

You can reach Casa da Música with the **Metro** – just stop at the station named **Casa da Música**. You can reach this metro stop with several metro lines (see image of the metro on the next page). You can even come directly from the airport to Casa da Música. If you are in the conference venue for the pre-conference events, you should take the yellow line in **Polo Universitário** until the **Trindade** stop, and then change to any other line to reach **Casa da Música** (going in the direction of Senhora da Hora – orange line; Senhor dos Matosinhos – blue line; Aeroporto – purple line; Póvoa do Varzim – red line; or ISMAI – green line).


PÓVOA DE VARZIM
A
B
C
D
E
F
Póvoa de Varzim
São Brás
Portas Fronhas
Alto de Pega
Vila do Conde
Santa Clara
VILA DO CONDE
Azurara
Árvore
Varziela
Espaço Natureza
Mindelo
Modivas Centro
Modivas Sul
Vilar do Pinheiro
Lidador
TROFA
Aeroporto
Botica
Pedras Rubras
Verdes
MAIA
ISMAI
Castêlo da Maia
Mandim
Zona Industrial
Fórum Maia
Parque Maia
Custió
Crestins
Esposade
Custóias
MATOSINHOS
Senhor de Matosinhos
Mercado
Brito Capelo
Matosinhos Sul
Câmara Matosinhos
Parque Real
Pedor Hispano
Vasco da Gama
Estádio do Mar
Araújo
Pias
Cândido dos Reis
Fonte do Cuco
VALONGO
Senhora da Hora
Sete Bicas
Viso
Ramalde
Francos
Casa da Música
Carolina Michaelis
Lapa
Trindade
Hospital São João
IPO
Pólo Universitário
Salgueiros
Combatentes
Marquês
Faria Guimarães
Bolhão
Campo 24 Agosto
Heroísmo
Campanhã
Aliados
São Bento
Estádio do Dragão
Baguim
Carreira
Campainha
Rio Tinto
Levada
Nau Vitória
Nasoni
Contumil
Venda Nova
Fânzeres
GONDOMAR
VILA NOVA DE GAIA
Jardim do Morro
General Torres
Câmara Gaia
João de Deus
D. João II
Santo Ovídio

Jazz Evening at the Hotfive – September 7, 2023

https://hotfive.pt/uptown/



As an additional opportunity to bond with your fellow colleagues at a modest cost, we reserved Hot5 – a music club in the center of Porto for hosting an affordable social event. **You can enjoy a concert at this space for 18 euros/ticket.** The concert will start at **21h30**.
You can have drinks at this location and connect with other colleagues, enjoy the night in Porto and relax to Jazz/Blues music.

Address: R. de Guerra Junqueiro 495, 4150-098 Porto (note: this club is very close to Casa da Música)

If you would like to buy tickets for this event, you can order them in the event registration link sent to the registered participants. If you have not received it, you can email org.escop2023@fpce.up.pt

Social Dinner - September 8, 2023

The conference dinner will be held at Casa Ferreira, a traditional Port Winemaker on the banks of the Douro River.

Address: Av. de Ramos Pinto 70, 4400-082 Vila Nova de Gaia

You can buy tickets for the social dinner at the registration platform.

Prepare your senses – Social Dinner – 08 September 2023
Ferreira Port Wine Cellar

Built by a family of winemakers from the Douro, in 1751, Ferreira possessed a rich tradition and a prominent role in the history of Porto Wine. Dona Antonia Adelaide Ferreira contributed significantly to the consolidation of the brand. A legendary woman with a unique personality, who became a myth and a symbol of strength, facing the adversities of nineteenth-century Douro.

Ferreira Cellars invite you to discover a brand over 250 years old, a symbol of the highest quality that encapsulates Portugal's heart and soul.

Participants who wish to join must purchase tickets to be admitted to the dinner.

Dinner for students: € 60 Dinner for Post-doc/Full Researcher: € 70

Farewell Cocktail - September 9, 2023

On the last day of the conference, you will be able to enjoy a farewell cocktail at the conference venue. **Participation in the farewell cocktail is free for all registered participants.**

Satellite Events

Participation in any of the events is free but requires pre-event sign-up. Places are limited. All registered participants will receive an email with the link to the signup form.

Wednesday, 06 September, 2023

Session 1a – 10h00 – Auditorium 1

INTRODUCTION TO THE ERC FUNDING OPPORTUNITIES

Organizer: Pilar LACRUZ, *ERC*

Pilar LACRUZ has a master's degree in Clinical Psychology from the University of Deusto (Spain) and postgraduate studies in Artificial Intelligence (Cognitive Science) from University of Leuven (Belgium). She has also a master's degree in Law from the University of Deusto (Spain). She has worked at regulatory affairs manager in a Belgian Foundation that runs clinical trials in cancer and as Policy Officer at Directorate General for Health and Consumers of the European Commission in different areas: Substances of human origin, Tobacco control and Food contact materials. In 2012 Pilar joined the European Research Council Executive Agency and since 2016 she is the **Panel coordinator** for the SH4 panel **"The Human Mind and its Complexity"** that covers Cognitive Science, Psychology, parts of Philosophy and Linguistics. Pilar will present the ERC Work programme for 2024, which incorporates several changes.

Session 1b – 09h30 to 12h30 – Room 250

Workshop

CITIZEN SCIENCE IN PSYCHOLOGICAL SCIENCE: WHEN AND HOW TO USE COCREATION METHODS IN RESEARCH PROJECTS?

Organizers: Célia Sales, Hernâni Zão, & Juliana Monteiro, *Center for Psychology, FPCEUP*

This workshop will present the concept of citizen science and its potential application to psychological science. Participant will learn in an interactive and collaborative session how to bridge the gap between psychological science and the general public by planning how to include the public in scientific research.

The workshop will be lead by a team of experts from the Faculty of Psychology and Education Sciences that are working with citizen science in a set of ERC funded projects.

Session 1c – 09h30 to 12h30 – Computer Room 103

Workshop

CREATING EXPERIMENTS IN PSYCHOPY

Organizers: Open Science Tools

This workshop is designed to give a broad introduction to using PsychoPy. We aim to make materials useful for beginners but also include useful tips and tricks for those already familiar. In the workshop, we will cover: how to build an experiment using PsychoPy's Builder interface, how to push that experiment online to Pavlovia, and how to extend experiments created in Builder view using Code Components.

What you will need to do to prepare: We recommend watching this 15-minute video in advance of the session, this can get you up to speed on the materials we cover in the workshop. We believe very much in learning by doing, our workshops work best if attendees follow along with making an experiment on their own computer whilst we talk through its creation. Before the workshop, please make sure that you have a recent version of PsychoPy installed and that you have registered for a free pavlovia.org account using your institution's email address where possible.

The workshop will be held in one of the computer rooms at the venue. All programs necessary will be pre-installed on the computers. Note that **places are limited**, hence if you signed up and can no longer attend please inform the organizers to free up the spot to another interested attendee.

Session 1d – 09h30 to 12h30 – Computer Room 117

Workshop

IMPROVING INFERENCE ABOUT COGNITIVE PROCESSES USING MIXTURE MODELS

Instructors: Gidon T. Frischkorn & Vencislav Popov, *University of Zurich, Department of Psychology*

This workshop will focus on the implementation and use of mixture models in a Bayesian hierarchical framework. Mixture Models have been popular in visual working memory research to dissociate different types of responses (e.g., successful memory retrieval, swap errors, or random guessing) and their association with latent cognitive processes. However, such models can be applied in a broad range of

cognitive tasks using reaction times or accuracy as performance indicators and provide more refined assessment of different cognitive processes underlying observed behavior.

In the workshop, we will introduce how mixture models can be implemented in the R package brms that provides a flexible linear model syntax allowing for easy and straightforward specification of Bayesian hierarchical models. The benefit of such Bayesian hierarchical models is that they provide robust parameter estimates with less data and allow to compare complex models over the whole sample. We will start by looking at common mixture models in visual working memory research to understand their benefits when analyzing data and making inferences about the underlying cognitive processes. Building on these mixture models, we will look at more broad implementations of mixture models for accuracy and reaction time data that allow to mathematically model the proportion of guessing in experimental designs, and finally discuss additional applications of mixture models in cognitive psychology.

Participants should have basic knowledge in linear mixed effects modeling in R (e.g., using packages like lme4, nlme, or brms) and basic understanding of Bayesian statistics (MCMC sampling, interpretation of posterior densities). We will not be able to provide an in-depth introduction into Bayesian hierarchical modeling but will shortly introduce the basic assumptions and benefits of it. For the workshop participants should bring their laptop with a current version of R, RStudio and the brms installed.

Materials of this workshop will be made publicly available via GitHub.

The workshop will be held in one of the computer rooms at the venue. All programs necessary will be pre-installed on the computers. Note that **places are limited**, hence if you signed up and can no longer attend please inform the organizers to free up the spot to another interested attendee.

Session 1e – 09h30 to 12h30 – Room 254

Workshop

FEASIBILITY OF USING EEG SYSTEMS IN MOBILE AND STATIONARY CONTEXTS

Presenter: ir. Krittika Choudhury, MSc, Head of Application Support @ANT Neuro

In this interactive workshop we will be introducing the attendees to the applicability of the eego systems in a variety of innovative use-cases encompassing both mobile and stationary settings. We will also be demonstrating the ease of acquisition with the eego systems across all caps that are part of our waveguard product line - waveguard original (gel caps), waveguard touch (dry caps) and waveguard nets (saline nets). In the last hour we will organize hands on acquisitions using our eego systems to give the attendees a chance to explore our hardware and software offerings.

Session 2a – 14h00 to 16h00 – Auditorium 1

Panel Discussion

TRANSITIONS IN CAREER PATHS

Organizers: WiCS-Europe

Career transition experiences of cognitive scientists range from changes across institutions, countries, roles, or work fields. The dynamics of transitions impact not only careers but also personal lives, which can be a challenge both for early career researchers and senior academics. Women in Cognitive Science-Europe invites us to reflect on the opportunities for, and challenges of, making career transitions outside as well as within academia. A panel of cognitive scientists across countries and career stages will draw on their own experiences to discuss how to transfer academic skills to different settings. The panel presentations will be followed by an open discussion with the audience and a speed mentoring session.

Speakers:

- Marilia Carvalho, Science Manager, Center for Psychology, University of Porto, Portugal
- Stravoula Kousta, Chief Editor at Nature Human Behaviour
- Sofía Castro, Jagiellonian University, Krakov, Poland
- Vanessa Loaiza, University of Essex, United Kingdom

Chairs:

- Anna Soveri, University of Turku, Finland
- María J. Maraver, University of Granada, Spain

Speed Mentoring & Reception

As part of this event, we invite you to participate in the WiCS-E speed mentoring. This part of the session will link junior researchers with senior faculty to meet for up to 20 minutes. The timing may allow up to two mentor-mentee sessions, subject to sign-ups. This session will include a coffee reception. WiCS speed mentoring sessions have now taken place at various international meetings (Psychonomic Society in the US and in Europe, APS, ICPS, or ESCOP). There are several ground rules for speed mentoring:

1. This is a one-time session (i.e., the mentor is not signing on for a longer-term mentoring relationship).
2. The mentee should come up with a specific question or two to guide the session and make the most of it.
3. The mentee should send the mentor a CV and the question(s) ahead of time, but not expect that the mentor will have read this information prior to the meeting.
4. The information shared during the session is to be kept completely confidential.

Both mentors and mentees from the previous sessions have reported finding the experience to be very useful. This is a program for scientists of all gender identities, for both mentors and mentees.

If you are interested in being a mentor, please complete this < MENTOR FORM >
If you are interested in being a mentee, please complete this < MENTEE FORM >

All responses should be completed by Monday, **7th August 2023**. Note that you may wish to sign up as BOTH a mentor and a mentee. For example, a first-year professor may wish for mentoring around earning permanent positions AND may be positioned well to mentor others about navigating through the stages of the PhD program.

WiCS membership is free and open to scientists of all gender identities. **Join WiCS** here. Contact: wics.europe@gmail.com

https://www.womenincogsci.org/wics-europe

Session 2b – 14h00 to 16h00 – Auditorium 2a

Panel Discussion

THE PATHWAY TO A SUCCESSFUL ERC PROPOSAL: SHARING KNOWLEDGE AND EXPERIENCES

Moderator: Ana Catarina Canário, Center for Psychology, FPCEUP

Panel: Prof. Jorge Almeida (Starting ERC grantee, University of Coimbra), Prof. Ana João Rodrigues (Consolidator ERC grantee, University of Minho), and Prof. Axel Cleeremans (Advanced ERC grantee)

A grant from the European Research Council (ERC) represents a major milestone in the career of a researcher. It allows individual researchers to build up a team to focus on a frontier high-gain/high-risk project during 5 years with a substantial amount of funding: 1.5 million (starting level), 2 million (consolidator level), or 2.5 million (advanced level). The criterion to obtain an ERC grant is scientific excellence of the researcher and the proposal. The journey to write a successful proposal is, however, not easy. It requires vision, but also dedication. Learning from researchers that have successfully passed the stages of this competitive scheme can help motivate other researchers to move forward in delineating their own proposals.

In this panel discussion, ERC grantees representing the three ERC levels (stating, consolidator, and advanced) will share their experience, focusing on providing important tips on how to write a successful application, deliver an excellent presentation and respond to questions in the interview phase, as well as on how to persist in case feedback is not positive in the first submission attempt. There will be time as well for questions from the audience.

Session 2c – 14h00 to 16h00 – Computer Room 103

Workshop

INTRODUCTION TO R AND RSTUDIO

Instructors: Tiago Ferreira, & Filipa Nunes, *Faculty of Psychology and Education Sciences*

R is an open-source programming language particularly suitable for statistical analysis.

This workshop offers an introduction to R and RStudio. We will focus on presenting the R basic syntax and way of functioning. The general goal is to give attendees the necessary skills to perform basic operations for data manipulation and management, data visualization, and simple descriptive and inferential statistical procedures. The workshop will give attendees' the opportunity to put these skills into practice. During these sessions, the instructor and participants will work together to perform a set of tasks and solve practical exercises using R. Three blocks of contents are planned.

1st Block: Introduction to R and RStudio environments, R basic operators, objects, data structures, and built-in functions;
2nd Block: Creating, indexing, and manipulating data objects in R;
3rd Block: Plotting data and computing descriptive and basic inference statistics using R.

Target audience:
No previous R knowledge is required. Basic statistical knowledge namely on summary measures, correlation, and regression is assumed. Participants should have installed in their laptops the latest version of R (https://www.r-project.org/) and RStudio (https://rstudio.com/products/rstudio/download/).

The workshop will be held in one of the computer rooms at the venue. All programs necessary will be pre-installed on the computers. Note that **places are limited**, hence if you signed up and can no longer attend please inform the organizers to free up the spot to another interested attendee.

Program Overview

Schedule at a Glance

Time	Wednesday 06 September	Time	Thursday 07 September	Friday 08 September	Saturday 09 September
08h00	Registration	08h00-09h00	Registration	Registration	Registration
		09h00-10h40	Symposia I	Symposia III	Symposia V
09h30-12h30	Satellite Events / Workshops	10h40-12h00	*Coffee break* Poster I	*Coffee break* Poster II	*Coffee break* Poster III
		12h00-13h20	Talks I Blitz-Talks I	Talks III Blitz-Talks II	Talks V Blitz-talks III
12h30-14h00		13h20-14h20	*Lunch*	*Lunch*	*Lunch* **ESCOP Business Meeting**
14h00-16h00	Satellite Events / Workshops	14h20-16h20	Talks II	Talks IV	Talks VI
16h00-17h30	*Transit to* Casa da Música	16h20-16h40	*Coffee break*	*Coffee break*	*Coffee break*
17h30-18h30	**Opening Ceremony** **Casa da Música**	16h40-18h20	Symposia II	Symposia IV	Symposia VI
18h30-19h30	**Broadbent lecture** Jonathan Grainger	18h30-19h30	**Keynote lecture** Dorthe Bernstein	*Product demo*	**Bertelson Lecture** Eliana Vassena
19h30-20h30	**Opening Reception** **Casa da Música**	Evening	Social Event – 21h00 Hot5 jazz house	20h00 - Conference Dinner	Closing of the conference Farewell Reception

Detailed Program – Wednesday, 06 September 2023

	WEDNESDAY				
9h30 12h30	**Auditorium 1** *Session 1a* *10h00* **Introduction to the ERC funding opportunities**	***Room 250*** *Session 1b* Workshop - **Citizen Science**	**Computer Room 103** *Session 1c* Workshop - **Creating Experiments in PsychoPy** *Open Science Tools Team*	**Computer Room 117** *Session 1d* Workshop - **Improving inference about cognitive processes using mixture models** *Gidon Frischkorn & Ven Popov*	**Room 254** Session 1e Workshop - **Feasibility of using EEG systems in mobile and stationary contexts** *ANT Neuro team*
14h00 16h00	**Auditorium 1** *Session 2a* Panel discussion: **Transitions in Career Paths** *Women in Cognitive Sciences*	**Auditorium 2A** *Session 2b* Panel discussion **The Pathway to a Successful ERC Proposal: Sharing Knowledge and Experiences** Moderator: *Ana Catarina Canário* Panel: *Jorge Almeida* *Ana João Rodrigues* *Axel Cleeremans*	**Computer Room 103** *Session 2c* **Introduction to R and R Studio** *Tiago Ferreira* *Filipa Nunes*		
16h00 17h30	*Transit to Casa da Música (for the opening ceremony, keynote, and welcome cocktail)*				
17h30	Opening Ceremony				
18h30 19h30	**Broadbent Lecture** Jonathan Grainger - *ORTHOGRAPHY, PHONOLOGY, MORPHOLOGY, AND READING*				
19h30 21h00	**Welcome Reception at Casa da Música**				

Detailed Program - Thursday, 07 September 2023

	THURSDAY						
	Auditorium 2A	Auditorium 2B	Auditorium 2C	Auditorium 1	Room 250	Room 254	Room 252
09h00 10h40	**SYM1 - Psychonomics** The Power of Language Use on Judgment and Decision-Making	**SYM2** Statistical learning: developmental and evolutionary approaches	**SYM3** Flicker and flutter - recent advances in studying cognition using frequency tagging	**SYM4** Factors contributing to cognitive training gains: Lessons learned from recent studies in healthy and in clinical populations	**SYM5** Facets of Episodic Memory Research: From Memory Development to Everyday Forgetting	**SYM6** Written production of words and sentences	
10h40 12h00	**Poster Session 1** *Coffee Break*						
12h00 13h20	**T1** Reading and Eye Tracking	**T2** Bilingualism I	**Blitz-Talks 1** Cognitive Aging I	**Blitz-Talks 2** Memory I	**T3** Autobiographic Memory	**T4** Decision Making I	**T5** Tool and Action Knowledge
13h20 14h20	*Lunch break*						
14h20 16h20	**T6** Word Learning	**T7** False Memory	**T8** Motor Cognition I	**T9** Short-Term Memory	**T10** Individual Differences	**T11** Perception and Vision	**T12** Child Development I
16h20 16h40	*Coffee Break*						
16h40 18h20	**SYM7 - Broadbent** Word and sentence reading	**SYM8** Preferred rhythms in auditory cognition	**SYM9** Unifying perspectives on proactive and reactive control to uncover promise and challenges of the dichotomy	**SYM10** Holding information in mind: The contribution of action-planning and non-mnemonic processes to working memory performance	**SYM11** Defying the Standards of Cognition: What About Evolution? [take 1]	**SYM12** Beyond the Tried and True: Moving Bilingual Language Production Research Forward	
18h30 19h30	**Keynote talk** Dorthe Berntsen - *TWO ROUTES TO THE PERSONAL PAST: COMPARING INVOLUNTARY (INCIDENTAL) AND INTENTIONAL RETRIEVAL OF AUTOBIOGRAPHICAL EVENTS*						
21h00	**Social Event – HOT5 JAZZ CLUB**						

Detailed Program - Friday, 08 September 2023

	FRIDAY						
	Auditorium 2A	Auditorium 2B	Auditorium 2C	Auditorium 1	Room 250	Room 254	Room 252
09h00 10h40	**SYM13** Sleep and the Consolidation and Updating of Linguistic Knowledge	**SYM14** Applying computational methods in reading and visual word recognition research	**SYM15** Modeling of Training-Related Cognitive Changes	**SYM16** Features, Objects, and Feature Binding in Working Memory	**SYM17** Bilingual lexico-syntactic processing: last updates on lexical access, code-switching and language attrition	**SYM18** Mapping multiple dimensions in the human neocortex	
10h40 12h00	**Poster Session II** *Coffee Break*						
12h00 13h20	**T13** Writing	**T14** Cognitive Control I	**Blitz-Talks 3** Language I	**Blitz-Talks 4** Decision Making II	**T15** Higher Cognitive Functions I	**T16** Memory Updating	**T17** Emotion I
13h20 14h20	*Lunch break*						
14h20 16h20	**T18** Learning	**T19** Cognitive Aging II	**T20** Face processing	**T21** Memory II	**T22** Motor Cognition II	**T23** Attention	**T24** Numerical Cognition
16h20 16h40	*Coffee Break*						
16h40 18h20	**SYM19 - Betersoln** Mechanisms of appetitive and aversive control: from cost-benefit integration to computational psychiatry	**SYM20** The psycholinguistics of understudied languages	**SYM21** Cognitive and affective factors underlying vaccine decision-making	**SYM22** Information exchange between the working memory and long-term memory system	**SYM23** Studying (embodied) emotions and social connectedness across disciplines	**SYM24** Learning (about) words and their meanings	
18h30 19h30	**Product Demo**						
20h00	**Social Dinner – Porto Wine Cellars "Casa Ferreirinha"**						

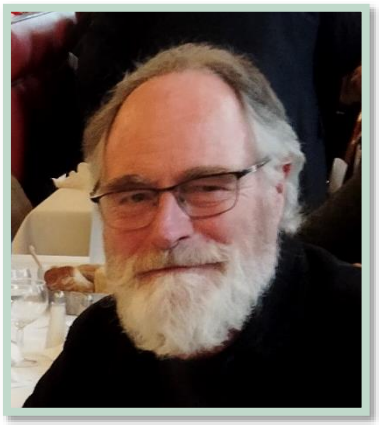
Detailed Program – Saturday, 09 September 2023

	SATURDAY						
	Auditorium 2A	Auditorium 2B	Auditorium 2C	Auditorium 1	Room 250	Room 254	Room 252
09h00 10h40	**SYM25 - Keynote** Recent advances in research on autobiographical memory	**SYM26** Writing fluency: Exploring its development, impacts, determining factors, and variability	**SYM27** Cognitive or Automatic? Unpacking the Nature of Mismatch Negativity as an ERP Component	**SYM28** Interaction of perceptual attention and attention to information held in working memory	**SYM29** Innovative eye-tracking approaches in language learning and bilingual processing research	**SYM30** The role of parafoveal processing during reading	
10h40 12h00	**Poster Session III** *Coffee break*						
12h00 13h20	**T25** Long-Term influences on Working Memory	**T26** Emotion II	**T27** Higher Cognitive Functions II	**Blitz-Talks 5** Perception, Attention & Learning	**T28** Embodied Cognition	**T29** Decision Making III	**T30** Language II
13h20 14h20	*Lunch Break* – **ESCOP Business Meeting - Auditorium 1**						
14h20 16h20	**T31** Reading	**T32** Cognitive Modeling	**T33** Bilingualism II	**T34** Attention and Memory	**T35** Child development II	**T36** Cognitive Control II	
16h20 16h40	*Coffee break*						
16h40 18h20	**SYM31** Minds without imagery: Exploring cognition and language in aphantasia	**SYM32** Cognitive Science of Culture: literacy as a cultural object with impact outside the written domain	**SYM33** Citizen science in cognitive psychology	**SYM34** Interactions of Existing Knowledge and Memory for New Information in Development and Aging: What Supports What?	**SYM35** Defying the Standards of Cognition: What About Evolution? [take 2]	**SYM36** How internal signals inform cognition	
18h30 19h30	**Betersoln Award Lecture** Eliana Vassena - *NO BEES NO HONEY, NO WORK NO MONEY! A MECHANISTIC ACCOUNT OF HUMAN MOTIVATION*						
19h30	**Closing of the Conference** **Farewell Cocktail at the Conference Venue**						

Keynote Lectures

Broadbent Lecture

ORTHOGRAPHY, PHONOLOGY, MORPHOLOGY, AND READING



Jonathan Grainger

Laboratoire de Psychologie Cognitive
CNRS & Aix-Marseille University
Marseille, France

How do the majority of literate human adults read so effortlessly and efficiently? That is the question! I provide an overview of my research, performed in collaboration with numerous colleagues, aimed at answering that question. I begin with single letter identification, and from there examine how the processing of orthographic, phonological, and morphological information provides the essential ingredients for single word recognition – the gateway to higher-level processes involved in skilled reading. In the final part of the talk, I describe how information about word identities and their ordering in a sequence of words provides access to the syntactic and semantic information that enables computation of a sentence-level representation and text comprehension. The theoretical backbone guiding all this research is - hierarchical, cascaded, interactive processing - whereby lower levels of processing feedforward information to higher levels that in turn constrain on-going processing at the lower levels. This theoretical stance accounts for key phenomena such as word superiority and sentence superiority effects, as well as transposed-letter and transposed-word effects.

Bertelson Award

NO BEES NO HONEY, NO WORK NO MONEY! A MECHANISTIC ACCOUNT OF HUMAN MOTIVATION

Eliana Vassena, PhD
Behavioural Science Institute (Radboud University Nijmegen)

Was it worth it traveling all the way to Porto to listen to some wonderful science talks? Probably. Did the expectation of savoring a few pasteis de nata and taking in beautiful views in the process sweeten the effort? Certainly. Are you up for enjoying (or enduring) one last hour of scientific evidence in this talk? We shall see.

These are the key questions that have driven my curiosity in the past years. Why do we put effort in what we do? When and how do we feel in (or out of) control or? When do we give up? How do failures or successes influence our perseverance? The ubiquitous decision to exert effort towards a goal is guided by expectations about incentives (rewards/punishment), probability (how volatile our environment is), and cost (how costly effort exertion is). In a series of studies, I investigated how we dynamically solve this trade-off, how this affects our behaviour, and how alterations in reward/punishments and cost estimates may be a key mechanism in triggering vulnerability to psychopathology.

Integrating results from behaviour, physiology, neuroimaging and animal work, I propose a novel account of human motivation, where incentives, volatility and effort cost are estimated and integrated on the fly to guide decisions to exert effort. I propose that this integration gives rise to the experience of control (controllability) and outline a neurocomputational model explaining of how these parameters interact, linking momentary effort-based decisions to temporally extended meta-decision to persist on a task. I suggest a neurobiologically plausible implementation of these computation in the human brain, and propose a model to test mathematically precise predictions of how incentive, effort, volatility and controllability may be altered in psychopathology. Capturing this multivariate optimisation process for each individual may provide the key to personalizing treatment of psychopathology and developing just-in-time effective prevention.

Invited keynote

TWO ROUTES TO THE PERSONAL PAST: COMPARING INVOLUNTARY (INCIDENTAL) AND INTENTIONAL RETRIEVAL OF AUTOBIOGRAPHICAL EVENTS

Dorthe Berntsen, Aarhus University

Accumulating research has shown that recollections of past events can be the product of two different retrieval processes: An intentional (strategic) route that searches the mind in a controlled and effortful fashion, and an involuntary (incidental) route driven by uncontrolled, associative processes. Both types of retrieval were acknowledged by early memory researchers, but most modern memory research has focused on intentional, controlled retrieval of past events. In this talk, I review and integrate what we have learned about the alternative, involuntary (incidental) memory route based on 25 years of research from my group and others using both naturalistic, experimental and brain imaging studies. Involuntary conscious memories are frequent in daily life with a daily prevalence exceeding the one of intentionally retrieved memories of past events. Evidence from fMRI brain imaging as well as behavioral experiments shows less prefrontal activity and shorter retrieval times for involuntary memories than for intentionally retrieved memories, supporting their ontological status as a low-effort memory route. Surprisingly, in spite of reduced effort, involuntary retrieval more frequently accesses memories of specific episodes. Involuntary memories are present earlier in childhood, and their frequency and episodic richness are less reduced in older age. Comparative studies suggest their existence in great apes. Taken together, the findings suggest involuntary retrieval represents an evolutionarily earlier route to remembering events in the personal past.

Thursday, 07 September 2023

09h00 to 10h20

SYM1 - THE POWER OF LANGUAGE USE ON JUDGEMENT AND DECISION-MAKING

Psychonomic's Sponsored Symposium – Auditorium 2A – Chair: Boaz Keysar

Thursday **09h00**	PAST AND FUTURE FEEL MORE DISTANT IN A FOREIGN LANGUAGE	Zeynep Aslan, Janet Geipel, & Boaz Keysar
Thursday **09h20**	OK OR NOT OK TO LIE? THAT IS A QUESTION OF LANGUAGE	Eduardo Navarrete & Zhimin Hu
Thursday **09h40**	REGIONAL LANGUAGE EFFECTS ON MORAL JUDGMENT	Francesca Peressotti & Michele Miozzo
Thursday **10h00**	THE NUMERIC FORM OF PRICES AFFECTS ONLINE SALES: A NATURAL FIELD EXPERIMENT	Constantinos Hadjichristidis & Hamed Zarandi
Thursday **10h20**	LANGUAGE MODALITY INFLUENCES RISK PERCEPTION	Janet Geipel, Constantinos Hadjichristidis, Lucia Savadori, & Boaz Keysar

SYM2 - STATISTICAL LEARNING: DEVELOPMENTAL AND EVOLUTIONARY APPROACHES

Symposium – Auditorium 2B – Chair: Dezso Németh

Thursday **09h00**	INVERTED U-SHAPED DEVELOPMENTAL TRAJECTORY ACROSS THE LIFESPAN IN ONLINE AND OFFLINE MEASURES OF VERBAL STATISTICAL LEARNING	Krisztina Sára Lukics, Dorottya Dobó, & Ágnes Lukács
Thursday **09h20**	LIFESPAN DEVELOPMENTAL INVARIANCE IN MEMORY CONSOLIDATION OF STATISTICAL KNOWLEDGE	Dezso Németh, Karolina Janacsek, & Eszter Tóth-Fáber
Thursday **09h40**	HOW STATISTICAL LEARNING CONTRIBUTES TO VOCABULARY IN TYPICAL DEVELOPMENT AND DEVELOPMENTAL LANGUAGE DISORDER	Ferenc Kemény & Ágnes Lukács
Thursday **10h00**	LINGUISTIC RULE LEARNING THROUGH CROSS-SITUATIONAL WORD LEARNING IN DLD AND TYPICAL LANGUAGE DEVELOPMENT	Judith Rispens, Rosanne Abrahamse, Iris Broedelet, & Padraic Monaghan
Thursday **10h20**	CHUNKING MECHANISMS IN HUMANS (HOMO SAPIENS) AND GUINEA BABOONS (PAPIO PAPIO)	Laure Tosatto, Joël Fagot, & Arnaud Rey

SYM3 - FLICKER AND FLUTTER - RECENT ADVANCES IN STUDYING COGNITION USING FREQUENCY TAGGING

Symposium – Auditorium 2C – Chair: Katharina Duecker

Thursday **09h00**	USING RAPID INVISIBLE FREQUENCY TAGGING TO STUDY MULTIMODAL LANGUAGE PROCESSING IN THE BRAIN	Noor Seijel
Thursday **09h20**	DYNAMICS OF ATTENTIONAL ALLOCATION TO TARGETS AND DISTRACTORS DURING VISUAL SEARCH	Norman Forschack
Thursday **09h40**	ALPHA OSCILLATIONS IN EARLY VISUAL REGIONS SUPPORT FEATURE GUIDANCE THROUGH FUNCTIONAL INHIBITION	Katharina Duecker
Thursday **10h00**	RANDOM TACTILE NOISE STIMULATION REVEALS BETA-RHYTHMIC IMPULSE RESPONSE FUNCTION OF THE SOMATOSENSORY SYSTEM	Samson Chota
Thursday **10h20**	UTILIZING FREQUENCY TAGGING TO MEASURE ATTENTION FLEXIBILITY	Omer Reuveni, Moran Eidelman-Rothman, Lior Kritzman, & Nava Levit-Binnun

SYM4 - FACTORS CONTRIBUTING TO COGNITIVE TRAINING GAINS: LESSONS LEARNED FROM RECENT STUDIES IN HEALTHY AND IN CLINICAL POPULATIONS

Symposium – Auditorium 1 – Chair: Mor Hahum

Thursday **09h00**	DESIGNING GAMES TO IMPROVE HEARING AND VISION	Aaron Seitz
Thursday **09h20**	THE IMPACT OF SENSORY CUES ON MULTIPLE OBJECT TRACKING IN CHILDREN AND ADULTS	Julia Föcker
Thursday **09h40**	A CROWDSOURCING APPROACH TO COMPARING LEVELS OF GAMIFICATION IN WORKING MEMORY TRAINING	Anja Pahor, Aaron Seitz, & Susanne Jaeggi
Thursday **10h00**	COGNITIVE TRAINING COMBINED WITH META-COGNITIVE GOAL SETTING TRAINING IN CANCER SURVIVORS	Talia Maeir, Chen Makranz, Tamar Peretz, Ester Odem, Shani Tsabari, Yafit Gilboa, & Mor Nahum
Thursday **10h20**	FROM VULNERABILITY TO RESILIENCE: THE OFFERINGS OF COGNITIVE TRAINING	Nazanin Derakhshan

SYM5 - FACETS OF EPISODIC MEMORY RESEARCH: FROM MEMORY DEVELOPMENT TO EVERYDAY FORGETTING

Symposium – Room 250 – Chair: Marcel R Schreiner & Julian Quevedo Pütter

Thursday **09h00**	DEVELOPMENT OF MEMORY GENERALIZATION AND SPECIFICITY ACROSS CHILDHOOD	Zoe Ngo
Thursday **09h20**	MEMORY INTEGRATION IN EPISODIC MEMORY: AN INVESTIGATION OF THE MODERATING ROLE OF AGENCY	Marcel R. Schreiner, Arndt Bröder, & Thorsten Meiser
Thursday **09h40**	DO STUDY ORDER AND RECALL ORDER MATTER FOR REMEMBERING, AND DO PEOPLE CONTROL THEM EFFECTIVELY?	Vered Halamish & Pnina Stern
Thursday **10h00**	ALCOHOL-INDUCED RETROGRADE FACILITATION: A MODEL-BASED ENCODING-MAINTENANCE-RETRIEVAL ANALYSIS	Julian Quevedo Pütter & Edgar Erdfelder
Thursday **10h20**	BIASED RETRIEVAL OR BIASED STORAGE? A MODEL-BASED APPROACH TO MOTIVATED FORGETTING OF UNETHICAL BEHAVIOR	Johanna M. Höhs, & Mandy Hütter

SYM6 - WRITTEN PRODUCTION OF WORDS AND SENTENCES

Symposium – Room 254 – Chair: Mark Torrance

Thursday **09h00**	EFFECTS OF CONCEPTUAL AND HANDWRITING DEMANDS ON PRODUCTION OF SIMPLE AND COMPLEX SENTENCES	Thierry Olive & Christine Ros
Thursday **09h20**	NO SCOPE FOR PLANNING: LANGUAGE PRE-PLANNING AS BAYESIAN MIXTURE PROCESS	Jens Roeser, Mark Torrance, Mark Andrews, & Thom Baguley
Thursday **09h40**	PREDICTORS OF ELECTROPHYSIOLOGICAL BRAIN ACTIVITY DURING HANDWRITING PICTURE NAMING USING A TOPOGRAPHIC ERP ANALYSIS	Cyril Perret & Caroline Borde
Thursday **10h00**	NEURAL CORRELATES OF LEXICAL, SUBLEXICAL AND MOTOR PROCESSES IN WRITING PRODUCTION	Olivia Afonso, Alberto Avilés, & Carlos J. Álvarez
Thursday **10h20**	THE ROLE OF LOOKBACK IN THE WRITTEN PRODUCTION OF MULTI-SENTENCE TEXTS	Mark Torrance, Jens Roeser, Emily Dux Speltz, & Evgeny Chukharev-Hudilainen

10h20 to 12h00

POSTER SESSION I

ATTENTION

1	INFLUENCE OF RHYTHMIC CONTEXTS ON PERCEIVED EVENT DURATION	Paulina del Carmen Martín-Sánchez, Rafael Román-Caballero, Juan Lupiáñez, & Mariagrazia Capizzi
2	WE CARE A LOT! INDIVIDUAL ATTITUDES AND VALUE-BASED ATTENTIONAL CAPTURE	Serena Mastria, Maurizio Codispoti, & Andrea De Cesarei
3	EXPLORING THE INFLUENCE OF BREATHING PHASES ON VISUO-SPATIAL ATTENTION	Francesco Belli, & Martin H. Fischer
4	EFFECTS OF RELATIONAL MEMORY AND REPETITION ON EYE MOVEMENT CONTROL IN NATURALISTIC SCENES – OPERATIONALIZATION MATTERS	Josefine Albert, Birte Gestefeld, Christian H. Poth, & Werner X. Schneider
5	VIGILANCE IN PLAY HOW ACTION VIDEOGAME EXPERIENCE IMPROVES PERIPHERAL DETECTION IN EMOTIONAL SETTINGS	Joana Dias, Samuel Silva, Fábio Silva, Swann Pichon, & Sandra C. Soares
6	FROM EMOTION TO ACTION TENDENCY TIME COURSE OF ATTENTIONAL EFFECTS OF AGONISTIC AND ANTAGONISTIC OVERLAY OF INTRINSIC AND GOAL RELEVANCES	Hippolyte Fournier, & Olivier Koenig
7	HAZARD PREDICTION TEST REVEALS THAT ATTENTIONAL ORIENTING DEFICITS MAY AFFECT DRIVING AFTER SUFFERING A STROKE.	Candida Castro, Ana Szot, Lucia Laffarga, Daniel A. Salazar-Frías, Ismael Muela, Maria Rodriguez-Bailon, pedrogarcia@ugr.es, Eduardo Eisman, & Ana Chica
8	INHIBITION OF RETURN AND LEARNED VALUE	Francissco Garre-Frutos, & Juan Lupiáñez
9	EFFECTS OF RHYTHM AND PRENATAL RHYTHMIC STIMULATION ON NEWBORNS' ATTENTIONAL DISENGAGEMENT	Martina Arioli, Valentina Silvestri, Melissa Savoldi, Lorenzo Colombo, Niccolò Giovannini, Daniela Morniroli, Giulia Vizzari, & Viola Macchi Cassia

COGNITIVE CONTROL

10	EFFECTS OF DISTRACTOR MODALITY ON THE TIME COURSE OF SPATIAL CONFLICT RESOLUTION INSIGHTS FROM MOUSE MOVEMENT TRAJECTORIES IN AN ACCESSORY SIMON TASK	Malte Möller, & Susanne Mayr
11	ABSTRACT, INTERNALISED CONTEXT MODULATES STIMULUS-RESPONSE BINDING	Anna Render, Malte Möller, & Susanne Mayr
12	COMPARING SEQUENTIAL EFFECTS ACROSS PARADIGMS USING A MODELLING APPROACH	Anne Voormann, & Jeff Miller
13	THE SPLIT-HALF RELIABILITY IN THE AX-CPT IS AS QUESTIONABLE AS IN OTHER TASKS USED TO ASSESS ATTENTIONAL CONTROL	Niels Kempkens, & Alodie Rey-Mermet
14	THE STRUCTURE OF BINDINGS FOR ACTION SLIPS	Anna Foerster, Birte Moeller, Christian Frings, & Roland Pfister
15	INDEPENDENT REPRESENTATIONAL CONTENTS IN INHIBITORY CONTROL SUBPROCESSES	Negin Gholamipourbarogh, Astrid Prochnow, Moritz Mückschel, Filippo Ghin, Ann-Kathrin Stock, Christian Frings, & Christian Beste
16	PERFORMANCE-CONTINGENT REWARD INCREASES THE USE OF CONGRUENT DISTRACTING INFORMATION	Kerstin Fröber, & Veronika Lerche
17	THE IMPACT OF AGE, SEX AND GENERAL COGNITIVE SKILLS ON THEORY OF MIND ACROSS THE LIFESPAN	Dorottya Dobó, & Ágnes Lukács

DECISION MAKING

18	WHEN "LESS IS BETTER" CONFLICTS WITH "MORE IS BETTER" THE IMPACT OF MINDSET SWITCHING ON CROSS-DOMAIN SHOPPING	Chia-Yuan Lin, & Wei-Fen Chen
19	AVOIDANCE AFTER INTERPERSONAL BETRAYAL	Yuzhu Zhang, Janelle M. Jones, & Frederike Beyer
20	TMS STUDY OF THE ROLE OF THE DORSOLATERAL AND DORSOMEDIAL PREFRONTAL CORTICES IN THE SPREADING OF ALTERNATIVES DURING DECISION-MAKING	Alina Davydova, Julia Sheronova, Vladimir Kosonogov, Anna Shestakova, & Vasily Klucharev
21	COGNITIVE, EMOTIONAL AND MOTIVATIONAL DETERMINANTS OF DECISION TO VOLUNTEER AGAIN. A STUDY OF VOLUNTEERS WORKING FOR RUSSO-UKRAINIAN WAR REFUGEES	Agata Chudzicka-Czupała, Marta Żywiołek-Szeja, Nadiya Hapon, & Liudmyla Karamushka
22	SPONTANEOUS TRACKING OF OTHER AGENTS' LOGICAL INFERENCES GUIDES BELIEF ATTRIBUTION	Dóra Fogd, Ernő Téglás, & Ágnes M. Kovács

EMOTION & MOTIVATION		
23	MONEY TALKS: THE ROLE OF FINANCIAL INCENTIVES IN FAIRNESS-BASED BEHAVIOR	Martin Weiß, Anne Saulin, Vassil Iotzov, Johannes Hewig, & Grit Hein
24	CONTENT ANALYSIS OF HUMAN-ROBOT DAILY INTERACTIONS AND THE ROLE OF ROBOT PERSONALITY	Yuefang Zhou, Matt McMullen, Kino Coursey, & Martin H. Fischer
25	MOTIVATIONAL INFLUENCE ON TIME PERCEPTION OF EMOTIONAL STIMULI	Aslan Karaaslan, & Sonia Amado
26	THE RELATIONSHIP BETWEEN EMOTION REGULATION IN DAILY LIFE, MENTAL HEALTH, AND EXECUTIVE FUNCTIONS	Dorian de la Fuente, Tanja Könen, & Julia Karbach
27	USUALLY I DON'T RUMINATE, ONLY FROM TIME TO TIME THE PREDICTIVE VALUE OF TRAIT AND STATE MEASURES OF RUMINATION FOR THE INTENSITY OF AFFECTIVE STATES	Flóra Hann, Levente Rónai, Szabolcs Kéri, & Bertalan Polner
28	LISTENING TO MUSIC WITH A FRIEND MODULATES REWARD RESPONSES AND MEMORY	Federico Curzel, Barbara Tillmann, & Laura Ferreri
29	INFLUENCE OF EXPRESSIVE WRITING ON HEART-RATE VARIABILITY AND EMOTIONAL REGULATION	Teresa Jacques, & Rui A. Alves
30	RESTRICTING MOVEMENTS OF LOWER FACE LEAVES RECOGNITION OF EMOTIONAL VOCALIZATIONS INTACT BUT INTRODUCES A VALENCE POSITIVITY BIAS	Kinga Wołoszyn, Mateusz Hohol, Michał Kuniecki, & Piotr Winkielman
31	THE LINK BETWEEN STATISTICAL LEARNING AND LANGUAGE: A META-ANALYSIS	Sam Boeve, Haoyu Zhou, & Louisa Bogaert
32	WHAT MAKES PEOPLE HAPPY PEOPLE	Tommaso Feraco, & Giorgia Cona
33	THE LINK BETWEEN PROCRASTINATION, EMOTION REGULATION AND VIGILANCE	Ewa Wiwatowska, Magdalena Prost, Tao Coll Martin, Magdalena Pietruch, & Juan Lupiáñez Castillo
HIGHER COGNITIVE FUNCTIONS		
34		
35	EMOTIONAL QUALITY AND PERCEPTUAL AMBIGUITY MODULATE BEHAVIORAL INHIBITION IN AN AUDITORY GO/NO-GO TASK	Maria Amorim, Sonja A. Kotz, & Ana P. Pinheiro
36	THE DICE TRAIL TEST A NONVERBAL VERSION OF THE TRAIL MAKING TEST FOR INDIVIDUALS WITH DOWN SYNDROME	Katja Sandkühler, Elisabeth Wlasich, Armelle Müller, Hannah Stadler, Lena Heiß Dr. med. Olivia Wagemann, Dr. med. Georg Nübling, Prof. Dr. med. Adrian Danek, Prof. Dr. med Johannes Levin, & Dr. Sandra Vera Loosli
37	CLUSTERING & SWITCHING IN TYPICALLY DEVELOPING CHILDREN (5-17 YEARS) THEIR RELATIONSHIP WITH SEMANTIC VERBAL FLUENCY, LANGUAGE AND EXECUTIVE FUNCTION	Alexandra Karousou, Dimitra Economacou, & Vaia Thomaidou
38	VARIABILITY IN EXECUTIVE FUNCTIONING DEVELOPMENT ASSOCIATION WITH HOME AND PEERS' SES	Veronica Nin, Hernan Delgado, & Alejandra Carboni
39	CUE-BASED BIASING WHEN SWITCHING BETWEEN REVERSED STIMULUS-RESPONSE MAPPINGS	Mike Wendt
40	OCDTWIN STUDY – IDENTIFYING NEUROCOGNITIVE RISK FACTORS FOR OCD	Dr. Julia Franke, & Prof. Dr. Beucke
41	SOCIAL INSTRUCTIONS THE FORMATION OF SHARED TASK SETS IN A COLLABORATIVE CONTEXT	Mathias Van der Biest, Anna Kuhlen, Frederick Verbruggen, & Marcel Brass
42	IS SCHIZOTYPY RELATED TO ENHANCED DIVERGENT AND OVERINCLUSIVE THINKING?	Hanna Kucwaj, Bartlomiej Kroczek, Adam Chuderski, & Zdzislaw Gajewski
43	HOW MUCH DOES IT TAKE TO RELATE? EXPLORING THE IMPACT OF REDUCED SPEAKER VISIBILITY ON EMPATHY, THEORY OF MIND, AND PROSOCIAL BEHAVIOR	Eva Landmann, Inga Felicia Straub, & Anne Böckler
44	DO PEOPLE WITH CONSPIRACY BELIEFS PREFER COMPLEXITY?	Michael Hattersley, Sam Johnson, Elliot A. Ludvig, & Gordon D.A. Brown
45	THE ROLE OF HOLISTIC PROCESSING AND EYE MOVEMENT STRATEGIES ON INDIVIDUAL DIFFERENCES IN FACE RECOGNITION ABILITY	Sonia Amado, Elif Yüvrük, Ayşegül Aydınlık, Belkıs Durmuş, Murat Karataş, Büşra Batır, & Aycan Kapucu
46	BASELINE PUPIL SIZE SEEMS UNRELATED TO FLUID INTELLIGENCE, WORKING MEMORY CAPACITY, AND ATTENTIONAL CONTROL	Veera Ruuskanen, Thomas Hagen, Thomas Espeseth, & Sebastiaan Mathôt

WORKING MEMORY

47	UNIQUE AND SHARED CONTRIBUTION OF WORKING MEMORY AND SPATIAL ABILITY TO CHILDREN'S MATH PERFORMANCE.	Chloe Oi Ying Leung, Christine Espin, Dr. Marian Hickendorff, & Dietsje Jolles
48	TRACKING WORKING MEMORY LOAD OR SELECTION WITH MULTIVARIATE PATTERN ANALYSIS FROM ELECTROENCEPHALOGRAPHIC DATA	Miriam Tortajada, Johannes J. Fahrenfort, Alejandro Sandoval Lentisco, Víctor Martínez Pérez, Lucía B. Palmero, Alejandro Castillo, Luis J. Fuentes Melero, Guillermo Campoy, & Christian N. L. Olivers
49	INTERHEMISPHERIC SYNCHRONY IN VISUAL WORKING MEMORY	Judith Sattelberger, J Matias Palva, & Satu Palva
50	THE EFFECT OF SEQUENTIAL AND SPATIAL PROXIMITY ON THE GROUPING OF SIMILAR ITEMS IN VISUOSPATIAL WORKING MEMORY	Antonio Prieto, Julia Mayas, & Pedro R. Montoro
51	INTERFERENCE IN ACTIVE AND PASSIVE WORKING MEMORY STATES	Yuanyuan Weng, Sophia Wilhelm, Jelmer Borst, & Elkan Akyürek
52	THE INTERPLAY BETWEEN MULTISENSORY INTEGRATION AND ATTENTION HOW ARE CROSS-MODAL OBJECTS MAINTAINED IN WORKING MEMORY?	Ceren Arslan, Daniel Schneider, Stephan Getzmann, Edmund Wascher, & Laura-Isabelle Klatt
53	THE EFFECT OF EMOTION ON SPATIAL WORKING MEMORY CAPACITY	Beatrice Cianfanelli, Antonino Esposito, Pietro Spataro, Vincenzo Cestari, Clelia Rossi-Arnaud, & Marco Costanzi
54	HOW ARTISTIC EXPERTISE SHAPES INDIVIDUAL DIFFERENCES IN LOW-LEVEL SENSORY WORKING MEMORY	Damla Çifçi, Joana Pereira Seabra, Vivien Chopurian, & Thomas B. Christophel
55	REPETITION LEARNING EQUAL OR SIMILAR FOR DECLARATIVE AND PROCEDURAL WORKING MEMORY REPRESENTATIONS?	Isabel Courage, & Gidon T. Frischkorn
56	CAN SPATIAL ASSOCIATIONS BE TRANSFERRED FROM SHORT-TERM TO LONG-TERM MEMORY? INVESTIGATING THE SPOARC EFFECT USING REPEATED SEQUENCES.	Morgane Ftaïta, Alessandro Guida, Michaël Fartoukh, & Fabien Mathy
57	DO WORKING MEMORY LIMITS CONSTRAIN LONG-TERM RETENTION OF VERBAL INFORMATION	Elisabeth Knight, Dominic Guitard, Claudia C. von Bastian, & Alicia Forsberg
58	WORKING MEMORY & SPATIAL STROOP HYBRID TASK A TEST OF WORKING MEMORY'S EFFECT ON SIMPLE PROCESSING AND THE TRANSLATIONAL HYPOTHESIS	Molly A. Delooze, & Dr. Candice C. Morey
59	WHAT MECHANISM UNDERLIES THE IRRELEVANT SPEECH EFFECT PHONOLOGICAL PROCESSING OR REHEARSAL?	Abdullah Jelelati, Larissa Leist, Thomas Lachmann, & Maria Klatte
60	INDEPENDENT EFFECTS OF TOP-DOWN AND BOTTOM-UP ATTENTION IN A DUAL-TASK TEST OF WORKING MEMORY WITH SCENES	Azumi Tanabe-Ishibashi, Ryo Ishibashi, & Yasuhiro Hatori
61	SELECTION WITHIN WORKING MEMORY IMPAIRS PERCEPTUAL DETECTION	Joaquín Macedo-Pascual, Almudena Capilla, Pablo Campo, José Antonio Hinojosa, & Claudia Poch
62	NO SINGLE MEASUREMENT MODEL OF VISUAL WORKING MEMORY CAN EXPLAIN TRAINING-INDUCED CHANGE	Shuangke Jiang, Myles Jones, & Claudia C von Bastian

MEMORY

63	FACE THE MUSIC ARE MUSICIANS LESS SUSCEPTIBLE THAN LAYPEOPLE TO MISINFORMATION ABOUT A MELODY?	Joanna Ulatowska, & Magdalena Frass
64	GRADED FORGETTING	Simon Nørby
65	DIRECTED FORGETTING AND SURVIVAL AN EXPLORATION OF THE INHIBITION PROCESS IN MATERIAL WITH AN INTRINSIC SURVIVAL VALUE	Andrés E. Zerpa, & María A. Alonso
66	ACHIEVEMENT MOTIVATION AFFECTS MEMORY FOR UNFINISHED TASKS	Romain Ghibellini, & Beat Meier
67	THE EVOLUTION OF THE FLUENCY HEURISTIC IN AMNESIA	Willems Sylvie, & Billet Maud
68	THE CUTE, THE BAD AND THE NEUTRAL EMOTIONAL STIMULI CAN COMPENSATE FOR THE TASK-SWITCHING EFFECT ON SUBSEQUENT MEMORY PERFORMANCE	Michèle Muhmenthaler, & Beat Meier
69	THE EFFECT OF EMOTIONAL VALENCE ON NONBELIEVED MEMORIES	Valentine Vanootighem, & Zélie Nicolas
70	WHAT HELPS MEMORY RETENTION MORE, A BRIEF PERIOD OF WAKEFUL REST OR REPEATING THE INFORMATION?	Markus Martini, Luis Gutmann, Robert Marhenke, & Pierre Sachse
71	DEFICITS IN INHIBITORY CONTROL OVER INTRUSIVE MEMORIES AND DEPRESSIVE RUMINATION	Javier Pacios, Claudia Cogollos, Iván Blanco, María Carmen Martín-Buro, & Fernando Maestú

72	LIVING WITHOUT IMAGERY STUDY OF EPISODIC ASSOCIATIVE MEMORY STRATEGIES IN APHANTASIA	Emma Delhaye, Pauline Fritz, Christine Bastin, & Charlotte Martial
73	ENHANCING THE RETRIEVAL OF EPISODIC MEMORIES THROUGH ATTENTIONAL FOCUSING IN WORKING MEMORY EVIDENCE BY EVENT-RELATED POTENTIALS IN THE EEG	Daniel Schneider, & Melinda Sabo
74	A NEW MULTINOMIAL MODEL OF EVENT-BASED PROSPECTIVE MEMORY DISENTANGLING THE PROSPECTIVE AND BOTH RETROSPECTIVE COMPONENTS	Fabian E. Gümüsdagli, & Ute J. Bayen
75	USING NETWORK SCIENCE TO PREDICT HUMAN ESTIMATES OF EVENT-BASED CENTRALITY AND STANDARDNESS	Kara E. Hannah, Martha Valmana Crocker, Beatrice Valmana Crocker, Kevin S. Brown, & Ken McRae
76	METAMEMORY BELIEF IN SCHEMA-BASED SOURCE MONITORING REMEDIES OF THE METAMEMORY EXPECTANCY ILLUSION	Marie Luisa Schaper, Carolin V. Hey, & Ute J. Bayen
77	EPISODIC MEMORY REPRESENTATIONAL SIMILARITY ANALYSES AGE SPECIFIC NEURAL SIMILARITY ACTIVITY EFFECT AT DISTINCT LEVELS	Zoltán Apa, Florence Requier, Mohamed A. Bahri, Christophe Phillips, & Fabienne Collette
METACOGNITION		
78	EFFECT OF WRITING SCRIPT ON METACOGNITION OF WORD LEARNING	Mikhail Ordin, & Leona Polyanskaya
79	AGE-RELATED DIFFERENCES IN METACOGNITIVE CONTROL IN TODDLERHOOD A PILOT STUDY	Marie Geurten, & Marion Gardier
80	METACOGNITIVE EFFECTS OF CONTEXT REINSTATEMENT ACROSS EPISODIC AND SEMANTIC MEMORY TASKS	Maciej Hanczakowski, Chris J.A. Moulin, & Katarzyna Zawadzka
81	STUDY OF EARLY METACOGNITION AND ITS INFLUENCE ON THE USE OF THE MEMORABILITY HEURISTIC	Marion Gardier, & Marie Geurten
82	DYNAMICS OF CONFIDENCE IN IMPLICIT PROBABILISTIC LEARNING	Ivan Ivanchei
83	EXPLICIT METACOGNITIVE MONITORING DIMINISHES PERFORMANCE IN A BASIC VISUAL TASK SIMILARLY TO AN ADDITIONAL PERCEPTUAL TASK	Piotr Litwin, Marta Siedlecka, & Borysław Paulewicz
84	WHERE THERE'S A WILL, THERE'S A WAY THE STRUCTURE OF IMPLICIT THEORIES OF WILLPOWER	Anssi Bwalya, Polaris Koi, Hugh Rabagliati, & Nicolas Chevalier
LEARNING		
85	MODALITY-BASED DIFFERENCES IN DISTRIBUTIONAL STATISTICAL LEARNING CATEGORIZATION AND PRODUCTION OF SIGNALS ACROSS MODALITIES	Haoyu Zhou, Sabine van der Ham, Bart de Boer, Limor Raviv, & Louisa Bogaerts
86	BEYOND SELF-REPORTS USING PHYSIOLOGICAL SYNCHRONY AS AN OBJECTIVE MEASURE OF EFFECTIVE COLLABORATION IN EDUCATIONAL BOARD GAMES	Ayano Tsuda, & Emmanuel Manalo
87	INTERVENTION TO SUPPORT HEALTHCARE PROFESSIONALS IN REFUTING ANTI-VACCINATION ARGUMENTS THE EMPATHETIC REFUTATIONAL TECHNIQUE	Otto Mäki, Dawn Holford, Linda C. Karlsson, Stephan Lewandowsky, Virginia C. Gould, & Anna Soveri
88	THE INFLUENCE OF CONTEXTUAL VARIABILITY ON THE LEARNING AND RETENTION OF NOVEL WORDS DOES THE TYPE OF VARIABILITY MATTER?	Raphaël Fargier, Andreas Falck, Tine Hovland, Hakan Bayar, & Janne von Koss Torkildsen
BILINGUALISM		
89	INVESTIGATION INTO THE PROCESSING OF ENGLISH LOANWORDS IN CROATIAN USING CROSS-LINGUISTIC TRANSLATION AND SEMANTIC PRIMING PARADIGMS	Eva Pavlinušić Vilus, Irena Bogunović, & Bojana Ćoso
90	EFFECTS OF BOTH AGEING AND BILINGUALISM ON ATTENTION AND EXECUTIVE FUNCTIONS	Roksana Markiewicz, Foyzul Rahman, Eunice G. Fernandes, Allison Wetterlin, Linda Wheeldon, & Katrien Segaert
91	WITHIN- AND BETWEEN-LANGUAGE SEMANTIC PRIMING IN CLASSIFIER-NOUN PHRASES	Jing Tong, Andrea Philipp, & Iring Koch
92	TOWARDS A QUANTIFIABLE MEASURE OF ORTHOGRAPHIC CONGRUENCY BETWEEN , LANGUAGES	Ding Yan, Séverine Casalis, & Paolo Mairano
93	TEMPORAL DYNAMICS OF THE FOREIGN LANGUAGE EFFECT IN MORAL DECISIONS A MOUSE TRACKING STUDY	Zhimin Hu, Francesca Peressotti, & Eduardo Navarrete
94	FOREIGN LANGUAGE EFFECT ON THE JUDGMENT OF BULLSHIT	Lea Gorišek, Dušica Filipović Đurđević, & Kaja Damnjanović
95	MOVIES IN THE MAGNET INVESTIGATING EMOTIONAL LANGUAGE PROCESSING IN BILINGUALS WITH A NATURALISTIC VIEWING PARADIGM	Camilla Bellini, Marco Gentile, Gianpaolo del Mauro, Nicola del Maschio, & Jubin Abutalebi

96	COGNITIVE AND ENVIRONMENTAL FACTORS UNDERLYING LEXICAL RESTRUCTURING IN A FOREIGN LANGUAGE	Marco van de Ven, Eliane Segers, Joyce Gubbels, Xi Chen, & Ludo Verhoeven
97	USING A FOREIGN LANGUAGE INCREASES RISK TOLERANCE, BUT NOT DUE TO ATTENUATED EMOTIONAL RESPONSES OR GREATER ACCESSIBILITY OF RISK-INCREASING THOUGHTS	Rafał Muda, & Michał Białek
LANGUAGE		
98	THE INFLUENCE OF WRITING TECHNOLOGY AND GESTURE MODALITY ON THE DEVELOPMENT OF EARLY LITERACY	Theresa Kalchhauser, Mariana Silva, & Rui A. Alves
99	EFFECTS OF EARLY FOREIGN LANGUAGE EXPOSURE PROGRAMS ON CHILDREN'S COGNITIVE DEVELOPMENT A SYSTEMATIC REVIEW.	Natália Guerra, Diana R. Pereira, Helena M. Oliveira, & Ana Paula Soares
100	RAPID AUDITORY PROCESSING TRAINING IMPROVES LINGUISTIC AND NON-LINGUISTIC FUNCTIONS IN INDIVIDUALS WITH APHASIA	Aneta Szymaszek, Mateusz Choinski, Magdalena Stanczyk, & Anna Bombinska
101	THE COUPLING BETWEEN EYE ACTIVITY AND AFFECTIVE SPEECH	Sümeyye Şen Alpay Christian Keitel, & Anne Keitel
102	CONTRASTIVE LEXICALITY EFFECTS WHEN REPORTING LETTER REPETITIONS COMPARED TO LETTER SUBSTITUTIONS ACROSS ORTHOGRAPHIC STRINGS	Michael Pilling, & Olivia Afonso
103	HUNGARIAN SPEAKERS CONVERGE TO CONJUGATION PATTERNS IN NONCE VERBS	Rácz, Péter
104	GENDER-DIVERSE EXPERIENCES AT THE INTERFACE BETWEEN EXTEROCEPTION AND INTEROCEPTION. AN INVESTIGATION ON VOICE PERCEPTION	Chiara De Livio, Claudia Mazzuca, Chiara Fini, & Anna M. Borghi
105	TRANSPOSED-CHARACTER EFFECTS THROUGHOUT READING ACQUISITION WHEN DO LETTER AND NON-LETTER STRINGS PROCESSING BECOME DIFFERENT ?	Lisa Rondot, Acha Joana, Vergara-Matinez Marta, Lété Bernard, Favre Emilie, & Massol Stéphanie
106	NOVEL VISUAL WORD LEARNING TRACKED WITH FPVS-EEG	Amaury Barillon, Christine Schiltz, & Aliette Lochy
107	UNRAVELLING WORD RECOGNITION IN SPANISH A LARGE LEXICAL DECISION MEGA-STUDY CONSIDERING PSYCHOLINGUISTIC VARIABLES AND INDIVIDUAL DIFFERENCES	Juan Haro Rodríguez, José Antonio Hinojosa Poveda, & Pilar Ferré Romeu
108	EMBODIED PRACTICE AND VOCABULARY ACQUISITION IN FRENCH KINDERGARTEN CHILDREN	Anaïs Cauna, Maureen Astier-Perret, Marion Tellier, & Pascale Colé
109	READING ABILITIES IN DEAF INFLUENCE OF THE LANGUAGE SYSTEM ON THE CROWDING EFFECT	Veena Kamble, Sahana Kashyap, Suma Raju, & Virginie Crollen
110	DOES A MISMATCH ON ACCENTUAL CUES AFFECT THE MAGNITUDE OF THE SHORT-TERM REPETITION PRIMING EFFECT? AN ERP INVESTIGATION IN FRENCH	Amandine Michelas, & Sophie Dufour
111	STATISTICAL LEARNING IN ACQUIRING THE ALPHABETIC CODE A STUDY IN CHILDREN AT RISK FOR READING DISABILITY	Marie Boyer, Teng Guo, Samantha Ruvoletto, & Daniel Zagar
112	ADAPTIVE PROCESSING IN WORD PRODUCTION REPEATED NAMING REDUCES SEMANTIC COMPETITION	Jörg D. Jescheniak, Stefan Wöhner, Andreas Mädebach, & Herbert Schriefers
113	TO ADD OR REMOVE? INVESTIGATING THE EFFECTS OF DIACRITICAL MARKS ON VISUAL-WORD RECOGNITION IN GERMAN AND FINNISH	Melanie Labusch, Jukka Hyönä, & Manuel Perea
114	PERCEPTUAL STRENGTH NORMS FOR 5,500 SPANISH WORDS	Díez-Álamo, Antonio M., Díez, Emiliano, Wojcik, Dominika, Alonso, María A., & Fernandez, Angel
115	HOW DO PEOPLE DISCRIMINATE CONVERSATIONS GENERATED BY HUMANS AND ARTIFICIAL INTELLIGENCE? THE ROLE OF INDIVIDUAL VARIABILITY ON PEOPLE'S JUDGMENT	Doris Pischedda, Şafak Erener, Anna K. Kuhlen, & John-Dylan Haynes
MOTOR COGNITION		
116	HUMANS ASSUME THAT ROBOT ACTIONS ARE GOAL-ORIENTED	Abdulaziz Abubshait, & Agnieszka Wykowska
117	MOTOR CONTAGION OF MULTIPLE AGENTS A KINEMATIC ANALYSIS	Dr. Matilde Rocca, & Prof. Dr. Marcel Brass
118	AS EMBODIMENT COMES OF AGE A PROCESSING ADVANTAGE FOR ACTION WORDS IS MODULATED BY AGING AND THE TASK	Alex Miklashevsky, Jana Reifegerste, Adolfo M. García, Friedemann Pulvermüller, David A. Balota, & Michael T. Ullman
119	REPRESENTATION OF 'SELF AND 'OTHER' POSSIBLE MOVEMENT DIRECTIONS JOINT ACTION PLANNING AN EEG STUDY	Dimitrios Kourtis
120	ENCODING OF ACTION'S SENSORY OUTCOME REVEALED IN PRE-MOTOR POTENTIALS AND MULTIVARIATE PATTERN ANALYSIS AN EEG STUDY	Edward Ody, Yifei He, Benjamin Straube, & Tilo Kircher

NUMERICAL COGNITION		
121	MATH ANXIETY IS RELATED TO ALTERED RESPONSE MONITORING IN AN ARITHMETIC TASK	Nuñez-Peña, M.I., & Campos-Rodríguez, C.
122	CAN COGNITIVE CALCULATORS COMPUTE CORRECTLY? BUILT-IN BIAS IN MENTAL ARITHMETIC	Sam Shaki, & Martin H. Fischer
123	NEURAL SIGNATURE OF THE OPERATIONAL MOMENTUM EFFECT REVEALED BY INTERMODULATIONS IN FREQUENCY-TAGGED ELECTROENCEPHALOGRAM	Nicolas Masson, Christine Schiltz, & Talia L. Retter
124	IS THE SNARC EFFECT ASSOCIATED WITH PRE-MATHEMATICAL AND SPATIAL ABILITIES IN PRESCHOOL?	Tânia Ramos, Carrie Georges, & Christine Schiltz
PERCEPTION		
125	IN SNARC-LIKE TASKS TEMPORAL SPEED PREVAILS ON TEMPORAL DURATION	Alberto Mariconda, Valter Prpic, Serena Mingolo, Fabrizio Sors, Tiziano Agostini, & Mauro Murgia
126	INVOLUNTARY MOTOR RESPONSES ARE ELICITED BOTH BY RARE SOUNDS AND RARE PITCH CHANGES	Simily Sabu, Fabrice B. R. Parmentier, & János Horváth
127	VISUALLY-FILLED VS. EMPTY REPRODUCTIONS EFFECTS ON THE REPRODUCED DURATIONS OF AUDITORY STIMULI.	Miria Plastira, & Marios Avraamides
128	USING EEG FREQUENCY TAGGING TO MEASURE THE PERCEPTION OF INDIVIDUAL AND GROUP MOVEMENTS	Emiel Cracco, Danna Oomen, Liuba Papeo, & Jan R. Wiersema
129	SPACE-VALENCE COMPATIBILITY IN AN ECOLOGICAL TOUCHSCREEN ENVIRONMENT THE EFFECT OF HAND AND SIDE	Marta Maisto, & Rossana Actis-Grosso
130	WHEN RELYING ON KNOWLEDGE INCREASES INTERPRETATION BIAS: INSIGHTS FROM AGING	Dorit Segal, & Gitit Kavé
131	BILINGUALISM AND BIASES: BILINGUAL LANGUAGE EXPERIENCE AS A MODERATOR IN THE ASSOCIATION BETWEEN INTERNAL MOTIVATION AND EXPLICIT BIASES	Sofía Castro, Patrycja Kałamała, Marcin Bukowski, & Zofia Wodniecka

12h00 to 13h20

T1 - READING AND EYE-TRACKING

Regular Talks – Auditorium 2A – Chair: Rui Alves

Thursday **12h00**	HOW LOW CAN YOU GO? EYE MOVEMENTS DURING READING AT DIFFERENT SAMPLING RATES	Bernhard Angele & Jon Andoni Duñabeitia
Thursday **12h20**	POPEYE - AN R PACKAGE TO ANALYSE EYE MOVEMENT DATA FROM READING EXPERIMENTS	Sascha Schroeder
Thursday **12h40**	EFFICIENT EYE MOVEMENTS IN VISUAL WORD RECOGNITION: SENSITIVITY TO THE STRUCTURE OF THE LEXICON	Jon Carr, Monica Fantini, & Davide Crepaldi
Thursday **13h00**	THE USE OF SPECIFIC SEGMENTATION CUES IN READING UNSPACED FINNISH TEXT	Raymond Bertram

T2 - BILINGUALISM I

Regular Talks – Auditorium 2B – Chair: Iring Koch

Thursday **12h00**	LANGUAGE CONTEXT MODULATES THE ASYMMETRY OF SWITCH COSTS AND REVERSE DOMINANCE EFFECTS IN THE LANGUAGE SWITCHING PARADIGM	Agata Wolna, Kalinka Timmer, Jakub Szewczyk, & Zofia Wodniecka
Thursday **12h20**	HOW DOES ORTHOGRAPHIC SIMILARITY IMPACT LANGUAGE SWITCHING?	Tanja Römbke
Thursday **12h40**	(AFTER-)EFFECTS OF LANGUAGE SWITCHING: EVIDENCE FOR PROACTIVE INHIBITION?	Andrea M. Philipp, Tanja Roembke, Chiara Koch, Mathieu Declerck, & Iring Koch
Thursday **13h00**	DOES THE DOMINANT LANGUAGE ALWAYS REQUIRE MORE INHIBITION DURING BILINGUAL LANGUAGE PRODUCTION?	Iring Koch, Mathieu Declerck, Greta Petersen, Daniel Rister, Wolfgang Scharke, & Andrea M. Philipp

B1 - COGNITIVE AGING I

Blitz-Talks – Auditorium 2C – Chair: Sarah De Pue

Thursday **12h00**	THE AGING CHALLENGE: DOES HEALTHY AGING AFFECT DIFFERENT COGNITIVE CONTROL FUNCTIONS EQUALLY?	Sarah De Pue, Céline Gillebert, Eva Dierckx, & Eva Van den Bussche
Thursday **12h10**	INDUCING PLASTICITY IN THE AGING BRAIN: A NEUROIMAGING AND COGNITIVE PERSPECTIVE	Amy Miller, & Dr Melanie Burke
Thursday **12h20**	INTERGENERATIONAL CONTACT AND AGEISM PREDICT PREVENTIVE ATTITUDES AND BEHAVIORS DURING THE COVID-19 PANDEMIC	Emilio Paolo Visintin
Thursday **12h30**	THE PRETESTING EFFECT AMONG YOUNG AND HEALTHY OLDER ADULTS	Yeray Mera, Nataliya Dianova, & Eugenia Marin-Garcia
Thursday **12h40**	OPTIMIZING OLDER ADULTS' PERFORMANCE IN THE STROOP TASK	Mariana Burca, Pierre Chausse, David Clarys, Ludovic Ferrand, Nabil Hasshim, Banjamin A. Parris, Laetitia Silvert, & Maria Augustinova
Thursday **12h50**	THE EFFECT OF POST-COVID SYNDROME ON RESTING-STATE NEURAL DYNAMICS AND THEIR CHANGES WITH COGNITIVE TRAINING IN OLDER ADULTS	Boglárka Nagy, Andrea B. Protzner, Balázs Czigler, Mátyás Sarudi, & Zsófia Anna Gaál
Thursday **13h00**	COGNITIVE TRAINING EFFECTS ON HEALTHY AND POST-COVID OLDER ADULTS: CHANGES IN BEHAVIOUR AND EVENT-RELATED POTENTIALS	Zsófia Anna Gaál, Boglárka Nagy, Lili Kővári, Mátyás Sarudi, Balázs Czigler, Györgyi Balla, Réka Válóczy, & István Czigler

B2 - MEMORY I

Blitz-Talks – Auditorium 1 – Chair: Evie Vergauwe

Thursday **12h00**	DOES SENSORY DISCRIMINATION ABILITY EXPLAIN THE RELATION BETWEEN ACTIVE MUSIC-MAKING AND WORKING MEMORY?	Christ B. Aryanto, Emma Blakey, Renee Timmers, & Claudia C. von Bastian
Thursday **12h10**	CHILDREN'S WORKING MEMORY IS NOT MORE SUSCEPTIBLE TO DISTRACTION THAN ADULTS' WORKING MEMORY	Nora Turoman, Elodie Walter, Anae Motz, & Evie Vergauwe
Thursday **12h20**	STRATEGIC PRIORITIZATION IN WORKING MEMORY: A DIRECT COMPARISON OF CUING, REWARDING, AND REFRESHING	Evie Vergauwe, Ziyao Zhang, Caro Hautekiet, & Jarrod Lewis-Peacock
Thursday **12h30**	ATTENTIONAL GUIDANCE FROM WORKING MEMORY ENHANCES LONG-TERM MEMORY FOR DISTRACTORS.	Jun Moriya
Thursday **12h40**	VISUAL SHORT-TERM MEMORY AND ATTENTIONAL CAPTURE PROVIDE INDEPENDENT SOURCES OF GUIDANCE FOR SACCADIC SAMPLING DURING PREVIEW SEARCH	Doug J K Barrett, & Tahani Alqahtani
Thursday **12h50**	HAND-VR: THE ROLE OF PERSPECTIVE IN BODY-RELATED STIMULI SPATIAL MEMORY	Claudia Repetto, Silvia Serino, Paolo Manenti, Daniele Di Lernia, & Giuseppe Riva
Thursday **13h00**	MENTAL JOURNEY TO THE FUTURE AND PROSPECTIVE MEMORY DURING THE COVID19 PANDEMIC LOCKDOWN	Alaitz Aizpurua Sanz, & Malen Migueles Seco
Thursday **13h10**	VISUAL WORKING MEMORY AS THE SUBSTRATE FOR MENTAL ROTATION: A REPLICATION	Miro Ebert, Leonardo Jost, Petra Jansen, Biljana Stevanovski, & Daniel Voyer

T3 - AUTOBIOGRAPHIC MEMORY

Regular Talks – Room 250 – Chair:

Thursday **12h00**	AUTOBIOGRAPHICAL FUTURE THINKING IN EXCEPTIONAL MEMORY: A SINGLE CASE HIGHLY SUPERIOR AUTOBIOGRAPHICAL MEMORY STUDY	Jessica Talbot, Michela Marchetti, Mara Stockner, & Giuliana Mazzoni
Thursday **12h20**	CHAINED-EVENT SEQUENCES: EVALUATING THE CHAIN OF THOUGHT IN SPONTANEOUS EPISODIC FUTURE THINKING AND INVOLUNTARY AUTOBIOGRAPHICAL MEMORY	Mackenzie Bain, & Ken McRae
Thursday **12h40**	REMEMBERING EVERYDAY EVENTS: BOUNDARIES PROMOTE EVENT COMPLETION THOUGH BACKWARDS INFERENCES	Ayse Candan Simsek, Tolgahan Aydın, & Markus Huff

T4 – DECISION MAKING I

Regular Talks – Room 254 – Chair: Daniele Gatti

Thursday **12h00**	CHOOSING BETWEEN RISK AND CERTAINTY: THE 1-IN-X EFFECT ON CHOICES	Stefania Pighin, Alessandro Bogani, Gloria Berenisse Castro Davalos, & Lucia Savadori
Thursday **12h20**	COMMUNICATING AI INTENTIONS TO SUPPORT THE SENSE OF AGENCY RELIABILITY	Pagliari Marine, Chambon Valerian, & Berberian Bruno
Thursday **12h40**	FROM MILAN TO ROME: SPATIAL, TEMPORAL AND LINGUISTIC COMPONENTS OF COGNITIVE MAPS	Daniele Gatti, Giorgia Anceresi, Marco Marelli, Tomaso Vecchi, & Luca Rinaldi

T5 – TOOLS AND ACTION KNOWLEDGE

Regular Talks – Room 252 – Chair: Alexandre Bluet

Thursday **12h00**	THE TECHNICAL-REASONING NETWORK IS RECRUITED WHEN PEOPLE OBSERVE OTHERS MAKE OR TEACH HOW TO MAKE TOOLS: AN FMRI STUDY	Alexandre Bluet, Emanuelle Reynaud, Giovanni Federico, Chloé Bryche, Mathieu Lesourd, Franck Lamberton, Danielle Ibarrola, Yves Rossetti, & François Osiurak
Thursday **12h20**	REVISITING THE ROLE OF LEFT AND RIGHT HEMISPHERES IN ACTION AND SEMANTIC TOOL KNOWLEDGE: EVIDENCE FROM BRAIN-DAMAGE PATIENTS	Mathieu Lesourd, Julie Martin, Sébastien Hague, Margolise Levitre, Elisabeth Medeiros de Bustos, Guillaume Fargeix, Eloi Magnin, & Thierry Moulin
Thursday **12h40**	UNDERSTANDING THE BRAIN REORGANISATION DURING PIANO PLAYING IN NOVICE PIANISTS: AN FMRI STUDY	Alicja M. Olszewska, Maciej Gaca, Dawid Droździel, Agnieszka Widlarz, Aleksandra M. Herman, & Artur Marchewka
Thursday **13h00**	MEG EVIDENCE SUPPORTING NEURAL PLASTICITY OF THE ACTION OBSERVATION NETWORK IN BRAIN TUMOR PATIENTS	Lucia Amoruso, Ileana Quiñones, Nicola Molinaro, Santiago Gil-Robles, Iñigo Pomposo Gastelu, Garazi Bermudez, & Manuel Carreiras

14h20 to 16h20

T6 - WORD LEARNING

Regular Talks – Auditorium 2A – Chair: Eleonore Smalle

Thursday **14h20**	TO SPELL OR NOT TO SPELL? EXPLICIT VERSUS IMPLICIT CREATION OF SPELLING EXPECTATIONS DURING SPOKEN WORD LEARNING	Mina Jevtović, Efthymia Kapnoula, & Clara D. Martin
Thursday **14h40**	THE INFLUENCE OF OVERT SPOKEN AND WRITTEN PRODUCTION ON NOVEL WORD LEARNING	Svetlana Pinet, & Clara Martin
Thursday **15h00**	MORPHOLOGICAL DECOMPOSITION OF NOVEL DERIVED WORDS: BEHAVIORAL AND NEURAL EVIDENCE	Tali Bitan, Upasana Nathaniel, Brianna L. Yamasak, Stav Eidelsztein, Bracha Nir, Vedran Dronjic, & James R. Booth
Thursday **15h20**	TEMPORAL CONSTRAINTS ON THE LEARNING OF MULTI-WORD CHUNKS REVEALED BY BEHAVIOUR AND EEG	Lena Henke, & Lars Meyer
Thursday **15h40**	VISUAL SIMILARITY AND LEXICAL ACCESS IN ARABIC SCRIPT: EVIDENCE FROM PERSIAN	Sarvenaz Changizi, & Manuel Perea Lara
Thursday **16h00**	COGNITIVE COST AS IMPORTANT PIECE OF THE LANGUAGE LEARNING PUZZLE	Eleonore Smalle

T7 - FALSE MEMORY

Regular Talks – Auditorium 2B – Chair: María J. Maraver

Thursday **14h20**	THE INTERPLAY BETWEEN WORKING MEMORY MAINTENANCE AND GIST ACTIVATION IN SHORT-TERM FALSE MEMORIES IN CHILDREN AND ADULTS	Rousselle Manon, Blaye Agnès, & Abadie Marlène
Thursday **14h40**	PREDICTING FALSE MEMORIES WITH DATA-DRIVEN COMPUTATIONAL MODELS: THE ROLE OF VISUAL AND LINGUISTIC SIMILARITY IN THE DRM PARADIGM	Marco Petilli, Francesca Rodio, Daniele Gatti, Luca Rinaldi, & Marco Marelli
Thursday **15h00**	SHORT-TERM FALSE MEMORIES ACROSS THE LIFESPAN	Marlène Abadie
Thursday **15h20**	HOW OLDER ADULTS CORRECT FALSE MEMORIES: A STUDY USING PRAGMATIC INFERENCE SENTENCES	María J. Maraver, Nuria Montoro-Membila, Alejandra Marful, & Teresa Bajo
Thursday **15h40**	FALSE MEMORIES FROM NOWHERE? PSEUDOWORDS CAN TRIGGER THE DRM EFFECT	Michela Marchetti, Daniele Gatti, Marco Petilli, Marco Marelli, Tomaso Vecchi, Giuliana Mazzoni, & Luca Rinaldi

T8 - MOTOR COGNITION I

Regular Talks – Auditorium 2C – Chair: Silvia Formica

Thursday **14h20**	VISUOMOTOR INTERFERENCE AND ANTICIPATORY NEURAL REPRESENTATIONS DURING JOINT ACTIONS	Silvia Formica, & Marcel Brass
Thursday **14h40**	IS YOUR PLAN MY PLAN? FEATURE BINDING AND RETRIEVAL IN REPRESENTING OWN AND OTHERS' ACTIONS	Viola Mocke, Carina Giesen, Mrudula Arunkumar, & Wilfried Kunde
Thursday **15h00**	THE EFFECT OF SEX AND SEX-ROLE ON SOCIAL ATTENTION: INVESTIGATING THE ASSOCIATION WITH SOCIAL SKILLS AND ACADEMIC PREFERENCES	Jeanette A. Chacón-Candia, Juan Lupiáñez, Maria Casagrande, & Andrea Marotta
Thursday **15h20**	MODULATING SOCIAL PREDICTION ABILITIES THROUGH CEREBELLAR NEUROMODULATION: EVIDENCE FROM HEALTHY AND CLINICAL SAMPLES	Viola Oldrati, Alessandra Finisguerra, Niccolò Butti, Elisabetta Ferrari, Renato Borgatti, & Cosimo Urgesi
Thursday **15h40**	LEXICAL DECISION ACROSS THE MOTOR-HIERARCHY: AN EEG/EMG INVESTIGATION OF THE DECISIONAL COMPONENTS OF MOTOR-RESPONSE EXECUTION	Michele Scaltritti, Elena Greatti, & Simone Sulpizio
Thursday **16h00**	THE HANDEDNESS CONTINUUM CAPTURES INDIVIDUAL VARIATIONS IN THE LATERALIZATION OF GLOBAL-LOCAL, WORD AND FACE PROCESSES	Anjoom Thahir Alikkam Veetil, Neelabja Roy, & Ark Verma

T9 - SHORT-TERM MEMORY

Regular Talks – Auditorium 1 – Chair: Steve Majerus

Thursday **14h20**	EXPLORING WORKING MEMORY: HOW BROWN-PETERSON AND COMPLEX SPAN TASKS DIFFER?	Pierre Barrouillet, Valérie Camos, Julie Pougeon, & Clément Belletier
Thursday **14h40**	NO TRADEOFF BETWEEN CHAINING AND POSITION IN SHORT-TERM MEMORY	Dominic Guitard, & Nelson Cowan
Thursday **15h00**	TEMPORAL MEMORY FOR COMPLEX EVENTS IS SUPPORTED BY GAMMA OSCILLATORY ACTIVITY	Matteo Frisoni, Pierpaolo Croce, Filippo Zappasodi, & Carlo Sestieri
Thursday **15h20**	IMPROVING BRAIN AND BEHAVIORAL WORKING MEMORY ABILITIES USING VISUAL RHYTHMIC STIMULATIONS	Roxane S. Hoyer, Jérémie Ginzburg, Corentin Labelle, & Philippe Albouy
Thursday **15h40**	RECOLLECTIVE AND NON-RECOLLECTIVE PROCESSES IN WORKING MEMORY RETRIEVAL	Valérie Camos, Marlène Abadie, Stéphanie Mariz Elsig, & Pierre Barrouillet
Thursday **16h00**	THE NATURE OF THE PRECISION OF VERBAL WORKING MEMORY FOR PHONOLOGICAL INFORMATION	Steve Majerus, & Marion Bouffier

T10 - INDIVIDUAL DIFFERENCES

Regular Talks – Room 250 – Chair: Anna-Lena Schubert

Thursday **14h20**	WORKING MEMORY LOAD AFFECTS INTELLIGENCE TEST PERFORMANCE BY REDUCING THE STRENGTH OF ITEM BINDINGS AND IMPAIRING THE FILTERING OF DISTRACTORS	Anna-Lena Schubert, Christoph Löffler, Kathrin Sadus, Jan Göttmann, Johanna Hein, Pauline Schröer, Antonia Teuber, & Dirk Hagemann
Thursday **14h40**	DO PERCEPTUAL ABILITIES FULLY ACCOUNT FOR THE RELATIONSHIP OF WORKING MEMORY CAPACITY AND REASONING ABILITY?	Gidon T. Frischkorn, Klaus Oberauer, & Alessandra S. Souza
Thursday **15h00**	ATTENTIONAL CONTROL CAN BE EXTRACTED AT THE LATENT-VARIABLE LEVEL FROM WORKING-MEMORY TASKS – BUT THIS FINDING IS NOT REPLICATED ACROSS DATASETS	Alodie Rey-Mermet, & Nicolas Rothen
Thursday **15h20**	THE HEIDELBERG MATRICES TEST: A NEW TEST FOR THE ASSESSMENT OF REASONING ABILITIES	Jan Rummel, Vanessa Pallentin, & Daniel Danner
Thursday **15h40**	GLOBAL RELATIONS VERSUS OBJECT RELATIONS IN VISUAL ANALOGIES	Amin Hashemi, & Elisabet Tubau
Thursday **16h00**	THE EFFECT OF CONTEXT AND INDIVIDUAL DIFFERENCES IN HUMAN-GENERATED RANDOMNESS	Mikołaj Biesaga, Szymon Talaga, & Andrzej Nowak

T11 – PERCEPTION AND VISION

Regular Talks – Room 254 – Chair: Michał Wierzchoń

Thursday **14h20**	THE AUTOMATIC CODING OF BODY PARTS AND THEIR RELATION TO THE STRUCTURAL BODY REPRESENTATION	Alessia Tessari, & Giovanni Ottoboni
Thursday **14h40**	BODY PERCEPTION AND BRAIN PLASTICITY IN BLIND AND SIGHTED INDIVIDUALS: FROM HEARTBEATS TO RUBBER HANDS	Dominika Radziun, Maksymilian Korczyk, Laura Crucianelli, Marcin Szwed, & H. Henrik Ehrsson
Thursday **15h00**	LOW-LEVEL VISUAL ATTRIBUTES AFFECT THE INTEGRATION OF VISUAL CONTEXT DURING SIZE PROCESSING	Laurie Geers, Gilles Vannuscorps, Mauro Pesenti, & Michael Andres
Thursday **15h20**	CAUSAL EFFECTS OF PUPIL SIZE ON VISUAL PROCESSING	Sebastiaan Mathôt, Hermine Berberyan, Philipp Büchel, Veera Ruuskanen, Ana Vilotijević, & Wouter Kruijne
Thursday **15h40**	PUPIL DILATION SIGNALIZES EVENT BOUNDARIES AND NARRATIVE SHIFTS	Péter Pajkossy, Ágnes Szőllősi, & Mihály Racsmány
Thursday **16h00**	HOW CIRCULAR SHOULD A CIRCULAR ARRAY BE? INVESTIGATING THE SHAPE OF THE VISUAL FIELD WITH A CIRCULAR ARRAY TASK.	Michał Wierzchoń, Simon Hviid Del Pin, Zuzanna Skóra, & Kristian Sandberg

T12 - CHILD-DEVELOPMENT I

Regular Talks – Room 252 – Chair: David Crepaldi

Thursday **14h20**	THE ORIGINS OF WORD ASSOCIATIONS IN EARLY CHILDHOOD	Olivera Savic, Hyungwook Yim, Layla Unger, Simon Dennis, & Vladimir Sloutsky
Thursday **14h40**	DO EARLY MUSICAL IMPAIRMENTS PREDICT LATER READING DIFFICULTIES? A LONGITUDINAL STUDY OF PRE-READERS WITH AND WITHOUT FAMILIAL RISK FOR DYSLEXIA	Manon Couvignou, Hugo Peyre, Franck Ramus, & Régine Kolinsky
Thursday **15h00**	COGNITIVE AND MUSICAL SKILLS OF SCHOOL-AGED CHILDREN	Carolina Cordeiro, & Graça Boal-Palheiros
Thursday **15h20**	HOW SPEECH AND REPRESENTATIONAL GESTURES ALIGN IN CHILD-DIRECTED LANGUAGE: A CORPUS-BASED STUDY	Yumeng Wang, Ed Donnellan, & Gabriella Vigliocco
Thursday **15h40**	THE CHILDREN AND YOUNG PEOPLE'S BOOKS LEXICON (CYP-LEX): A LEXICAL DATABASE OF BOOKS DIRECTED AT CHILDREN AND YOUNG ADULTS	Maria Korochkina, Marco Marelli, Marc Brysbaert, & Kathleen Rastle
Thursday **16h00**	THE EFFECT OF PARENTAL REMINISCING STYLE ON PRESCHOOLERS' INDEPENDENT MEMORY SKILLS	Christina Léonard, & Marie Geurten

16h40 to 18h20

SYM7 - WORD AND SENTENCE READING

Broadbent Symposium – Auditorium 2A – Chair: Jonathan Grainger

Thursday **16h40**	ERP SIGNATURES OF THE PROCESSING OF LOGOS: COLOR BEATS ORTHOGRAPHY	Marta Vergara-Martínez, Maria Fernandez-Lopez, Francisco Rocabado, Melanie Labusch, Ana Marcet, & Manuel Perea
Thursday **17h00**	EFFECTS OF VISUAL SIMILARITY AND TRANSPOSED-CHARACTERS IN THE SAME-DIFFERENT MATCHING TASK WITH STRINGS OF LETTERS AND SYMBOLS	Stéphanie Massol, Jonathan Mirault, & Jonathan Grainger
Thursday **17h20**	ON THE ROLE OF STEMS AND PREFIXES IN READING COMPLEX NONWORDS: EVIDENCE FROM INDIVIDUALS WITH AND WITHOUT ACQUIRED DYSLEXIA	Elisabeth Beyersmann, Tara Arrow, & Simon Fischer-Baum
Thursday **17h40**	THE EFFECTS OF SEMANTIC AND SYNTACTIC PREDICTION ON READING ALOUD	Elisa Gavard & Johannes C. Ziegler
Thursday **18h00**	SENTENCE READING IN OB1-READER	Martijn Meeter, Joshua Snell, & Jonathan Grainger

SYM8 - PREFERRED RHYTHMS IN AUDITORY COGNITION

Symposium – Auditorium 2B – Chair: Anne Keitel

Thursday **16h40**	EXPLAINING FLEXIBLE CONTINUOUS SPEECH COMPREHENSION FROM INDIVIDUAL MOTOR AND AUDITORY RHYTHMS	Christina Lubinus, Anne Keitel, Jonas Obleser, David Poeppel, & Johanna M. Rimmele
Thursday **17h00**	THE ROLE OF PREFERRED NEURAL AND BEHAVIOURAL RHYTHMS IN MUSIC TEMPO PREFERENCE	Efstratios Koukouvinis, & Anne Keitel
Thursday **17h20**	INTERNAL RHYTHMS AND EXTERNAL DRIVERS - RHYTHMIC COGNITION AS A BRIDGE BETWEEN THE SELF AND THE EXTERNAL WORLD	Leah Snapiri, Yael Kaplan, Nir Shalev, & Ayelet N. Landau
Thursday **17h40**	TRACKING STOCHASTIC RHYTHMS IN AUDITION AND SPEECH	Pierre Bonnet, Mathilde Bonnefond, & Anne Kösem
Thursday **18h00**	PREFERRED RATES FOR RHYTHMIC ENTRAINMENT ECHOES IN AUDITORY PERCEPTION	Sylvain L'Hermite, & Benedikt Zoefel

SYM9 - UNIFYING PERSPECTIVES ON PROACTIVE AND REACTIVE CONTROL TO UNCOVER PROMISE AND CHALLENGES OF THE DICHOTOMY

Symposium – Auditorium 2C – Chair: Giacomo Spinelli

Thursday **16h40**	EXAMINING THE RESOURCE REQUIREMENTS OF PROACTIVE AND REACTIVE CONTROL IN THE STROOP TASK USING A CONCURRENT WORKING-MEMORY LOAD	Giacomo Spinelli, & Simone Sulpizio
Thursday **17h00**	PROACTIVE AND REACTIVE CONTROL IN AGING BY MEANS OF THE DISTRACTOR CONTEXT MANIPULATION IN VISUAL SEARCH	Roberta Daini, & Marco Petilli
Thursday **17h20**	PROACTIVE AND REACTIVE CONTROL BEYOND PERFORMANCE IN THE AX-CPT: INSIGHTS INTO PROACTIVE RESPONSE PROCESSES	Corentin Gonthier, & Agnès Blaye
Thursday **17h40**	THE MULTIVARIATE SPATIO-TEMPORO-SPECTRAL SIGNATURES OF COGNITIVE CONTROL REPRESENTATIONS: AN EEG REPRESENTATIONAL SIMILARITY ANALYSIS STUDY	Giada Viviani, Antonino Visalli, Antonino Vallesi, & Ettore Ambrosini
Thursday **18h00**	WHEN PROACTIVE IS REACTIVE AND REACTIVE IS PROACTIVE	Senne Braem

SYM10 - HOLDING INFORMATION IN MIND: THE CONTRIBUTION OF ACTION-PLANNING AND NON-MNEMONIC PROCESSES TO WORKING MEMORY PERFORMANCE

Symposium – Auditorium 1 – Chair: Candice Morey

Thursday **16h40**	NONWORD REPETITION: EVIDENCE FOR A KEY ROLE FOR ARTICULATORY PLANNING	Rob Hughes, Hannah Harvey, & Jennifer Mills
Thursday **17h00**	THE DEVELOPING IMPACT OF VERBAL LABELS ON VISUAL MEMORIES IN CHILDREN	Clara Overkott, Alessandra S. Souza, & Candice C. Morey
Thursday **17h20**	PREPARE FOR THE UNKNOWN: LINKING WORKING MEMORY AND PREPARATION FOR ANTICIPATED ACTIONS	Marlene Rösner, Melinda Sabo, Laura-Isabelle Klatt, Edmund Wascher, & Daniel Schneider
Thursday **17h40**	WHAT MECHANISMS CONTROL THE STRENGTH OF RELEVANT AND IRRELEVANT CONTENT IN WORKING MEMORY	Hannah Dames, Vencislav Popov, & Klaus Oberauer
Thursday **18h00**	AN ADVERSARIAL COLLABORATION: CONTRASTING TWO EXPLANATIONS FOR THE EFFECT OF WORKING MEMORY LOAD ON PROCESSING TASKS	David Greeno, Candice C. Morey, & Vencislav Popov

SYM11 - DEFYING THE STANDARDS OF COGNITION: WHAT ABOUT EVOLUTION? [TAKE 1]

Symposium – Room 250 – Chair: Josefa Pandeirada

Thursday **16h40**	THE CASE AGAINST EVOLUTIONARY COGNITIVE ANALYSIS	James S. Nairne
Thursday **17h00**	HOW DOES SURVIVAL PROCESSING AFFECT STORAGE AND RETRIEVAL PROCESSES?	Meike Kroneisen, & Edgar Erdfelder
Thursday **17h20**	THE ANIMACY EFFECT ON MEMORY: A TEST OF THE RICHNESS-OF-ENCODING ACCOUNT	Gesa Fee Komar, Laura Mieth, Axel Buchner, & Raoul Bell
Thursday **17h40**	(DIS)ENTANGLING THE ANIMACY EFFECT IN PROSPECTIVE MEMORY	Sara B. Félix, Marie Poirier, James S. Nairne, & Josefa N. S. Pandeirada
Thursday **18h00**	DO ANIMACY AND EMOTIONS GO HAND-BY-HAND ON WORD PROCESSING?	Pilar Ferré, Montserrat Comesaña, Sara B. Félix, & Josefa N. S. Pandeirada

SYM12 - BEYOND THE TRIED AND TRUE: MOVING BILINGUAL LANGUAGE PRODUCTION RESEARCH FORWARD

Symposium – Room 254 – Chair: Alex Titus

Thursday **16h40**	THE INFLUENCE OF PRIOR LANGUAGE CONTEXT ON BILINGUAL LANGUAGE PRODUCTION	Mathieu Declerck
Thursday **17h00**	THE EFFECT OF SENTENCE CONTEXT AND CONVERSATION PARTNER ON BILINGUAL LANGUAGE CHOICE AND SWITCHING	Angela de Bruin, & Veniamin Shiron
Thursday **17h20**	CONVERSATIONAL LANGUAGE SWITCHING	Kalinka Timmer, & Zofia Wodniecka
Thursday **17h40**	BILINGUAL SWITCHING BETWEEN LANGUAGES AND LISTENERS IN IMMERSIVE VIRTUAL REALITY	Alex Titus
Thursday **18h00**	SWITCHING BETWEEN LISTENERS DURING BILINGUAL LANGUAGE PRODUCTION	David Peeters, & Ton Dijkstra

Friday, 08 September 2023

09h00 to 10h20

SYM13 - SLEEP AND THE CONSOLIDATION AND UPDATING OF LINGUISTIC KNOWLEDGE

Symposium – Auditorium 2A – Chair: Nicolas Dumay

Friday **09h00**	VIEWING GENERAL MODELS OF MEMORY THROUGH THE LENS OF FIRST AND SECOND LANGUAGE NOVEL WORD LEARNING IN ADULTS	Debra Titone, & Pauline Palma
Friday **09h20**	HOW ACTIVE ARE SUBLEXICAL AND LEXICAL REPRESENTATIONS, 12 HOURS AFTER THEY HAVE BEEN USED TO UNDERSTAND SPEECH?	Arthur G. Samuel, & Nicolas Dumay
Friday **09h40**	THE INTERACTION OF LANGUAGE AND SLEEP: WHERE WILL IT END?	Gareth Gaskell
Friday **10h00**	L2 WORD LEARNING IN CHILDREN, FROM A NEUROCOGNITIVE PERSPECTIVE	Atsuko Takashima, Clara Ekerdt, Willeke Menks, Guillén Fernández, James McQueen, & Gabriele Janzen
Friday **10h20**		

SYM14 - APPLYING COMPUTATIONAL METHODS IN READING AND VISUAL WORD RECOGNITION RESEARCH

Symposium – Auditorium 2B – Chair: Jana Hasenäcker

Friday **09h00**	A NETWORK SCIENCE APPROACH TO ORTHOGRAPHIC NEIGHBORHOOD DYNAMICS AND LEXICAL TUNING IN READING DEVELOPMENT	Jana Hasenäcker, & Sascha Schroeder
Friday **09h20**	LANGUAGE MODELS EXPLAIN WORD READING TIMES BETTER THAN EMPIRICAL PREDICTABILITY	Markus J. Hofmann, Lars Kuchinke, & Ralf Radach
Friday **09h40**	THE MEANING OF WUG: HOW TO CAPTURE SEMANTIC EFFECTS IN PSEUDOWORD READING	Marco Marelli
Friday **10h00**	THE LEXICAL CATEGORIZATION TRAINING: USING NEURO-COGNITIVE MODELS AND MACHINE LEARNING TO INCREASE THE READING SPEED OF LANGUAGE LEARNERS	Klara Gregorová, & Benjamin Gagl
Friday **10h20**	MEASUREMENT RELIABILITY OF INDIVIDUAL DIFFERENCES IN SENTENCE PROCESSING	Lena A. Jäger

SYM15 - STATISTICAL MODELING OF TRAINING-RELATED COGNITIVE CHANGES

Symposium – Auditorium 2C – Chair: Tanja Könen

Friday **09h00**	DAILY EFFECTS IN WORKING-MEMORY TRAINING IN ELEMENTARY SCHOOL CHILDREN	Tanja Könen
Friday **09h20**	TRAINING EXECUTIVE FUNCTIONS IN CHILDREN FROM DISADVANTAGED BACKGROUNDS: A LATENT CHANGE SCORE APPROACH	Verena E. Johann, Maki Kubota, Candice C. Morey, Nicolas Chevalier, & Julia Karbach
Friday **09h40**	THE IMPACT OF COGNITIVE TRAINING ON PERCEPTUAL DECISION-MAKING: A DIFFUSION MODEL APPROACH	Alice Reinhartz, Tilo Strobach, Thomas Jacobsen, & Claudia C. von Bastian
Friday **10h00**	AUTONOMY IN TRAINING SCHEDULES IS BENEFICIAL FOR ON-TASK LEARNING: IMPLICATIONS FOR THE DISTRIBUTION OF COGNITIVE TRAINING SESSIONS	Domenico Tullo, John M. Cote, Yi Feng, Anja Pahor, Yue J. He, Aaron R. Seitz, & Susanne M. Jaeggi
Friday **10h20**	A MACHINE LEARNING APPROACH TO PREDICT COGNITIVE TRAINING TRAJECTORIES	Yi Feng, Martin Buschkuehl, & Susanne M. Jaeggi

SYM16 - FEATURES, OBJECTS, AND FEATURE BINDING IN WORKING MEMORY

Symposium – Auditorium 1 – Chair: Laura-Isabelle Klatt

Friday **09h00**	ROLE OF LOCATION IN BINDING FEATURES IN VISUAL WORKING MEMORY	Suaad Said Al Hadhrami, Lea Bartsch, & Klaus Oberauer
Friday **09h20**	ROLE OF TIME IN BINDING FEATURES IN VISUAL WORKING MEMORY	Paul Bays, Sebastian Schneegans, & Jessica M V McMaster
Friday **09h40**	THE AUTOMATICITY OF FEATURE BINDING IN WORKING MEMORY	Hiu Wah Cheung, Nicolas Geeraert, & Vanessa M. Loaiza
Friday **10h00**	ENCODING AND STORAGE OF CROSS-MODAL FEATURES IN WORKING MEMORY: A MULTISENSORY PERSPECTIVE ON THE BINDING PROBLEM	Laura-Isabelle Klatt, Ceren Arslan, Stephan Getzmann, Edmund Wascher, & Daniel Schneider
Friday **10h20**	THE ROLE OF MEANINGFULNESS IN VISUAL WORKING MEMORY: REAL-WORLD OBJECTS PROVIDE AN EFFECTIVE SCAFFOLD FOR REMEMBERING SIMPLE VISUAL FEATURES	Viola Störmer

SYM17 - BILINGUAL LEXICO-SYNTACTIC PROCESSING: RECENT UPDATES ON LEXICAL ACCESS, CODE-SWITCHING AND LANGUAGE ATTRITION

Symposium – Room 250 – Chair: Montserrat Comesaña

Friday **09h00**	WHEN ANOTHER LANGUAGE MEANS ANOTHER GENDER: HOW ARE THE MASCULINE AND FEMININE VALUES ENCODED DURING BILINGUAL LEXICAL ACCESS?	Ana Rita Sá-Leite
Friday **09h20**	THE HOW AND THE WHEN OF SEMANTIC ILLUSIONS IN FIRST AND SECOND LANGUAGES	Montserrat Comesaña, Ana Isabel Fernandes, Cristina Flores, Juliana Novo, Ana María Bautista, Juan Haro, & Pilar Ferré
Friday **09h40**	CODE-SWITCHING IN NEURODEVELOPMENTAL CONDITIONS: A SCOPING REVIEW	Carmen Parafita, & Drasko Kašćelan
Friday **10h00**	ON DOMINANCE SHIFT, LANGUAGE ATTRITION AND LANGUAGE REACTIVATION IN BILINGUAL RETURNEES	Cristina Flores, Chao Zhou, & Carina Eira
Friday **10h20**	Discussion	

SYM18 - MAPPING MULTIPLE DIMENSIONS IN THE HUMAN NEOCORTEX

Symposium – Room 254 – Chair: Zohar Tal

Friday **09h00**	THE NEURAL ORGANIZATION OF VISUAL INFORMATION IN THE AUDITORY CORTEX OF THE CONGENITALLY DEAF	Zohar Tal
Friday **09h20**	MODELLING EYE-POSITION DEPENDENT GAIN FIELDS AT 7T	Alessio Fracasso
Friday **09h40**	NEURAL AND BEHAVIOURAL SIGNATURES OF THE MULTIDIMENSIONALITY OF OBJECT PROCESSING	Jorge Almeida
Friday **10h00**	CONTENTOTOPIC MAPPING: TOPOGRAPHIC ORGANIZATION OF OBJECT MANIPULATION INFORMATION	Stephanie Kristensen
Friday **10h20**	DISCUSSION	Zohar Tal

10h20 to 12h00

POSTER SESSION II

COGNITIVE DEVELOPMENT

1	PHYSICAL FITNESS DIFFERENTLY AFFECTS COGNITIVE FUNCTIONS ACROSS THE ADULT LIFESPAN	Patrick D. Gajewski, Klaus Golka, Jan G. Hengstler, Thura Kadhum, Jan Digutsch, Erhan Genç, Edmund Wascher, & Stephan Getzmann
2	SYNTACTIC ABILITY: DOES IT REALLY DECLINE DURING HEALTHY AGING? AN FMRI STUDY	Gioia Bulzomì, Federico Gallo, Davide Fedeli, Nicola Del Maschio, & Jubin Abutalebi
3	OPENNESS TO EXPERIENCE, A PERSONALITY TRAIT THAT REDUCES SUSCEPTIBILITY TO MEMORY AGE-BASED STEREOTYPE THREAT	Badiâa Bouazzaoui, Séverine Fay, Emilie Alibran, Léa Martinez, Nolwenn Kherardy, Tugba Onsekiz, & Laurence Taconnat
4	EFFECT OF PHYSICAL AND COGNITIVE STIMULATION IN A SOCIALLY ENRICHED ENVIRONMENT ON OLDER PEOPLE'S COGNITIVE ABILITIES	Gonnord Tiphanie, Esnard Catherine, Boucard Geoffroy, & Clarys David
5	EFFECTS OF DEAFNESS CHARACTERISTICS AND PRINT EXPOSURE ON LITERACY SKILLS IN ORALLY EDUCATED DEAF CHILDREN	Stéphanie Colin, Jean Ecalle, & Annie Magnan
6	IMPROVING READING THROUGH VISUAL SALIENCY: A REMEDIAL TOOL FOR NEURODEVELOPMENTAL DISORDERS	Marie Vernet, Bernard Lété, Jérémy Danna, Delphine Massendari, Yves Chaix, & Stéphanie Ducrot
7	THE IMPACT OF THE VIRTUAL CONTEXT ON THE THEORY OF MIND ABILITY OF PRE-SCHOOLERS	Ildikó Király, Alexandra Kelemen, & Krisztina Andrási

ATTENTION

8	THE EFFICIENCY OF ATTENTIONAL NETWORKS IN TAKOSTUBO SYNDROME	Francesca Favieri, Giuseppe Forte, Andrea Marotta, Luca Arcari, Luca Cacciotti, & Maria Casagrande
9	ATTENTIONAL ORIENTING TO SOCIAL CUES HELD IN WORKING MEMORY: A PARADIGM OF INTERNAL SOCIAL ATTENTION?	Luca Cammisa, & Anna Pecchinenda
10	CUE-TARGET UNCERTAINTY MODULATES ATTENTION CONTROL: EXAMINING THE ROLE OF CURIOSITY	Seema Prasad, & Bernhard Hommel
11	DOES PREPARATION REDUCE THE EFFECTS OF FEATURE BINDING WHEN SWITCHING AUDITORY ATTENTION?	Amy Strivens, Elena Benini, Andrea M. Philipp, Iring Koch, & Aureliu Lavric
12	EXPLORING THE ROLE OF MIND WANDERING AND EXECUTIVE CONTROL IN THE VIGILANCE DECREMENT: A STUDY USING THE ANTI-VEA TASK	Maria Julieta Aguirre, Elisa Martín-Arévalo, Juan Lupiáñez, Pablo Barttfeld, & Fernando G. Luna
13	THE ANTI-VEA-UGR: A NEW PUBLIC TOOL FOR THE ONLINE ASSESSMENT OF THE ATTENTIONAL NETWORKS AND VIGILANCE	Laura Trujillo, Paulina del Carmen Martín-Sánchez, Tao Coll-Martín, Rafael Román-Caballero, M. Concepción Castellanos, & Juan Lupiáñez
14	DYNAMICS OF FUNCTIONAL CONNECTIVITY WHILE ATTENDING TO TO-BE-DISCRIMINATED OR TO-BE-DETECTED VISUAL STIMULI	Bartłomiej Panek, Dariusz Asanowicz, & Rob H.J. van der Lubbe
15	PERIPHERAL CUEING AND ALERTNESS MODULATION OVER SPATIAL INTERFERENCE: SHARED AND SPECIFIC ATTENTIONAL MECHANISMS TRIGGERED BY GAZE AND ARROWS	Renato Ponce, Rafael Román-Caballero, María Casagrande, Andrea Marotta, & Juan Lupiáñez
16	INFLUENCE OF EMOTION-ASSOCIATED SALIENT FEATURES ON VISUAL ATTENTION CAPTURE	Tanisha Arya, & Meera Mary Sunny
17	DECODING ATTENTIONAL BREADTH AND SELECTION FROM TARGET-EVOKED ACTIVITY	Ana Vilotijević, & Sebastiaan Mathôt

COGNITIVE CONTROL

18	WHAT TRIGGERS TASK CONFLICT? EVIDENCE FROM THE STROOP TASK	Eldad Keha, & Eyal Kalanthroff
19	EFFECTS OF A DYNAMICALLY CHANGING RESPONSE SET OVERLAP ON N – , REPETITION COSTS	Juliane Scheil, & Thomas Kleinsorge
20	TESTING THE SPECIFICITY OF CONTROL ADAPTATIONS: EVIDENCE FOR A CONFLICT-SPECIFIC CONTROL PREPARATION	Nicola Vasta, Barbara Treccani, & Claudio Mulatti
21	EFFECTS OF INTERRUPTION FREQUENCY ON THE PERFORMANCE IN A VISUAL SEARCH TASK	Tara Radovic, Torsten Schubert, Tobias Rieger, & Dietrich Manzey

22	THE IMPACT OF PREFRONTAL HIGH-DEFINITION TRANSCRANIAL DIRECT CURRENT STIMULATION (HD-TDCS) ON CONFLICT RESOLUTION AND ITS PHENOMENOLOGICAL DYNAMICS	Víctor Martínez Pérez, Clara Alameda, Elisa Martín-Arévalo, Luis J. Fuentes, Tristán A. Bekinschtein, Miguel A. Fernández-del-Olmo, Daniel Sanabria, & Antonio Luque-Casado
23	THE ROLE OF MUSIC IN MALADAPTIVE DAYDREAMING	Laura Ferreri, Lilya Abergel, Ilaria Bufalari, & Marco Sperduti
DECISION MAKING		
24	FREEDOM OF CHOICE INTENSIFIES THE NEURAL PROCESSING OF BOTH POSITIVE AND NEGATIVE FEEDBACK DURING REINFORCEMENT LEARNING	Maren Giersiepen, Simone Schütz-Bosbach, & Jakob Kaiser
25	TRUST, TRUSTWORTHINESS, AND APPROPRIATE RELIANCE IN THE CONTEXT OF AI. WHAT ARE WE ACTUALLY TALKING ABOUT?	Tobias Peters, Roel Visser, Barbara Hammer, & Ingrid Scharlau
26	HUMANS AS INTUITIVE CLASSIFIERS	Ido Erev
27	INVESTIGATING THE DECISION-MAKING PROCESSES FOR NON-FUNGIBLE TOKENS BASED ON THE CONSTRUAL LEVEL THEORY	Shih-Yu Lo, Jie-Yu Tsai, & Chung-Wei Kuo
28	UNCERTAINTY AND CHANGE-POINT DETECTION DURING DECISIONS UNDER UNCERTAINTY MODULATE PUPIL-LINKED AROUSAL DIFFERENTLY IN YOUNG AND OLDER ADULTS	Maria J. Ribeiro, Nádia Canário, Susana Mouga, Inês Bernardino, Carolina Sousa, Sofia Marcos, Hugo Quental, Miguel Castelo-Branco, Joshua Calder-Travis, Ruud L. van den Brink, & Tobias H. Donner
29	IF I WERE YOU: MINORITIES ARE BETTER THAN MAJORITIES AT IMAGINING THE OTHERS' PERSPECTIVE	Dalit Milshtein, Achmad Serhan, & Simone Shamay-Tsoory
30	FRAME AND TREATMENT DECISIONS: IMPACT OF COVID?	Kelly L. Schuller, R. Nathan Pipitone, & Joanna Salapska-Gelleri
EMOTION & MOTIVATION		
31	PROSOCIAL EFFECT OF MORAL ELEVATION OVER CAUSAL ATTRIBUTIONS OF OTHERS' ACTIONS	Ion Yarritu
32	THOUGHTS ABOUT WHAT COULD HAVE HAPPENED AMONG SURVIVORS AFTER TERRORISM – VIVIDNESS AND FREQUENCY OF COUNTERFACTUAL THINKING	Andrea Undset, Grete Dyb, Tine Jensen, Tore Wentzel-Larsen, & Ines Blix
33	INHIBITING MIMICRY DISRUPTS EMOTIONAL AUTHENTICITY PERCEPTION IN LAUGHS AND CRIES	Ricardo F. Vilaverde, Oleksandr V. Horchak, Ana P. Pinheiro, Sebastian Korb, & César F. Lima
34	AFFECTIVE ATTITUDES TOWARD SUSTAINABILITY: THE ROLE OF MINDFULNESS, HEARTFULNESS, CONNECTEDNESS TO NATURE AND PROSOCIALNESS	Annica Winkelmair, Markus Siebertz, Leonardo Jost, Franziska Anna Schroter, Christopher Timm Johannes Bartenschlager, & Petra Jansen
35	ABSTRACTNESS OF PAINTING STYLE AFFECTS AFFECTIVE PRIMING ON AESTHETIC PREFERENCE.	Tomohiro Fukunaga, Yuma Taniyama, Teruyuki Inoue, Shigeki Nakauchi, Kyoko Hine, & Tetsuto Minami
36	CAN A NEGATIVE EMOTIONAL STATE INFLUENCE OUR VISUAL PERSPECTIVE-TAKING LEVEL , ABILITY?	Alaitz Intxaustegi, Francesc Sidera, Thomas Castelain, & Elisabet Serrat
37	DOES BLINDNESS AFFECTS EMOTIONAL AUTHENTICITY PERCEPTION? BEHAVIORAL AND ERP INSIGHTS	João Sarzedas, César F. Lima, Ana P. Pinheiro, & Tatiana Conde
38	THE AMBIGUITY OF WORDS (ON THE EMOTIONAL SPACES OF VALENCE, ORIGIN, AND ACTIVATION) IN THE N-BACK TASK: BEHAVIORAL AND EYE TRACKING MEASUREMENTS	Adrianna Wielgopolan, & Kamil Imbir
39	THE VALIDATION OF THE EMOTIONAL CLIMATE CHANGE STORIES (ECCS) DATABASE	Dominika Zaremba, Małgorzata Wierzba, Christian A. Klöckner, Jarosław Michałowski, & Artur Marchewka
40	EFFECT OF GENDER AND MOTIVATION ON ACTUAL AND PERCEIVED MENTAL ROTATION PERFORMANCE IN ADOLESCENTS	Martina Rahe, & Linda Schürmann
41	BINDING OF APPROACH-AVOIDANCE GOALS TO STIMULI	Andreas B. Eder, Anand Krishna, Carina Giesen, & Christian Frings
42	THE BENEFICIAL ROLE OF CURIOSITY ON ROUTE MEMORY IN CHILDREN	Yadurshana Sivashankar, Myra Fernandes, & Hélène Sauzéon
43	DO WE PUNISH WHAT IS MORALLY WRONG OR WHAT IS UNCOMMON? THE EFFECT OF A DESCRIPTIVE COOPERATION NORM ON PUNISHMENT	Ana Philippsen, Laura Mieth, Axel Buchner, & Raoul Bell
44	LOOK ME IN THE EYE – HOW SOCIO-EMOTIONAL CUES INFLUENCE OUR DECISIONS	Anna Fischer, Darius Lewen, Vladislav Ivanov, Johannes Ruß, Igor Kagan, Viola Priesemann, Lars Penke, Alexander Gail, & Anne Schacht

HIGHER COGNITIVE FUNCTIONS

45	INABILITY TO DISSOCIATE ALCOHOL OR DRUG CONSUMPTION FROM DRIVING. EFFECT OF DRIVING EXPERIENCE AND RELATIONSHIP WITH VIOLATIONS, ERRORS AND LAPSES.	Andreea I. Dinu, Pablo Doncel, Francisca Padilla, & Candida Castro
46	THE DOMAIN-SPECIFIC VS. DOMAIN-GENERAL NATURE OF RESISTANCE TO INTERFERENCE ? AN AGING STUDY	Coline Grégoire, & Steve Majerus
47	PERCEPTUAL ORIENTATION AND LEGITIMACY OF INTERPERSONAL CUES TO ENDANGERMENT (P.O.L.I.C.E.)	Harry Piper, & Dr. Paloma Mari-Beffa
48	GAIN-LOSS FRAMING EFFECTS OF RISK-AVERSE OR RISK-SEEKING CHOICES ARE ELIMINATED BY A HUMAN EXPERT BUT NOT AN ARTIFICIAL INTELLIGENCE'S RECOMMENDATION	Xinyue Dai, Mark T. Keane, Laurence Shalloo, Elodie Ruelle, & Ruth M. J. Byrne
49	DO DIFFERENCES IN SOCIAL STATUS MODULATE RETRIEVAL OF OBSERVATIONALLY ACQUIRED STIMULUS-RESPONSE BINDINGS?	Kira Franke, & Carina G. Giesen
50	TAKE YOUR TIME: SLOW BRAIN RHYTHMS PREDICT FLUID INTELLIGENCE	Michał Ociepka, Patrycja Kałamała, & Adam Chuderski
51	INFLUENCES FROM FORCED EFFORT ON SEMANTIC INFERENCE DURING CROSS-SENTENCE PROCESSING	Jin Yimeng, Ma Chunyu, You Junpeng, & Johan Lauwereyns

BILINGUALISM

52	IS INTERPRETER ADVANTAGE A GIFT OR AN EFFECT OF TRAINING: THE RELATIONSHIP BETWEEN EXECUTIVE FUNCTION AND TASK PERFORMANCE IN INTERPRETING TRAINING	Xueni Zhang, Binghan Zheng, Rui Wang, & Haoshen He
53	THE EFFECT OF L,-L, SIMILARITY IN L, PREDICTION: EVIDENCE FROM VISUAL-WORLD EYE-TRACKING STUDY	Binger Lu, Robert Hartsuiker, & Hang Wei
54	THE TIME COURSE OF MORAL DECISION MAKING IN A NATIVE AND A FOREIGN LANGUAGE	Susanne Brouwer
55	DOES STUDYING IN A SECOND LANGUAGE HINDER LEARNING MONITORING?	Marta Reyes Sánchez, M. Julia Morales Castillo, & M. Teresa Bajo Molina
56	LINGUISTIC TYPOLOGY, METACOGNITION, AND DECISION-MAKING	Leona Polyanskaya, & Mikhail Ordin
57	INDIVIDUAL DIFFERENCES IN THE IFOF EXPLAIN BILINGUALS' ABILITY TO REVISE AN UNEXPECTED INTERPRETATION DURING TEXT COMPREHENSION: A MRI STUDY	Ana I. Pérez, Elisa Martín-Arévalo, & Teresa Bajo
58	LEXICAL ALIGNMENT DOES MAKE SPEAKING EASIER FOR BILINGUALS EVEN IN THE FACE OF INTERFERENCE	Diana Uribe, Anahy Barragan, & Iva Ivanova

LANGUAGE

60	THE INFLUENCE OF COGNITIVE ABILITIES ON SECOND LANGUAGE LEARNING.	Stavroula Gkountroumpi, Patricia Román, & María Julia Morales Castillo
61	INVESTIGATING SOCIAL GROUNDING OF ABSTRACT WORDS	Daria Goriachun, Kristof Strijkers, Núria Gala, & Johannes Ziegler
62	THE EFFECT OF MORPHOLOGY ON SPELLING ACCURACY AND SPELLING CONSISTENCY: A STUDY ON GREEK CHILDREN WITH SPELLING DIFFICULTIES.	Kleopatra Diakogiorgi, & Evangelia-Jessica Pantazopoulou
63	IS FOREIGN-ACCENTED SPEECH LESS CREDIBLE? EVIDENCE FROM THE ILLUSORY TRUTH EFFECT	Anna Lorenzoni, Rita Faccio, & Eduardo Navarrete
64	WORD DIFFICULTY, BUT NOT SENTENCE BOUNDARIES DETERMINE THE ACCURACY OF REGRESSIVE SACCADES IN READING	Ralph Radach, Anne Friede, Christian Vorstius, & Albrecht Inhoff
65	EYE MOVEMENTS IN FRENCH DYSLEXIC ADULTS DURING READING ALOUD TEXTS OF DIFFERENT DECODING DIFFICULTY	Aikaterini Premeti, Frédéric Isel, & Maria Pia Bucci
66	DOES SEMANTIC DISTANCE AFFECT READING? AN EYE-TRACKING STUDY ON SPANISH	Mariia Baltais, & Robert Hartsuiker
67	REGULARITY IN EYE MOVEMENT DATA PREDICTS COMPREHENSION DURING TEXT READING	Monika Tschense, & Sebastian Wallot

68	THE EFFECTS OF LOCAL AND GLOBAL ALPHABET CONTEXT ON CODE SWITCHING IN WORD RECOGNITION	Dušica Filipović Đurđević, & Laurie Beth Feldman
69	NEIGHBORS (AND OTHER FACTORS) -- BUT NOT COHORTS -- PREDICT SPOKEN WORD RECOGNITION PERFORMANCE IN DECISION TASKS	James S. Magnuson, David Saltzman, Sahil Luthra, Anne Marie Crinnion, Samantha Grubb, Giovanni Peraza-Santiago, Purna Dalal, Jonathan Daniel, & Boyu Xie
70	COMPARING PHONEME CATEGORIES BETWEEN PRODUCTION AND PERCEPTION IN WORD PRODUCTION WITH FMRI	Xenia Dmitrieva, Amie Fairs, Bissera Ivanova, Elin Runnqvist, Bruno Nazarian, Julien Sein, Jean-Luc Anton, Friedemann Pulvermüller, Sophie Dufour, & Kristof Strijkers
71	MULTIMODAL INFORMATION CONTRIBUTION TO LANGUAGE COMPREHENSION IN NATURALISTIC SETTINGS: EEG EVIDENCE	Ye Zhang, Yumeng Wang, Diego Frassinelli, Martín Antúnez, Dicky Lim, Michi Aneez, Keyue Chen, & Gabriella Vigliocco
72	A PROPOSED UNIFICATION OF GOOD-ENOUGH AND NOISY CHANNEL LANGUAGE PROCESSING APPROACHES	Kiel Christianson, Jack Dempsey, Maria Goldshtein, & Laurel Brehm
73	NEURAL SIGNATURES OF LEXICAL ALIGNMENT IN NATIVE AND NON-NATIVE VERBAL INTERACTIONS	Cristina Baus, Alice Foucart, & Giusy Cirillo
74	HILEX – A QUICK TEST TO MEASURE LEXICAL PROFICIENCY IN HINDI	Niket Agrawal, & Ark Verma
75	PHONOLOGICAL PROCESSES IN WILLIAMS SYNDROME: STRENGTHS OR WEAKNESSES? A SYSTEMATIC REVIEW.	Amandine Hippolyte, Steve Majerus, & Laure Ibernon
76	EXPLORING THE ROLE OF INTERLOCUTOR IDENTITY ON SOCIAL ATTENTION	Anna Lorenzoni, Giulia Calignano, Mario Dalmaso, & Eduardo Navarrete
77	INVARIANT REPRESENTATIONS IN GROUNDED COGNITION THEORIES: THEORY AND EVIDENCE	Jannis C. Friedrich, Markus Raab, & Laura Voigt
78	LANGUAGE USE INFLUENCES IMMANENT JUSTICE THINKING	Janet Geipel, Constantinos Hadjichristidis, & Luca Surian
79	HEMISPHERIC BRAIN-RHYTHM ASYMMETRIES IN SPEECH-IN-NOISE COMPREHENSION	Tanja Atanasova, & Anne Keitel
LEARNING		
80	HOW DOES THE MODULATION OF DORSOLATERAL PREFRONTAL CORTEX BY NON-INVASIVE BRAIN STIMULATION AFFECT THE RETRIEVAL OF PROBABILISTIC SEQUENCE KNOWLEDGE	Laura Szücs-Bencze, Teodóra Vékony, Orsolya Pesthy, Nikoletta Szabó, & Dezso Nemeth
81	INTACT PREDICTIVE PROCESSING IN AUTISTIC ADULTS – A STATISTICAL LEARNING STUDY	Orsolya Pesthy, Kinga Farkas, Laurie-Anne Sapey-Triomphe, Anna Guttengéber, Eszter Komoróczy, Karolina Janacsek, János M. Réthelyi, & Dezso Nemeth
82	DISSECTING TEMPORAL PREPARATION: NEUROPHYSIOLOGICAL AND COMPUTATIONAL EVIDENCE FOR ITS UNDERLYING COGNITIVE STEPS	Wouter Kruijne, Martijn Meeter, Josh M. Salet, & Sander A. Los
83	THE EFFECT OF WORD FAMILIARITY ON SPACED LEARNING ACROSS TIME	Melina L. Knabe, & Haley A. Vlach
84	STIMULUS-RESPONSE BINDINGS AS A SOURCE OF CONTINGENCY LEARNING; CONTINGENCY AWARENESS AS A SOURCE OF EVALUATIVE CONDITIONING	Carina G. Giesen
MEMORY		
85	IMAGERY AND VERBAL STRATEGIES IN MEMORY RECALL OF SPATIAL DESCRIPTIONS	Ioanna Markostamou
86	SEARCHING AMONG MEMBERS OF A SUPERORDINATE CATEGORY INCREASES HITS AND FALSE ALARMS DURING RECOGNITION TASK	Ivan Aslanov, & Alexey Kotov
87	FACTORS RELATED TO CORRECT AND FALSE RECALL AND RECOGNITION OF A SET OF 55 LISTS OF ,0 WORDS: A MEGA-STUDY	Emiliano Díez, Mª Angeles Alonso, Dominika Zofia Wojcik, Antonio M. Díez-Álamo, & Angel Fernandez
88	THE TEMPORAL COMPRESSION OF EXPERIENCE IN MEMORY: THE EFFECTS OF THE NUMBER AND DURATION OF EVENTS	Nathan Leroy, Steve Majerus, & Arnaud D'Argembeau
89	DISENTANGLING THE EFFECTS OF LINEUP SIZE ON THE COGNITIVE PROCESSES UNDERLYING EYEWITNESS IDENTIFICATION DECISIONS USING MULTINOMIAL MODELING	Nicola Marie Menne, Kristina Winter, Raoul Bell, & Axel Buchner
90	THE PROCESS-SENSITIVITY OF THE CHANGING-STATE EFFECT	Philipp Radloff, & Judith Schweppe

91	USING OBJECTIVE AND SUBJECTIVE MEASURES TO REVEAL QUALITATIVE DIFFERENCES BETWEEN MNEMONIC EFFECTS OF OVERT AND COVERT RETRIEVAL	Jasmine Sagi, & Ainat Pansky
92	PROMOTING RESILIENCE: INVESTIGATING INDIVIDUAL DIFFERENCES IN THE ABILITY TO CONTROL INTRUSIVE MEMORIES	Stephanie Ashton, & Conny Quaedflieg
93	THE REASONS FOR WITNESSES SUCCUMBING TO MISINFORMATION HEARD FROM OTHER WITNESSES: VERIFYING THE MECHANISMS OF THE MEMORY CONFORMITY EFFECT	Magdalena Kękuś, Romuald Polczyk, Hiroshi Ito, Kazuo Mori, & Krystian Barzykowski
94	INDIVIDUAL DIFFERENCES IN RETENTION OF NOVEL WORDFORMS LEARNED THROUGH AUDITORY STATISTICAL LEARNING	Christophe Vanhouwe, & Louisa Bogaerts
95	MEMORY AND LISTENING EFFORT IN TWO-TALKER CONVERSATIONS: DOES FACE VISIBILITY HELP US REMEMBER?	Chinthusa Mohanathasan, Jonathan Ehret, Cosima A. Ermert, Janina Fels, Torsten W. Kuhlen, & Sabine J. Schlittmeier
96	PERSONAL LIKELIHOOD AND EVENT FAMILIARITY INFLUENCE THE SIMULATION OF FUTURE EVENTS	Claudia Morales-Valiente, & Ken McRae
97	THE SELF AS A MEMORY HOOK: AN UP-TO-DATE META-ANALYSIS ON THE SELF-REFERENCE EFFECT	Julia Englert, Christine Wilhelm, & Nexhmedin Morina

WORKING MEMORY

98	SEQUENTIAL VERSUS SIMULTANEOUS PRESENTATION OF MEMORANDA IN VERBAL WORKING MEMORY: (HOW) DOES IT MATTER?	Laura Ordonez Magro, Jonathan Mirault, Jonathan Grainger, & Steve Majerus
99	THE EFFECT OF THE LOCI METHOD ON SHORT-TERM MEMORY	Gaën Plancher, Anya Laine, Maximilien Labaronne, & Alessandro Guida
100	A SEMANTIC STRATEGY TRAINING INTERVENTION AIMED AT ENHANCING YOUNG AND OLDER ADULTS' VISUAL WORKING MEMORY CAPACITY.	Louise A. Brown Nicholls, & Rebecca Hart
101	THE IMPACT OF TEST LANGUAGE ON SHORT-TERM MEMORY IN A MULTILINGUAL SETTING: DIGITS VS. NONWORDS	Dzenita Kijamet, & Dr Sonja Ugen
102	INDIVIDUAL DIFFERENCES IN WORKING MEMORY REACTIVATION OF LONG-TERM MEMORIES PREDICT PROTECTION AGAINST ANTICIPATED INTERFERENCE	Nursena Ataseven, Lara Todorova, Duygu Yücel, Berna Güler, Keisuke Fukuda, & Eren Günseli
103	WORKING MEMORY CAPACITY EFFECTS ON EYE MOVEMENTS: READING VS READING SPAN TASK	Polina Shirokova, Anna Izmalkova, & Andriy Myachykov
104	LOOKING-AT-NOTHING AND MEMORY STRENGTH IN WORKING MEMORY	João Vieira, Agnes Rosner, Ruhi Bhanap, & Alessandra S. Souza
105	NEUROPHYSIOLOGICAL MARKERS OF MUSICAL AND VERBAL SHORT-TERM MEMORY: A FUNCTIONAL NEAR-INFRARED SPECTROSCOPY (FNIRS) STUDY	Jeremie Ginzburg, Anne Cheylus, Barbara Tillmann, Annie Moulin, & Anne Caclin
106	THE CONTRIBUTION OF PHONOLOGICAL AS OPPOSED TO SERIAL ORDER SHORT-TERM MEMORY TO SECOND LANGUAGE NEW WORD LEARNING	Qiuzhi Xie, Steve Majerus, & Sami Boudelaa
107	THE IMPACT OF WORKING MEMORY LOAD ON THE SEMANTIC STROOP EFFECT	Simone Sulpizio, Giacomo Spinelli, & Michele Scaltritti
108	EXPLORING CAPACITY LIMITS IN UNCONSCIOUS VISUAL WORKING MEMORY	Amy U. Barton, Fernando Valle-Inclán, Eli McMahill, & Steven A. Hackley
109	HOW WELL DO THE THREE EMBEDDED COMPONENTS OF WORKING MEMORY ACCOUNT FOR THE REASONING AND WORKING MEMORY RELATIONSHIP? A LATENT-VARIABLE ANALYSIS	W. Fred Garvey, Dr. Alicia Forsberg, & Dr. Claudia von Bastian

MOTOR COGNITION

110	INFLUENCE OF COGNITIVE DEMAND PREDICTABILITY ON BALANCE CONTROL	Anton Koger, Iring Koch, Leif Johannsen, & Denise N. Stephan
111	DOES TYPING-RELATED MOTOR EXPERIENCE INFLUENCE THE RETRIEVAL OF ORTHOGRAPHIC INFORMATION? EFFECT OF LETTER CONFIGURATION IN AN ANAGRAM SOLUTION TASK.	Wamain Yannick, Longcamp Marieke, Ott Laurent, & Danna Jérémy
112	ON THE ROLE OF THE RIGHT PREMOTOR CORTEX IN MUSICAL RHYTHM PERCEPTION: A DENSE-TRANSCRANIAL MAGNETIC STIMULATION (TMS) MAPPING APPROACH	Carlotta Lega, Giorgio Lazzari, Stefania La Rocca, Andrea Massironi, Giulio Costantini, Luigi Cattaneo, & Virginia Penhune

113	DEGREE OF VOLUNTARINESS IN ACTION CONTROL AND SENSE OF AGENCY: EVIDENCE FROM MANIPULATING SACCADE AUTOMATICITY	Julian Gutzeit, & Lynn Huestegge
114	RELATIONSHIP BETWEEN HEART AND PULSE RATE VARIABILITY	Vivien Tomacsek, Zita Lilla Róka, & Peter Simor
NUMERICAL COGNITION		
115	HOW DOES THE CONTEXT SHAPE THE SNARC EFFECT? EVIDENCE FROM DIFFERENT TASKS EMPLOYING A CLOCKFACE DISPLAY	Mauro Murgia, Serena Mingolo, Claudia Virginia Manara, Alberto Mariconda, & Valter Prpic
116	COUNT ON THE €URO! INTERFERENCE BETWEEN THE SIZE AND THE VALUE OF THE COINS IN THE JUDGMENT OF THE MONETARY VALUE.	Styliani Politi, Alexander Cruise, Christine Schiltz, & Mathieu Guillaume
117	DOES COGNITIVE LOAD INFLUENCE FLEXIBILITY? A STUDY OF ARITHMETIC REASONING AMONG CHILDREN AND ADULTS	Maelle Dagnogo, Hippolyte Gros, & Evelyne Clément
118	DOES AGE HAVE AN EFFECT ON THE SNARC EFFECT IN TURKISH CHILDREN AGED 4-6 WHO GO TO KINDERGARTEN?	Asena Caglican, Beyza Tunc, Elif Simsek, Nilay Isbilir, & Hakan Cetinkaya
119	INVESTIGATION OF NON-SNARC IN A MAGNITUDE COMPARISON TASK	Eylül Hırlak, Ceyhun Yener, Bade Karınca, Özge Akkoç, & Hakan Çetinkaya
PERCEPTION		
120	PREFERENTIAL GUIDANCE OF FOOT-RELATED MACRO-AFFORDANCES BY NATURALISTIC IMAGES OF MAN-MADE SPATIAL ENVIRONMENTS	Annalisa Tosoni, Emanuele Cosimo Altomare, Rosalia Di Matteo, & Giorgia Committeri
121	AUDIO-VISUAL INTEGRATION DURING KNOWLEDGE ACTIVATION IN REAL-WORLD SCENE PROCESSING	Sara Spotorno, George Tinkler Ganley, & Krystian Ciesielski
122	FACE LEARNING STRATEGIES IN TYPICAL OBSERVERS AND IN DEVELOPMENTAL PROSOPAGNOSIA	Christel Devue, Morgan Reedy, Hazel K. Godfrey, & Tirta Susilo
123	RECOGNISING NEWLY LEARNED FACES ACROSS CHANGES IN AGE	Laura Sexton, Mila Mileva, Graham Hole, Ailsa Strathie, & Sarah Laurence
124	TASK-IRRELEVANT COLOR OR ORIENTATION CHANGE CUES TARGET OBJECT LOCATION EQUALLY WELL	Irina Angelova, & Armina Janyan
125	ONLINE PROCESSING OF NATIVE, DIALECTAL AND FOREIGN ACCENT DURING EXTENDED LISTENING TASKS	Trisha Thomas, Irene Bernardi, Clara D. Martin, & Sendy Caffarra
126	TYPICAL COLOR AFFECTS OBJECT IDENTIFICATION ON GLOBAL/LOCAL PROCESSING	Teruyuki Inoue, Taniyama, Kyoko Hine, Shigeki Nakauchi, & Tetsuto Minami
127	NEURAL UNDERPINNINGS OF SELF-REFERENTIAL PROCESSING: AN EEG/FMRI STUDY OF SELF-FACE AND PERSONAL OBJECT PERCEPTION	Ilona Kotlewska, Krzysztof Bielski, Bartłomiej Panek, & Dariusz Asanowicz
128	THE EFFECT OF INTERNAL AND EXTERNAL VISUALIZATION OF ROTATION ON POSTURAL STABILITY	Leonardo Jost, Markus Siebertz, Philipp Hofmann, & Petra Jansen
129	AN ADVANTAGE BY DYSLEXIC OVER TYPICAL READERS IN THE IMPOSSIBLE FIGURE TASK	Mariona Pascual, Susana Araújo, Julia Stolinska, Sofia Velasco, & Tânia Fernandes
130	TEMPORAL NEURAL DYNAMICS OF EVENT SEGMENTATION AND HOW METACONTROL AFFECTS THIS PROCESS	Xianzhen Zhou, Astrid Prochnow, Foroogh Ghorbani, & Christian Beste
131	SYNCHRONOUS MARCHING IN VR INCREASES INFORMATIONAL CONFORMITY AND SELF-OTHER BLURRING	Manisha Biswas, & Marcel Brass

12h00 to 13h20

T13 - WRITING

Regular Talks – Auditorium 2A – Chair: Rui Alves

Friday **12h00**	THE WRITTEN LANGUAGE NETWORK FROM PROFICIENCY TO DISABILITY: DATA-DRIVEN EVIDENCE FROM A TRANSDIAGNOSTIC DIMENSIONAL GRAPH MODELLING	Elise Lefèvre, Lynne Duncan, Abdessadek El Ahmadi, Pascale Colé, & Eddy Cavalli
Friday **12h20**	A LARGE DATABASE FOR TABOO WORDS IN 14 LANGUAGES	Fritz Günther, Marco Marelli, & Simone Sulpizio
Friday **12h40**	COGNITIVE MODERATORS OF WRITING-INTERVENTION EFFICACY	Naymé Salas, & Mariona Pascual
Friday **13h00**	THE INNER STRUCTURE OF THE WORLD'S WRITING SYSTEMS	Daniel Zagar, & Teng Guo

T14 - COGNITIVE CONTROL I

Regular Talks – Auditorium 2B – Chair: Adam Chuderski

Friday **12h00**	WITHIN-TRIAL CONFLICT-TRIGGERED ADJUSTMENT OF COGNITIVE CONTROL IN THE COMBINED WORD-WORD INTERFERENCE AND STROOP TASK	Patrycja Kałamała-Ligęza, Michał Ociepka, & Adam Chuderski
Friday **12h20**	QUALITY OVER QUANTITY: FOCUSING ON HIGH-CONFLICT TRIALS TO IMPROVE THE RELIABILITY AND VALIDITY OF ATTENTIONAL CONTROL MEASURES	Luca Moretti, Iring Koch, & Claudia von Bastian
Friday **12h40**	EXPLAINING DUAL-ACTION BENEFITS: INHIBITORY CONTROL AND REDUNDANCY GAINS AS COMPLEMENTARY MECHANISMS	Tim Raettig, & Lynn Huestegge
Friday **13h00**	TASK-ORDER REPRESENTATIONS IN DUAL TASKS CAN BE ACTIVATED BY PARTIAL TASK-ORDER INFORMATION	Torsten Schubert, Daniel Darnstaedt, Leif Langsdorf, & Sebastian Kuebler

B3 - LANGUAGE I

Blitz-Talks – Auditorium 2C – Chair: Nuno Sobrinho

Friday **12h00**	BILINGUALS ARE LESS SENSITIVE TO GENDER STEREOTYPE VIOLATIONS IN THEIR SECOND LANGUAGE	Katarzyna Jankowiak, Marcin Naranowicz, Joanna Pawelczyk, & Dariusz Drążkowski
Friday **12h10**	VOCABULARY SIZE MODULATES LINGUISTIC PREDICTION IN ADULT L2 SPEAKERS OF ENGLISH	Giuli Dussias, Lillian Griffin, Teresa Bajo, Priscila López-Beltrán, Katrina Connell, & Manuel Pulido
Friday **12h20**	A SYLLABLE-BASED INTERVENTION TO IMPROVE PHONEMIC AWARENESS AND READING IN CHILDREN WITH DEVELOPMENTAL LANGUAGE DISORDER (DLD)	Maria Vazeux, Perrine Le Nail, & Nadège Doignon-Camus
Friday **12h30**	NOVEL WORD LEARNING, MORPHOLOGY AND STATISTICAL LEARNING	Olga Solaja, & Davide Crepaldi
Friday **12h40**	THE EFFECT OF LOG FORWARD TRANSITIONAL PROBABILITY ON VERB PRODUCTION	Solveig Castelli, Srdjan Popov, Roel Jonkers, & Audrey Bürki,
Friday **12h50**	A CROSSMODAL COMPARISON OF LANGUAGE-BRAIN ENTRAINMENT IN SPOKEN AND SIGNED LANGUAGES	Chiara Luna Rivolta, Brendan Costello, Mikel Lizarazu, & Manuel Carreiras
Friday **13h00**	THE PSYCHOPHYSIOLOGY OF INTERPRETING EMOTIONAL LANGUAGE	Pawel Korpal, Katarzyna Jankowiak, & Lukasz Kaczmarek
Friday **13h10**	DISTINCT COMPONENTS OF STROOP INTERFERENCE AND FACILITATION IN CHINESE: THE ROLE OF PHONOLOGY AND RESPONSE MODALITY	Yicheng Qiu, & Walter van Heuven

B4 - DECISION MAKING II

Blitz-Talks – Auditorium 1 – Chair: João Vieira

Friday **12h00**	ACTION PREDICTION IS BIASED BY CONTEXTUAL CUES IN CHILDREN WITH CEREBRAL PALSY BUT NOT IN CHILDREN WITH DYSPRAXIA	Sara Boscarol, Alessandra Finisguerra, Verusca Gasparroni, Tiziana Zilli, & Cosimo Urgesi
Friday **12h10**	MORAL FLEXIBILITY: METACOGNITIVE PROCESSES OF SOCIAL INFLUENCE ON MORAL JUDGEMENT	André Ricardo Amaral, Mário Ferreira, & Bruno Schiavon
Friday **12h20**	HIGHER EMOTIONAL VALUES OF THE OPTIONS, BUT NOT UTILITARIAN ONES, MAKE MORAL DECISIONS MORE DIFFICULT	Liu Yu
Friday **12h30**	DUAL-TASK ON THE GO: THE EFFECT OF WALKING ON INHIBITORY CONTROL AND DECISION MAKING UNDER RISK	Carlotta Maiocchi, Nicola Canessa, Marta Milanesi, Giulia Mattavelli, Stefania Sozzi, Antonio Nardone, & Claudia Gianelli
Friday **12h40**	THE EFFECTS OF ANXIETY AND ITS INTERPLAY WITH SOCIAL CUES WHEN PERCEIVING AGGRESSIVE BEHAVIORS	Fábio Silva, Marta I. Garrido, & Sandra C. Soares
Friday **12h50**	TO BE ME OR TO BE THE ROBOT? IDENTIFYING VALUES WHICH GUIDE SOCIAL DECISION MAKING IN A MODIFIED VERSION OF THE CYBERBALL GAME	Serena Marchesi, & Agnieszka Wykowska
Friday **13h00**	FRAMING FEEDBACK: HOW FAILURE STILL HARMS LEARNING	André Gonçalves, Leonel Garcia-Marques, & Mário Ferreira
Friday **13h10**	BLINK SYNCHRONIZATION INCREASES OVER TIME AND PREDICTS PROBLEM-SOLVING PERFORMANCE IN VIRTUAL TEAMS	Alexandra Hoffmann, Anna-Maria Schellhorn, & Pierre Sachse

T15 - HIGHER COGNITIVE FUNCTIONS I

Regular Talks – Room 250 – Chair:

Friday **12h00**	NONVERBAL BEHAVIORAL CUES AND PERSONALITY TRAITS IN CONCEALING HOSTILE INTENTIONS	Thebault Guiochon, A., Mortier-Mourzelas, M., Hannoah, M., & Duran, G.
Friday **12h20**	WHY IS OUR OPINION THE ONLY ONE THAT MATTERS? CONFIRMATION BIAS AND SOCIAL APPROVAL CUES IN FAKE NEWS DETECTION ACCURACY AND CREDIBILITY PERCEPTION	Elena Artemenko, Taisia Uliyanova, Maksim Terpilowskii, & Olessia Koltsova
Friday **12h40**	DOES MUSIC TRAINING PROVIDE NON-MUSICAL BENEFITS? EVIDENCE FROM AUDITORY, LINGUISTIC, AND SOCIO-EMOTIONAL PROCESSING	Leonor Neves, Marta Martins, Ana Correia, Daniel Martins, Bogdan Draganski, São Luís Castro, & César Lima
Friday **13h00**		

T16 - MEMORY UPDATING

Regular Talks – Room 254 – Chair: Yoav Kessler

Friday **12h00**	FAST AND OBLIGATORY UPDATING OF ITEMS IN DECLARATIVE AND PROCEDURAL WORKING MEMORY	Yoav Kessler
Friday **12h20**	REMOVAL OF OUTDATED INFORMATION IN WORKING MEMORY UPDATING	Chenyu Li, Gidon Frischkorn, & Klaus Oberauer
Friday **12h40**	FORGETTING IN WORKING MEMORY: DOES INTERFERENCE'S LEVEL OF ATTENTION MATTERS?	Andrea Díaz-Barriga Yáñez, Gaël Malleret, Paul Salin, Stéphanie Mazza, & Gaën Plancher
Friday **13h00**	RECOGNIZED ITEMS RESIST INTENTIONAL FORGETTING: A RETRIEVAL ACCOUNT OF ITEM-METHOD DIRECTED FORGETTING	Pelin Tanberg, & Myra A. Fernandes

T17 - EMOTION I

Regular Talks – Room 252 – Chair: Andrea Kiesel

Friday **12h00**	A NOVEL COGNITION-BASED DIAGNOSTIC SUPPORT-SYSTEM: USING MACHINE-LEARNING ANALYSIS TO DIAGNOSE ANXIETY AND DEPRESSION	Hadas Okon-Singer, Thalia Richter, Barak Fishbain, Eyal Fruchter, & Gal Richter-Levin
Friday **12h20**	COGNITIVE-AFFECTIVE MAPS AS A NOVEL RESEARCH TOOL TO ASSESS ATTITUDES AND BELIEFS	Andrea Kiesel, Lisa Reuter, Julius Fenn, Wilhelm Gros, Sabrina Livanec, Michael Gorki, & Michael Stump
Friday **12h40**	DO BILINGUALS PROCESS EMOTION DIFFERENTLY IN THEIR NON-NATIVE LANGUAGE? IMPACTS OF PROFICIENCY ON WORD PROCESSING ACROSS STIMULUS VALENCE AND AROUSAL	Michelle Stankovic, Britta Biedermann, & Takeshi Hamamura
Friday **13h00**	THE RELATIONSHIP BETWEEN RHYTHMIC ABILITIES AND MUSIC REWARD SENSITIVITY	Eleonora Fullone, Daniele Gatti, Giorgio Lazzati, Luca Rinaldi, Carlotta Lega, & Laura Ferreri

14h20 to 16h20

T18 - LEARNING

Regular Talks – Auditorium 2A – Chair: Judith Schweppe

Friday **14h20**	IS STATISTICAL LEARNING A FIXED INDIVIDUAL ABILITY? USING PREDICTIVE EYE MOVEMENTS TO MEASURE SENSITIVITY TO DIFFERENT LEVELS OF REGULARITIES	Naama Schwartz, Yaara Loyfer, Louisa Bogaerts, Amir Tal, Noam Siegelman, & Ram Frost
Friday **14h40**	THE ROLE OF VARIABLE RETRIEVAL IN EFFECTIVE LEARNING	Katarzyna Zawadzka, Ewa Butowska, & Maciej Hanczakowski
Friday **15h00**	DO PREQUESTIONS SUPPORT LEARNING MORE THAN LEARNING OBJECTIVES?	Judith Schweppe, Philipp Radloff, & Alexander Fenzl
Friday **15h20**	IS THE MAGNITUDE OF THE TESTING EFFECT INFLUENCED BY THE DURATION OF INITIAL RETRIEVAL?	Ainat Pansky, & Jaron Breitman
Friday **15h40**	MIND WANDERING BOOSTS PREDICTIVE PROCESSES	Teodóra Vékony, Bence C. Farkas, Bianka Brezóczki, Matthias Mittner, Gábor Csifcsák, Péter Simor, & Dezso Németh
Friday **16h00**	CHRONOTYPE AND TIME-OF-DAY: NO EVIDENCE FOR DIFFERENTIAL EFFECTS ON CONTROLLED AND AUTOMATIC PROCESSES AT MEMORY RETRIEVAL	Nicolas Rothen

T19 - COGNITIVE AGING II

Regular Talks – Auditorium 2B – Chair: Carina Fernandes

Friday **14h20**	NEUROPHYSIOLOGICAL EXAMINATION OF DECISION-MAKING IN THE AGING BRAIN: AN ERP STUDY FROM DIFFERENT CONTEXTS OF DECISION	Carina Fernandes, Inês Macedo, Fernando Barbosa, & João Marques-Teixeira
Friday **14h40**	OLDER ADULTS CAN CATCH UP WITH YOUNGER ADULTS IN ASSOCIATIVE MEMORY IF THEY IMPROVE MEMORY ENCODING	Sophie Nolden, & Yee Lee Shing
Friday **15h00**	TEMPORAL PREPARATION IN AGING: A DISSOCIATION BETWEEN AUTOMATIC AND CONTROLLED PROCESSES?	Lucie Attout, Giovanna Mionni, Mariagrazia Capizzi, & Pom Charras
Friday **15h20**	AN EXAMINATION OF SEQUENTIAL ANOVAS AS A TOOL FOR RESEARCH ABOUT AGE-RELATED DIFFERENCES IN COGNITIVE PERFORMANCES	Meike Steinhilber, Prof. Dr. Beatrice Kuhlmann, & Prof. Dr. Anna-Lena Schubert
Friday **15h40**	MULTILINGUAL EXPERIENCE AFFECTS RESTING-STATE FUNCTIONAL CONNECTIVITY IN (COGNITIVE) AGING	Vincent DeLuca, Toms Voits, Kirill Elin, Jon Andoni Dunabeitia, Janine Rook, Jubin Abutalebi, & Jason Rothman

T20 - FACE PROCESSING

Regular Talks – Auditorium 2C – Chair: Mario Dalmaso

Friday **14h20**	APPROACHING EMOTIONAL FACES: DIFFERENTIAL ELECTROPHYSIOLOGICAL DYNAMICS FOR FILTERED STIMULI BY LOW AND HIGH SPATIAL FREQUENCIES	Zhou Yu, Eleanor Moses, & Alan Pegna
Friday **14h40**	THE MINIMAL EXPOSURE DURATION REQUIRED FOR DETECTING MEANINGFUL INFORMATION IN HUMAN FACES	Renzo Lanfranco, Andrés Canales-Johnson, Hugh Rabagliati, David Carmel, & Axel Cleeremans
Friday **15h00**	PERCEIVED ETHNIC TYPICALITY MODULATES THE OWN-GROUP RECOGNITION BIAS	Malvina Brunet, Maja Becker, Maité Brunel, Jacques Py, & Colin Tredoux
Friday **15h20**	THE MODULATORY EFFECT OF EXPECTATION ON EARLY FACE PERCEPTION AND ITS ASSOCIATION WITH EXPERTISE – NEURAL AND BEHAVIORAL EVIDENCE	Inês Mares, Fraser W. Smith, Emily Goddard, Lianne Keighery, Louise Ewing, & Marie L. Smith
Friday **15h40**	CONCEALED FAMILIAR FACE DETECTION WITH EEG IN RAPID SERIAL VISUAL PRESENTATION	Ivory Y. Chen, Sebastiaan Mathôt, Robbert van der Mijn, Aytaç Karabay, Howard Bowman, & Elkan G. Akyürek
Friday **16h00**	FACE AGE IS MAPPED INTO THREE-DIMENSIONAL SPACE	Mario Dalmaso, Stefano Pileggi, & Michele Vicovaro

T21 - MEMORY II

Regular Talks – Auditorium 1 – Chair: Henrik Singmann

Friday **14h20**	REPETITION LEARNING DEPENDS ON EXPLICIT RETRIEVAL FROM EPISODIC MEMORY: EVIDENCE FROM BEHAVIORAL AND NEUROIMAGING STUDIES	Philipp Musfeld, Olga Kozlova, Yvanna Yeo, & Keisuke Fukuda
Friday **14h40**	DISTRACTOR PROCESSING HAS NO IMPACT ON THE HEBB REPETITION EFFECT IN COMPLEX SPAN TASKS	Claudia Araya, Klaus Oberauer, & Saturo Saito
Friday **15h00**	THE INTERDEPENDENCE OF THE MEMORY REACTIVATION OF ITEMS AND TASK RULES	Yağmur Damla Şentürk, Nursima Ünver, Can Demircan, Tobias Egner, & Eren Günseli
Friday **15h20**	EXPECTATIONS ABOUT RETENTION INTERVAL TUNE FORGETTING IN VISUAL WORKING MEMORY.	Joost de Jong, Sophia Wilhelm, & Elkan Akyürek
Friday **15h40**	LOW-LEVEL FEATURES OF IMAGES FADE IN LONG-TERM MEMORY	Henrik Singmann, & Eda Mizrak
Friday **16h00**	HOW DOES SEMANTIC ELABORATION BENEFIT LONG-TERM MEMORY?	Joscha Dutli, Klaus Oberauer, & Lea M. Bartsch

T22 - MOTOR COGNITION II

Regular Talks – Room 250 – Chair: Lynn Huestegge

Friday **14h20**	TEMPORAL GENERALIZATION REVEALS A CLOSE RELATIONSHIP BETWEEN THE PREPARATION OF SELF-INDUCED ACTION AND THE PERCEPTION OF ITS SENSORY OUTCOME	Yifei He, Edward Ody, Tilo Kircher, & Benjamin Straube
Friday **14h40**	TOWARDS UNDERSTANDING HOW REINFORCEMENT FROM SENSORIMOTOR PREDICTABILITY INFLUENCES BEHAVIOR AT DIFFERENT LEVELS OF PROCESSING	Noam Karsh, Bat-Sheva Hadad, Erez Freud, Zoha Ahmad, Andrei Teodorescu, & Liora Eliraz
Friday **15h00**	EVIDENCE FOR COMPOSITIONAL ACTION REPRESENTATION IN TASKS WITH LOW DIMENSIONAL OVERLAP	Lynn Huestegge & Tilo Strobach
Friday **15h20**	BINDING OF CONTINUOUS PROPERTIES OF ACTIONS AND AUDITORY ACTION EFFECTS	Sámuel Varga, Roland Pfister, Bence Neszmélyi, Wilfried Kunde, & János Horváth
Friday **15h40**	RESPONSE PRECUEING IN A CROSSMODAL CONTEXT	Denise N. Stephan, & Iring Koch
Friday **16h00**	CONFIDENCE IN ACTION: ON HOW MONITORING SHAPES PERCEPTUAL UNCERTAINTY	Remi Sanchez, Karen Davranche, Thibault Gajdos, & Andrea Desantis

T23 - ATTENTION

Regular Talks – Room 254 – Chair: Christina U. Pfeuffer

Friday **14h20**	ANTICIPATORY SACCADES REVEAL TASK-SPECIFIC TEMPORAL ANTICIPATION AND PROACTIVE MONITORING OF ACTION EFFECTS – AN ONLINE EYE TRACKING STUDY	Christina U. Pfeuffer, & Sarah Lukas
Friday **14h40**	EMOTIONAL MODULATION OF THE GAZE CUEING EFFECT	Manon Mulckhuyse
Friday **15h00**	SEARCHING FOR THE GOLDEN GAZE: HOW CONVERSATION PARTNERS ARE JUDGED DEPENDING ON GAZE BEHAVIOR - AND CONTEXT	Anne Böckler-Raettig, Eva Landmann, & Lynn Huestegge
Friday **15h20**	EXECUTIVE ATTENTION DEVELOPMENT AND TACTILE SENSORY PREDICTION: PERSPECTIVES FOR UNDERSTANDING NEURODEVELOPMENTAL DISORDERS	Marie Anquetil, Anne-Lise Marais, Victoria Dumont, Nadège Roche-Labarbe, & Sandrine Rossi
Friday **15h40**	ATTENTION AND MEMORY EFFECTS OF GAZE AND ARROWS: IS GAZE SPECIAL?	Belén Aranda Martín, & Juan Lupiáñez
Friday **16h00**	ATTENTIONAL BLUR AND BLINK: EFFECTS OF ADAPTIVE ATTENTIONAL SCALING ON VISUAL AWARENESS	Shuyao Wang, Aytaç Karabay, & Elkan Akyürek

T24 - NUMERICAL COGNITION

Regular Talks – Room 252 – Chair: Hakan Çetinkaya

Friday **14h20**	EMBODIED COGNITION ON SNARC: THE EFFECTS OF HAND POSITION ON FOOT RESPONSES	Hakan Çetinkaya, Müberra Maçin, Ezgi Palaz, & Seda Dural
Friday **14h40**	SPATIAL FREQUENCIES MODULATE SPATIAL-NUMERICAL ASSOCIATIONS	Xin Li, Jochen Laubrock, Arianna Felisatti, & Martin H. Fischer
Friday **15h00**	IS THE SNARC A LINEAR EFFECT?	Michele Vicovaro, & Mario Dalmaso
Friday **15h20**	THE TIME DEPENDENT EFFECTS OF MENTAL NUMBER LINE COMPATIBILITY UNDER DIFFERENT REPRESENTATIONAL CONTEXTS ON SPACE NUMBER ASSOCIATIONS	Ezgi Palaz, Hakan Çetinkaya, & Seda Dural
Friday **15h40**	MEASURING GRIP FORCE FLUCTUATIONS DURING MENTAL ARITHMETIC	Oliver Lindemann, & Alexej Michirev
Friday **16h00**	AGE-RELATED DIFFERENCES IN HOW NEGATIVE EMOTIONS INFLUENCE MATHEMATICAL COGNITION: A MEG STUDY	Camille Lallement, Thomas Hinault, & Patrick Lemaire

16h40 to 18h20

SYM19 - MECHANISMS OF APPETITIVE AND AVERSIVE CONTROL: FROM COST-BENEFIT INTEGRATION TO COMPUTATIONAL PSYCHIATRY

Bertelson Symposium – Auditorium 2A – Chair: Eliana Vassena

Friday **16h40**	THE VALUE AND COSTS OF GATHERING INFORMATION AND THEIR IMPLICATIONS FOR ATTENTION CONTROL	Jacqueline Gottlieb
Friday **17h00**	NEURAL AND COMPUTATIONAL MECHANISMS OF MOMENTARY FATIGUE AND PERSISTENCE	Dr. Matthew Apps
Friday **17h20**	THE ELUSIVE RELATIONSHIP BETWEEN MENTAL HEALTH PROFILES AND VALENCE-RELATED BIASES IN REINFORCEMENT LEARNING	Zoe Koopmans, Stefano Vrizzi, & Stefano Palminteri
Friday **17h40**	COMPUTATIONAL APPROACH TO MOTIVATION DISORDERS	Mathias Pessiglione

SYM20 - THE PSYCHOLINGUISTICS OF UNDERSTUDIED LANGUAGES

Symposium – Auditorium 2B – Chair: Fernanda Ferreira

Friday **16h40**	EFFORT AND EFFORTLESSNESS IN THE DEVELOPMENT OF HEBREW WORD RECOGNITION: AN EXPERIMENTAL INVESTIGATION USING PUPILLOMETRY	Adi Shechter, & David L. Share
Friday **17h00**	SENTENCE PLANNING AND PRODUCTION IN TWO AUSTRALIAN INDIGENOUS FREE WORD ORDER LANGUAGES	Evan Kidd, Gabriela Rodriguez Garrido, Sasha Wilmoth, & Rachel Nordlinger
Friday **17h20**	CHARACTERIZING PAPIAMENTO-DUTCH CODE-SWITCHING	Brechje van Osch, & M. Carmen Parafita Couto
Friday **17h40**	DOES LITERACY ENHANCE RETRIEVAL OF CONCEPTUAL REPRESENTATIONS?	Susana Araújo, & Falk Huettig
Friday **18h00**	THE TIME COURSE OF SENTENCE PLANNING IS SHAPED BY CROSSLINGUISTIC DIFFERENCES IN CASE MARKING	Sebastian Sauppe

SYM21 - COGNITIVE AND AFFECTIVE FACTORS UNDERLYING VACCINE DECISION-MAKING

Symposium – Auditorium 2C – Chair: Stephan Lewandowsky

Friday **16h40**	INTERNATIONAL VALIDATION OF THE PRO-VC-BE—AN INSTRUMENT MEASURING PSYCHOSOCIAL DETERMINANTS OF HEALTH PROFESSIONALS' VACCINE CONFIDENCE	Amanda Garrison, Linda Karlsson, Lisa Fressard, Stephan Lewandowsky, Angelo Fasce, Dawn Holford, Philipp Schmid, Cornelia Betsch, Fernanda Rodrigues, Emma Anderson, Frederike Taubert, Michelle Barden, Arnaud Gagneur, Eve Dubé, Peter Nynäs, Anna Soveri, & Pierre Verger
Friday **17h00**	DETERMINING THE COGNITIVE FACTORS DRIVING ANTI-VACCINATION ATTITUDES FROM LINGUISTIC EXPRESSION	Dawn Holford, Angelo Fasce, Stephan Lewandowsky, Ezequiel Lopez-Lopez, & Stefan M. Herzog
Friday **17h20**	CREATING A FAMILY-CENTRED APPROACH TOWARDS VACCINATION IN PORTUGAL	Joana Mendonça, & Ana Patrícia Hilário
Friday **17h40**	THE EFFECT OF PSYCHOLOGICAL REACTANCE AND MESSAGE FRAMING ON RESISTANCE TO SCIENTIFIC INFORMATION ABOUT VACCINES	Anna Soveri, Linda Karlsson, Angelo Fasce, Dawn Holford, Philipp Schmid, Jan Antfolk, Stephan Lewandowsky, Saara Nolvi, Max Karukivi, Hasse Karlsson, & Linnea Karlsson
Friday **18h00**	THE EMPATHETIC REFUTATIONAL INTERVIEW: AN INTERVENTION TARGETING COGNITIVE AND AFFECTIVE MOTIVATIONS TO BELIEVE VACCINE MISINFORMATION	Dawn Holford, Stephan Lewandowsky, Philipp Schmid, Angelo Fasce, & Alisa Srirat

SYM22 - INFORMATION EXCHANGE BETWEEN THE WORKING MEMORY AND LONG-TERM MEMORY SYSTEM

Symposium – Auditorium 1 – Chair: Melinda Sabo

Friday **16h40**	EVIDENCE FOR A SINGLE MECHANISM GATING PERCEPTUAL AND LONG-TERM MEMORY INFORMATION INTO WORKING MEMORY	Sam Verschooren, Yoav Kessler, & Tobias Egner
Friday **17h00**	INDIVIDUAL DIFFERENCES IN WORKING MEMORY REACTIVATION OF LONG-TERM MEMORIES PREDICT PROTECTION AGAINST ANTICIPATED INTERFERENCE	Eren Günseli
Friday **17h20**	ATTENTIONAL SELECTION IN GOAL-DIRECTED MEMORY RETRIEVAL. THE HIDDEN ROLE OF THE WORKING MEMORY SYSTEM	Melinda Sabo, & Daniel Schneider
Friday **17h40**	WHAT CHARACTERIZES THE LONG-TERM MEMORY REPRESENTATIONS THAT CONTRIBUTE TO WORKING MEMORY PERFORMANCE?	Ana Rodriguez, & Lea Bartsch
Friday **18h00**	THE IMPACTS OF LONG-TERM REPETITION LEARNING ON AGE-RELATED BINDING DEFICITS IN WORKING MEMORY	Vanessa M. Loaiza

SYM23 - STUDYING (EMBODIED) EMOTIONS AND SOCIAL CONNECTEDNESS ACROSS DISCIPLINES

Symposium – Room 250 – Chair: Julia Folz

Friday **16h40**	RECOGNITION OF BASIC EMOTIONS IN CHILDHOOD IS INFLUENCED BY PARTICIPANT-, TASK- AND STIMULUS-RELATED FEATURES: A META-ANALYTIC REVIEW	Christopher Riddell, Milica Nikolic, Elise Dusseldorp, & Mariska E. Kret
Friday **17h00**	INTER-GROUP CONFLICT AFFECTS INTER-BRAIN SYNCHRONY DURING SYNCHRONIZED MOVEMENTS	H. Nathan Gamliel, M. Nevat, H. Z. Gvirts Probolovski, M. Karklinsky, S. Han, & S.G. Shamay-Tsoory
Friday **17h20**	"FEEL" THAT YOU CAN TRUST POLITICIANS? THE ROLE OF BODILY RESPONSES AND THEIR SENSATION IN TRUST JUDGMENTS	Julia Folz, Chujun Lin, Milica Nikolic, Mariska Kret, & Piotr Winkielman
Friday **17h40**	LENSES OF LONELINESS: INNER AND OUTER EMOTIONAL ASPECTS OF CONNECTION	Andrew Arnold
Friday **18h00**	ESTRANGED FROM ONESELF, ESTRANGED FROM OTHERS: DEPERSONALISATION EXPERIENCES MODULATE VICARIOUS AFFECTIVE TOUCH AND SELF TOUCH	Anna Ciaunica, Jyothisa Mathew, Ophelia Deroy, & Merle Fairhurst

SYM24 - LEARNING (ABOUT) WORDS AND THEIR MEANINGS

Symposium – Room 254 – Chair: Xenia Schmalz

Friday **16h40**	PAAZ OR PAHZ? THE RELATIONSHIP BETWEEN GRAPHOTACTIC KNOWLEDGE AND ORTHOGRAPHIC LEARNING	Xenia Schmalz, Heike Mehlhase, Kristina Moll, Gerd Schulte-Körne, & Huachen Wang
Friday **17h00**	SOUND-SYMBOL LEARNING AND THE RELATIONSHIP TO SPELLING IN FIRST GRADE CHILDREN	Heike Mehlhase, Jan Luis Sigmund, Gerd Schulte-Körne, & Kristina Moll
Friday **17h20**	THE IMPACT OF OVERLAPPING MAPPINGS ON THE ACQUISITION AND RETRIEVAL OF WORD MEANINGS	Matilde E Simonetti, Tanja C Roembke, Megan G Lorenz, & Iring Koch
Friday **17h40**	THE ROLE OF CONTEXTUAL CONSTRAINTS ON WORD MEANING RETRIEVAL IN READING	Elena Semenova, Alexandra Berlin, Anastasia Streltsova, & Tatiana Logvinenko
Friday **18h00**	THE DEVELOPMENT OF THE THEMATIC SUPERIORITY EFFECT ACROSS MIDDLE CHILDHOOD	Alexandra Schmitterer

Saturday, 09 September 2023

09h00 to 10h20

SYM25 - RECENT ADVANCES IN RESEARCH ON AUTOBIOGRAPHICAL MEMORY

Invited Keynote Symposium – Auditorium 2A – Chair: Dorthe Berntsen

Saturday **09h00**	VERBALLY REPORTED SPONTANEOUS MEMORIES IN YOUNG CHILDREN	Peter Krøjgaard
Saturday **09h20**	INVOLUNTARY AUTOBIOGRAPHICAL MEMORIES AND THOUGHTS ABOUT THE FUTURE IN EVERYDAY LIFE: RESULTS FROM INTERVIEW STUDIES OF CHILDREN AND ADULTS	Lia Kvavilashvili, Ruth Ford, Heather Waddington, & Ioanna Markostamou
Saturday **09h40**	DIFFERENTIATING AUTOBIOGRAPHICAL MEMORY COMPONENTS' RELATIONSHIP WITH PSYCHOSIS DIMENSIONS	Mélissa C. Allé
Saturday **10h00**	EXPANDING LABORATORY-BASED CONCEPTS OF MEMORY FOR AUTOBIOGRAPHICAL MEMORY AND BEYOND	David C. Rubin
Saturday **10h20**	INDIVIDUAL DIFFERENCES IN THE EXPERIENCE OF AUTOBIOGRAPHICAL MEMORIES	Dorthe Berntsen

SYM26 - WRITING FLUENCY: EXPLORING ITS DEVELOPMENT, IMPACTS, DETERMINING FACTORS, AND VARIABILITY

Symposium – Auditorium 2B – Chair: Lisa Haake

Saturday **09h00**	WRITING FLUENCY: FROM GRADE 2 TO UNIVERSITY STUDENTS	Afra Sturm
Saturday **09h20**	PEN MOVEMENT FLUENCY IN STRUGGLING FIRST GRADE WRITERS COMPOSING TEXT BY HAND	María Arrimada, Jens Roeser, & Mark Torrance
Saturday **09h40**	EXPLORING WRITING PROCESS FLUENCY IN TWO LANGUAGES AND TWO GENRES AND ITS RELATION TO TEXT QUALITY	Nina Vandermeulen, Maria Levlin, Christian Waldmann, & Eva Lindgren
Saturday **10h00**	THE EFFECT OF EXECUTIVE CONTROL SKILLS ON WRITING FLUENCY AT VARYING LANGUAGE PROFICIENCY LEVELS	Lisa Haake
Saturday **10h20**	FLUENCY MANIPULATION THROUGH REAL-TIME FEEDBACK DURING TEXT PRODUCTION, AND ITS EFFECTS ON PRODUCT AND PROCESS MEASURES	Emily Dux Speltz, Jennifer Godbersen, & Evgeny Chukharev-Hudilainen

SYM27 - COGNITIVE OR AUTOMATIC? UNPACKING THE NATURE OF MISMATCH NEGATIVITY AS AN ERP COMPONENT

Symposium – Auditorium 2C – Chair: Thomas Lachmann

Saturday **09h00**	N1 PREDICTION IS IMPAIRED IN AUTISM WHEN FAST UPDATING IS REQUIRED	Merav Ahissar, Yarden Weiss, & Nathaniel Zuk
Saturday **09h20**	FLEXIBILITY OF NEURONAL PROCESSES: EFFECTS OF COGNITIVE RESOURCES ON VMMN	Ann-Kathrin Beck, Daniela Czernochowski, & Thomas Lachmann
Saturday **09h40**	THE DEVIANT, THE NOVEL, AND THE RARE EVENT: REVISITING DIFFERENT MECHANISMS OF AUTOMATIC CHANGE DETECTION IN AUDITION	Stefan Berti
Saturday **10h00**	WHAT CAN WE LEARN FROM THE MOTOR-SENSORY OMISSION RESPONSE? INSIGHTS INTO PREDICTION AND SIMILARITIES TO THE MMN	Tjerk T. Dercksen, Andreas Widmann, & Nicole Wetzel
Saturday **10h20**	MARKOV CHAINS AS A USEFUL NARRATIVE FOR INVESTIGATING THE PREDICTIVE PROCESSING OF EVENT SEQUENCES	Erich Schröger & Nina Coy

SYM28 - INTERACTION OF PERCEPTUAL ATTENTION AND ATTENTION TO INFORMATION HELD IN WORKING MEMORY

Symposium – Auditorium 1 – Chair: Agnes Rosner

Saturday **09h00**	IS THE VALUE EFFECT IN WORKING MEMORY DRIVEN BY PREFERENTIAL ENCODING? AN EXAMINATION USING EYE-TRACKING	Amy L. Atkinson, Richard J. Allen, Amanda H. Waterman, & Tom Beesley
Saturday **09h20**	HOW DOES PERCEPTUALLY PRESENTED INFORMATION AFFECT PRIORITIZED INFORMATION IN WORKING MEMORY?	Caro Hautekiet, Naomi Langerock, & Evie Vergauwe
Saturday **09h40**	NO EFFECT OF WORKING MEMORY ON LEARNING AND STORING INFORMATION	Jan Theeuwes
Saturday **10h00**	WHICH INFORMATION IS RETRIEVED FROM WORKING MEMORY IN AN ASSOCIATIVE-RECOGNITION TEST? EVIDENCE FROM EYE MOVEMENTS	Ruhi Bhanap, Klaus Oberauer, & Agnes Rosner
Saturday **10h20**	THE CUEING BENEFIT: A SHARED MECHANISM IN PERCEPTION AND WORKING MEMORY?	Sizhu Han, & Anna Schubö

SYM29 - INNOVATIVE EYE-TRACKING APPROACHES IN LANGUAGE LEARNING AND BILINGUAL PROCESSING RESEARCH

Symposium – Room 250 – Chair: Irina Elgort

Saturday **09h00**	THE MULTILINGUAL EYE-MOVEMENTS CORPUS (MECO) AS A SOURCE OF EVIDENCE ON THE TIME-COURSE OF BILINGUAL PROCESSING	Victor Kuperman, & Noam Siegelman
Saturday **09h20**	PROCESSING OF L1 AND L2 WORD COMBINATIONS: PROBING THE ROLE OF LEXICAL FIXEDNESS	Irene Fioravanti, Marco Silvio Giuseppe Senaldi, Alessandro Lenci, & Anna Siyanova-Chanturia

Saturday **09h40**	DO L2 LEARNERS ACQUIRE NEW FORMULAIC LANGUAGE DURING NATURAL READING: EVIDENCE FROM EYE-TRACKING	Kathy Conklin, Suhad Sonbul, Dina El-Dakhs, & Gareth Carrol
Saturday **10h00**	WHAT LIES BENEATH? TESTING THE LOCUS OF CROSS-LANGUAGE IDIOM MEANING ACTIVATION DURING READING	Irina Elgort, Lingli Du, & Anna Siyanova-Chanturia
Saturday **10h20**	REPORTING PRACTICES IN SECOND LANGUAGE AND BILINGUAL EYE-TRACKING RESEARCH	Aline Godfroid

SYM30 - THE ROLE OF PARAFOVEAL PROCESSING DURING READING

Symposium – Room 254 – Chair: Aaron Vandendaele

Saturday **09h00**	WHAT TRANSPOSED-WORD EFFECTS TELL US ABOUT THE MECHANISMS THAT ASSOCIATE WORD IDENTITIES TO A SENTENCE-LEVEL REPRESENTATION	Aaron Vandendaele, & Jonathan Mirault
Saturday **09h20**	NEURAL EVIDENCE FOR LEXICAL AND SEMANTIC PARAFOVEAL PROCESSING DURING READING	Yali Pan
Saturday **09h40**	EXECUTIVE FUNCTIONS AT THE EARLY YEARS OF SCHOOLING PREDICT READING PERFORMANCE AND THE SIZE OF THE PERCEPTUAL SPAN SEVEN YEARS LATER	Jochen Laubrock
Saturday **10h00**	PARALLEL PROCESSING OF SYNTAX: FLANKER EFFECTS AND FIXATION-RELATED POTENTIALS	Joshua Snell, Carolin Vetter, Jeremy Yeaton, Jonathan Mirault, & Jonathan Grainger
Saturday **10h20**	THE TIMING OF SEMANTIC PROCESSING IN PARAFOVEA: EVIDENCES FROM A RAPID PARALLEL VISUAL PRESENTATION STUDY	Lisa S. Arduino, Maria Martelli, & Silvia Primativo

10h20 to 12h00

POSTER SESSION III

ATTENTION

1	COGNITIVE LOAD MODULATES THE EFFECTS OF TDCS ON EXECUTIVE VIGILANCE: BENEFITS UNDER HIGH DEMANDS	Klara Hemmerich, Juan Lupiáñez, & Elisa Martín-Arévalo
2	PROCESSING EMOTIONAL FACES AT HIGH PERCEPTUAL LOAD	Siddhima Gupta, & Dirk Wentura
3	EVIDENCE THAT ANXIETY INDUCES AN ENGAGEMENT BIAS TOWARDS NEGATIVE INFORMATION.	Firdous Ahmad War, & Dr. Ark Verma
4	INTERFERENCE VS DISTRACTION: QUALITATIVELY DIFFERENT ATTENTIONAL CAPTURE EFFECTS DEPENDING ON DISTRACTOR RELEVANCE	Greta Manini, Francisco Garre, Fabiano Botta, Elisa Martín-Arévalo, & Juan Lupiáñez
5	IS THE VIGILANCE DECREMENT MITIGATED BY TASK LOAD AND PERCEPTUAL SALIENCE? AN ONLINE AND WITHIN-PARTICIPANTS STUDY	Fernando Gabriel Luna, Damián Baños-Sáez, Klara Hemmerich, Elisa Martín-Arévalo, & Juan Lupiáñez
6	COGNITIVE CAPACITY LIMITATIONS UNDER ALCOHOL WHEN PROCESSING MULTIPLE VISUAL OBJECTS	Dr Alistair Harvey, Elizabeth Madley, & Lauren Noya
7	A VALENCE BASED SNARC-LIKE EFFECT ENGAGE BUT NOT DISENGAGE ATTENTION: EVIDENCE FROM A MODIFIED POSNER CUEING TASK	Francesco Darek Costa, & Carlo Fantoni
8	WHY ARE SUSTAINED ATTENTION AND WORKING MEMORY RELATED? THE ROLE OF INDIVIDUAL DIFFERENCES IN STATE INTRINSIC MOTIVATION	Hakan Atis, Daniel J. Carroll, & Claudia C. Von Bastian

COGNITIVE CONTROL

9	STOPPING IN ANTICIPATION: THE TWO-SIDED EFFECT OF ANTICIPATION ON RESPONSE INHIBITION	Roos A. Doekemeijer, Anneleen Dewulf, Frederick Verbruggen, & C. Nico Boehler
10	THE RETRIEVAL OF STIMULUS-RESPONSE (S-R) EPISODES IS INFLUENCED BY CONTEXTUAL DISCRIMINABILITY	Susanne Mayr, Malte Möller, Ruyi Qiu, & Iring Koch
11	THETA BAND ACTIVITY AS A MEASURE OF COGNITIVE CONTROL IN THE LIST-WIDE PROPORTION CONGRUENCY EFFECT	Jonathan Mendl, Sayani Banerjee, Rico Fischer, Moritz Köster, & Gesine Dreisbach
12	A SET OF SHARED NEURAL DYNAMICS SUPPORT ATTENTIONAL SWITCHES AND MEMORY UPDATING AS TWO KEY ASPECTS OF FLEXIBLE BEHAVIOUR	Jakob Kaiser, & Simone Schütz-Bosbach

13	TEMPORAL COURSE OF TASK INHIBITION DURING TASK SWITCHING	Stefano Sdoia, Pierpaolo Zivi, Anna Zigrino, & Fabio Ferlazzo
14	EFFECTS OF DUAL-TASK PRACTICE ON TASK-ORDER COORDINATION AND ITS ADAPTATION	Tilo Strobach, Amelie Jägersberg, & Mike Wendt
15	EXECUTIVE FUNCTIONS INVOLVED IN THOUGHT SUPPRESSION: AN ATTEMPT TO INTEGRATE RESEARCH IN TWO PARADIGMS	Aneta Niczyporuk, & Edward Nęcka
16	INCONGRUENCE EFFECTS DEPEND ON SOA BETWEEN IRRELEVANT FLANKER PRIME AND TARGET AS INDEXED BY N2 AND LRPS	Daniela Czernochowski, Maximilian Wolkersdorfer, & Larissa Leist
17	CHANGES IN BRAIN SIGNAL VARIABILITY PREDICT TASK SWITCHING SPECIFIC BEHAVIORAL PERFORMANCE BENEFITS.	José C. García Alanis, Michael D. Nunez, Christoph Löffler, & Anna-Lena Schubert
DECISION MAKING		
18	CREATIVE THINKING DOES NOT PROMOTE DISHONESTY	Moritz Reis, Roland Pfister, Wilfried Kunde, & Anna Förster
19	PEOPLE WITH HIGH FLUID INTELLIGENCE SHOW GREATER RESPONSE BIAS IN FAVOR OF THEIR PRIOR IDEAS DURING THE EVALUATION OF POLARIZED INFORMATION	F. Javier Gutiérrez, & Isabel Orenes
20	TOOLS UNDER THE ELECTROENCEPHALOSCOPE: TOWARDS A UNIFIED PICTURE OF THE NEURAL TIME COURSE OF VISUAL TOOL PROCESSING	Miguel Baião, Lénia Amaral, Jorge Almeida, & Gabriel Besson
21	COGNITIVE CORRELATES OF ACTION VIDEO GAMING: A CROSS-SECTIONAL STUDY OF COUNTER-STRIKE PLAYERS	Eleanor R. A. Hyde, Claudia C. Von Bastian, Daniel J. Carroll, & Robert Schmidt
22	DECOMPOSING DECISION AND MOTOR PROCESSES DRIVING RESPONSE BIAS: A MODEL-BASED ELECTROMYOGRAPHIC STUDY	Edouard Dendauw, Thibault Gajdos, & Mathieu Servant
23	CHANGE OF MIND IN THE MORAL EVALUATION OF REAL-WORLD IMAGES	Danyang Liu, Ji Xu, Yimeng Jin, Chunyu Ma, & Johan Lauwereyns
24	THE BAKER'S ADVICE MATTERS! MULTIPLE ANCHORING IN JUDICIAL DECISION-MAKING.	Aglaé Navarre, André Didierjean, & Cyril Thomas
EMOTION & MOTIVATION		
25	AFFECTIVE LANGUAGE PROCESSING IN HEALTH PROVIDERS: EEG EVIDENCE OF EMOTIONAL, ATTENTIONAL, AND SEMANTIC OPERATIONS	Enrique Garcia-Marco, Yurena Morera, Naira Delgado, Adolfo M. García, Manuel De Vega, & Lasana Harris
26	DOES THE PRESENCE OF EARLY PSYCHOTIC SYMPTOMS IMPACT FACIAL EMOTION RECOGNITION SKILLS IN 22Q,,.2DS?	Marie-Noëlle Babinet, Caroline Demily, & George A. Michael
27	MOTOR CORTICOSPINAL EXCITABILITY DURING THE OBSERVATION OF FACES VARYING IN TRUSTWORTHINESS	Sonia Paternò, & Chiara Ferrari
28	THE EFFECT OF FRUSTRATION ON INHIBITORY FUNCTION AND WORKING MEMORY OF PEOPLE WITH ANXIOUS TRAITS	Alexandre Ponte, António Caldeira, Francisco Marques, Osvaldo Roque, & Catarina Mendonça
29	THE EFFECT OF AROUSAL CHANGES ON VISUAL SPEED OF PROCESSING	Gaia Lapomarda, Michele Deodato, & David Melcher
30	VALIDATION OF A CONTROLLED SET OF SEXUALLY EXPLICIT VIDEOS – A PREREGISTERED STUDY	Mariana L. Carrito, Pedro Nobre, & Erick Janssen
31	COGNITIVE-AFFECTIVE MAPS - A NOVEL RESEARCH TOOL TO MOTIVATE ATTITUDE CHANGE	Julius Fenn, Wilhelm Gros, Florian Gouret, Lisa Reuter, Michael Gorki, & Andrea Kiesel
HIGHER COGNITIVE FUNCTIONS		
32	SENSORIMOTOR CONTEXT INFLUENCES ORIGINALITY AND EXECUTIVE FUNCTIONS	Fabien Bitu, & Michèle Molina
33	YOU GET A GAIN, YOU GET A GAIN, EVERYBODY GETS A GAIN!?: ACCOUNTING FOR INDIVIDUAL DIFFERENCES IN EXECUTIVE FUNCTION TRAINING GAINS	Marina Martinčević, Luka Juras, & Andrea Vranić
34	EXECUTIVE FUNCTIONS AND PROBLEM-SOLVING: THE IMPACT OF INHIBITION, FLEXIBILITY, AND WORKING MEMORY ON TECHNICAL PROBLEM-SOLVING IN PRIMARY SCHOOL AGE	Jonas Schäfer, Timo Reuter, Miriam Leuchter, & Julia Karbach
35	THE FACTORIAL STRUCTURE OF EXECUTIVE FUNCTIONS IN PRESCHOOL AND ELEMENTARY SCHOOL CHILDREN	Sophia Grobe, Christina David, Lena Grüneisen, Tanja Könen, Laura Dörrenbächer-Ulrich, Franziska Perels, & Julia Karbach
36	ADAPTATION AND VALIDATION OF THE HAYLING TEST FOR FRENCH CHILDREN AGED 6 TO 11 YEARS	Catherine Monnier, & Sophie Bayard
37	HEART RATE VARIABILITY AS A MARKER OF COGNITIVE FUNCTIONING	Giuseppe Forte, Francesca Favieri, & Maria Casagrande

38	PRIMACY EFFECTS IN EXTERNAL STRATEGY CHOICE – INITIAL SPEED BENEFITS OUTWEIGH LATER SPEED BENEFITS.	Patrick P. Weis, & Wilfried Kunde
39	CHARACTERIZATION OF EXECUTIVE AND EMOTIONAL SKILLS IN A RARE GENETIC SYNDROME (PRADER WILLI SYNDROME) AND PRESENTATION OF INNOVATIVE TREATMENTS	Postal Virginie, Camblats Anna-Malika, Maire Jenna, Mathey Stéphanie, Robert Christelle, Tricot Julie, Mourre Fabien, Laurier Virginie, Chevalere Johann, Famelart Nawelle, & Tauber Maithé
40	WORKING MEMORY MODALITY AND LOAD EFFECTS ON DRIVING SPEED: A STUDY IN A DRIVING SIMULATOR	Debaparna Mukherjee, Dr. Ark Verma, & Prof. Nagendra R Velaga
41	A MNEMONIC ADVANTAGE FOR BEAUTY: IS IT SELF-REFERENCE OR EMOTIONAL PROCESSING?	Salgues Sara, Jacquot Amélie, Baekeland Justine, Tahar Chainez, Piolino Pascale, & Marco Sperduti
42	HOW DELIBERATIVE PROCESSES AFFECT THE PATTERN OF ACTIVATION IN COMPOUND REMOTE ASSOCIATE (CRA) PROBLEMS	Artur Ammalainen, Nikita Loginov, & Vladimir Spiridonov
43	WITH YOU OR AGAINST YOU: SOCIAL COORDINATION STRATEGIES IN YOUNG ADOLESCENTS	Serena Maria Stagnitto, Serena Lecce, & Gabriele Chierchia
44	BIOLOGICAL MATURITY DISSOCIATES VERBAL AND NONVERBAL COGNITION IN ADOLESCENCE	Kristof Kovacs, Ilona Kovács, Patrícia Gerván, Katinka Utczás, Gyöngyi Oláh, Zsófia Tróznai, Andrea Berencsi, Hanna Szakács, & Ferenc Gombos
45	HOW COGNITIVE RESERVE AFFECTS NEUROPSYCHOLOGICAL FUNCTIONS	Giovanna Troisi, Giulia Marselli, Ilaria Corbo, Angela Guarino, & Maria Casagrande
46	EFFECTS OF COGNITIVE INTERVENTIONS ON QUALITY OF SLEEP: THE CASE OF THE ELDERLY WITH INSOMNIA	Prof. Orna Tzischinsky, Dr. Kineret Weissler, Kfir Asraf, & Prof. Iris Haimov
47	RELATIONS OF EXECUTIVE CONTROL FUNCTIONS, SELF-REGULATION, AND AFFECT: A MACHINE LEARNING AND NETWORK MODELLING APPROACH	Markus Neubeck, & Tanja Könen
BILINGUALISM		
48	BRAIN POTENTIALS SHOW REDUCED SENSITIVITY TO NEGATIVE CONTENT DURING SECOND LANGUAGE PRODUCTION	Rafał Jończyk, Marcin Naranowicz, Paweł Korpal, Katarzyna Jankowiak, & Katarzyna Bromberek-Dyzman
49	EXAMINING EFFECTS OF BILINGUALISM FOR SUSTAINED ATTENTION AND INHIBITION WITH ROBUST TASKS	Moulshree Rana, & Ark Verma
50	DO FOREIGN SPEAKERS AFFECT MORAL DECISION-MAKING?	Merel Vermeer, Alice Foucart, & Susanne Brouwer
51	MAY YOUR DECISIONS REFLECT YOUR LANGUAGE? HOW SPEAKING A FOREIGN LANGUAGE CAN AFFECT CHOICES IN A WORLD OF UNCERTAINTY	Camilla Bellini, Nicola Del Maschio, & Simone Sulpizio
52	PROJECT ENGRI: REDISCOVERING ENGLISH LOANWORDS THROUGH COMPUTATIONAL LINGUISTIC, PSYCHOLINGUISTIC AND NEUROSCIENTIFIC APPROACH	Irena Bogunović, Eva Pavlinušić Vilus, & Bojana Ćoso
53	IS L2 MORPHOLOGICAL PROCESSING MODULATED BY INDIVIDUAL VARIABLES? A MASKED PRIMING STUDY	Ana Isabel Fernandes, Juan Haro, Lynne Duncan, Pilar Ferré, & Montserrat Comesaña
LANGUAGE		
54	PHONEMIC PERCEPTION IN MULTILINGUALS: AN ERP STUDY	Hanna Kędzierska, Karolina Rataj, Magdalena Wrembel, Anna Balas, & Zuzanna Cal
55	INVESTIGATING METHODOLOGIES AND OUTCOMES OF VOCABULARY RESEARCH FOR YOUNG DEAF POPULATIONS	Hülya Aldemir, Adrián Solís-Campos, David Saldaña, & Isabel R. Rodríguez-Ortiz
56	LINKING L, PHONEME CATEGORIZATION TO NON-NATIVE PHONETIC LEARNING: THE ROLE OF GRADIENCY	Efthymia C. Kapnoula, & Arthur G. Samuel
57	NEUROPHYSIOLOICAL EVDENCE OF ZERO MORPHEME PROCESSING: AN MEG STUDY	Maria Alekseeva, Yury Shtyrov, & Andriy Myachykov
58	CHALLENGES IN EARLY DETECTION OF CHILDREN AT RISK FOR ORAL LANGUAGE DISORDERS: THE POTENTIAL OF SPEECH PROCESSING TECHNOLOGIES.	Camille Bonnet, Astrid Warny, Baptiste Barbot, & Jolijn Vanderauwera
59	WORD ORDER PRIMING WITH GERMAN DATIVE EXPERIENCER VERBS	Anna Jessen, & Robert Hartsuiker
60	GRAMMATICAL GENDER AND PARTICIPANT SEX INTERACTION IN LEXICAL ACCESS AND EMBODIED PERSPECTIVE TAKING	Elena Andonova
61	UNCONSCIOUS CATEGORISATION OF L2 CONCEPTS MAY BE BASED ON THE NATIVE SEMANTIC NETWORK	Jen Lewendon, Jueyao Lin, & Stephen Politzer-Ahles
62	NON-BINARY MORPHOLOGICAL FORM IN TWO SPANISH-SPEAKING POPULATIONS: A PSYCHOLINGUISTIC STUDY	Gabriela Mariel Zunino, Noelia Stetie, & Camila Martínez Rebolledo

63	SIMILARITY OF SENSORIMOTOR EXPERIENCE AS A MEASURE OF THE RELATEDNESS AMONG THE MEANINGS OF AMBIGUOUS WORDS	Sara Anđelić, & Dušica Filipović Đurđević
64	LONGITUDINAL ANALYSIS OF LETTER AND SPEECH SOUND ASSOCIATION	Joanna Beck, & Katarzyna Jednorogiego
65	UNDERSTANDING REVERSAL ERRORS IN DYSLEXIA: THE ROLE OF THE MAGNOCELLULAR/DORSAL VISUAL STREAM	Marie Houbben, & Gilles Vannuscorps
66	IMPROVING SACCADIC EYE MOVEMENTS IN YOUNG AND POOR READERS	Ducrot Stéphanie, Vernet Marie, Lete Bernard, Massendari Delphine, & Danna Jeremy
67	SPEECH ACT RECOGNITION IN YOUNGER AND OLDER JAPANESE ADULTS	Liwei Tan, & Sachiko Kiyama
LEARNING		
68	COMPARING L2 WORD LEARNING USING ORTHOGRAPHY VERSUS VISUAL REFERENTS	Mathew Cieśla, Katarzyna Jankowiak, Maksym Pozdniakov, & Efthymia Kapnoula
69	PATTERNS OF VISUAL ATTENTION IN MASSED AND INTERLEAVED LEARNING: EFFECTS ON CATEGORY LEARNING AND RECOGNITION MEMORY	Ezgi Melisa Yuksel, Melina Knabe, Benjamin R Barmore, & Haley Vlach
70		
71	IT'S TIME TO GET ON MY FEET: DECISION TO TERMINATE SOCIAL LEARNING IN AN INFORMATION FORAGING TASK.	Hidezo Suganuma, Aoi Naito, Kentaro Katahira, & Tatsuya Kameda
72	SPECIFIC LEARNING DISORDER IN MATHEMATICS IN A MULTILINGUAL EDUCATION CONTEXT: TOWARDS A MORE TAILORED DIAGNOSIS	Vera Hilger, Sonja Ugen, Linda Romanovska, & Christine Schiltz
73	IMPROVED KNOWLEDGE IN STEM AND NON-STEM FIELDS WHEN USING COMICS COMPARED TO NON-COMICS LEARNING MATERIAL	Marianna Pagkratidou, Neil Cohn, Phivos Phylactou, Marietta Papadatou-Pastou, & Gavin Duffy
74	EXECUTIVE CONTROL AND THE REWIRING OF PROBABILISTIC REPRESENTATIONS	Felipe Pedraza, Teodóra Vékony, Gaën Plancher, & Dezso Nemeth
75	IMPROVED BROAD MATH LEARNING WHEN TRAINING SPATIAL SKILLS VIA THE ONLINE LEARNING PLATFORM RIF3.0	Eleni Lagoudaki, Günter Maresch, & Marianna Pagkratidou
76	NULL DISFLUENCY EFFECT IN LEARNING: EVIDENCE FROM TWO EXPERIMENTS	Elina Tsigeman, Likhanov Maxim, & Yulia Kovas
77	WHAT DRIVES THE NEURAL ENTRAINMENT EFFECT IN VISUAL STATISTICAL LEARNING?	Liesa Ravijts, & Louisa Bogaerts
MEMORY		
78	ASSESSING MEMORY AND METAMEMORY FOR EVERYDAY VISUAL SETTINGS BY MEANS OF CAR BRAND LOGOS	Pedro R. Montoro, Antonio Prieto, Julia Mayas, & Soler-Gutierrez, A.M
79	MODULATION OF RECOGNITION MEMORY BY ASSOCIATED RELEVANCE: TIME-RESOLVED EVIDENCE FROM EVENT-RELATED BRAIN POTENTIALS	Esther Semmelhack, Francesco Grassi, & Anne Schacht
80	DESTINATION AND SOURCE MEMORY REVISED: SAME SAME BUT DIFFERENT?!	Nikoletta Symeonidou, & Liliane Wulff
81	ARE RECALL AND RECOGNITION CONDITIONALLY INDEPENDENT? TESTING THE RETRIEVAL INDEPENDENCE ASSUMPTION IN MULTINOMIAL MODELING	Carolin Streitberger, Julian Quevedo Pütter, Edgar Erdfelder, & Beatrice Kuhlmann
82	EFFECTS OF CONTEXT CHANGES ON MEMORY REACTIVATION	Şahcan Özdemir, Yağmur Damla Şentürk, Nursima Ünver, Can Demircan, Christian N.L. Olivers, Tobias Egner, & Eren Günseli
83	COLLABORATION IN ELECTRONIC GROUPS: POSITIVE AND NEGATIVE EFFECTS ON MEMORY AND SUGGESTIBILITY	Clelia Rossi-Arnaud, Aicia Naser, Maria Chiara Pesola, Alessandro Santirocchi, Pietro Spataro, & Vincenzo Cestari
84	EFFECTS OF GROUP DISCUSSION ON TRUE AND FALSE MEMORIES	Martin Bourgeois, Joanna Salapska-Gelleri, & Todd Mcelroy
85	RECOGNISING FACES 20 YEARS LATER: A COMPARISON OF TYPICAL AND SUPERIOR RECOGNISERS.	Sarah Laurence, Josh P. Davis, & Laura Sexton
86	FLASHBULB AND EVENT MEMORIES: REMEMBERING THE 20,6 EURO CUP FINAL	Andreia Ribeiro, Margarida Marques, Magda Sofia Roberto, & Ana Raposo
87	THE JOINT EFFECT OF WORD FREQUENCY AND OUTPUT INTERFERENCE IN RECOGNITION MEMORY: TEST OF A MODEL PREDICTION	Hatice Dedetas Satir, & Asli Kilic Özhan
88	EFFECTS OF PRIOR-TASK SUCCESS AND FEEDBACK ON EPISODIC MEMORY PERFORMANCE AND ORGANIZATIONAL STRATEGY EFFECTIVENESS IN YOUNG AND OLDER ADULTS	Laurence Taconnat, Florent Pinard, Emma Guillard, Manon Diot, & Pierre Sabatier

89	SURVIVAL PROCESSING IN IMMERSIVE ENVIRONMENTS ENHANCES MEMORY PERFORMANCE	Ryunosuke Hayashida, & Shigeki Nakauchi
90	PUPIL OLD-NEW EFFECT AND ITS MODULATION BY MEMORY RETRIEVAL	Ádám Albi, & Péter Pajkossy
91	CONTEXTUAL STABILITY, NOT PREDICTION ERRORS, UNDERLIES EVENT SEGMENTATION	Berna Güler, Fatih Serin, & Eren Günseli
92	ENHANCING STORY MEMORIZATION IN CHILDREN WITH WEAK PHONOLOGICAL SKILLS: THE ROLE OF PICTORIAL SUPPORT AND MODE OF PRESENTATION (LISTENING OR READING)	Christophe Fitamen, & Léa Leuthold
93	MEASURING EPISODIC MEMORY IN DAILY LIFE: AN APPROACH WITH DEEP LEARNING TECHNOLOGY FOR NATURAL LANGUAGE PROCESSING	Satoru Nishiyama, & Masataka Nakayama
94	FALSE MEMORY PRODUCTION INDICES FOR AD HOC CATEGORICAL AND ASSOCIATIVE LISTS.	Verónica Benítez, & María Ángeles Alonso
WORKING MEMORY		
95	GAZE AND VISUAL SHORT-TERM MEMORY FOR LOCALIZING IMAGE PARTS	David Souto, Ana, Barbosa, Doug J. K. Barrett, Jennifer Sudkamp, & Marina Bloj
96	CAN YOUNGER AND OLDER ADULTS ENGAGE IN PRIORITISATION WHEN FOLLOWING INSTRUCTIONS WITHIN A WORKING MEMORY PARADIGM?	Asiyah Alzahrani, Professor Amanda Waterman, & Dr Richard Allen
97	EXPLORING PRIORITISATION EFFECTS ACROSS DIFFERENT FORMS OF BINDING IN WORKING MEMORY	Hatice Cinar, Richard J. Allen, Amanda H. Waterman, & Amy L. Atkinson
98	THE USE OF COGNITIVE STRATEGIES IN TWO-PHASE WORKING MEMORY TRAINING	Nan Ni, & Satoru Saito
99	SPATIALIZATION TESTED VIA THE SPOARC EFFECT IS MODULATED BY THE NUMBER OF ITEMS TO BE MEMORIZED IN WORKING MEMORY.	Maëliss Vivion, Alessandro Guida, Stephen Ramanoël, & Fabien Mathy
100	SEMANTIC AND PHONOLOGICAL ERRORS IN WORKING MEMORY TASKS IN CHILDREN AND ADULTS	Léa Hami, Laurence Casini, & Marlène Abadie
101	SUPPORTING CHILDREN WITH POOR WORKING MEMORY WITHIN THE CLASSROOM	Harry Bennett, Amanda Waterman, & Richard Allen
102	SPONTANEOUS ADAPTATION OF MAINTENANCE STRATEGIES IN WORKING MEMORY	Leproult Inès, Lemaire Benoît, & Portrat Sophie
103	THE ROLE OF ATTENTIONAL RESOURCES IN WORKING MEMORY IN AGE-BASED STEREOTYPE THREAT	Margaux Piroelle, Marlène Abadie, & Isabelle Régner
MOTOR COGNITION		
104	THE NEURAL CORRELATES OF APRAXIA: AN ANATOMICAL LIKELIHOOD ESTIMATION META-ANALYSIS OF LESION-SYMPTOM MAPPING STUDIES	Maximilien Metaireau, Mathieu Lesourd, & François Osiurak
105	AGING AND THE CONTROL OF ACTION SEQUENCES	Silvia Selimi, & Birte Moeller
106	LET'S PLAY TOGETHER: THE EFFECT OF MUSICAL PLEASANTNESS ON INTERPERSONAL SYNCHRONIZATION	Giorgio Lazzari, Carlotta Lega, Lucia Sacheli, Charles-Etienne Benoit, & Floris Van Vugt
107	MOVEMENT-INDUCED SELF-REFERENTIAL MEMORY ADVANTAGE WITH TEMPORARILY-ESTABLISHED SELF-RELEVANT STIMULI	Serge Onyper, & Mark A. Oakes
108	TIMING ERROR IN EXECUTED MOTOR ACTION ALTERS VISUAL MOTION PERCEPTION IN PREDICTION-MOTION TASK	Sylvain Cremoux, Xuening Li, & Robin Baures
109	AGENCY AND SENSORIMOTRICITY: IS EVERYDAY LIFE SENSE OF AGENCY LINKED TO ACTION-EFFECT ANTICIPATION?	Lorina Puech, Lionel Brunel, & Karolina Moutsopoulou
110	IMPACT OF AFFORDANCE SIMILARITY AND THEMATIC RELATIONS ON MU RHYTHM DESYNCHRONIZATION DURING PERCEPTION OF 3D OBJECT PAIRS.	Lilas Haddad, Solène Kalénine, Paul Kozieja, & Yannick Wamain
111	THE INFLUENCE OF ACTION-EFFECT COMPATIBILITY ON SEQUENCE PLANNING AND INTER-MANUAL TRANSFER	Rachel M. Brown, & Prof. Iring Koch
NUMERICAL COGNITION		
112	ASSESSING CHILDREN'S UNDERSTANDING OF THE NUMBER CONCEPT THROUGH CARDINALITY TASKS	Marie Krenger, & Catherine Thevenot
113	PROFESSIONAL ARCHITECTS REVEAL A MORE PRECISE REPRESENTATION OF ANGLES THAN CONTROLS	Mateusz Hohol, Piotr Szymanek, & Krzysztof Cipora
114	THE SNARC EFFECT RELIES ON AN ALLOCENTRIC FRAME OF REFERENCE.	Katharina Kühne, Martin H. Fischer, & Oliver Lindemann

115	FREQUENCY-TAGGING EEG REVEALS INSTRUCTION-DRIVEN MAGNITUDE INTEGRATION USING THE NUMERICAL DISTANCE EFFECT	Cathy Marlair, Aliette Lochy, & Virginie Crollen
116	INDEPENDENT SPATIAL NUMERICAL ASSOCIATIONS FOR SYMBOLIC AND NON-SYMBOLIC NUMERALS	Valter Prpic, Davide Badii, Yasmine A. Basamh, Jamie Sargent-Walker, Courtney M. Goodridge, Tiziano Agostini, & Mauro Murgia
PERCEPTION		
117	DOES STATIC LIGHT VARIATION INFLUENCE HOW PEOPLE ATTEND TO FEATURES DEPICTED IN STAINED-GLASS?	Kate M. Nevin, Elizabeth Mason, David J. Shepherd, & Fiona N. Newell
118	NEGATIVE EMOTIONS FACILITATE RESPONSES TO SOUNDS WITH DESCENDING PITCH	Márta Szabina Pápai, Vasileia Christou, & Jordi Navarra
119	CAN THE FOREST BE PERCEIVED IN THE ABSENCE OF VISUAL AWARENESS? MASKED PRIMING OF GLOBAL STRUCTURE IN HIERARCHICAL VISUAL PATTERNS.	José A Hinojosa, Mikel Jiménez, Antonio Prieto, & Pedro Montoro
120	THE ROLE OF ATTENTIONAL RESOURCES IN HAPTIC DISCRIMINATION	Jessica Dukes, & Jutta Billino
121	THE TEMPORAL DYNAMICS OF TOOL-RELATED REPRESENTATIONS: AN RSA STUDY ON EEG DATA	Besson Gabriel, Baião Miguel, Walbrin Jon, & Almeida Jorge
122	THE INFLUENCE OF GAZE BEHAVIOR AND PERSONALITY TRAITS ON THE RECOGNITION OF SUBTLE EMOTIONAL FACIAL EXPRESSIONS	Alice Cartaud, Dorine Vergilino-Perez, & Laurence Chaby
123	EFFECTS OF FACE FAMILIARITY ON ENSEMBLE CODING OF FACE IDENTITY	Aysegul Aydinlik, & Sonia Amado
124	SOCIAL CUES IN NEWS INTERFACES: A KEY TO BUILDING PRIMARY ONLINE TRUST	Ekaterina Kosova, & Elena Gorbunova
125	THE POWER OF POWERFUL AVATARS: CAN EMBODYING A SUPERHERO IN VIRTUAL REALITY IMPROVE OUR PERFORMANCE?	Eva-Marie Heißler, Marieke Lieve Weijs, Jonas Schlomberg, Marte Roel Lesur, & Bigna Lenggenhager
126	REDUNDANCY MASKING AND THE COMPRESSION OF VISUAL INFORMATION	Bilge Sayim, & Sabrina Hansmann-Roth
127	"HOW ANIMATE IS 'LIVER'?": DIFFERENCES AND COMMONALITIES ON ANIMACY RATINGS AMONG PORTUGUESE, AMERICAN AND BRITISH PARTICIPANTS	Josefa N. S. Pandeirada, Sara B. Félix, & Marie Poirier
128	INVESTIGATING THE ROLE OF WORKING MEMORY IN THE OCCURRENCE OF INVOLUNTARY PAST AND FUTURE THOUGHTS	Krystian Barzykowski, Ewa Ilczuk, & Lia Kvavilashvili

12h00 to 13h20

T25 - LONG-TERM MEMORY INFLUENCES ON WORKING MEMORY

Regular Talks – Auditorium 2A – Chair: Klaus Oberauer

Saturday **12h00**	HOW DOES SEMANTIC MEANING BENEFIT VISUAL WORKING MEMORY OF SPATIAL LOCATIONS?	Tomer Sahar, Nurit Gronau, & Tal Makovski
Saturday **12h20**	ASSOCIATIONS INCOMPATIBLE WITH PRIOR KNOWLEDGE HINDER WORKING MEMORY PRECISION	Nuno D. Sobrinho & Alessandra S. Souza
Saturday **12h40**	THE ROLE OF WORKING MEMORY FOR MENTAL OPERATIONS ON INFORMATION IN LONG-TERM MEMORY	Duygu Yücel, Betül Türk, & Eren Günseli
Saturday **13h00**	THE CONTRIBUTION OF EPISODIC LONG-TERM MEMORY TO PERFORMANCE IN TESTS OF WORKING MEMORY	Klaus Oberauer, & Lea Bartsch

T26 - EMOTION II

Regular Talks – Auditorium 2B – Chair: Franziska Schroter

Saturday **12h00**	EMOTIONS AND THE SENSE OF SELF: THE ROLE OF EMOTIONS IN BODY DETACHMENT AND HOW MINDFULNESS CAN HELP RECONNECTING TO OUR BODY	Franziska Schroter, & Petra Jansen
Saturday **12h20**	SATISFACTION OVER PLEASURE: INVESTIGATING THE ROLE OF PRIOR MINDFULNESS MEDITATION PRACTICE IN REDUCING EMOTIONAL INTERFERENCE	Surabhi Lodha, & Rashmi Gupta

Saturday **12h40**	DOES PERSONALITY MODULATE THE SIZE DISTORTION OF EMOTIONALLY PRIMED SQUARES?	Amandine Guillin, Dorine-Vergilino-Perez, & Laurence Chaby
Saturday **13h00**	EMOTION AND MOVEMENT: SUPERIOR MEMORY FOR EMOTIONAL BUT NOT FOR MOVING STIMULI	Hanna Chainay, Adam W. Cox, Paul Foret-Bruno, Inés Tchekemian Lanaspa, Isabella Zsoldos, & Patrick S.R. Davidson

T27 - HIGHER COGNITIVE FUNCTIONS II

Regular Talks – Auditorium 2C – Chair: Crystal Silver

Saturday **12h00**	SOCIAL INTERACTION DIFFERENTIALLY IMPACTS THE TIME COURSE OF IMPLICIT AND EXPLICIT SENSE OF AGENCY	Crystal Silver, Ben Tatler, Rama Chakravarthi, & Bert Timmermans
Saturday **12h20**	ON PREVENTIVE BEHAVIOR: AN EXPERIMENTAL INVESTIGATION ON SELF-PROTECTION	Vincent Lenglin, Fabrice Le Lec, & Joël Santos
Saturday **12h40**	METACOGNITION FACILITATES THEORY OF MIND THROUGH OPTIMAL WEIGHTING OF TRAIT INFERENCES	Emily L. Long, Caroline Catmur, Stephen M. Fleming, & Geoffrey Bird
Saturday **13h00**	CAUSAL EVIDENCE FOR A CONTRIBUTION OF THE LEFT EXTRASTRIATE BODY AREA TO THE PERCEPTION OF INTERACTING HUMAN DYADS	Marco Gandolfo, Etienne Abassi, Eva Balgova, Paul E. Downing, Liuba Papeo, & Kami Koldewyn

B5 - PERCEPTION, ATTENTION & LEARNING

Blitz-Talks – Auditorium 1 – Chair: Teresa Jacques

Saturday **12h00**	THE ROLE OF KINEMATICS IN THE ACQUISITION OF NUMBER MEANING IN KINDERGARTEN?	Christel Bidet-Ildei, Victor Francisco, Sabine Fevin, & Nicolas Vibert
Saturday **12h10**	THINK POSITIVE! THE IMPACT OF DISEASE THREAT ON HUMAN BISTABLE MOTION PERCEPTION	Ana Cláudia Magalhães, Fábio Silva, Inês Lameirinha, Mariana Rodrigues, & Sandra C. Soares
Saturday **12h20**	MUSICAL TRAINING EXPERTISE REDUCES AUDIOVISUAL SPATIAL VENTRILOQUISM	Matthew O'Donohue, Philippe Lacherez, & Naohide Yamamoto
Saturday **12h30**	ATTRACTIVENESS AND SOCIAL APPEAL OF SYNTHETIC VOICES	Camila Bruder, Pamela Breda, & Pauline Larrouy-Maestri
Saturday **12h40**	LET'S AGREE THEY DISAGREE: THE MIDSCALE DISAGREEMENT PROBLEM IN PSYCHOLINGUISTIC RATINGS AND ITS IMPLICATIONS	Dimitri Paisios, Nathalie Huet, & Elodie Labeye
Saturday **12h50**	ATTENTIONAL RIGHTWARD BIAS IN CHILDREN DURING WORD RECOGNITION USING THE FLANKERS TASK PARADIGM	Christophe Cauchi, Bernard Létém, & Jonathan Grainger
Saturday **13h00**	ENDOGENOUS SPATIAL AND TEMPORAL ORIENTING OF ATTENTION IN A TEMPORAL RESOLUTION TASK	Pom Charras, Mustafa Zeyd Söyük, Laura Herreros Juan Ignacio Grec, Ana B Chica, & Mariagrazia Capizzi
Saturday **13h10**	SPATIAL REGULARITIES EMBEDDED IN A NOVEL AUDITORY-BIOFEEDBACK VISUAL SEARCH TASK BIAS SUBSEQUENT FREE VIEWING BEHAVIOR	Sebastiano Cinetto, Elvio Blini, Andrea Zangrossi, Maurizio Corbetta, & Marco Zorzi

T28 - EMBODIED COGNITION

Regular Talks – Room 250 – Chair: Dominique Makowski

Saturday **12h00**	IS THIS A REAL PERSON? COGNITIVE AND EMBODIED FACTORS CONTRIBUTING TO OUR BELIEFS OF REALITY	Dominique Makowski, An Shu Te, & Annabel Chen
Saturday **12h20**	SYNTAX SHAPES THE SENSORIMOTOR ACTIVATION DRIVEN BY NOUN-ADJECTIVE PAIRINGS: EVIDENCE FROM A GRASP-COMPATIBILITY TASK.	Gioacchino Garofalo, Lucia Riggio, Francesco Bianchini, & Elena Gherri
Saturday **12h40**	EMBODIED COGNITION, FAST AND SLOW: THE CRUCIAL ROLE OF TIMING FOR SENSORIMOTOR SEMANTIC ACTIVATION	Olesia Platonova, & Alex Miklashevsky
Saturday **13h00**	MOTOR FLUENCY AND PREFERENCE JUDGMENTS: MODULATING THE EFFECT OF TYPING EXPERTISE ON THE LIKEABILITY OF LETTER DYADS	Mara Stockner, Giuliana Mazzoni, & Francesco Ianì

T29 - DECISION MAKING III

Regular Talks – Room 254 – Chair: Todd A. Vogel

Saturday **12h00**	DECIDING WHEN TO HELP OTHERS DEPENDS ON THE EXPECTED VALUE OF THE ENVIRONMENT	Todd A. Vogel, Luke Priestly, Jo Cutler, Nima Khalighinejad, Neil Garrett, Matthew A. J. Apps, Matthew F. Rushworth, & Patricia L. Lockwood
Saturday **12h20**	FACING THE (ILLUSIONARY) TRUTH: CORRUGATOR ACTIVITY SUBSTANTIATES AFFECTIVE COMPONENT IN THE REPETITION-INDUCED TRUTH EFFECT	Annika Stump, Torsten Wüstenberg, & Andreas Voss
Saturday **12h40**	SEARCH THE DIFFERENCES IN AN ILLUSIONARY CONTEXT	Valeriia Karpinskaia, Filippova Margarita, & Andrianova Natalia
Saturday **13h00**	THE COSTS AND BENEFITS OF OPTING OUT DURING PERCEPTUAL DECISION-MAKING	Rawa Al Dowaji, Ji Xu, & Johan Lauwereyns

T30 - LANGUAGE II

Regular Talks – Room 252 – Chair: Davide Crepladi

Saturday **12h00**	CONTEXTUALIZED WORD EMBEDDINGS CAPTURE COMPOUND WORDS' IMPLICIT RELATIONAL INTERPRETATIONS	Marco Ciapparelli, & Marco Marelli
Saturday **12h20**	GRAMMATICAL GENDER EFFECTS ARE REFLECTED IN THE DISTRIBUTIONAL STRUCTURE OF LANGUAGE	Luca Onnis, & Alfred Lim
Saturday **12h40**	STATISTICAL LEARNING IN READING: A NEW LOOK AT PHONICS INSTRUCTION	Teng Guo, Samantha Ruvoletto, Marie Boyer, & Daniel Zagar
Saturday **13h00**	VISUAL EXPERIENCE ALTERS THE SENSITIVITY TO THE DISTRIBUTION OF WORDS IN NATURAL LANGUAGE	Giorgia Anceresi, Daniele Gatti, Tomaso Vecchi, Luca Rinaldi, & Marco Marelli

14h20 to 16h20

T31 - READING

Regular Talks – Auditorium 2A – Chair: Davide Crepaldi

Saturday **14h20**	ORTHOGRAPHIC AND PHONOLOGICAL CODE ACTIVATION IN DEAF AND HEARING READERS	Karen Emmorey, Emily M. Akers, Phillip J. Holcomb, & Katherine J. Midgley
Saturday **14h40**	ORTHOGRAPHIC ENCODING IN DEAF READERS OF SPANISH: THE WHAT MATTERS MORE THAN THE WHERE	Brendan Costello, Sendy Caffarra, Noemi Fariña, Jon Andoni Duñabeitia, & Manuel Carreiras
Saturday **15h00**	IS LETTER POSITION CODING A UNIQUE SKILL IN DEVELOPING READERS?	Pablo Gomez, Ana Marcet, Francisco Rocabado, & Manuel Perea
Saturday **15h20**	AN EXAMINATION OF MODELS OF READING MULTI-MORPHEMIC AND PSEUDO MULTI-MORPHEMIC WORDS USING SANDWICH PRIMING	Stephen J. Lupker, & Giacomo Spinelli
Saturday **15h40**	UNCOVERING THE FOUNDATIONS OF READING: THE EMERGENCE OF ORTHOGRAPHIC PROCESSING	Maria Fernández-López, & Manuel Perea
Saturday **16h00**	IS READING THE SAME AS TRANSLATION IN YOUNG MULTI-LECTAL SPEAKERS?	Björn Lundquist, Anya Vinichenko, & Maud Westendorp

T32 - COGNITIVE MODELING

Regular Talks – Auditorium 2B – Chair: Jean-Paul Snijder

Saturday **14h20**	BIASES ARE THE NORM (WHEN CONTEXT IS PRESENT IN PERCEPTION OR MEMORY)	Andrey Chetverikov
Saturday **14h40**	COGNITIVE MODELING OF QUANTITATIVE JUDGMENTS USING NATURALISTIC STIMULI	David Izydorczyk, & Arndt Bröder
Saturday **15h00**	AN INTRODUCTION TO DYNAMIC STRUCTURAL EQUATION MODELS USING STAN: A PRACTICAL GUIDE FOR COGNITIVE RESEARCHERS	Jean-Paul Snijder, Valentin Pratz, & Anna-Lena Schubert

Saturday **15h20**	CHALLENGES TO VALIDATING MODEL PARAMETERS IN THE DIFFUSION MODEL: A STUDY ON CONVERGENT AND DISCRIMINANT VALIDITY	Katja M. Pollak, Veronika Lerche, & Andrea Kiesel
Saturday **15h40**	TIME TO JUMP: EXPLORING THE DISTRIBUTION OF NOISE IN EVIDENCE ACCUMULATION AS A FUNCTION OF TIME PRESSURE	Julia V. Liss, Mischa von Krause, Eva Marie Hunsmann, Lasse Elsemüller, & Veronika Lerche

T33 - BILINGUALISM II

Regular Talks – Auditorium 2C – Chair: Debra Jared

Saturday **14h20**	CROSS-LANGUAGE ACTIVATION OF IDIOM MEANINGS: EVIDENCE FROM FRENCH- VIETNAMESE-AND INDONESIAN-ENGLISH BILINGUALS	Debra Jared, Pearley Nguyen, Alyssa Grant-Pereira, Qamara Rizkyana, & Mirrah Maziyah Mohamed
Saturday **14h40**	FREE OR FORCED LANGUAGE CHOICE IN LANGUAGE-SWITCHING AND ITS TRANSFER TO NON-LINGUISTIC TASK-SWITCHING - AN ERP STUDY	Jonas Walther, Kalinka Timmer, Patrycja Kałamała, & Zofia Wodniecka
Saturday **15h00**	ACCOUNTING FOR MULTILINGUAL PROFILES DURING PRESURGICAL MAPPING OF GLIOMA PATIENTS	Ileana Quiñones, Sandra Gisbert, Lucía Amoruso, Lucia Manso-Ortega, Santiago Gil-Robles, Iñigo Pomposo, Garazi Bermudez, & Manuel Carreiras
Saturday **15h20**	TWO MEMORY ROUTES FOR LEARNING WORDS? SCHEMA CONSISTENCY EFFECTS ON SOURCE MEMORY DURING L2 WORD LEARNING	Kristin Lemhöfer, & Elena Markantonakis
Saturday **15h40**	BILINGUAL SENTENCE PLANNING: LINGUISTIC AND COGNITIVE EFFECTS ON GRAMMATICAL PLANNING SCOPE	Mikael André Albrecht, Allison Wetterlin, & Linda Wheeldon
Saturday **16h00**	RE-THINKING L1/L2 SIMILARITIES AND DIFFERENCES IN ENGLISH PROFICIENCY: INSIGHTS FROM THE ENGLISH READING ONLINE (ENRO) PROJECT	Noam Siegelman, & Victor Kuperman

T34 - ATTENTION AND MEMORY

Regular Talks – Auditorium 1 – Chair: Richard J. Allen

Saturday **14h20**	I REMEMBER ME THE BEST, ALWAYS? EVIDENCE FOR SELF-PRIORITIZATION IN WORKING MEMORY BINDING USING A VISUO-SPATIAL WORKING MEMORY TASK	Neelabja Roy, Irfan Ahmad, & Dr Ark Verma
Saturday **14h40**	THE EFFECTS OF INVOLUNTARY AND VOLUNTARY INTERNAL ATTENTION ON DIFFERENT TYPES OF WORKING MEMORY CONTENTS	Cipriani, G. A., González-García, C., Martín-Arévalo, E., Lupiáñez, J., & Botta F.
Saturday **15h00**	EXPLORING THE RELATION BETWEEN ATTENTIONAL SELECTION, SUPPRESSION AND VISUAL WORKING MEMORY DEVELOPMENT	Andria Shimi
Saturday **15h20**	LONG-TERM REWARDS IN WORKING MEMORY: A QUESTION OF ENCODING OR MAINTENANCE?	Maximilien Labaronne & Gaën Plancher
Saturday **15h40**	VALUE-DRIVEN PRIORITISATION IN WORKING MEMORY; DO THE EFFECTS EXTEND INTO LONG-TERM MEMORY?	Richard J. Allen, Amanda H. Waterman, & Amy L. Atkinson
Saturday **16h00**	HOW DOES LONG-TERM MEMORY BENEFIT WORKING MEMORY?	Eda Mizrak & Sanjay Manohar

T35 - CHILD DEVELOPMENT II

Regular Talks – Room 250 – Chair: Genevieve L. Quek

Saturday **14h20**	"EXPLORATION-EXPLOITATION DILEMMA" IN CHILDREN'S DECISION-MAKING: A LONGITUDINAL STUDY	Qianqian Wan, Olivera Savic, Emily Weichart, Nathaniel Blanco, Mengcun Gao, & Vladimir Sloutsky
Saturday **14h40**	ROLE OF DOMAIN-GENERAL AND DOMAIN-SPECIFIC COGNITIVE FACTORS IN PREDICTING ARITHMETIC ABILITY IN CHILDREN: A CROSS-SECTIONAL INVESTIGATION	Ankit Mishra & Azizuddin Khan
Saturday **15h00**	CHILDREN'S UNDERSTANDING OF OTHERS' LOGICAL INFERENCES. TWO NEW THEORY OF MIND TASKS*	Nikolaos Makris, Alexandra Karousou, Dimitra Economacou, & Smaragda Kazi
Saturday **15h20**	AGE-RELATED DIFFERENCES IN THE PROCESSING OF INTERACTIVE BIOLOGICAL MOTION IS UNDERSCORED BY ALTERNATIVE BRAIN CONNECTIVITY	Jon Walbrin, Jorge Almeida, & Kami Koldewyn
Saturday **15h40**	TIME ESTIMATION AND EXECUTIVE FUNCTIONS IN CHILDREN AND ADOLESCENTS WITH AND WITHOUT IDIOPATHIC MILD INTELLECTUAL DISABILITY	Elsa Gourlat, Cédric Albinet, Anne-Claire Rattat, & Benoît Valéry

Saturday **16h00**	NEURAL MARKERS OF OBJECT-SCENE CONGRUENCE IN ADULTS AND YOUNG INFANTS	Genevieve L. Quek, Manuel Varlet, Zhen Zeng, Jordan Ratcliffe, Pauline Trichet, Jessica L. L. Chin, & Tijl Grootswagers

T36 - COGNITIVE CONTROL II

Regular Talks – Room 254 – Chair: Solveig Tonn

Saturday **14h20**	TRANSITION VS. END-STATE: ELUCIDATING THE CONTENT OF IDEOMOTOR EFFECT ANTICIPATIONS	Solveig Tonn, Moritz Schaaf, Wilfried Kunde, & Roland Pfister
Saturday **14h40**	SHORT-TERM BINDING OF SELF-RELEVANT STIMULI IN ACTION CONTROL	Marcel Pauly, Dirk Wentura, & Christian Frings
Saturday **15h00**	EXAMINING THE LINKS BETWEEN ANXIETY SYMPTOMS AND ERROR MONITORING: A NETWORK ANALYSIS	Anna Grabowska, & Magdalena Senderecka
Saturday **15h20**	SPATIAL CODES FOR DIFFERENT REFERENCE FRAMES: THE WHAT, WHEN AND HOW	Pamela Baess, & Christina Bermeitinger
Saturday **15h40**	TOWARDS A BETTER UNDERSTANDING OF IMPULSIVITY IN CHILDREN WITH ADHD BY DISSOCIATING THE EXPRESSION AND THE INHIBITION OF IMPULSIVE RESPONSES	Aurelie Grandjean, Isabel Suarez, David DaFonseca, & Laurence Casini
Saturday **16h00**	VISUALLY-GUIDED FORAGING IN VIRTUAL WORLDS: DOMAIN-GENERAL PROPERTIES OF SEARCH BEHAVIOUR	Sarah Salo, Dr Matt Roser, & Dr Alastair D. Smith

16h40 to 18h20

SYM31 - MINDS WITHOUT IMAGERY: EXPLORING COGNITION AND LANGUAGE IN APHANTASIA

Symposium – Auditorium 2A – Chair: Laura Speed

Saturday **16h40**	BLIND IMAGINATION: THE COGNITIVE AND NEURAL SIGNATURES OF APHANTASIA	Fraser Milton
Saturday **17h00**	THE ROLE OF MENTAL IMAGERY IN READING: EVIDENCE FROM APHANTASIA	Laura Speed
Saturday **17h20**	HOW DO PEOPLE WITH APHANTASIA THINK? BEYOND VISUAL-VERBAL COGNITION	Carla J. Dance, & Jules Simner
Saturday **17h40**	SOME THINGS ARE BETTER LEFT UNSAID – JUST NOT FOR EVERYONE: NO VERBAL OVERSHADOWING EFFECT IN APHANTASIA	Merlin Monzel, & Jennifer Handlogten
Saturday **18h00**	THE DIVERSITY OF IMAGINATION WITH APHANTASIA	Wesley Nixon, Alec Figueroa, & Reshanne Reeder

SYM32 - COGNITIVE SCIENCE OF CULTURE: LITERACY AS A CULTURAL OBJECT WITH IMPACT OUTSIDE THE WRITTEN DOMAIN

Symposium – Auditorium 2B – Chair: Tânia Fernandes

Saturday **16h40**	COGNITIVE SCIENCE OF CULTURE: SETTING THE STAGE TO A LESS-WEIRD STUDY OF THE IMPACT OF CULTURE IN OTHER COGNITIVE SYSTEMS	Tânia Fernandes
Saturday **17h00**	THE NEUROSCIENCE OF READING - HAS A FOCUS ON THE ROMAN ALPHABET LED US ASTRAY?	Alexis Hervais-Adelman, & Falk Huettig
Saturday **17h20**	THE LENS OF LITERACY ON A PERCEPTUAL ILLUSION: THE EBBINGHAUS ILLUSION IS ENHANCED IN READERS	Miguel Domingues, Régine Kolinsky, & Tânia Fernandes
Saturday **17h40**	DOES LITERACY IMPACT THE PERCEPTION OF VOICE IDENTITY?	São Luís Castro, & Ana Mesquita
Saturday **18h00**	CULTURAL DIFFERENCES WITHIN OUR OWN WALLS? LITERACY, CRITICAL THINKING AND VULNERABILITY TO MISINFORMATION	Régine Kolinsky, Camila Arnal, Habiba Bouali, Julia Justino, José Morais, Myrto Pantazi, & Olivier Klein

SYM33 - CITIZEN SCIENCE IN COGNITIVE PSYCHOLOGY

Symposium – Auditorium 2C – Chair: Eva van den Bussche

Saturday **16h40**	CITIZEN SCIENCE IN COGNITIVE PSYCHOLOGY: OPPORTUNITIES, CHALLENGES AND APPLICATION	Kirsten Verhaegen, Gethin Hughes, Bert Reynvoet, & Eva Van den Bussche
Saturday **17h00**	A CITIZEN SCIENCE APPROACH TO MEASURING COGNITION IN CHILDREN: LEARNINGS FROM BBC TERRIFIC SCIENTIFIC	Josie Booth, Naomi Brooks, Trish Gorely, Ross Chesham, & Colin N. Moran
Saturday **17h20**	CITIZEN SCIENCE AS AN AVENUE OF INTERDISCIPLINARY RESEARCH	Loreta Tauginienė
Saturday **17h40**	CITIZEN SCIENCE BETWEEN METHODOLOGICAL INNOVATION AND AWARENESS RAISING	Stefania Milan
Saturday **18h00**	GETTING INSIGHT INTO MATHEMATICAL PROBLEMS IN CHILDREN WITH DEVELOPMENTAL COORDINATION DISORDER (DCD): A (SEMI)-CITIZEN SCIENCE APPROACH	Bert Reynvoet

SYM 34 - INTERACTIONS OF EXISTING KNOWLEDGE AND MEMORY FOR NEW INFORMATION IN DEVELOPMENT AND AGING: WHAT SUPPORTS WHAT?

Symposium – Auditorium 1 – Chair: Zoe Ngo

Saturday **16h40**	CONTINGENCY BETWEEN SPECIFIC MEMORIES AND NOVEL CATEGORY LEARNING IN EARLY DEVELOPMENT	Nora Newcombe, Sabrina Karjack, Zoe Ngo, & Kara Storjohann
Saturday **17h00**	DEVELOPMENT OF MEMORY GENERALIZATION IN CHILDHOOD	Tydings M. McClary, Elisa S. Buchberger, Zoe Ngo, & Markus Werkle-Bergner
Saturday **17h20**	CONSTRUCTING A TASK BATTERY TO ASSESS HIPPOCAMPAL NEURAL COMPUTATIONS SUPPORTING MEMORY IN EARLY DEVELOPMENT	Attila Keresztes, Hunor Kis, & Ildikó Király
Saturday **17h40**	MEMORY CONSOLIDATION OF CONGRUENT AND INCONGRUENT EVENTS: COMPARING CHILDREN AND ADULTS	Iryna Schommartz, & Yee Lee Shing
Saturday **18h00**	TRUE AND FALSE MEMORIES IN AGING CAUSED BY AN EMPHASIS ON PRE-EXISTING SEMANTIC KNOWLEDGE AT ENCODING? FMRI STUDIES WITH MULTIVOXEL PATTERN ANALYSES	Loris Naspi, Paola Gega, & Roberto Cabeza

SYM35 - DEFYING THE STANDARDS OF COGNITION: WHAT ABOUT EVOLUTION? [TAKE 2]

Symposium – Room 250 – Chair: Sara B. Félix

Saturday **16h40**	NORMS OF SURVIVAL-RELATED DIMENSIONS FOR A SET OF FRENCH WORDS: RELATIONSHIPS WITH OTHER PSYCHOLINGUISTIC VARIABLES AND MEMORY PERFORMANCE	Patrick Bonin, Gaëtan Thiebaut, & Alain Méot
Saturday **17h00**	IS SURVIVAL PROCESSING SPECIAL? INSIGHTS FROM PSYCHOLOGICAL REFRACTORY PERIOD EXPERIMENTS	Edgar Erdfelder, Meike Kroneisen, & Markus Janczyk
Saturday **17h20**	THE ANIMACY EFFECT ON MEMORY IN MIXED AND PURE LISTS: A TEST OF THE ATTENTIONAL-PRIORITIZATION ACCOUNT	Raoul Bell, Gesa Fee Komar, Laura Mieth, & Axel Buchner
Saturday **17h40**	DOES ENCOUNTERING POTENTIALLY CONTAMINATED ITEMS IMPROVE MEMORY FOR FUTURE INTENTIONS? THE CONTAMINATION EFFECT IN PROSPECTIVE MEMORY	Natália Santos Fernandes, Sónia S. Santos, & Josefa N. S. Pandeirada

SYM36 - HOW INTERNAL SIGNALS INFORM COGNITION

Symposium – Room 254 – Chair: Gerardo Salvato

Saturday **16h40**	THERMOREGULATION AND BODILY SELF-AWARENESS: IS THERE A LINK? EVIDENCE FROM PATHOLOGICAL POPULATIONS	Gerardo Salvato
Saturday **17h00**	INTEROCEPTION AND PERSPECTIVE-TAKING: REVIEW AND BEHAVIOURAL EVIDENCE	Louise Kirsch, Chiara Baiano, Xavier Job, & Malika Auvray
Saturday **17h20**	INTEROCEPTIVE PROCESSING AND TIME PERCEPTION IN THE SECOND RANGE: BEHAVIOURAL AND NEUROIMAGING EVIDENCE	Alice Teghil
Saturday **17h40**	LINKING PERCEPTION OF BODILY STATES AND COGNITIVE CONTROL: THE ROLE OF INTEROCEPTION IN IMPULSIVE DECISION-MAKING	Chiara Baiano, Massimiliano Conson, Lucia Ricciardi, Francesca Morgante, Marianna Amboni, Carmine Vitale, & Gabriella Santangelo
Saturday **18h00**	ENHANCED CARDIAC INTEROCEPTION IN BLIND INDIVIDUALS: UNRAVELING CROSS-MODAL PLASTICITY AND EMOTIONAL PROCESSING	Dominika Radziun, Maksymilian Korczyk, Laura Crucianelli, Marcin Szwed, & H. Henrik Ehrsson

Abstracts

Talks – Thursday

SYMPOSIA – 09H00 TO 10H40

SYMPOSIUM 1 – Psychonomic's Sponsored

THE POWER OF LANGUAGE USE ON JUDGMENT AND DECISION-MAKING

Organizers: Boaz Keysar[1], [1]*University of Chicago, USA,* Zeynep Aslan, *University of Chicago, USA,* and Janet Geipel, *University of Exeter, UK*

Symposium Abstract: Language is embedded in almost every aspect of our lives. People use language not only to communicate with others but also to think about the world and make decisions. Despite such heavy involvement of language in our daily experiences, understanding the nature of the relationship between language and thought has been a longstanding challenge for cognitive science. An extensive literature describes how speakers of different languages perceive and think about the world differently, demonstrating how different linguistic structures can shape the thought processes of individuals. However, relatively recently, research has shown that other seemingly insignificant elements of language, such as language status (i.e., native or foreign) and language modality (i.e., spoken or written) can influence how people think, judge, and decide. This symposium will present cutting-edge research on how and why such aspects of language systematically influence processes that govern judgment and decision-making.

PAST AND FUTURE FEEL MORE DISTANT IN A FOREIGN LANGUAGE

Zeynep Aslan[1], Janet Geipel[2], & Boaz Keysar[1]; [1]*University of Chicago, USA;* [2]*University of Exeter, UK*

In a series of studies conducted with different bilingual populations, we investigated whether operating in a foreign language as compared to native tongue influences perceived distance judgments of individuals about their past and future. We found that when participants recalled and recited their memories in a foreign language, they judged the event to have occurred earlier in the past. This sense of distance induced by foreign language also influenced people's estimates about the future. Participants rated the probability of future positive and negative events as lower when they used a foreign language compared to their native tongue. Overall, our findings show that foreign language can influence our judgments about past and future by inducing a subjective feeling of distance.

OK OR NOT OK TO LIE? THAT IS A QUESTION OF LANGUAGE

Eduardo Navarrete[1], & Zhimin Hu[1]; [1]*University of Padova, Italy*

People's attitudes regarding lying depend on social interactions, as lies can be either black or white. We examine whether the perception of white and black lies is affected by language context (native vs. foreign). In Experiment 1, eighty-five participants judged scenarios of black and white lies on their acceptability in either Italian (native) or English (foreign) language. The results showed an interaction between the two factors: white lies were more acceptable than black lies, and this difference was attenuated in the foreign language. In Experiment 2, we replicated Experiment 1 with a different set of materials. The results confirmed that a foreign language attenuates the difference between more and less acceptable lies. Overall, these results suggest that a foreign language alters the perception of lies, but its effect differs depending on the type of lies, possibly due to a different combination of emotionality and social norm activation.

REGIONAL LANGUAGE EFFECTS ON MORAL JUDGMENT

Francesca Peressotti[1], & Michele Miozzo[2]; [1]*University of Padova, Italy;* [2]*Columbia University, USA*

Bilingualism comes in different forms. People may use a foreign language, which they learned in school, less commonly and proficiently than their native language. There are also people born in a region where, together with the national language, a regional language is commonly used by most of the inhabitants for everyday conversations. Even if these two types of bilinguals differ in many respects (i.e., proficiency and age of acquisition), we show that regional languages can influence moral judgements in a similar way as foreign languages do. This convergence of results challenges the explanations proposed in the literature to account for the language effects in moral decisions.

THE NUMERIC FORM OF PRICES AFFECTS ONLINE SALES: A NATURAL FIELD EXPERIMENT

Constantinos Hadjichristidis[1], & Hamed Zarandi[2]; [1]*University of Trento, Italy;* [2]*Islamic Azad University, Iran*

While in most countries prices are displayed using Western Arabic numerals (e.g., $120), in Iran they are more routinely displayed

using Persian numerals (e.g., $۱۲۰). We conducted a natural field experiment to explore the effect of the numeric form of price on sales. The experiment was conducted on an Iranian business that sells its products online and in a physical store and displays prices using Western Arabic numerals. In a particular week in 2019, we substituted all online prices with their Persian equivalents, but left those of the physical store unaltered. We found that displaying prices with Persian numerals had a detrimental effect on online orders (-21%) and online sales (-26%). Drawing on literature on foreign language effects, we propose that using the more native Persian numerals might have reduced sales by emphasizing the pain of paying. A prescription for Iranian retailers is to display prices using Western Arabic numerals.

LANGUAGE MODALITY INFLUENCES RISK PERCEPTION

Janet Geipel[1], Constantinos Hadjichristidis[2], Lucia Savadori, & Boaz Keysar[3]; *[1]University of Exeter, UK; [2] University of Trento, Italy; [3] University of Chicago, USA*

Innovations carry risks and benefits. A new flu medication may be beneficial because it treats symptoms faster, but also risky because it has side effects. Understanding how people judge risks and benefits is important because such assessments influence the willingness to adopt novel technologies. Normatively, risk judgments should be a function of the information content and independent of whether people receive the information in written or spoken form. However, in three studies (N=984), we demonstrate that language modality influences risk and benefit judgments of novel technologies. The technologies were judged as less risky and more beneficial with spoken than written descriptions. This was because spoken descriptions increased positive feelings towards the novel technologies. These findings suggest that language modality can influence how people think and judge, and hence should be considered when conducting and interpreting surveys and when devising communication strategies to promote novel technologies.

SYMPOSIUM 2

STATISTICAL LEARNING: DEVELOPMENTAL AND EVOLUTIONARY APPROACHES

Organizers: Dezso Németh[1], Ágnes Lukács[2]; *[1]Centre de Recherche en Neurosciences de Lyon, INSERM, France, [2]Department of Cognitive Sciences, Budapest University Of Technology And Economics, Hungary*

Symposium Abstract: The symposium will provide insights into empirical developments on the evolutionary and developmental aspects of statistical learning (SL) underlying predictive processing of the brain and many areas of skill learning. Talks will focus on the variability of mechanisms supporting the development of pattern extraction through sensitivity to statistical information, presenting results from probabilistic and deterministic sequence learning, focusing on chunking and cross-situational learning. They will cover a range of experimental methods to examine statistical learning in different populations: in different age groups in typical development across the lifespan, in atypical development (in developmental language disorder), in humans and nonhuman primates (bonobos). The symposium will show state-of-the-art methods and approaches to uncover developmental changes in phylogeny and ontogeny, and also contribute to debates about domain and species generality and specificity of statistical learning.

INVERTED U-SHAPED DEVELOPMENTAL TRAJECTORY ACROSS THE LIFESPAN IN ONLINE AND OFFLINE MEASURES OF VERBAL STATISTICAL LEARNING

Krisztina Sára Lukics[1], Dorottya Dobó[1], Ágnes Lukács[1]; *[1]Department of Cognitive Science, Budapest University of Technology and Economics, Budapest, Hungary*

To understand the contribution of statistical learning to across-the-lifespan changes in the efficiency of language acquisition, we tested age-related changes in participants aged between 8 and 80 years, in two types of verbal SL tasks. We applied a word segmentation and an artificial grammar learning (AGL) task, which model word and grammar acquisition, respectively. Models of language acquisition that associate grammar acquisition with childhood while not restricting vocabulary acquisition to earlier years of life would predict that AGL performance would decline while segmentation would be less affected by age. Besides the traditional forced-choice test, we included online measures reflecting the SL process, and a sequence completion tasks. Contrary to the above prediction, we observed an inverted U-shaped developmental curve in both speech segmentation and AGL performance: younger adults showed higher performance than children and older adults. These results suggest that cognitive factors showing a similar developmental trajectory (working memory, cognitive control or processing speed) play a role in shaping age related changes in SL performance in the lab and in real-life language acquisition as well.

LIFESPAN DEVELOPMENTAL INVARIANCE IN MEMORY CONSOLIDATION OF STATISTICAL KNOWLEDGE

Dezso Németh[1], Karolina Janacsek[2], Eszter Tóth-Fáber[3]; *[1]Centre de Recherche en Neurosciences de Lyon, INSERM, France, [2]University of Greenwich, London UK, [3]Institute of Cognitive*

Neuroscience and Psychology, Research Centre for Natural Sciences, Budapest, Hungary

Characterizing ontogenetic changes across the lifespan is a crucial tool in understanding neurocognitive functions. While age-related changes in learning and memory functions have been extensively characterized in the past decades, the lifespan trajectory of memory consolidation, a critical function that supports the stabilization and long-term retention of memories, is still poorly understood. We used a lifespan approach: 255 participants aged between 7 and 76 performed a well-established statistical learning task. This task enabled us to disentangle two critical processes: statistical learning and general skill learning. To measure the consolidation of statistical and general skill knowledge, the task was administered in two sessions with a 24-hour delay between them. Here, we report successful retention of statistical knowledge with no differences across age groups. For general skill knowledge, offline improvement was observed over the delay period, and the degree of this improvement was also comparable across the age groups. Overall, our findings reveal age invariance in these two key aspects of memory consolidation across the human lifespan.

HOW STATISTICAL LEARNING CONTRIBUTES TO VOCABULARY IN TYPICAL DEVELOPMENT AND DEVELOPMENTAL LANGUAGE DISORDER

Ferenc Kemény[1], Ágnes Lukács[2]; *[1]Institute of Psychology at the University of Graz, Austria, [2]Department of Cognitive Science, Budapest University of Technology and Economics, Budapest, Hungary*

Studies on the interface between statistical learning and language are dominated by its role in word segmentation and association with grammar skills, while research on its role in lexical development is scarce. We are aimed at exploring whether and how statistical learning and verbal short-term memory are associated with lexical skills in typically developing German-speaker primary school children and Hungarian-speaking children with developmental language disorder. In TD children, statistical learning skills had an independent contribution to vocabulary size over and above age, receptive grammatical abilities and short-term memory, whereas working memory did not have an independent contribution. The pattern was reverse in SLI: Vocabulary size was predicted by short-term memory skills over and above age, receptive grammar and statistical learning, whereas statistical learning had no independent contribution. Our results suggest that lexical development rely on different underlying memory processes in typical development and in developmental language disorder to different degrees.

LINGUISTIC RULE LEARNING THROUGH CROSS-SITUATIONAL WORD LEARNING IN DLD AND TYPICAL LANGUAGE DEVELOPMENT

Judith Rispens[1], Rosanne Abrahamse[2], Iris Broedelet[3], Padraic Monaghan[4]; *[1]University of Amsterdam, Amsterdam Center of Language and Communication, Netherland, [2]Macquarie University Child Language Lab, [3]University of Amsterdam, Amsterdam Center of Language and Communication, [4]University of Lancaster*

Linguistic rule learning has been explained by various mechanisms, among which the ability of humans to track distributional information of incoming stimuli and use this statistical information to determine patterns occurring in the input (cross-situational learning). Children with developmental language disorder (DLD) have shown weaknesses in statistical learning and in linguistic rule learning. In this study, we investigated whether cross-situational statistics are sufficient for learning a semantic property of the noun which was reflected by a morphophonological pattern. We furthermore investigated whether children with DLD showed evidence of impaired learning. Results of 30 adult participants showed evidence of learning the semantic categorization in a cross-situational word learning paradigm using morphophonological pattens, just like 15 typically developing children (age 8-9 years). A group of 19 children with DLD (age 8-9 years of age) did not show evidence of learning. Our results show evidence of learning natural linguistic language properties within a cross-situational paradigm both in children and in adults. The children with DLD did not show evidence for or against this learning.

CHUNKING MECHANISMS IN HUMANS (HOMO SAPIENS) AND GUINEA BABOONS (PAPIO PAPIO)

Laure Tosatto[1], Joël Fagot[1], Arnaud Rey[1]; *[1]LPC & ILCB, CNRS & Aix-Marseille University, France*

The dynamics of chunking during the learning of a visuo-motor sequence is investigated in humans and Guinea baboons (Papio papio). On each trial, participants had to point to a moving target on a touch screen. The experiment involved the repetition of the same sequence of 9-items over a thousand trials. To reproduce as much as possible the conditions under which baboons performed the task, human participants were tested at their own pace. Results revealed that baboons and humans shared similar chunking dynamics: in both species, the sequence was initially parsed into small chunks that became longer and fewer with practice through two reorganization mechanisms (recombinations and concatenations). Differences were also observed regarding the global decrease in response times that was faster and more pronounced in humans compared to baboons. Analyses of these similarities and

differences provide new empirical evidence for understanding the general properties of chunking mechanisms in sequence learning and its evolution across species.

SYMPOSIUM 3

FLICKER AND FLUTTER - RECENT ADVANCES IN STUDYING COGNITION USING FREQUENCY TAGGING

Organizers: Katharina Duecker[1], Christian Keitel[2]; *[1]University of Birmingham, [2]University of Dundee*

Symposium Abstract: Our understanding of human cognition gravely benefits from studying its neurophysiological substrates, but each neuroimaging method has its individual strengths and benefits. EEG/MEG frequency tagging stands out as it allows probing cortical processing in different sensory modalities while emulating natural environments more closely than the classic event-related design. Frequency tagging involves the periodic or quasi-periodic modulation of a stimulus feature, e.g., luminance, to elicit sustained brain responses synchronous to the stimulation rhythm. These responses serve as a fingerprint of cortical processing that can be tracked for multiple stimuli simultaneously. Frequency tagging is highly versatile: The novel Rapid Invisible Frequency Tagging avoids involuntary attentional capture by visual flicker. Also, applying Frequency Tagging to two sensory modalities allows investigating multisensory integrations. Finally, Frequency Tagging may allow for causal interactions with natural rhythms of the brain that have themselves been implicated in cognitive function. Our symposium will provide an overview of the state-of-the-art frequency-tagging research and how it advances our understanding of human cognitive function.

USING RAPID INVISIBLE FREQUENCY TAGGING TO STUDY MULTIMODAL LANGUAGE PROCESSING IN THE BRAIN

Noor Seijel[1]; *[1]Donders Institute, Radboud University Nijmegen; Max Planck Institute for Psycholinguistics Nijmegen*

During face-to-face communication, our brains need to integrate information from auditory and visual signals to form a unified percept of our environment. In a series of M/EEG experiments, we used RIFT to generate steady-state evoked fields and investigate the integration of audiovisual information in various attentional contexts. We observed a peak at the intermodulation frequency of the auditory and visual signals (fvisual − fauditory) in several experiments, reflecting their interaction. The strength of this intermodulation frequency, as well as power at the tagged frequencies, was modulated by attention. As RIFT leaves low-frequency oscillations unperturbed, we were able to demonstrate that alpha phase synchronization between sensory regions was stronger when there was a larger need for integration. We believe that RIFT can have far-reaching implications for studying the role of oscillatory activity in cognitive processes, such as multimodal language processing, as these situations can be investigated in a more naturalistic manner.

DYNAMICS OF ATTENTIONAL ALLOCATION TO TARGETS AND DISTRACTORS DURING VISUAL SEARCH

Norman Forschack[1]; *[1]University of Leipzig*

Controversy exists about how attention is allocated to task-irrelevant but distracting stimuli in a visual scene. Stimulus-driven theories stress that all salient stimuli capture attention regardless of their relevance. Goal-driven theories assert that task-relevant stimuli are primed to capture attention, while capture by irrelevant distractors can be inhibited. With electrophysiological recordings of continuous frequency-tagged stimulation, we show that pop-out distractors initially captured attention that was withdrawn subsequently. In contrast, attentional deployment was sustained for targets over a much-extended period. The extent to which high-level control affected stimulus processing depended on factors like stimulus salience and the pre-activation of stimulus-coding neural ensembles. E.g., marking the locations of display items allowed for a faster allocation of attention. Interestingly, early attentional capture by distractors did not impair task performance, suggesting that the brain has mechanisms to effectively withdraw attention from irrelevant stimuli. These findings provide important insight into the neural mechanisms underlying visual search and attentional control beyond existing electrophysiological approaches.

ALPHA OSCILLATIONS IN EARLY VISUAL REGIONS SUPPORT FEATURE GUIDANCE THROUGH FUNCTIONAL INHIBITION

Katharina Duecker[1]; *[1]University of Birmingham*

Visual search models typically employ priority maps, used to guide attention towards target features and away from distractors. Ventral stream neurons beyond primary visual cortex (V1) have been shown to respond more strongly to Targets than Distractors. Here, we show that feature guidance modulates neuronal excitability in V1/V2. Importantly, we demonstrate that alpha oscillations in V1 facilitate search through functional inhibition. Using Rapid Invisible Frequency Tagging (RIFT) and MEG, we probed neuronal excitability to Targets and Distractors when colour was a guiding feature or was irrelevant (unguided search). RIFT responses to Targets were significantly enhanced and responses to Distractors

were reduced in guided compared to unguided search. Strong pre-search alpha power in V1 predicted faster reaction times and reduced RIFT responses to all stimuli. We propose that alpha oscillations support feature guidance through functional inhibition, by setting a threshold defining which stimuli will be searched and ignored.

RANDOM TACTILE NOISE STIMULATION REVEALS BETA-RHYTHMIC IMPULSE RESPONSE FUNCTION OF THE SOMATOSENSORY SYSTEM

Samson Chota[1] ; [1]*Université de Toulouse, Utrecht University*

Beta-band power decreases following stimulation of the somatosensory system. This relative suppression of beta oscillations is generally interpreted as an increase in cortical excitability. Here, next to traditional single-pulse stimuli, we employed a random intensity tactile stimulation (white noise), to uncover an impulse response function (IRF) of the somatosensory system. We demonstrate a burst-like initial increase rather than decrease of beta activity following white noise stimulation (human participants, N = 18). These beta bursts, on average, lasted for 3 cycles and their frequency was correlated with resonant frequency of somatosensory cortex, as measured by a multi-frequency steady-state somatosensory evoked potential (SSSEP) paradigm. Furthermore, beta-band bursts shared spectro-temporal characteristics with evoked and resting-state beta oscillations. Our findings reveal a novel oscillatory signature of somatosensory processing mimicking visual IRFs and point to a common oscillatory generator underlying spontaneous beta, phase-locked beta bursts following stimulation and the resonance properties of the somatosensory system.

UTILIZING FREQUENCY TAGGING TO MEASURE ATTENTION FLEXIBILITY

Omer Reuveni[1], Moran Eidelman-Rothman[2], Lior Kritzman[3], Nava Levit-Binnun[2]; [1]*Sagol Center for Brain and Mind, Reichman University; University of Haifa,* [2]*Sagol Center for Brain and Mind, Reichman University,* [3]*Sagol Center for Brain and Mind, Reichman University; Tel Aviv University*

The ability to shift attention in a flexible manner has been suggested to play a pivotal role in wellbeing and psychopathology. Training this ability has been shown to be effective in various clinical interventions (e.g., Mindfulness Based Interventions). However, there is still a need to develop tasks that will objectively and accurately measure the neural processes related to the flexible shifting of attention. In this talk we will present a number of studies conducted in our lab in order to meet this need, utilizing a frequency-tagging approach. In all studies, dots flickering in different frequencies were displayed to generate steady-state visual evoked potentials. Participants were required to first direct their attention to specific targets, followed by an instruction to switch their attention towards a new target. Our results show that the ability of participants to shift their attention across targets can be successfully quantified using these tasks, both on the group and the individual level. The results and conclusions will be discussed along with some methodological considerations and future directions.

SYMPOSIUM 4

FACTORS CONTRIBUTING TO COGNITIVE TRAINING GAINS: LESSONS LEARNED FROM RECENT STUDIES IN HEALTHY AND IN CLINICAL POPULATIONS

Organizers: Mor Nahum[1], Julia Föcker[2], Aaron Seitz[3], Anja Pahor[4], Nazanin Derakhshan[5]; [1]*The Hebrew University, Jerusalem, Israel,* [2]*University of Lincoln, United Kingdom,* [3]*Northeastern University,* [4]*University of Maribor,* [5]*University of Reading, UK*

Symposium Abstract: Cognitive training holds promise in improving cognitive function in both healthy and clinical populations, but results related to more broad, generalizable effects, remain inconclusive. To maximize training gains, there is a need to better understand the factors and contexts affecting learning and lead to generalization and transfer, and study moderators of training-related gains. In this symposium, we present recent results from various cognitive training studies and discuss the factors which help maximize training benefits in both clinical and healthy populations. Dr. Seitz will present design principles which result in broader transfer of auditory and visual training to everyday function. Dr. Föcker will discuss how training might facilitate multisensory integration and implications for cognitive tasks. Dr. Pahor will discuss how gamification of working memory training affects learning and transfer of benefits. Dr. Nahum will present data showing that the combination of cognitive training and meta-cognitive goal-setting training boosts functional outcomes in cancer survivors. Finally, Dr. Derakhshan will discuss how using adaptive cognitive training strategies can be employed to build resilience in vulnerable individuals.

DESIGNING GAMES TO IMPROVE HEARING AND VISION

Aaron Seitz[1]; [1]*Northeastern University*

A hallmark of modern perceptual learning is the nature to which learning effects are specific to the trained stimuli. Such specificity to the fine details of the auditory or visual stimuli that are trained has

been used as psychophysical evidence of neural basis of learning. However, contemporary research in the field in perceptual learning increasingly focusses on how training perceptual skills can be effective to more broadly improve perceptual and cognitive skills. In this talk, I'll review some design principles that lead to broader transfer from hearing and vision training as well as highlight results from work from our lab showing how broad transfer can be found (such as hearing in competition or even playing baseball) from appropriate designed perceptual learning games.

THE IMPACT OF SENSORY CUES ON MULTIPLE OBJECT TRACKING IN CHILDREN AND ADULTS

Julia Föcker[1]; *[1]University of Lincoln, UK*

Previous studies suggest that training with action mini games can improve attentional capacity and multisensory integration in 4-5 years old children (Nava, Föcker, & Gori, 2020). In further studies we investigated the developmental trajectory of the ability to integrate sensory cues during multiple object tracking. Therefore, we presented visual, auditory, and audio-visual cues during tracking in 6-11 years old children and adults. Adults showed improved tracking performance when auditory and visual cues were presented, whereas typical developing children mainly integrated visual cues during tracking irrespective of task difficulty. We discuss possible underlying mechanisms of these findings such as cognitive load, multisensory integration abilities in children and outline future training designs.

A CROWDSOURCING APPROACH TO COMPARING LEVELS OF GAMIFICATION IN WORKING MEMORY TRAINING

Anja Pahor[1], Aaron Seitz[2], Susanne Jaeggi[2]; *[1]University of Maribor, [2]Northeastern University*

Gamification of cognitive training can promote engagement and adherence, and in turn positively affect study outcomes; however, different types of gamification may not be equally effective for everyone. To examine this, a randomized control trial was launched in which participants completed a set of surveys and were assigned to four different levels of gamification of the n-back task, ranging from non-gamified to completely gamified with multisensory features. At pre-test and post-test, they completed a battery of working memory, reasoning, and cognitive control tasks. Through crowdsourcing, 564 participants (age range: 18-89 years) have completed the study to date. Preliminary results suggest that gamification differentially affects training and transfer as a function of age. The role of other moderators of cognitive training, such as past videogame playing experience, and other individual difference factors, will also be discussed.

COGNITIVE TRAINING COMBINED WITH META-COGNITIVE GOAL SETTING TRAINING IN CANCER SURVIVORS

Talia Maeir[1], Chen Makranz[2], Tamar Peretz[2], Ester Odem[3], Shani Tsabari[2], Yafit Gilboa[3], Mor Nahum[3]; *[1]The Hebrew University, Jerusalem , Israel, [2]Hadassah Medical Center, Jerusalem, Israel, [3]The Hebrew University, Jerusalem, Israel*

Computerized cognitive training (CCT) has been previously shown to improve cognitive function in individuals experiencing cancer-related cognitive impairment (CRCI). However, its effect on everyday function remains inconclusive. Recent meta-analyses suggest that combination of cognitive training with meta-cognitive interventions may improve generalizability of training. Here, we report the results of a recent randomized controlled trial, examining the efficacy of a novel intervention, combining CCT with remotely applied, occupation-based goal-setting training ("CRAFT"). 74 individuals with CRCI were randomized to receive either CRAFT, CCT, or treatment-as usual for 12 weeks. Participants were assessed immediately after training and at a 3-months follow up. Both cognitive training and CRAFT improved cognitive performance, perceived cognition, and participation in daily life activities, compared to the treatment-as-usual group. The CRAFT group participants further showed significantly larger clinically meaningful gains on participation and treatment satisfaction. We discuss the potential benefits of combining cognitive training and meta-cognitive instruction in maximizing training gains and potential mediators for change.

FROM VULNERABILITY TO RESILIENCE: THE OFFERINGS OF COGNITIVE TRAINING

Nazanin Derakhshan[1]; *[1]University of Reading, UK*

There is increasing evidence for the prediction that attentional control plays a key role in emotional vulnerability and resilience. This has led to a growing literature testing the effectiveness of cognitive training in reducing anxiety and depressive related symptoms in vulnerable populations, including women with a breast cancer diagnosis. The emerging picture of results shows much promise but also suggests that to optimise benefits, moderators of training related gains can help personalise training protocols moving away from a one-size-fits-all approach. This talk will discuss recent attempts at empowering vulnerable individuals towards resilience using adaptive cognitive training, as well as identifying the possible moderators that can maximise individuation for sustainable training benefits.

SYMPOSIUM 5

FACETS OF EPISODIC MEMORY RESEARCH: FROM MEMORY DEVELOPMENT TO EVERYDAY FORGETTING

Organizers: Marcel R. Schreiner[1], Julian Quevedo Pütter[1]; *[1]University of Mannheim*

Symposium Abstract: Human episodic memory has been the subject of intense empirical research for over a century due to its fundamental role for everyday functioning across the human lifespan. The complex and multi-faceted characteristics of humans' "mental time travel" device (Tulving, 1972) have inspired rigorous, creative, and diverse methodological approaches. In this symposium, we aim to showcase the breadth of current episodic memory research. The first contribution addresses the developmental trajectories of memory generalization and specificity. The second contribution investigates whether agency facilitates memory integration, thereby supporting the formation of more coherent memory representations. The third contribution addresses the question of how people encode and retrieve differently valued pieces of information. The fourth contribution grapples with the theoretical implications of the memory-enhancing effect of post-encoding alcohol consumption. The final contribution addresses information storage and retrieval in the context of motivated forgetting of unethical behavior. Together, these contributions show how different methodological approaches are necessary to reach a comprehensive understanding of episodic memory.

DEVELOPMENT OF MEMORY GENERALIZATION AND SPECIFICITY ACROSS CHILDHOOD

Zoe Ngo[1]; *[1]Center for Lifespan Psychology, Max Planck Institute for Human Development*

Memory allows us to make generalization based on the regularities across related experiences, while preserving the specific instances of our past. Theoretical memory models suggest that specific experiences are initially encoded as hippocampus-dependent episodic memories and slowly become amenable to generalization through consolidation. Post-learning sleep facilitates such consolidation processes. However, generalization can also occur rapidly during wakefulness. Here, we tested whether age differentially relates to rapid generalization and memory specificity, and the effect of a sleep-filled delay on generalization and memory specificity differs across age. We found that improvements with age being more pronounced in generalization than in memory specificity. Older children were more likely to retain general and specific aspects of memory after an overnight delay. Compared to younger children, older children showed greater gains in generalized, but not in specific memories. These findings reveal aspects of past experiences upon which children draw when creating inferences, and suggest that the effects of overnight delay on generalization and memory specificity interact with age.

MEMORY INTEGRATION IN EPISODIC MEMORY: AN INVESTIGATION OF THE MODERATING ROLE OF AGENCY

Marcel R. Schreiner[1], Arndt Bröder[1], Thorsten Meiser[1]; *[1]University of Mannheim*

The formation of coherent event representations in episodic memory requires that the events' constituent elements are bound together. So far, research on moderators of such binding processes has been scarce. In five experiments we tested whether the presence of an agentic element in an event facilitates the formation of coherent memory representations. Participants were presented events consisting of three elements. Using a linguistic agency manipulation, these were presented as scene descriptions in the form of sentences in either active voice, in which the agentic element served as the grammatical subject (agency condition), or in passive voice, in which there was no agent in the described scene (non-agency condition). In some experiments, event elements were presented in a sequential pairwise manner, while they were presented simultaneously in others. The results yielded no evidence for a facilitating effect of agency on the binding of event elements, but effects may have been concealed due to low memory performance in the experiments. In addition, binding effects were only found in case of simultaneous, but not sequential, event element presentation, suggesting an effect of the presentation format.

DO STUDY ORDER AND RECALL ORDER MATTER FOR REMEMBERING, AND DO PEOPLE CONTROL THEM EFFECTIVELY?

Vered Halamish[1], Pnina Stern[1]; *[1]Bar-Ilan University*

Often when learning and remembering information, some pieces of information are more valuable to remember than others. During encoding, people may study the valuable items before the less-valuable items, or vice versa. During retrieval, they may attempt to retrieve the valuable items before the less-valuable information, or vice versa. Do study order and recall order matter, and do people control study and recall order effectively? In a series of experiments designed to answer these questions, participants studied and were tested on information that included more valuable items (targets) and less valuable items (non-targets). We manipulated the order of

targets and non-targets during either study or test. Results revealed that overall, targets were better recalled than non-targets. Study and recall order did not affect target recall, but they did affect non-target recall. Studying non-targets first impaired recall of non-targets, compared to studying targets first. Recalling targets first impaired recall of non-targets, compared to recalling non-targets first. Interestingly, when allowed to control the order, participants preferred the less effective study and recall orders.

ALCOHOL-INDUCED RETROGRADE FACILITATION: A MODEL-BASED ENCODING-MAINTENANCE-RETRIEVAL ANALYSIS

Julian Quevedo Pütter[1], Edgar Erdfelder[1]; [1]*University of Mannheim*

Consuming alcohol after learning has been shown to improve subsequent memory performance (Parker et al., 1981). This alcohol-induced retrograde facilitation effect is typically explained by the opportunistic consolidation hypothesis: According to this theoretical account, reduced encoding of new information during acute alcohol intoxication allows hippocampal resources to be reallocated to consolidation processes. In contrast, temporal distinctiveness theory attributes the effect to enhanced temporal isolation of to-be-remembered items in memory. In our registered report conceptual replication, participants (N = 93) were randomly assigned to an alcohol or a placebo condition and tested in a free-then-cued recall paradigm. We applied the encoding-maintenance-retrieval (EMR) model to our data, which allowed us to precisely disentangle encoding, maintenance, and retrieval processes. In overall recall measures, we failed to replicate the original retrograde facilitation effect. However, we did find a positive effect of alcohol on the retrieval parameter of the EMR model. This result suggests that alcohol-induced retrograde facilitation might be best explained by temporal distinctiveness theory.

BIASED RETRIEVAL OR BIASED STORAGE? A MODEL-BASED APPROACH TO MOTIVATED FORGETTING OF UNETHICAL BEHAVIOR

Johanna M. Höhs[1], Mandy Hütter[2]; [1] *University of Tübingen, University of Cologne,* [2] *University of Tübingen*

Our goal was to advance the conceptual understanding of morality-related motivated forgetting ('moral forgetting') with a cognitive modeling approach. We aimed to test whether moral forgetting represents immorality and agency-specific loss of information and whether moral forgetting originates from inhibited information retrieval. We used the multinomial storage-and-retrieval model (Riefer & Rouder, 1992) to separate storage and retrieval processes for this purpose. In an incidental paired-associate learning task, participants imagined a sequence of immoral behavior descriptions that referred to the participant as the behavior-performing agent or the behavior-involved patient. Memory for this information was later tested in a free-recall-then-cued-recall paradigm. Contrary to our expectation, the model-based results of Experiment 1 (N = 119) revealed in fact better (instead of worse) retrieval of information associated with the agency-related immoral encoding context. However, the results indicated worse storage of information associated with the agency-related immoral encoding context. The findings emphasize the value of cognitive modeling as a tool to promote conceptual preciseness in applied episodic memory research.

SYMPOSIUM 6

WRITTEN PRODUCTION OF WORDS AND SENTENCES

Organizers: Mark Torrance[1]; [1]*Nottingham Trent University, UK*

Symposium Abstract: Language production has historically been studied in speech. Written production differs from spoken production in important ways. Forming letters, by pen and by keyboard, involves complex, motor planning. Writing words requires orthographic retrieval, either through phoneme-to-grapheme mapping or directly via stored orthographic lexemes. Both of these are late-learned and place additional demands on the writer. On the plus side, writers can hesitate at any point during production without damaging communicational effect, and writers have a permanent external representation of what they have just said. Written production is therefore different from spoken production in ways that are cognitively interesting but are as yet not well understood. The research reported in this symposium develops understanding of the cognitive mechanisms that underlie writing, addressing questions about how writers plan finger movements, retrieve or generate correctly spelled words, and plan sentences.

EFFECTS OF CONCEPTUAL AND HANDWRITING DEMANDS ON PRODUCTION OF SIMPLE AND COMPLEX SENTENCES

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Sentence planning may occur before the sentence is transcribed, during a pre-writing pause, or by producing it unit by unit, with longer pauses at unit boundaries (Roeser et al., 2019). It can also occur in parallel with sentence handwriting when the capacity of working memory is sufficient to allow parallel processing between central and peripheral processes (Olive, 2014). 45 participants composed 2-clause sentences from 2 target words, with each clause containing 1 target word. Conceptualization demands were

manipulated by varying the semantic distance between the two target words, and handwriting demands by asking writers to use either familiar or unfamiliar handwriting. The Eye and Pen application (Chesnet et al., 2022) controlled word presentation and recorded the spatiotemporal parameters of handwriting. We examined prewriting and inter-clauses pauses in two experiments in which writers composed simple and complex sentences. Preliminary results indicate that, in both studies, conceptualization and handwriting demands independently impacted sentence production. In addition, the results suggest that articulation of sentence planning and handwriting can change to adapt to the task demands.

NO SCOPE FOR PLANNING: LANGUAGE PRE-PLANNING AS BAYESIAN MIXTURE PROCESS

Jens Roeser[1], Mark Torrance[1], Mark Andrews[1], Thom Baguley[1]; *[1]Nottingham Trent University, UK*

Language production obligates pre-planning of some minimal linguistic unit. The phrase has been proposed to be the "default scope" (Martin et al., 2010) of this unit. Evidence for this comes from the observation that, when a sentence starts with a conjoined NP (The A and the B), production onset is delayed compared to matched sentences starting with a simple NP (The A). An alternative view is that planning beyond the first noun is not obligated by the linguistic encoder. Under the latter view extended onset latencies may occur sporadically across trials and for reasons other than obligatory planning scope. We contrasted these two views directly in a series of Bayesian models implemented in Stan. We reanalysed onset latencies from 8 peer-reviewed studies, in which participants described image arrays starting with a conjoined or a simple NP and run two follow-up experiments using the same design. We found converging evidence for the alternative hypothesis, that longer latencies are more likely but not obligated for conjoined NPs. We suggest that the frequently replicated slowdown for conjoined NPs might be better explained by a linking from object representations to a conceptual structure that acts only on a subset of trials.

PREDICTORS OF ELECTROPHYSIOLOGICAL BRAIN ACTIVITY DURING HANDWRITING PICTURE NAMING USING A TOPOGRAPHIC ERP ANALYSIS

Cyril Perret[1], Caroline Borde[2] ; *[1]CeRCA, Université de Poitiers, Université de Tours, CNRS, France, [2]MSHS, Université de Poitiers, CNRS, France*

Writing a text involves articulation of several cognitive activities. One of them consists in translating a communicative intent - a word - into graphomotor gestures. The literature on handwritten word production describes processing levels from this communication intention to motor planning. These proposals stem from work aiming to relate the initialization latencies of image label handwriting to predictors. Predictors are chosen because they index certain levels of processing. For instance, image variability refers to the semantic/conceptual richness of the concept depicted by the picture. Thus, observing that a predictor accounts for a significant part of the variance in latencies reinforces the hypothesis that the level of processing is involved in picture naming. We will describe similar research except that we regress electroencephalographic activity of adults onto the predictors. We use the eight classic predictors of picture naming studies (Perret & Bonin, 2019): visual complexity, name and picture agreements, image variability, conceptual familiarity, age of acquisition, lexical frequency and number of letters. Analyses were run both on ERP signal and on characteristics of stable topographies.

NEURAL CORRELATES OF LEXICAL, SUBLEXICAL AND MOTOR PROCESSES IN WRITING PRODUCTION

Olivia Afonso[1], Alberto Avilés[2], Carlos J. Álvarez[3]; *[1]Centre for Psychological Research, Oxford Brookes University, United Kingdom, [2]School of Psychology and Counselling, The Open University, United Kingdom, [3]Departmento de Psicología Cognitiva, Organizacional y Social and IUNE, Universidad de La Laguna, Spain*

Writing recruits a vast neural network underpinning linguistic and motor processes. Previous studies have tried to identify which brain areas are "writing-specific" and which are shared with other activities such as reading or drawing. In this fMRI study, participants (n = 25) copied or saw/read symbols or words varying in frequency and phonology-to-orthography (P-O) consistency. Increased activation in writing than in reading for words but not for symbols revealed the involvement of left-lateralised fronto-parietal regions and the cerebellum in the production of writing-specific movements. Comparisons between symbols and words when writing but not when reading identified several areas involved in linguistic writing-specific processes. Interestingly, anterior parts of the inferior frontal gyrus were selectively recruited when writing P-O inconsistent words, while the right Heschl's gyrus was recruited when writing consistent words. Non-specific motor and linguistic areas were also identified. These results contribute to identify the neural substrate of the lexical and sublexical spelling routes and suggest that different brain areas might be involved in the lexical processing of input (reading) and output (writing) orthography.

THE ROLE OF LOOKBACK IN THE WRITTEN PRODUCTION OF MULTI-SENTENCE TEXTS

Mark Torrance[1], Jens Roeser[1], Emily Dux Speltz[2], Evgeny Chukharev-Hudilainen[2]; *[1]Nottingham Trent University, UK, [2]Iowa State University, USA*

Written production of continuous text is a semi-parallel, cascaded, just-in-time process. As a result output can be remarkably fluent. But this fluency is fragile. Writers frequently pause, briefly, and glance back at text they have just produced. One possible function of this lookback is to cue retrieval of the message (or language) of the next sentence. We summarise findings from two studies. In the first adults (N = 39) wrote argumentative essays in their first language (L1) and in a language that they were learning (L2). We tracked eye movements. Lookback was more common and of longer duration at sentence boundaries, with no effect of L1/L2. Lookback from between and within words was more common and further into the preceding text in L2 than in L1. This is consistent reduced parallelism in L2, hence greater need for external cuing of what to say next. As a stronger test of the cuing hypothesis (new sample of 30 adults, L1 only, data analysis currently in progress) we look in detail at lookback that occurs between sentences. We examine the semantic and syntactic relationships between words fixated in the previous sentence and the meaning and syntax of the sentence that follows.

TALKS & BLITZ-TALKS – 12h00 to 13h20

TALKS 1
READING AND EYE TRACKING

HOW LOW CAN YOU GO? EYE MOVEMENTS DURING READING AT DIFFERENT SAMPLING RATES

Bernhard Angele[1], Jon Andoni Duñabeitia[1]; *[1]Universidad Nebrija*

Modern eye trackers used in language and reading research offer remarkable temporal resolution with sampling rates of 1000 Hz and more. However, such eye tracking equipment is expensive, limiting its use outside of the laboratory. Inexpensive eye tracking solutions are available, but their sampling rate is generally much lower than the one offered by research-grade eye trackers. So far, it has not been tested so far whether and how data collection at lower sampling rates affects common eye movement phenomena observed in reading, such as the frequency effect (e.g., Inhoff & Rayner, 1986; Rayner, 1998), the word length effect (e.g., Rayner, 1998), and landing positions of saccades (e.g., Vitu et al., 1990). We present findings from a study that recorded readers' eye movements during reading at different sampling rates. In the study, we aim to replicate these classic effects with data collected at different sampling rates. The results of this study have important implications for the design of eye-tracking studies, particularly those using cheaper equipment, and may shed light on the underlying cognitive processes involved in reading.

POPEYE - AN R PACKAGE TO ANALYSE EYE MOVEMENT DATA FROM READING EXPERIMENTS

Sascha Schroeder[1]; *[1]University of Goettingen*

popEye is an R package to analyse eye movement data from reading experiments (Schroeder, 2019; freely available at https://github.com/sascha2schroeder/popEye). popEye allows to analyse data collected using different eye tracking devices (SR research, GazePoint, etc.) and software packages (Experiment Builder, EyeTrack, PychoPy, etc.) within the same workflow. A unique feature of popEye is that it allows semi-automatic analysis of text-level experiments. To this end, popEye implements a wide selection of state-of-the-art line assignment algorithms and sentence-level measures. In addition, popEye has been designed to be used in cross-linguistic studies and thus supports a wide variety of languages including Hebrew, Korean, and Chinese. In this talk, I will demonstrate how popEye is used and present newly implemented features, including new options for data pre-processing, line-assignment, and automated cleaning that make the analysis process more flexible, transparent, and reproducible.

EFFICIENT EYE MOVEMENTS IN VISUAL WORD RECOGNITION: SENSITIVITY TO THE STRUCTURE OF THE LEXICON

Jon Carr[1], Monica Fantini[2], Davide Crepaldi[2]; *[1]International School for Advanced Studies (SISSA) and Royal Holloway University of London, [2]International School for Advanced Studies (SISSA)*

Languages are teeming with statistical cues for the cognitive system to capitalize on, and at least some aspects of language processing might be explained by sensitivity to such cues via general-purpose cognitive machinery. One cue relevant to the task of reading is the way in which information about word identity is typically distributed within a given lexicon. Previous research on visual word recognition has struggled to disentangle information distribution from perceptual factors because they are unavoidably interconnected in language processing. To tackle this issue, we first constructed a Bayesian cognitive model that explicitly teases apart information and perception. We then used this model to inform two experiments with artificial lexicons, including one experiment with eye tracking.

Our results suggest that readers are sensitive to the distribution of information, targeting different letter positions depending on whether the language they learned is more informative on the left or right. This provides a causal demonstration that the way in which the lexicon distributes information affects how readers visually explore words, thus revealing the use of a probabilistic cue based simply on efficient information gathering.

THE USE OF SPECIFIC SEGMENTATION CUES IN READING UNSPACED FINNISH TEXT

Raymond Bertram[1]; [1]*University of Turku*

In alphabetic languages, spaces are functional segmentation cues allowing for faster word recognition. Rayner and Pollatsek (1996) found that reading English text without spacing is 30% slower than reading with spaces. The current eye movement experiment compares reading Finnish sentences in spaced and unspaced format. As readers can make sense of reading normally spaced text in unspaced format, the main question was what cues readers use to detect words in unspaced text. The experiment included 50 participants who read 138 target sentences for comprehension, while eye movements were recorded with EyeLink 1000. The results showed that unspacing text in Finnish increases sentence reading times with 35%, in line with what was reported earlier for English. More importantly, the results showed that unspaced text reading is facilitated by reduced word length and higher word frequency, but also affected by position of the word in the sentence and average bigram frequency at word boundaries. It thus seems that readers without much experience in reading unspaced text are equipped to make use of specific word segmentation cues, some of them similar to segmentation cues in speech recognition or in typically unspaced languages like Chinese.

TALKS 2
BILINGUALISM I

LANGUAGE CONTEXT MODULATES THE ASYMMETRY OF SWITCH COSTS AND REVERSE DOMINANCE EFFECTS IN THE LANGUAGE SWITCHING PARADIGM

Agata Wolna[1], Kalinka Timmer[2], Jakub Szewczyk[3], Zofia Wodniecka[1]; [1]*Jagiellonian University in Krakow,* [2]*University of Warsaw,* [3]*Donders Institute for Brain, Cognition and Behaviour, Nijmegen*

Does language environment, dominantly L1 or L2, modulate the way bilinguals implement the control mechanisms in speech production? In the language-switching (LS) task, two indices of control are typically studied: asymmetric switch costs (switch to L1 larger than to L2) and the reversed dominance effect (L1 is slower than L2). Here we ask if these measures of control are affected by the language context (L1-dominant vs. L2-dominant). 82 Polish-English unbalanced bilinguals performed the LS task under two different language contexts introduced in two ways: 1) by assigning the 67% majority of trials in the LS task to the context-dominant language (L1 or L2); 2) by preceding the LS task with a block of naming in L1 or L2. In the L1 context, we replicated the effects typical for unbalanced bilinguals: asymmetric switch costs and reversed language dominance. However, in the L2 context, the asymmetry of switch costs was reversed, and the reversed dominance effect was increased. Our findings show that 1) immediate language context qualitatively determines the nature of bilingual control; 2) reversed dominance and asymmetric switch costs dissociate and likely reflect two different aspects of bilingual control.

HOW DOES ORTHOGRAPHIC SIMILARITY IMPACT LANGUAGE SWITCHING?

Tanja Römbke[1]; [1]*RWTH Aachen University*

Previous research has shown that it is easier to switch between languages when using cognates (e.g., FISH/FISCH [English/German]) than non-cognates (e.g., DRESS/KLEID), suggesting that cross-language similarity of translation-equivalent words impacts how easy it is to access them. Yet, this research has concentrated on the impact of words' phonological similarity and ignored orthographic similarity. Further, cognates and non-cognates were treated as distinct categories not as a continuum. Thus, in this study, we explored how orthographic similarity impacts language switching. 52 unbalanced German-English bilinguals completed a cued picture naming task where they typed or spoke responses in mixed language blocks. To-be-named pictures referred to translation-equivalent words that differed continuously in their orthographic similarity. We found that it was easier to name and switch between orthographically similar word pairs than dissimilar ones. These effects were observed for both written and spoken responses, but were reduced for the latter. Our results are consistent with translation-equivalent words existing on a continuum of orthographic similarity, which can facilitate lexical access through cross-language activation.

(AFTER-)EFFECTS OF LANGUAGE SWITCHING: EVIDENCE FOR PROACTIVE INHIBITION?

Andrea M. Philipp[1], Tanja Roembke[1], Chiara Koch[1], Mathieu Declerck[2], Iring Koch[1]; [1]*RWTH Aachen University,* [2]*Vrije Universiteit Brussel*

Bilinguals are able to flexibly use their languages and to switch between them. Yet, it is currently not clear how language activation is adjusted to facilitate such language switching. In this study, German-English bilinguals (n = 50) named pictures in either their dominant L1 (German) or non-dominant L2 (English) in a blocked language order design (i.e., single-language blocks [L1/L2 or L2/L1], mixed-language blocks, single-language blocks). In mixed-language blocks, we observed a better performance in language-repetition than in language-switch trials (switch costs) as well a worse performance in L1 than in L2 (L1 slowing). While the performance for L1 was not different between single-language blocks before and after the mixed-language blocks, performance in L2 was better in the single-language blocks after than before the mixed-language blocks. Thus, as regards the single-language blocks, we observed positive practice effects for L2 but not for L1. We suppose that practice effects for L1 were counteracted by proactive inhibition of the dominant language during mixed-language blocks. This proactive inhibition presumably emerged as L1 slowing in the mixed-language blocks and persisted as an aftereffect in single-language blocks.

DOES THE DOMINANT LANGUAGE ALWAYS REQUIRE MORE INHIBITION DURING BILINGUAL LANGUAGE PRODUCTION?

Iring Koch[1], Mathieu Declerck[2], Greta Petersen[1], Daniel Rister[1], Wolfgang Scharke[1], Andrea M. Philipp[1]; *[1]RWTH Aachen University, [2]Vrije Universiteit Brussel, Belgium*

Speaking two or more languages shows bilingual flexibility, but flexible switching requires language control and often incurs performance costs. In two experiments, we examined inhibitory control assessing n-2 repetition costs when switching three languages (L1 [German], L2 [English], L3 [French]). These costs denote worse performance in n-2 repetitions (e.g., L2-L3-L2) than in n-2 non-repetitions (e.g., L1-L3-L2), indicating persisting inhibition. In two experiments (n = 28 in Experiment 1; n = 44 in Experiment 2), n-2 repetition costs were observed, but only for L2. Looking into L2 trials specifically, we found n-2 repetition costs when switching back to L2 from the still weaker L3 but not when returning from the stronger L1, suggesting that L2 is a strong competitor (requiring inhibition) for L3 but less so for L1. Because L1 produced the best performance overall, consistent with being the most dominant language, finding no n-2 repetition costs for L1 may be due to inhibition of L1 in all trials (i.e., even when switching between the two non-dominant languages). We discuss how the data are consistent with the theoretically assumed relation between language dominance and language inhibition.

BLITZ-TALKS 1
COGNITIVE AGING

THE AGING CHALLENGE: DOES HEALTHY AGING AFFECT DIFFERENT COGNITIVE CONTROL FUNCTIONS EQUALLY?

Sarah De Pue[1], Céline Gillebert[1], Eva Dierckx[2], Eva Van den Bussche[1]; *[1]KU Leuven, [2]Vrije Universiteit Brussel, Alexianen Zorggroep Tienen*

In this rapidly aging society, one of the biggest challenges is the increasing cognitive decline with age. Although general cognitive control declines with age, different functions decline at a different onset, pace and trajectory. To better understand the cognitive control decline in aging, we recruited 75 young adults and three older adult cohorts: 60-69 years old (n=80), 70-79 years old (n=82) and 80 years or older (n=69). Participants completed a test battery measuring updating, inhibition, shifting and proactive control. Results showed that all older adults still preferred a proactive control strategy. Inhibition surprisingly did not differ with age, whereas updating linearly declined across the age groups. Finally, for shifting, switch costs were larger in older compared to young adults. It is clear that cognitive decline is highly heterogeneous. Some cognitive control functions showed expected age-related decline, but other functions did not seem to be impacted by aging. In addition, covariates such as sex and social network were studied. We are currently retesting these older adults to obtain a more fine-grained view on when cognitive decline is occurring and, ultimately, what we can do to prevent further cognitive decline.

INDUCING PLASTICITY IN THE AGING BRAIN: A NEUROIMAGING AND COGNITIVE PERSPECTIVE

Amy Miller[1], Dr Melanie Burke[1]; *[1]University of Leeds*

In this study, intermittent theta-burst stimulation (iTBS), a promising intervention for inducing neuroplasticity, was applied to the dorsolateral prefrontal cortex (DLPFC) to investigate the effects on cognition and functional brain activity. Forty-seven healthy participants aged 19 to 73 years, received iTBS over the left and right DLPFC in two sessions, in a randomised, pre-post design. Task-related eye-movements were recorded on attention, inhibition, working memory and sequence learning tasks. Oxygenated haemoglobin (HbO2) levels, over the DLPFC, were measured simultaneously using functional near infra-red spectroscopy (fNIRS). Analysis of within-session effects showed application of iTBS over the right DLPFC significantly reduced reaction time and increased accuracy in the working memory task across ages. Performance in the inhibition task showed significant bilateral effects of iTBS on reaction time for young adults only. Data analysis

for the fNIRS measures are ongoing and results are TBC. ITBS has a beneficial effect on cognitive performance in tasks which require storage and manipulation of information, showing iTBS is a promising intervention for enhancing cognitive performance.

INTERGENERATIONAL CONTACT AND AGEISM PREDICT PREVENTIVE ATTITUDES AND BEHAVIORS DURING THE COVID-19 PANDEMIC

Emilio Paolo Visintin[1]; *[1]University of Ferrara*

Political discourse, mass media and research have framed the COVID-19 pandemic as an intergenerational issue, stressing the vulnerability of older people to COVID-19, with the call to protect them. Therefore, attitudes and behaviors aimed at reducing the spread of coronavirus, such as properly wearing masks and supporting anti-COVID-19 vaccinations, may be seen as attitudes and behaviors aimed at protecting the health of older people. Hence, this research investigated whether contact with older people and ageism are associated with preventive behaviors aimed at reducing the spread of coronavirus (Study 1, N = 371) and with attitudes toward the vaccination passport (Study 2, N = 153). Supporting hypotheses, positive attitudes toward older people were positively associated with preventive behaviors (Study 1) and with positive attitudes toward the vaccination passport, controlling for attitudes toward vaccinations (Study 2). Further, quality of contacts with older people before the pandemic was associated with preventive behaviors (Study 1) and with positive attitudes toward the vaccination passport (Study 2) via attitudes toward older people. The role of intergenerational contact and ageism for public health will be discussed.

THE PRETESTING EFFECT AMONG YOUNG AND HEALTHY OLDER ADULTS

Yeray Mera[1], Nataliya Dianova[1], Eugenia Marin-Garcia[1]; *[1]University of the Basque Country UPV/EHU*

A growing body of evidence has shown that attempting to guess unknown information, even when making many errors, can improve memory performance in younger adults, known as the Pretesting effect. However, it is unclear whether this effect differs in healthy older adults compared to a younger population. For this purpose, both young and older adults were assigned into two experimental groups: (1) the pretest group started with an initial cued-recall test followed by corrective feedback and then completed a study session, and (2) the control-study group performed two consecutive study sessions. All groups had the same final cued-recall test after a five-minute distractor task. Our results showed the learning benefit of pretesting in both age groups. We also calculated an error correction index, which revealed that there were no significant differences in the amount of errorful learning between older adults and young adults. Finally, the level of perseverance of previous errors did not differ significantly with age. Thus, our research suggests that our capacity to learn from previously generated errors remains independent of age.

OPTIMIZING OLDER ADULTS' PERFORMANCE IN THE STROOP TASK

Mariana Burca[1], Pierre Chausse[1], David Clarys[2], Ludovic Ferrand[1], Nabil Hasshim[3], Banjamin A. Parris[4], Laetitia Silvert[1], Maria Augustinova[5]; *[1]Clermont Auvergne University, LAPSCO, [2]University of Tours, CeRCA/MSHS, [3]School of Applied Social Sciences, De Montfort University, [4]Department of Psychology, Bournemouth University, [5]Normandie Université, UNIROUEN, CRFDP*

Recent research has shown that greater magnitudes of the Stroop interference effect observed in older (vs. younger) adults result from significantly higher levels of semantic (as opposed to response) conflict. The present study investigated whether semantic, response or both conflicts can be reduced in older adults by enhancing their focus on the relevant color-dimension. 51 older adults completed the two-to-one color-response mapping Stroop task when either a single or all letters of Stroop words were colored and cued. Contrary to dominant single-stage response conflict models of the Stroop interference effect, the results showed that it was solely driven by semantic conflict (i.e., response conflict – allegedly driving all the Stroop interference effect – remained non-significant). Also, and importantly, semantic conflict was significantly reduced when only a single letter of Stroop words was colored and cued – suggesting that attentional selectivity of older adults can be efficiently optimized. Processes underlying this optimization will be discussed.

THE EFFECT OF POST-COVID SYNDROME ON RESTING-STATE NEURAL DYNAMICS AND THEIR CHANGES WITH COGNITIVE TRAINING IN OLDER ADULTS

Boglárka Nagy[1], Andrea B. Protzner[2], Balázs Czigler[3], Mátyás Sarudi[1], Zsófia Anna Gaál[1]; *[1]Institute of Cognitive Neuroscience and Psychology, Research Centre for Natural Sciences, Budapest, Hungary, [2]Department of Psychology, University of Calgary, Calgary, Alberta, Canada, [3]Bajcsy-Zsilinszky Hospital, Budapest, Hungary*

The current literature suggests that post-covid could accelerate neural and physiological aging. Thus, we were interested if this is the case in intrinsic brain dynamics, since aging is accompanied by

a shift from long-range to local neural processing. We had 30 older adults (60-75 years) with post-covid symptoms and 20 healthy peers who did not encounter the COVID-19 virus. Every participant underwent a one-month long cognitive training as a suitable method for improving cognitive aging. Resting-state EEG data was collected from pre- and post-training sessions. We applied multiscale entropy for detecting brain signal complexity and spectral power density for measuring oscillatory activity. Partial least squares, a data-driven multivariate technique was used for statistical analysis. Our results revealed generally increased finer timescale entropy and higher frequency band power in the post-covid group compared to the healthy one, however, these post-covid-related changes disappeared with cognitive training. In conclusion, post-covid syndrome seems to enhance the aging process in intrinsic neural dynamics by increasing local neural processing but cognitive training could be a promising candidate for counterbalancing these changes.

COGNITIVE TRAINING EFFECTS ON HEALTHY AND POST-COVID OLDER ADULTS: CHANGES IN BEHAVIOUR AND EVENT-RELATED POTENTIALS

Zsófia Anna Gaál[1], Boglárka Nagy[1], Lili Kővári[1], Mátyás Sarudi[1], Balázs Czigler[2], Györgyi Balla[1], Réka Válóczy[2], István Czigler[1]; *[1]Institute of Cognitive Neuroscience and Psychology, Research Centre for Natural Sciences, [2]Bajcsy-Zsilinszky Hospital*

We aimed to investigate whether cognitive training can compensate for post-COVID symptoms in older adults. We compared adults aged 60-75 years who did not encounter the virus (N=20) with those who experienced post-COVIDsymptoms (N=30). Participants underwent 8 one-hour long adaptive cognitive training sessions. We measured cognitive functions and registered the EEG during task-switching paradigms (one used as a reference and the other as a near transfer task), and attention network test (far transfer) before training and 1 month later. The groups did not differ in their behavioral results or training benefits, except for orienting, in which the post-COVID group performed worse and did not show improvement after training. EEG analysis revealed that their early and late positivity in cue-locked ERPs were reduced, while target-locked P3b was similar to that seen in healthy adults. Therefore, although the neurological examination did not confirm any organic deviation corresponding to the complaints, our results suggest that orientation is affected in post-COVID patients. However, cognitive training was effective in improving cognitive functions and producing transfer effects, not only in the healthy, but also in the post-COVID group.

BLITZ-TALKS 2

MEMORY I

DOES SENSORY DISCRIMINATION ABILITY EXPLAIN THE RELATION BETWEEN ACTIVE MUSIC-MAKING AND WORKING MEMORY?

Christ B. Aryanto[1], Emma Blakey[2], Renee Timmers[3], Claudia C. von Bastian[2]; *[1]Department of Psychology, University of Sheffield, UK and Faculty of Psychology, Atma Jaya Catholic University of Indonesia, Indonesia, [2]Department of Psychology, University of Sheffield, UK, [3]Department of Music, University of Sheffield, UK*

People who actively play music are thought to have higher working memory, but the reason for this relation is unclear. This study tested whether sensory discrimination is enhanced in musicians, and whether it mediates this relationship. Healthy adults (N=267) completed a music questionnaire, music ability tasks, and a series of auditory and visual working memory and sensory discrimination tasks. Measurement models were fitted to the data to analyse the relations between active music-making and both modality-specific (auditory and visual) and modality-general latent factors of working memory and sensory discrimination. Preliminary results showed that active music-making, working memory, and sensory discrimination were positively related in the modality-general model. However, sensory discrimination did not mediate the relationship between active music-making and working memory. Furthermore, although engaging in music-making is related to both auditory and visual discrimination and working memory, this relationship was mediated by neither sensory discrimination modalities. Therefore, our preliminary results suggest other factors, aside from sensory discrimination, explain the relation between active music-making and working memory.

CHILDREN'S WORKING MEMORY IS NOT MORE SUSCEPTIBLE TO DISTRACTION THAN ADULTS' WORKING MEMORY

Nora Turoman[1], Elodie Walter[1], Anae Motz[1], Evie Vergauwe[1]; *[1]University of Geneva*

The world around us is full of distracting information. Perceptual research suggests that distractors which stimulate multiple senses at a time (multisensory distractors) capture attention more readily. Meanwhile, attentional research suggests that children tend to be more distracted than adults. Does this mean that working memory (WM) is also more affected by multisensory distractors, and that children's WM is more susceptible to external distraction? To test this, we measured the WM performance of 60 young adults (aged 18-35), 58 older children (aged 8-10) and 58 younger children (aged 6-8) on a change detection task with either: no distractors, visual distractors, auditory distractors or multisensory (audiovisual) distractors. Surprisingly, we found that 1) visual distractors are the

most distracting of all, and 2) there was no evidence for a difference in distractibility between the age groups. Going against typically held assumptions in the literature, our findings indicate that children's WM may not be more susceptible to distraction than that of young adults, no matter the type of distractor. These findings underscore the resilience of children's WM, even in distractor-rich settings.

STRATEGIC PRIORITIZATION IN WORKING MEMORY: A DIRECT COMPARISON OF CUING, REWARDING, AND REFRESHING

Evie Vergauwe[1], Ziyao Zhang[2], Caro Hautekiet[1], Jarrod Lewis-Peacock[2]; *[1]University of Geneva, [2]University of Texas-Austin*

Humans are able to strategically prioritize a subset of information in working memory. Different experimental manipulations have been used to induce strategical prioritization in different studies. These manipulations include (1) using cues to indicate which information is most likely to be tested, (2) using reward patterns to indicate which information is most valuable, and (3) using instructions to indicate which information should be refreshed. For each of these manipulations, a memory boost for the prioritized information is typically observed, and researchers assume, either explicitly or implicitly, that this boost results from the same underlying mechanism, that of selective attentional focusing on the to-be-prioritized information. Here, we directly compared the behavioral consequences of strategic prioritization across different prioritization manipulations, and observed that the memory boost for prioritized information is substantially larger when prioritization is induced by cuing, as opposed to induced by rewarding or refreshing instructions, especially when more information is held in working memory. This suggests that different underlying prioritization mechanisms may be at play in working memory.

ATTENTIONAL GUIDANCE FROM WORKING MEMORY ENHANCES LONG-TERM MEMORY FOR DISTRACTORS

Jun Moriya[1]; *[1]Kansai University*

In a visual search task, attention to task-irrelevant distractors impedes search performance. However, I showed that attended distractors in a visual search task were better remembered in long-term memory (LTM) in the subsequent surprise recognition task. Participants performed a visual search task using real-world objects of a single color. They encoded color in working memory (WM) during the task; because each object had a different color, participants directed attention to the WM-matching colored distractor. Then, in the surprise recognition task, participants were required to indicate whether an object had been shown in the earlier visual search task, regardless of its color. The results showed that attended distractors were better remembered in LTM than non-attended distractors. Moreover, the more participants directed their attention to distractors, the better they explicitly remembered them. When the color of the distractors in the recognition task was mismatched with the color in the visual search task, LTM decreased compared with that for color-matching distractors. These results suggest that attention to distractors impairs search for a target, whereas it is helpful to remember distractors in LTM.

VISUAL SHORT-TERM MEMORY AND ATTENTIONAL CAPTURE PROVIDE INDEPENDENT SOURCES OF GUIDANCE FOR SACCADIC SAMPLING DURING PREVIEW SEARCH

Doug J K Barrett[1], Tahani Alqahtani[2]; *[1]Leicester University, [2]Leicester University & King Saud University*

Visual search is typically faster and more accurate when a subset of distractors appears before the display containing the target. This "preview benefit" has been attributed to guidance from VSTM and attentional capture during search. The extent to which this guidance reflects common or independent resources, however, remains contentious. We investigated the effect of increasing preview and search set sizes on oculomotor measures of visual search. Targets were uniquely oriented Landholt Cs (90° or 270°) among heterogeneously oriented distractors. Preview and search displays contained 4 or 8 objects, and observers reported the orientation of the target. Bayesian contrasts supported independent effects of preview and search set size on the number of saccades, scan path ratios and accuracy of saccades during search. Comparisons also favoured independent effects of preview and search set size on first target-fixation latencies, while decision latencies were best described by a model including set size only. These results indicate the preview benefit is mediated by independent sources of guidance during overt search, which reflect the distribution of VSTM and attentional resources across objects in preview and search displays respectively.

HAND-VR: THE ROLE OF PERSPECTIVE IN BODY-RELATED STIMULI SPATIAL MEMORY

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A growing body of evidence has suggested the role of sensorimotor information in successful spatial memory encoding and retrieval. The present study aims at investigating how individuals encode the spatial location of stimuli representing body parts and whether the perspective from which the body part is displayed impacts spatial

memory. We designed in Virtual Reality two different memory tasks, targeting both egocentric and allocentric spatial memory. Thirty-two healthy adults participated in the study. The virtual environment represented a museum with four different buildings. Each building was designed as a squared room, with 2 paintings hung up on each of the walls (8 paintings in total for each building). Overall, we used 32 stimuli, all representing pictures of right hands performing meaningless gestures. Half of the stimuli depicted the hand in the first-person perspective, and half of the stimuli depicted the hand in the third-person perspective. Both free and guided explorations served as encoding conditions. Immediately after that, the memory recall tasks were administered. Preliminary results indicated an advantage of the first-person perspective pictures in both the spatial memory tasks.

MENTAL JOURNEY TO THE FUTURE AND PROSPECTIVE MEMORY DURING THE COVID19 PANDEMIC LOCKDOWN

Alaitz Aizpurua Sanz[1], Malen Migueles Seco[1]; *[1]University of the Basque Country (Upv/Ehu)*

This study, conducted during the Covid19 confinement, examined whether the tendency to recall more positive than negative future experiences appears in the pandemic and under different experimental conditions. Participants freely produced future-events (Exp. 1) or received positive and negative cues to trigger production (Exp. 2) and then freely recalled the produced events. Valence (positive vs. negative) and Nature (personal vs. social) of the experiences were manipulated in both experiments, and the participants rated the emotional level of the events produced and recalled. Participants produced experiences with a high emotional level. There were no global differences between positive and negative content. However, Valence x Nature interaction was significant, with participants producing and recalling more positive personal content, whereas negative content was more social. Thus, a positivity phenomenon for personal events in the post-pandemic future was observed. In addition, the few recall errors of Exp. 1 and the tendency to transform negative cues into positive ones in Exp. 2 also show a positivity bias, a strategy that can enhance well-being and emotional balance in such complex situations as the Covid19 pandemic lockdown.

VISUAL WORKING MEMORY AS THE SUBSTRATE FOR MENTAL ROTATION: A REPLICATION

Miro Ebert[1], Leonardo Jost[1], Petra Jansen[1], Biljana Stevanovski[2], Daniel Voyer[2]; *[1]University of Regensburg, [2]University of New Brunswick*

An often-cited experimental study by Hyun and Luck suggests that object working memory (OWM), but not spatial working memory (SWM), is employed during mental rotation. In contrast, correlational research points to the relevance of SWM in mental rotation. Considering these somewhat conflicting results, we plan to conduct a replication of the study by Hyun and Luck and to extend the original work through exploratory investigations of sex effects. Two dual-task experiments (N>125 per experiment) will be conducted. Participants will perform a mental rotation task alone (indicate whether a rotated letter was presented in mirror-reversed or canonical form), a working memory task alone, and both tasks concurrently. In Experiment 1 (OWM task), participants will have to encode the colors of 4 squares. In Experiment 2 (SWM task), participants will have to encode the locations of 4 dots. Our working hypothesis regarding working memory interference is that dual-task interference will be larger with the object working memory than the spatial working memory secondary task. We will use mixed models approaches to examine the same effects Hyun and Luck did, and additionally conduct exploratory analyses of potential sex effects.

TALKS 3
AUTOBIOGRAPHIC MEMORY

AUTOBIOGRAPHICAL FUTURE THINKING IN EXCEPTIONAL MEMORY: A SINGLE CASE HIGHLY SUPERIOR AUTOBIOGRAPHICAL MEMORY STUDY

Jessica Talbot[1], Michela Marchetti[1], Mara Stockner[1], Giuliana Mazzoni[1]; *[1]Sapienza University of Rome*

Highly Superior Autobiographical Memory (HSAM) is an extremely rare form of exceptional memory, characterised by a remarkable ability to remember one's personal past. Understanding HSAM could provide novel ways to overcome issues related to flawed memory. As autobiographical memory (ABM) has been linked to future thinking, HSAM might show also enhanced future thinking. LK (24-year-old, healthy, HSAM female) and 22 matched controls completed a novel task. In Phase 1 single words or past dates (e.g., 11th January 2007) elicited specific past events and in Phase 2 words or future dates (e.g. 28th March 2033) elicited imagined plausible events. Verbal descriptions were recorded. Compared to controls, only LK was able to provide date specific past events, but not significantly more details for future dates. 7 days later a surprise free recall assessed memory of events provided in the first two phases. LK's memory was significantly more detailed for both past and future events provided. Contrary to the hypothesis, HSAM may not be characterised by exceptional future thinking, a finding that has important implications not only for understanding HSAM, but for defining the relationship between autobiographical memory and future thinking.

CHAINED-EVENT SEQUENCES: EVALUATING THE CHAIN OF THOUGHT IN SPONTANEOUS EPISODIC FUTURE THINKING AND INVOLUNTARY AUTOBIOGRAPHICAL MEMORY

Mackenzie Bain[1], Ken McRae[1]; [1]*University of Western Ontario*

Involuntary autobiographical memory studies suggest that environmental cues prompt associated memories. When multiple related memories are remembered at a single time, they are described as chained-event sequences. Despite overlap between memory and episodic future thinking, whether future thoughts occur in chains has not been studied. We investigated the degree to which future thoughts occur in chains, and the type of connections that exist within chains. Participants completed the vigilance task, a boring search task that prompts spontaneous thoughts by presenting occasional cue phrases during the task. Across 300 trials, 10 interruptions stopped the task, and participants audio recorded any off-task thoughts. A total of 1007 thoughts were reported. When multiple thoughts were reported, past and future thoughts occurred in chains ($p < .0001$). The number of connections involving activities, people, and objects were similar for past and future chains, but places connected more past than future thoughts ($p = .0006$). The findings support that episodic future thoughts are simulated in sequences similar to autobiographical memories, suggesting that memories and future thoughts may emerge from a shared mechanism of mental simulation.

REMEMBERING EVERYDAY EVENTS: BOUNDARIES PROMOTE EVENT COMPLETION THOUGH BACKWARDS INFERENCES

Ayse Candan Simsek[1], Tolgahan Aydın[1], Markus Huff[2]; [1]*Yasar University,* [2]*University of Tübingen*

Observers falsely remember the missing information if an event includes its causal implication. This event completion effect was demonstrated with simple ballistic events such as kicking a ball. In two pre-registered experiments, we use a visual recognition test to study event completion in naturalistic complex, higher-order events such as cleaning a room. Experiment 1 tested the effect of causal implication and event boundary information on event completion. More completion occurred in the condition with causal implication and event boundary information. We tested two competing hypotheses to explore the underlying process in Experiment 2. While the predictive processing hypothesis suggests that event completion is based on predicting the future states of the event, the backward inferences hypothesis suggests that event completion relies on fast backward inferences. The stimuli either depicted the beginnings or ends of an action. Experiment 2 found evidence for the backward inferences hypothesis. These results help to further understand event completion in naturalistic actions and event cognition in general.

TALKS 4
DECISION MAKING I

CHOOSING BETWEEN RISK AND CERTAINTY: THE 1-IN-X EFFECT ON CHOICES

Stefania Pighin[1], Alessandro Bogani[1], Gloria Berenisse Castro Davalos[1], Lucia Savadori[1]; [1]*University of Trento*

The 1-in-X numerical format (e.g., 1 in 200) has been shown to increase risk perception, as compared to the N-in-NX format (e.g., 5 in 1000). However, the impact of this format on actual choices has not yet been proven. In five online experiments (N = 650), we investigated whether the 1-in-X format could bias choices between truly incentivized options. Participants were endowed with 1 euro and then presented with a choice between two options: a sure loss or a lottery with the chance to lose the entire endowment, presented using either the 1-in-X or the N-in-NX format. In three experiments, in which the two options had equal expected values and the lottery was described with different degrees of concreteness, participants were significantly more risk-averse when the chance was described using the 1-in-X format than the N-in-NX format. The same effect was observed when the sure option had a slightly inferior expected value (Experiment 4), showing that the 1-in-X effect can also lead to disadvantageous choices. The effect, however, disappeared when the difference in expected value increased (Experiment 5). Implications for risk communication and a possible interpretation of the results will be discussed accordingly.

COMMUNICATING AI INTENTIONS TO SUPPORT THE SENSE OF AGENCY RELIABILITY

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Interacting with Artificial Intelligence (AI) can have a detrimental impact on one's own experience of agency (i.e., the sense of control over one's own actions and their consequences). We propose to mitigate this effect by making AI systems more intelligible to human operators. We conducted experiments to explore how communication of AI intentions during joint human-AI interaction affects the sense of control across different dimensions (performance, action fluency, contribution). Our results suggest that, in a joint action situation with an AI, communication of AI

intentions 1) increases the level of responsibility of human operators in a situation where they have to take part in the interaction with a robot to achieve a goal, 2) leads to a better judgment of the level of performance of human operators by increasing their level of perceived control during a more successful mission, and 3) leads to a better evaluation of the fluency of the interaction by decreasing the level of perceived control during non-fluent interactions. Overall, our results suggest that adding explanations during human-AI interaction has an effect on the sense of agency and is an interesting avenue of research to improve human-AI interactions.

FROM MILAN TO ROME: SPATIAL, TEMPORAL AND LINGUISTIC COMPONENTS OF COGNITIVE MAPS

Daniele Gatti[1], Giorgia Anceresi[1], Marco Marelli[2], Tomaso Vecchi[1], Luca Rinaldi[1]; *[1]University of Pavia, [2]Bicocca University of Milan*

When exploring large-scale maps, humans are assumed to mainly rely on spatial processing mechanisms although different experiential traces may be at play. In the present study, we tested whether temporal and linguistic information could account for humans' distortions in cognitive map processing over and above spatial information. We quantified temporal distance as the minimum time needed to travel by train across Italian cities, while linguistic distances were retrieved from language models based on non-spatial associative mechanisms (i.e., distributional semantic models). In a first study, we show that real spatial distances can be retrieved from temporal and linguistic distances. Then, in a second behavioral study, we show that linguistic information can account for human performance over and above spatial information in a task in which participants have to judge the distance between cities (while temporal information was found to be not relevant). These findings indicate that, when exploring large environments, humans can take advantage of linguistic information, with the formation of cognitive maps possibly relying on a strict interplay between spatial and non-spatial learning principles.

TALKS 5
TOOLS AND ACTION KNOWLEDGE

THE TECHNICAL-REASONING NETWORK IS RECRUITED WHEN PEOPLE OBSERVE OTHERS MAKE OR TEACH HOW TO MAKE TOOLS: AN FMRI STUDY

Alexandre Bluet[1], Emanuelle Reynaud[1], Giovanni Federico[2], Chloé Bryche[1], Mathieu Lesourd[3], Franck Lamberton[4], Danielle Ibarrola[4], Yves Rossetti[5], François Osiurak[1]; *[1]Université Lumière Lyon 2, [2]IRCCS Synlab, Naples Italy, [3]Université de Franche-Comté, Laboratoire de Recherches Intégratives en Neurosciences et Psychologie Cognitive, [4]CERMEP-Imagerie du vivant, MRI Department and CNRS UMS3453, Lyon, France, [5]Centre de Recherche en Neurosciences de Lyon (CRNL), Trajectoires Team (Inserm UMR_S 1028-CNRS-UMR 5292-Université de Lyon), Bron, France*

Cumulative technological culture (CTC) is defined as the increase in efficiency and complexity of tools and techniques over generations. While the role of social cognitive (SC) skills in cultural transmission has been long acknowledged, recent accounts have emphasized that non-social cognitive skills such as technical reasoning (TR), a form of causal reasoning aimed at understanding the physical world, are also at work during the social transmission of technical content. Here we contribute to this double process approach by reporting an fMRI study about the neurocognitive origins of CTC. Participants were shown videos depicting tool-making episodes in three social-learning conditions: Reverse engineering, Observation and Teaching. Our results showed that the TR network, centred around the Area PF of the left inferior parietal cortex, was preferentially activated when watching tool-making episodes. Additionally, the teaching component was related to an activation of the right middle temporal gyrus. We propose that TR is at the heart of CTC and that the role of SC and teaching is to improve the learner's TR by helping them concentrate on important parts of the technology. Thus, both TR and SC skills may play a key role in CTC.

REVISITING THE ROLE OF LEFT AND RIGHT HEMISPHERES IN ACTION AND SEMANTIC TOOL KNOWLEDGE: EVIDENCE FROM BRAIN-DAMAGE PATIENTS

Mathieu Lesourd[1], Julie Martin[2], Sébastien Hague[2], Margolise Levitre[2], Elisabeth Medeiros de Bustos[2], Guillaume Fargeix[2], Eloi Magnin[3], Thierry Moulin[4]; *[1]Laboratoire de Recherches Intégratives en Neurosciences et Psychologie Cognitive (UR 481), [2]Unité de Neurologie Vasculaire, CHRU de Besançon, France, [3]Centre Mémoire Ressources et Recherche (CMRR), service de Neurologie, CHRU Besançon, F-25000 Besançon, France, [4]Laboratoire de Recherches Intégratives en Neurosciences et Psychologie Cognitive (UR 481), Université de Franche-Comté, F-25000 Besançon, France*

Conceptual tool knowledge contains two forms of knowledge allowing us to use tools, namely, action tool (i.e., how to manipulate objects) and semantic tool (i.e., general knowledge about tools) knowledge. Neuropsychological studies showed that action tool and at a lesser extent semantic tool knowledge are impaired in left brain-damaged (LBD) patients. However, less is known about the effect of right brain-damage (RBD) on conceptual tool knowledge.To fill this gap, we assessed the performance of LBD (n = 29) and RBD (n = 33) patients, matched with control participants, in conceptual

tool tasks. Moreover, we examined the dissociations between tasks in LBD and RBD patients using the single-case methodology.We found that LBD patients were impaired in both tasks, with a more pronounced deficit of action compared to semantic matching tasks. Moreover, in LBD patients, deficits were more frequently observed either for action or action and semantic tasks but almost never for semantic task alone. Interestingly, RBD patients exhibited the same pattern of results as LBD patients. These results invite us to reconsider the relation between action tool and semantic tool knowledge and the role of the right hemisphere in conceptual tool knowledge.

UNDERSTANDING THE BRAIN REORGANISATION DURING PIANO PLAYING IN NOVICE PIANISTS: AN FMRI STUDY

Alicja M. Olszewska[1], Maciej Gaca[1], Dawid Droździel[1], Agnieszka Widlarz[2], Aleksandra M. Herman[1], Artur Marchewka[1]; *[1]Nencki Institute of Experimental Biology of the Polish Academy of Sciences, [2]The Chopin University of Music*

Learning to play the piano is a complex task, used as a model of neuroplasticity. Previous longitudinal studies show training-related reorganisation using only auditory tasks. The reorganisation of brain activity while actually playing an instrument is rarely studied. Thus, we investigated 24 novice learners using fMRI, while learning increasingly complex musical pieces after 1, 6, 13 and 26 weeks. A linear model revealed a significant effect of improved participants' performance in time. Playing music activated the network encompassing the auditory, motor and supplementary motor cortex. However, the training-related reorganisation was found in sensorimotor regions, superior parietal cortex, inferior frontal gyrus, posterior hippocampus and caudate nucleus. For all involved regions, we observed a decrease in activation over time, with region-specific decrease slopes. These results suggest a dissociation between the brain regions involved in playing the instrument and the higher-order cognitive control and integrative regions responding to training.

MEG EVIDENCE SUPPORTING NEURAL PLASTICITY OF THE ACTION OBSERVATION NETWORK IN BRAIN TUMOR PATIENTS

Lucia Amoruso[1], Ileana Quiñones[1], Nicola Molinaro[1], Santiago Gil-Robles[2], Iñigo Pomposo Gastelu[2], Garazi Bermudez[2], Manuel Carreiras[1]; *[1]Basque Center on Cognition, Brain and Language (BCBL), Spain, [2]BioCruces Research Institute, Spain*

Social cognition involves understanding others' behaviors and interacting with them daily. The Action Observation Network (AON) supports this ability by decoding people's intentions from their movements. This network shows high plasticity based on prior sensorimotor experience, but its potential for reshaping in the presence of brain damage is not well understood. To bridge this gap, we recorded MEG signals while healthy participants and patients with left tumors in AON hubs (e.g., IFG) viewed incomplete actions in congruent or incongruent contexts and inferred their unfolding. Results showed better decoding of others' intentions for congruent actions. At the oscillatory level, the AON exhibited stronger mu (8−13Hz) suppression during action observation compared to a static hand. In healthy individuals, congruency effects were reflected in early fronto-temporal power increases in theta rhythms (4−8Hz), followed by sensorimotor mu modulations in the left hemisphere. Conversely, patients exhibited preserved behavioural responses and congruency effects but in the right hemisphere. These findings highlight the AON's potential for reshaping and offer insight into the neural mechanisms underlying social perception in health and disease.

TALKS – 14h20 to 16h20

TALKS 6
WORD LEARNING

TO SPELL OR NOT TO SPELL? EXPLICIT VERSUS IMPLICIT CREATION OF SPELLING EXPECTATIONS DURING SPOKEN WORD LEARNING

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When learning novel spoken words, literate children and adults generate orthographic expectations before seeing words' spellings (Wegener et al., 2018). Importantly, they do so even when multiple spelling options are possible (Jevtović et al., 2022). We test whether orthographic expectations are generated automatically during spoken word learning, or only when it is useful for the task (i.e., strategically). Ninety-six Spanish adults first learned a set of novel spoken words with one or two possible spellings; half of the participants were explicitly asked to learn the words (explicit learners) while half was naïve as to the aim of the task (implicit learners). Participants were then presented with words' spellings in a reading task. Explicit learners were faster to read aurally acquired words with one as compared to those with two spellings, suggesting they had generated orthographic expectations. This difference was not observed in implicit learners. We conclude that generating orthographic expectations during spoken word learning is not automatic, but represents a strategy participants employ to facilitate the learning process.

THE INFLUENCE OF OVERT SPOKEN AND WRITTEN PRODUCTION ON NOVEL WORD LEARNING

Svetlana Pinet[1], Clara Martin[1]; *[1]BCBL, Ikerbasque*

Producing a word requires assembling motor programs specific to the modality the word is going to be produced in, i.e., moving articulators for speaking and hand/fingers for writing or typing. In this experiment, we evaluated the influence of overtly producing a word during training on the ability to learn and produce new words. Moreover, we aimed to test whether training in one modality (e.g., speaking) facilitates production in another modality (e.g., typing). We ran a novel word learning task in which each participant learned words in either one of two training conditions that required overt production (speaking or typing) or not (passive). At the end of training, learning was assessed through a spoken and a typed picture naming task. Training with overt production facilitated novel word learning relative to passive training as observed on both accuracy and reaction times. Typing training in particular led to fewer errors and shorter reaction times during testing in both modalities. Our results point to a positive impact of overt production during training. Moreover they suggest a possible transfer from typing to speaking skills, but not the other way around, sheding light on how typing fits within broader language production.

TALKS 7
FALSE MEMORY

THE INTERPLAY BETWEEN WORKING MEMORY MAINTENANCE AND GIST ACTIVATION IN SHORT-TERM FALSE MEMORIES IN CHILDREN AND ADULTS.

Rousselle Manon[1], Blaye Agnès[1], Abadie Marlène[1]; *[1]Aix-Marseille University*

Long-term memory gist traces and working memory (WM) maintenance mechanisms were recently shown to be involved in the occurrence of short-term false memories, a powerful illusion in which participants falsely remember information in mere seconds. The present study examined this matter from a developmental perspective comparing 9-year-olds and university students. They had to complete a complex span task in which 6-word lists composed by half of semantically related and half of unrelated words (i.e., gist strength manipulation), were to-be-learned for immediate recognition (Exp. 1) or recall (Exp. 2). In between words, a 5.4 second retention interval was filled with either a fast or slow pace parity judgment task (i.e., manipulation of the opportunity to maintain the words in WM). Short- term false memory's rate was higher on related than unrelated words, in children and adults. False memories were decreased in the slow pace condition but only in recall, in both age groups. These findings confirm that both gist memory and WM maintenance mechanisms determine the occurrence of short-term false memories both in old children and adults. The effect of WM maintenance mechanisms seems however to be conditioned by the type of test used.

PREDICTING FALSE MEMORIES WITH DATA-DRIVEN COMPUTATIONAL MODELS: THE ROLE OF VISUAL AND LINGUISTIC SIMILARITY IN THE DRM PARADIGM

Marco Petilli[1], Francesca Rodio[1], Daniele Gatti[2], Luca Rinaldi[2], Marco Marelli[1]; *[1]University of Milano-Bicocca, [2]University of Pavia*

The Deese–Roediger–McDermott paradigm (DRM) requires presenting lists of words to individuals and then assessing their ability to recall these words. Research has found that when novel words are semantically related to the memorised ones they tend to be erroneously recognised as part of the memorised list. Although the role of linguistic similarity in generating false memories is well established, less is known about whether visual similarity contributes to this phenomenon. To investigate this issue, we adopt a data-driven computational approach to independently quantify visual and linguistic similarities for the referents of words and image stimuli to be presented in two DRM variants and tested their effects on false memory generation. Our results show that false memories consistently increase for novel words and images that are visually and linguistically similar to those presented in the memorised lists, with a larger degree of visual and linguistic similarity in the DRM with images and words, respectively. These findings indicate that visual and linguistic processes are both involved in memory distortions, regardless of whether the information is presented in a visual or linguistic format.

SHORT-TERM FALSE MEMORIES ACROSS THE LIFESPAN

Marlène Abadie[1]; *[1]Aix-Marseille University*

This project aimed to investigate the mechanisms underlying short-term false memory across the lifespan. Fifteen experiments were conducted with children aged 4-10 years (N=430), young (18-30 years, N=391) and older adults (60-75 years, N=115). Brown-Peterson and complex span paradigms were used in which semantically related words (3-6 words) were to be held for a few seconds for later recognition or recall. The retention interval was filled by a concurrent task that either prevented active maintenance in working memory (WM) or not. Conjoint recognition methodology and phenomenological measurements were used during testing to capture the retrieval processes underlying false memories. Meta-analytic results showed that short-term false memories increase from early childhood to late adulthood. Their occurrence was moderated by WM maintenance from the age of 5 years until aging.

They were mainly underpinned by weakly specific gist representations, which increased from childhood to adulthood, and to a lesser extent by highly specific but erroneous representations, which increased from late childhood to late adulthood. The implications of these findings for the debate on the relationship between WM and long-term memory are discussed.

HOW OLDER ADULTS CORRECT FALSE MEMORIES: A STUDY USING PRAGMATIC INFERENCE SENTENCES

María J. Maraver[1], Nuria Montoro-Membila[1], Alejandra Marful[1], Teresa Bajo[1]; *[1]Mind, Brain, and Behavior Research Center, University of Granada, Spain*

Older adults are more susceptible to false memories than younger people, in part because of the age-related impairment in executive functions. Previous research with younger adults using sentences with pragmatic implications has demonstrated that false memory errors can be corrected, but when errors are noticed and replaced after receiving corrective feedback. However, much is still unknown about how false memories are modified in the elderly. To explore whether older adults can correct their false memories after receiving feedback, we conducted two experiments comparing younger and older participants, and using two different types of corrective feedback: simply providing the correct answer or giving the correct answer plus a follow-up question that forced participants to revise their previous response. In Experiment 1, participants performed pre- and post-feedback memory tests, and in Experiment 2 an additional transfer phase to new material was included. Results showed that both younger and older adults benefited similarly from directly comparing their own responses with the corrective feedback, suggesting that older adults make use of metamemory strategies for the correction of false memory errors.

FALSE MEMORIES FROM NOWHERE? PSEUDOWORDS CAN TRIGGER THE DRM EFFECT

Michela Marchetti[1], Daniele Gatti[2], Marco Petilli[3], Marco Marelli[4], Tomaso Vecchi[5], Giuliana Mazzoni[6], Luca Rinaldi[5]; *[1]Department of Dynamic and Clinical Psychology and Health Studies, Sapienza University of Rome, [2]Department of Brain and Behavioral Sciences, University of Pavia, [3]Department of Psychology, University of Milano-Bicocca, [4]Department of Psychology, University of Milano-Bicocca; NeuroMI, Milan Center for Neuroscience, Milano, Italy, [5]Department of Brain and Behavioral Sciences, University of Pavia; Cognitive Psychology Unit, IRCCS Mondino Foundation, Pavia, Italy, [6]Department of Dynamic and Clinical Psychology, and Health Studies, Sapienza University of Rome, Rome, Italy*

The Deese–Roediger–McDermott task (DRM) is a false memory paradigm in which participants generally falsely recognize words due to their relationship with a set of studied words. Seminal theories explained the DRM effect by tracing it back to associative vs. semantic processes, but it is still under debate which of the two processes leads to the formation of false memories. To directly test this, we used stimuli (i.e., pseudowords) that carry no associative information but for which it is possible to infer semantic content. We employed recent distributional semantic models grounded on psychologically plausible learning mechanisms, which exploit the information that pseudowords carry at the sub-word level. Participants were first instructed to memorize several lists of pseudowords and then to perform a recognition task. The pseudowords that composed each list were semantically related to a non-shown critical pseudoword. Participants reported a higher proportion of false recognitions for related pseudowords compared with unrelated pseudowords. These results challenge the associative view on the DRM effect and support memory as a distributional system.

TALKS 8
MOTOR COGNITION I

VISUOMOTOR INTERFERENCE AND ANTICIPATORY NEURAL REPRESENTATIONS DURING JOINT ACTIONS

Silvia Formica[1], Marcel Brass[1]; *[1]Humboldt-Universität zu Berlin*

Joint actions are defined as coordinated interactions of two or more agents. In this study, we collected EEG data while participants drew shapes simultaneously to a virtual partner, in two social contexts: either they had to synchronize and act jointly, or they performed the actions alongside, but independently. Crucially, the action of the partner could be congruent or incongruent with the one of the participants. We tested the extent to which the social context influenced visuomotor interference, quantified in the distortion in the drawn trajectories. At the neural level, we used univariate and multivariate analyses to investigate how the agent prepares for the upcoming action, and to what extent the action of the partner is anticipated during the interval preceding the movement. We found that incongruent actions from the partner elicit larger visuomotor interference when the two agents act independently. Initial neural evidence indicate that successful joint actions entail anticipation of the partner's movement. These findings support the hypothesis that reduced visuomotor interference during joint action results from the proactive anticipation of the partner's movements, which become integrated into a joint action plan.

IS YOUR PLAN MY PLAN? FEATURE BINDING AND RETRIEVAL IN REPRESENTING OWN AND OTHERS' ACTIONS

Viola Mocke[1], Carina Giesen[2], Mrudula Arunkumar[2], Wilfried Kunde[1]; *[1]Universität Würzburg, [2]Universität Jena*

According to binding accounts, action planning means binding feature codes that describe that action. For example, location (left vs. right) and duration (short vs. long) features are bound when planning an action (A) which is characterized by these dimensions. Such feature binding is indicated by the performance in another action (B), carried out while maintaining the action A plan for later execution. Action B is usually impaired if its features partially overlap with action A (as opposed to full or no overlap). Here, we examined whether such partial overlap costs occur when the planning of action A and execution of Action B is distributed across two people. We demonstrated partial overlap costs when a single person planned and executed a short or long keypress with their left or right hand. In another experiment. we had two participants sitting next to each other, each operating one key. Action B performance as a function of person overlap and duration overlap with action A showed no partial overlap costs, speaking against the incorporation of 'social' features ('me' vs. 'you') in action plans. These results thus further the understanding of representations of own versus other people's not-yet-executed action plans.

THE EFFECT OF SEX AND SEX-ROLE ON SOCIAL ATTENTION: INVESTIGATING THE ASSOCIATION WITH SOCIAL SKILLS AND ACADEMIC PREFERENCES

Jeanette A. Chacón-Candia[1], Juan Lupiáñez[1], Maria Casagrande[2], Andrea Marotta[1]; *[1]University of Granada, [2]"La Sapienza" University of Rome*

Several studies have shown that eye gaze and arrow cues produce quantitatively equivalent attentional effects. On the other hand, a qualitative dissociation between these two types of attentional orienting has been observed through precisely targeted experimental designs. It has been found that while arrows spread attention towards extended parts of the environment, eye-gaze retains attention to the specific looked-at location. Nonetheless, to date, it is still unclear whether this dissociation is related to individual differences in personal attributes that are usually associated with higher or lower social skills. To this aim, the present study explored whether the eye-gaze and arrow orienting effects differed among observers according to their sex, sex-role, academic background and/or social skills. Although the expected arrow–gaze dissociation was observed, this was unrelated to the participants' considered personal attributes. Our results argue against the idea that the differences between eye-gaze and arrows orienting effects may be associated with individual differences in social cognition.

MODULATING SOCIAL PREDICTION ABILITIES THROUGH CEREBELLAR NEUROMODULATION: EVIDENCE FROM HEALTHY AND CLINICAL SAMPLES

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Congenital cerebellar malformations (CM) are associated with motor, cognitive and social disorders. These disturbances may reflect the involvement of the cerebellum in generating and updating internal models subserving the prediction of sensory events. By integrating cerebellar functions in a predictive coding framework, we conducted three sham-controlled cerebellar tDCS (ctDCS) studies to test the contribution of the cerebellum in leveraging prior experience to predict upcoming events. We used tasks where the probability of co-occurrence between actions or physical/non-social events and contextual elements was manipulated in an implicit-learning phase to create strongly or moderately informative expectations. The use of expectations was then tested in a testing phase, requiring participants to predict the unfolding of the (temporally occluded) events. ctDCS induced task-specific, polarity and expectancy dependent effects in healthy adults when applied during the whole duration of the taks or only during the testing phase, pointing to a role of the cerebellum in updating, and not only in forming, predictions. The same results of an improvement in social prediction abilities after anodic ctDCS emerged in pediatric patients with CM.

LEXICAL DECISION ACROSS THE MOTOR-HIERARCHY: AN EEG/EMG INVESTIGATION OF THE DECISIONAL COMPONENTS OF MOTOR-RESPONSE EXECUTION

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Models of lexical decision and decision making envisage decisional and motor processes as serial stages. Electrophysiological evidence has however questioned this functional segregation, showing a propagation of decisional variables onto motor-response preparation and execution. By recording EEG and electromyographic signals time-locked to manual responses, we aimed to track lexical decisions across the motor-hierarchy. Motor preparation was indexed through the effector-selective lateralization of beta-frequency desynchronizations, motor programming via the lateralized readiness potential, and motor execution as the time from the onset of the muscular activity until the button-press (motor-time, MT). We also explored corticomuscular coherence (the synchronization between cortical and spinal/muscular activity) as a potential physiological underpinning of long-range interactions between motor preparation and execution. Lexicality (i.e., the difference between words and pseudowords) was found to affect only beta lateralization and MTs. The results are interpreted as

reflecting multiple decisional components that are selectively represented at different levels of the motor hierarchy.

THE HANDEDNESS CONTINUUM CAPTURES INDIVIDUAL VARIATIONS IN THE LATERALIZATION OF GLOBAL-LOCAL, WORD AND FACE PROCESSES

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Increased prevalence of left-handedness and atypical lateralization in neurodevelopmental and psychiatric disorders suggests a strong link between handedness, hemispheric asymmetry, and typical brain functioning. Studies, however, excluding left-handers, have impeded systematic addressing of the effects of variations in handedness on the lateralization of cognitive functions. Controlling the degree of handedness, we investigated its effects on the lateralization patterns of visual processing of spatial frequencies, global/local stimuli, faces and words in four different experiments using a divided visual half-field paradigm (Verma & Brysbaert, 2011). For all tasks except spatial frequency, we found laterality indices significantly correlated with the degree of handedness. Interestingly, we found that the direction of lateralization of global/local attention changed with the direction of handedness, while the word and face processes remained left and right-lateralized, respectively, independent of the direction of handedness. Our results indicate that handedness modulates the lateralization of visual processes and that the degree of handedness is a critical factor for controlling individual variations in laterality research.

TALKS 9
SHORT-TERM MEMORY

EXPLORING WORKING MEMORY: HOW BROWN-PETERSON AND COMPLEX SPAN TASKS DIFFER?

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Brown-Peterson (BP) and complex span (CS) tasks are routinely used to investigate working memory (WM), but are they substitutable? In a BP task, in which the processing task follows the presentation of all the memoranda, and in a CS task, in which processing episodes are interspersed between the memoranda, we compared the interplay of processing (a parity judgement task) and memory (serial recall of letters) using the so-called perfect-trial procedure. After having assessed their memory and processing spans through titration, participants were presented with a BP or a CS task and asked to perform at span in the memory or processing component, while we measured the residual performance in the other component. All the tasks were performed under concurrent articulation. Both memory and processing residuals proved lower in CS than BP. For both paradigms, processing proved higher than memory residuals. However, memory residuals were three times greater in the BP than the CS paradigm whereas processing residuals were roughly comparable. This suggests that, beyond WM, the BP paradigm involves an additional mnemonic component that could be episodic long-term memory. This means that BP and CS are not substitutable in investigating WM.

NO TRADEOFF BETWEEN CHAINING AND POSITION IN SHORT-TERM MEMORY

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Short-term or working memory allows us to hold a small amount of information active in a specific order to complete our daily tasks, such as preparing our meals. Despite decades of research, the question of how we hold information in order remains unanswered. Here, we addressed this question by examining attentional tradeoffs between item, chaining, and position information. According to the chaining scheme, order information is represented by the formation of associations between the items in the list. According to the position scheme, position information is represented by the formation of associations between each item and its position in the list. Using a within-list dual-task procedure (Guitard et al., 2021), across six experiments we evaluated attentional costs of dividing attention between an association test (which item was presented before or after a target item), a position test (where in the list the target item was presented), and an item test (what target item was presented). Both chaining and position information traded off with item information, but no tradeoff was observed between chaining and position information. Thus, chaining and position coding may both occur together without splitting a resource.

TEMPORAL MEMORY FOR COMPLEX EVENTS IS SUPPORTED BY GAMMA OSCILLATORY ACTIVITY

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The ability to organize events in time is a distinctive feature of episodic memory. However, little is known about the neural mechanisms underlying the ability to retrieve a temporal representation of complex events beyond the medial temporal lobe. In the present EEG study, twenty volunteers indicated the time of occurrence of short video clips extracted from a previously encoded movie on a horizontal timeline representing the movie duration. This procedure provided measures of temporal memory *precision* and perceived *temporal distance* between stimuli extracted from distinct

movie parts. Using a multivariate pattern analysis on time-frequency data, we found an electrophysiological signature of temporal precision in the gamma band during timeline presentation. We further tested whether the behavioral distance was related to the neural distance, defined as the spatial distribution of activity across electrodes. A significant brain-behavior correlation was observed at the same time and frequency underlying the precision effect, suggesting that the widespread distribution of gamma activity further codes for a temporal representation of the movie and contributes to the way complex events of our life become "infused with time".

IMPROVING BRAIN AND BEHAVIORAL WORKING MEMORY ABILITIES USING VISUAL RHYTHMIC STIMULATIONS

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Working memory (WM) refers to the ability to hold and manipulate information in memory. This function is supported by theta (5 Hz) oscillations (synchronized rhythmic activity of neural assemblies) in the fronto-parietal brain network. Behavioral training targeting WM has gained popularity over the last decades. The outcome of such interventions showed limited transfer effects, which can however be greatly improved by coupling behavioral and neurostimulation (e.g., transcranial magnetic stimulation) procedures. Unfortunately, neurostimulation devices are onerous and the procedure difficult to implement. In this context, we recently developed a new approach to perform neurostimulation without any neurostimulation device. In healthy adults, we showed that oscillatory activity in the fronto-parietal network can causally be entrained by visual rhythmic stimulations. More particularly, we found that visual 3D rotating shapes flickering at 5 Hz before each trial of different working memory tasks enhance theta activity in the fronto-parietal network, and thereby increase behavioral performance. Our studies open exciting new avenues to further explore whether visual rhythmic stimulations can be used to compensate WM disabilities.

RECOLLECTIVE AND NON-RECOLLECTIVE PROCESSES IN WORKING MEMORY RETRIEVAL

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The aim of this study was to investigate the nature of the processes involved in working memory retrieval by distinguishing recollective (direct access) and non-recollective (reconstruction) recall. For this purpose, the trichotomous theory of recall (Brainerd, Reyna, & Howe, 2009) was applied to young adults' recall performance in a complex span task in which lists of words were presented in three successive study-test trials. Three experiments manipulated factors known to affect WM performance, such as the cognitive load of the concurrent task and the implication of long-term memory knowledge. The two-stage model distinguishing direct access and reconstruction retrieval processes revealed a strong predominance of direct access and very few reconstructions during working memory recall. Direct access was positively affected by lower (vs. higher) cognitive load and by the presence of associative relatedness in word lists, but both factors had no impact on reconstruction processes. The implications of these findings for working memory theories are discussed.

THE NATURE OF THE PRECISION OF VERBAL WORKING MEMORY FOR PHONOLOGICAL INFORMATION

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While the role of phonological representations in the short-term maintenance of verbal information is well documented, little research has focused on the precision of these representations. Two multi-experiment studies assessed the acoustic and phonological precision of memoranda by varying the proximity between probes and memory targets in a short-term probe recognition paradigm. Study 1 showed reduced also still above-chance-level discrimination performance for single phoneme probe-target differences. Study 2 showed that discrimination performance approached chance-level when the phonemes were furthermore acoustically similar or ambiguous, but discrimination performance increased when target and probe phonemes showed enhanced phonological contrast, i.e., stemmed from a different phoneme category. These results indicate that verbal working memory precision can have single-phoneme level resolution, but this precision is supported by categorical rather than continuous acoustic features of phonological information.

TALKS 10
INDIVIDUAL DIFFERENCES

WORKING MEMORY LOAD AFFECTS INTELLIGENCE TEST PERFORMANCE BY REDUCING THE STRENGTH OF ITEM BINDINGS AND IMPAIRING THE FILTERING OF DISTRACTORS

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Individual differences in working memory capacity (WMC) are strongly related to individual differences in intelligence, but correlational studies do not allow drawing conclusions about the causal nature of this relationship. In two studies (n_1 = 65, n_2 = 113),

we investigated the causal nature of the relationship between WMC and intelligence by testing the effect of working memory load on intelligence test performance. Moreover, we tested if the effect of memory load on intelligence test performance increased under time constraints. We show that memory load impaired intelligence test performance ($OR_{1/2}$ = 1.26/1.84) and that this effect was not moderated by time constraints, which suggests that the two experimental manipulations did not affect the same cognitive process. Using a computational modeling approach, we demonstrated that external memory load affected both the building and maintenance of relational item bindings and the filtering of irrelevant information in working memory. Our results confirm that WMC causally contributes to higher-order reasoning. Moreover, they support the hypothesis that the abilities to maintain arbitrary bindings and to disengage from irrelevant information in particular are related to intelligence.

DO PERCEPTUAL ABILITIES FULLY ACCOUNT FOR THE RELATIONSHIP OF WORKING MEMORY CAPACITY AND REASONING ABILITY?

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Recent theoretical advances in working memory research suggest that working memory capacity (WMC) can be reduced to perceptual abilities. This challenges the assumption that WMC is critical for solving reasoning tasks. Here, we tested if individual differences in perceptual abilities can fully account for the relationship of WMC to reasoning. In a sample of younger (N = 170) and older (N = 170) adults, we measured WMC for visual features, using delayed estimation tasks for color and orientation. We measured perceptual abilities with perceptual matching tasks using the same procedure as delayed estimation, but with the target stimulus constantly visible. We then tested if the relationship between WMC and reasoning can be reduced to perceptual abilities. Our results show that perceptual matching and WMC were substantially correlated in both age groups (r_{Young} = .63; r_{Old} = .80), and both strongly predicted individual differences in reasoning (r_s = .62 to .75). Yet, mediation analyses revealed a direct contribution from WMC to reasoning irrespective of perceptual abilities. These results suggest that despite the strong relationship of perceptual abilities with reasoning, WMC predicts unique individual differences in reasoning.

ATTENTIONAL CONTROL CAN BE EXTRACTED AT THE LATENT-VARIABLE LEVEL FROM WORKING-MEMORY TASKS – BUT THIS FINDING IS NOT REPLICATED ACROSS DATASETS

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Attentional control – also called executive functions or cognitive control – is our ability to maintain and implement a goal and goal-relevant information in the face distraction. There is growing evidence that attentional control cannot be established at the latent-variable level with the measures used so far. This asks for other ways of measuring attentional control. Early research has modeled attentional control from working-memory (WM) tasks and short-term memory (STM) tasks (i.e., tasks used to measure either the temporary maintenance and manipulation of information or the temporary maintenance of information only). First, attentional control was estimated as the residual variance of WM after controlling for STM. Second, it was estimated as the common variance across WM and STM measures, with higher loadings of the WM measures to the factor of attentional control. We tested both models systematically by re-analyzing three datasets. In one dataset, both models were successfully estimated. However, these results were not consistently replicated in the other datasets. Thus, using WM and STM tasks does not solve the issue of establishing attentional control as a factor, further questioning the conceptualization of this construct.

THE HEIDELBERG MATRICES TEST: A NEW TEST FOR THE ASSESSMENT OF REASONING ABILITIES

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Figural matrices test are widely used to assess inductive reasoning. Solving these tests requires selecting a target that completes a figural matrix among a set of distractors. Despite their generally good psychometric properties, previous matrices test may not have come to their full potential, due to certain limitations associated with non-systematic distractor construction. For example, most tests allow participants to identify the correct response by eliminating distractors based on superficial features. We developed a new matrices test, the HeiQ, using a systematic distractor generation approach. The HeiQ showed good reliability and construct validity and it superseded the Raven Progressive Matrices Tests in criterion-related validity. The HeiQ also allows to infer which test construction principles were understood by a given participant based on the incorrectly selected distractors. As distractor selection can be informative regarding the cognitive processes used to solve a reasoning test, the HeiQ has the potential to broaden our understanding of reasoning abilities.

GLOBAL RELATIONS VERSUS OBJECT RELATIONS IN VISUAL ANALOGIES

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Inspired by the distinction between global and local levels of visual perception, here we studied different levels of visual analogical

reasoning. Specifically, we created problems that could be solved by either a global or object path, and which varied in the saliency of the global shape, the color and the familiarity of the objects. The results of two studies showed that global-based responses were more likely than object-based responses, particularly for images with salient global shapes. However, neither color, nor object familiarity affected the tendency to map object relations. Results also showed that the tendency to use the global path correlated with abstract reasoning, measured with the Advanced Raven Progressive Matrices. The correlation was positive in the case of black-and-white problems and negative in the case of colorful problems, suggesting that color was processed more as a global property of the images rather than as a local feature of the individual objects. Overall, the present findings suggest that the global precedence observed in image perception also seems to apply in the context of visual analogical reasoning.

THE EFFECT OF CONTEXT AND INDIVIDUAL DIFFERENCES IN HUMAN-GENERATED RANDOMNESS

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Many psychological studies have shown that human-generated sequences are hardly ever random. However, what remains an open question is the degree to which this (in)ability varies between people and is affected by contextual factors. We used a modern, robust measure of randomness based on algorithmic information theory to assess human-generated series. In S1, we tested the effects of context and mental fatigue on human-generated randomness. In S2, we investigated the effect of mental fatigue on the randomness and the relationship between the need for cognition (NFC) and the ability to produce random-like series. Results of S1 show that the activation of the ability to produce random-like series depends on the relevance of the contextual cues, whether they activate known representations of a random series generator and consequently help to avoid the production of trivial sequences. Our findings from S1 and S2 on the effect of mental fatigue and cognitive motivation demonstrate that regardless of the context or task's novelty people quickly lose interest in the random series generation. However, people high in the NFC can maintain cognitive motivation for a longer period and consequently on average generate more random series.

TALKS 11
PERCEPTION AND VISION

THE AUTOMATIC CODING OF BODY PARTS AND THEIR RELATION TO THE STRUCTURAL BODY REPRESENTATION

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To represent the human body, the cognitive system combines internal, somatosensory signals with external, visuospatial information generated from others' and own bodies. In a series of experiments, we investigated the *implicit* and automatic processing of body parts by manipulating either the body part stimuli' or the participants' body postures using a spatial compatibility task (the Sidedness task) requiring participants to judge the colour of a circle superimposed on a task-irrelevant body part picture. Responses are facilitated when the spatial side of the response corresponds to the spatial position such body parts have within a configural representation of the body structure (the Body Structural Description). The results are not influenced by manipulating the participants' response postures, suggesting that the *automatic* and *implicit* coding of body parts does not rely on proprioceptive information about one's body (the Body Schema) but on the human body's morphometry knowledge, enriched by biomechanical and anatomo-physiological information on the real body movement possibilities. We discuss the importance of the automatic orienting of attention based on the sidedness within the context of imitational learning.

BODY PERCEPTION AND BRAIN PLASTICITY IN BLIND AND SIGHTED INDIVIDUALS: FROM HEARTBEATS TO RUBBER HANDS

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How does the sense of body ownership arise in blind individuals? Here we present a series of experiments that focused on this profoundly understudied topic – bodily awareness following blindness. We tested 36 blind individuals and 36 age and sex-matched sighted volunteers. In experiment 1, we showed that blind individuals have significantly higher accuracy in perceiving their heartbeat sighted individuals. In experiment 2, we provided a broader insight into tactile perception following blindness by studying both discriminative and affective touch plasticity in blind and sighted groups. In experiment 3, we re-examined a classic paradigm to study body ownership, somatic rubber hand illusion (SRHI), and showed that blind individuals do not experience this illusion, which suggests that changes in multisensory integration of tactile and proprioceptive signals, possibly combined with more accurate interoception, may explain why blind individuals appear "immune" to the SRHI. Taken together, this series of experiments is the first attempt to systematically describe differences and similarities between blind and sighted individuals in bodily awareness and the functioning of the bodily senses, opening a new important line of research.

LOW-LEVEL VISUAL ATTRIBUTES AFFECT THE INTEGRATION OF VISUAL CONTEXT DURING SIZE PROCESSING

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The ventral and dorsal cerebral streams process the metrics of visual objects (e.g., their size) in a relative and absolute manner, respectively. They receive partially distinct inputs from magno(M)- and parvocellular(P) neurons with different spatial, temporal, and spectral properties. Low-level visual attributes biasing the processing of objects towards the M-dominant dorsal or P-dominant ventral streams should thus favor absolute and relative processing, respectively. We tested this by having participants judge the size of circles surrounded by larger or smaller circles resulting in the Ebbinghaus illusion. Ebbinghaus figures were displayed with visual attributes meant to bias their processing towards the M-dominant dorsal or P-dominant ventral streams. Size estimates were found to increase with actual circle size and equal sensitivity across conditions. Yet, the influence of surrounding circles was reduced for figures displayed with M-biased attributes while P-biased attributes had no effect. These results demonstrate that certain visual attributes lead objects to be processed in a more absolute manner, with significant implications for our understanding of visual perception.

CAUSAL EFFECTS OF PUPIL SIZE ON VISUAL PROCESSING

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The size of the eyes' pupils shapes visual processing by determining how much light enters the eye and how well this light is focused. Yet causal effects of pupil size on vision are still poorly understood. Here we report the effects of both experimentally induced and spontaneous changes in pupil size on visual processing as measured through EEG. Combining neural-network decoding with ERP and time-frequency analyses, we find that induced and spontaneous changes in pupil size affect EEG responses, mainly over occipital and parietal electrodes, and—crucially—that they do so very differently from changes in attention and stimulus intensity, two other factors that also affect early visual processing. Pupil size mainly modulates activity (but not overall power) in the high-frequency beta range; this may reflect a causal effect of pupil size on oculomotor activity and/ or visual processing. In addition, spontaneous (but not induced) pupil size tends to correlate negatively with alpha power; this may reflect a non-causal relationship, mediated by arousal. Taken together, we find that pupil size causally affects visual processing, and provide concrete starting points for further study of this important earliest stage of visual processing.

PUPIL DILATION SIGNALIZES EVENT BOUNDARIES AND NARRATIVE SHIFTS

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We automatically segment the continuous stream of our experiences into discrete events, and this serves as a basis for later episodic memories. Boundaries between events are characterized by significant changes in perceptual/semantic features and change-induced surprise has been previously linked to pupil dilation. Because of this, we investigated whether event boundaries are accompanied by pupil dilation. In Exp 1, participants indicated with a key-press when they perceived an event boundary during listening to short stories about everyday events. Then, in Exp 2, using a different sample, we showed that the event boundaries identified in Exp 1 trigger pupil dilation during listening to the stories. Moreover, the magnitude of this dilation predicted later memory for the stories, and pupil dilation was observed after narrative shifts involving either the spatial location or the protagonist. Our results show that attention-related brain networks automatically detect event boundaries. Furthermore, whereas previous studies demonstrated the link between surprise and pupil dilation using simple feedback learning paradigms, our results highlight that this link is present also in complex tasks, like narrative comprehension.

HOW CIRCULAR SHOULD A CIRCULAR ARRAY BE? INVESTIGATING THE SHAPE OF THE VISUAL FIELD WITH A CIRCULAR ARRAY TASK

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The studies investigating visual field capacity, e.g. visual working memory or conscious perception studies, often involve the simultaneous presentation of multiple objects in a circular array. Central fixation is displayed surrounded by objects arranged in a circle. Interestingly, the literature indicates differences in participant accuracy and response times depending on where an object is displayed. Here we present a series of three experiments (including the study with a sample size of 300 participants) aiming at taking a closer look at those differences. We have used a novel experimental paradigm developed in our lab. The task aims at making all objects detected evenly by adjusting the distance from the centre of 16

positions with a staircase procedure. We compare the possible models of visual space and conclude that it is an ellipse rather than a circle. The results can be used when designing stimulus displays and adding knowledge on the spatial characteristics of the visual field.

TALKS 12
CHILD DEVELOPMENT I

THE ORIGINS OF WORD ASSOCIATIONS IN EARLY CHILDHOOD

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Despite being extremely simple, word association task is a powerful tool for language and semantic development research. Here we revisit one of the most influential findings in the developmental literature - change in the type of early word associations from syntagmatic (i.e., sequential pattern: dog-bone) to paradigmatic (i.e., substitution pattern: dog-lion), through the lens of the recent empirical and computational work on the role of word co-occurrence regularities in shaping semantic development (Savic, Unger, & Sloutsky, 2023; Unger et al, 2023). We first present a new, growing data set of developmental word associations (N > 1200, ages 3-9, 151 cue words; https://isayusay.org/). Next, we present analyses of the syntagmatic-paradigmatic change based on human-tagged responses. Finally, we present analyses that predicts children's responses from simple, observable word co-occurrence regularities (CHILDES, MacWhinney, 2000). Taken together, our findings suggest that the previously reported increase in paradigmatic responses may be largely overestimated and that in early childhood the origins of both syntagmatic and paradigmatic associations may be primarily in simple, observable word co-occurrence regularities.

DO EARLY MUSICAL IMPAIRMENTS PREDICT LATER READING DIFFICULTIES? A LONGITUDINAL STUDY OF PRE-READERS WITH AND WITHOUT FAMILIAL RISK FOR DYSLEXIA

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Previous research has shown a triple association between music, phonology, and literacy skills, but the developmental mechanisms that may link these abilities are not well understood. The present longitudinal study examined the hypothesis that early musical skills predict later literacy development via a mediating effect of phonology. To this aim we examined 130 children, 31 of whom presented a familial risk for developmental dyslexia (DD). Their abilities in the three domains were assessed longitudinally, using a comprehensive battery of behavioral tests in kindergarten, first grade, and second grade, and were analyzed with structural equation models. The results showed that children with a familial risk for DD consistently underperformed children without familial risk in musical, phonological and literacy skills. A small effect of musical ability on literacy via phonology was observed. However, early musical skills did not add significant predictive power to later literacy difficulties beyond phonological skills and family risk status. We debate the clinical implications of these findings and discuss their potential to inform the recently documented comorbidity between DD and congenital amusia.

COGNITIVE AND MUSICAL SKILLS OF SCHOOL-AGED CHILDREN

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Children's cognitive skills (e.g., short-term memory) and musical skills (e.g., melodic, rhythmic) are positively associated. Their socioeconomic status (SES), including family income and parental education, may influence opportunities to learn musical skills. Here we examined the role of SES, cognitive skills, and musical perception on children's musical performance (rhythm, melody). Participants were 154 second graders (M = 6.84 years; SD = 0.43) from disadvantaged communities. Data on children's SES was collected. To evaluate cognitive skills, we used five WISC-III subtests. Musical perception was assessed with the MBEMA and musical performance was evaluated using a test designed for this study. Two multiple hierarchical regression analyses were conducted, for melody and rhythm. After controlling for SES (Step 1), we examined contributions of cognitive (Step 2), perception, and performance skills (Step 3) to musical performance. Concerning melody, the model explained 76%, and for rhythm, 45% of the variance, with previous performance and family income, respectively, as significant predictors. Findings suggest that cognitive skills do not predict musical performance skills and SES predicts rhythmic, but not melodic, performance.

HOW SPEECH AND REPRESENTATIONAL GESTURES ALIGN IN CHILD-DIRECTED LANGUAGE: A CORPUS-BASED STUDY

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Representational gestures carry semantic content related to the speech. Studies on adult-adult conversation have shown that the majority of representational gestures are produced before their

lexical affiliate (LA). However, how caregivers would time their gestures in naturalistic interactions with their children remains unknown. We annotated representational gestures from a large corpus (ECOLANG) of semi-naturalistic conversations between caregivers and their 3-4-year-old children (n = 899 gestures from n=36 caregivers). We found that, in contrast to the adult-directed language, caregivers' representational gestures were more concurrent with their LAs. We further found that age of acquisition rating of the LA had a significant effect on the speech-gesture latency. For words acquired earlier, the gesture's stroke (the meaningful part of a gesture) tended to occur before the LA's onset; for words acquired later, the stroke tended to occur concurrently with or after the onset of the LA. Our study is the first to demonstrate representational gesture-speech timing relationships in child-directed language. This work suggests that representational gestures can have a pedagogical function when produced by caregivers.

THE CHILDREN AND YOUNG PEOPLE'S BOOKS LEXICON (CYP-LEX): A LEXICAL DATABASE OF BOOKS DIRECTED AT CHILDREN AND YOUNG ADULTS

Maria Korochkina[1], Marco Marelli[2], Marc Brysbaert[3], Kathleen Rastle[1]; *[1]Department of Psychology, Royal Holloway University of London, United Kingdom, [2]Department of Psychology, University of Milano-Bicocca, Italy, [3]Department of Experimental Psychology, Ghent University, Belgium*

We present CYP-LEX, a large-scale lexical database derived from books directed at children and young people. CYP-LEX is publicly available on OSF and includes 1,200 books evenly distributed across three age bands (7-9, 10-12, 13+) and comprises over 71 million tokens and 320,000 types. Books were assigned to age bands using publisher classifications and recommendations on websites such as BookTrust, Goodreads, School Reading List, and Amazon. In addition to the lexical items themselves, for each book and each age band, we report statistics such as number of sentences, tokens, and types. For each type, we provide its raw and Zipf frequencies and all parts-of-speech in which it occurred, with the frequency and lemma for each occurrence. We also report metrics for multiword expressions and, for each age band, semantic similarity of the books within it. We discuss how the lexicons in the three age bands compare to each other, what our database reveals about the nature of the written texts children and young people are exposed to, and showcase how CYP-LEX can be used to address specific questions in research on reading and language acquisition and development.

THE EFFECT OF PARENTAL REMINISCING STYLE ON PRESCHOOLERS' INDEPENDENT MEMORY SKILLS

Christina Léonard[1], Marie Geurten[1], Sylvie Willems[1]; *[1]University of Liège*

High elaborative parents, who engage their child in detailed and collaborative discussions of the past, influence the quality of their child's recall during parental reminiscing, but a generalization on their independent memory skills (outside of parental reminiscing) is uncertain. To explore this issue, 50 parents and their preschooler were recruited. Parental reminiscing was assessed via a parent-child discussion of a staged event. Through a median split on parents' level of elaboration, 2 groups of parents were created (low/high elaborative). To assess child's independent memory, an experimenter administered 2 autobiographical memory tasks (one about an event previously discussed with the parent and one about an event non-discussed) and an episodic memory task. Results confirm that the parent groups significantly differed in their level of elaboration. Generalized linear mixed-effect models reveal that children of high elaborative parents showed better memory discrimination than those of low elaborative parents on the episodic memory task and thetask about the event non-discussed. This suggests that parental reminiscing is related to child's independent memory skills and possibly favors the development of memory strategies.

SYMPOSIA – 16h40 to 18h20

SYMPOSIUM 7
WORD AND SENTENCE READING

Organizer: Jonathan Grainger[1]; *[1]Laboratoire de Psychologie Cognitive, Aix-Marseille University & CNRS, Marseille, France*

Symposium Abstract: This symposium is associated with the Broadbent lecture "Orthography, phonology, morphology, and reading". Jonathan Grainger invited five colleagues to give talks on the general topic of "word and sentence reading". The presenters are all close colleagues of J. Grainger who have been involved in recent collaborations with him, and who have already established themselves as major players in the field of reading research. The main aim of this symposium was to provide more focused talks that would cover in greater detail some of the topics only briefly covered in the Broadbent lecture, as well as covering more ground than could be covered in one lecture.

ERP SIGNATURES OF THE PROCESSING OF LOGOS: COLOR BEATS ORTHOGRAPHY

Marta Vergara-Martínez[1], Maria Fernandez-Lopez[1,2], Francisco Rocabado[3], Melanie Labusch[1], Ana Marcet[1], Manuel Perea[1,3]; *[1]Universitat de Valencia; [2]Universidad de Zaragoza; [3]Universidad Nebrija*

Name, symbols, and color are key features that define logos. While graphic information facilitates their recognition, it makes them vulnerable to counterfeiting by subtle changes on the logo's features. Recognition of names in logos (e.g. amzaon) are more affected by letter transposition than misspelled words (e.g. cholocate): while orthographic features are key elements in common word processing, logos are more dependent on color and lettering styles than on correct orthographic encoding. In contrast, color information is lost early during the processing of common words. Here we analyzed the role of color and orthography in the identification of logos in two EEG experiments. In Exp.1 correctly spelled (SAMSUNG), letter-transposed (SASMUNG) and letter-replaced (SARVUNG) logos were used. In Exp.2 correct and incorrect (different color) logo versions were used. The ERPs of Exp.1 differentiated the replaced and the other conditions; the transposed and the correct conditions did not differ. In contrast, Exp.2 showed an early (N1) color effect during 400ms. In sum, although color and orthographic processing allow the identification of different stimuli, their role changes depending on whether the stimulus is a common word or a logotype.

EFFECTS OF VISUAL SIMILARITY AND TRANSPOSED-CHARACTERS IN THE SAME-DIFFERENT MATCHING TASK WITH STRINGS OF LETTERS AND SYMBOLS

Stéphanie Massol[1], Jonathan Mirault[2, 3] & Jonathan Grainger[2]; *[1]Laboratoire d'Etude des Mécanismes Cognitifs, Université Lumière Lyon 2 Lyon, France ; [2]Laboratoire de Psychologie Cognitive, Aix-Marseille University & CNRS, Marseille, France ; [3]Pôle pilôte Ampiric, Institut National Supérieur du Professorat et de l'Éducation, Aix-Marseille Université, Marseille, France.*

Using the same-different matching task, Massol and Grainger (2022) reported similar effects of low-level perceptual noise for different character strings (letters, digits, or symbols), whereas transposed-character effects were greater for letter strings. This pattern has been interpreted as follows. At the level of location-specific complex feature detectors, representations are subject to a certain amount of positional noise, independently of stimulus type. These then activate location-invariant object identities where object order is encoded. Here, a distinction is drawn between a generic mechanism for encoding order information and a more flexible mechanism that is only used to represent letter order. We investigated the role played by both mechanisms using the same-different task. Critical pairs of stimuli (letter or symbol strings) could differ by transposing two characters (e.g., FBJK-FJBK), substituting one character by another one that could be visually similar (e.g., FJDK-FJBK) or dissimilar (e.g., FJVK-FJBK), or substituting two characters (e.g., FHSK-FJBK). We predicted that effects of visual similarity will operate independently of stimulus type whereas transposed-character effects will be greater for letters.

ON THE ROLE OF STEMS AND PREFIXES IN READING COMPLEX NONWORDS: EVIDENCE FROM INDIVIDUALS WITH AND WITHOUT ACQUIRED DYSLEXIA

Elisabeth Beyersmann[1], Tara Arrow[1], Simon Fischer-Baum[2]; *[1]School of Psychological Sciences, Macquarie University, Sydney, Australia; [2]Department of Psychology, Rice University, Houston, USA*

The independent role of stems and prefixes in complex nonword reading was investigated in a group of unimpaired readers and four individuals with acquired dyslexia following brain damage. Participants were asked to read aloud four different types of complex nonwords: prefix + stem (refront), non-prefix + stem (tefront), prefix + non-stem (refrint), and non-prefix + non-stem (tefrint). The unimpaired readers responded fastest to nonwords containing two morphemes (prefix + stem), slower to nonwords with one morpheme (non-prefix + stem; prefix + non-stem), and slowest in the control condition (non-prefix + non-stem). All reading impaired individuals showed a facilitatory stem-effect, but only two benefitted from the presence of a prefix in their reading. One dyslexic participant consistently changed the order of morphemic constituents, pronouncing the stem first (front), then the prefix (re), and then the whole item (refront). The impact of morphological structure on nonword reading, clearly observed in impaired and unimpaired individuals, points to a pre-lexical activation of morphemes, suggesting that stem and affix processing are based on clearly dissociable mechanisms in the reading system.

THE EFFECTS OF SEMANTIC AND SYNTACTIC PREDICTION ON READING ALOUD

Elisa Gavard[1] & Johannes C. Ziegler[1] ; *[1]Aix-Marseille University, CNRS, Laboratoire de Psychologie Cognitive (UMR 7290), Marseille, France*

Semantic and syntactic prediction effects were investigated in a word naming task using semantic or syntactic contexts that varied between three and six words. Participants were asked to read the contexts silently and name a target word, which was indicated by a color change. Semantic contexts were composed of lists of semantically associated words without any syntactic information. Syntactic contexts were composed of semantically neutral

sentences, in which the grammatical category but not the lexical identity of the final word was highly predictable. We found facilitatory effects of both semantic and syntactic contexts but the size of the effects depended on the presentation time of the context with smaller syntactic context effects for shorter presentation times. We further explored whether the ability to make efficient semantic or syntactic predictions accounted for interindividual differences in reading ability while controlling for non-linguistic prediction skills. Results are discussed in the context of the extant literature on semantic and syntactic priming and theoretical proposals that emphasize the importance of prediction for language perception and production.

SENTENCE READING IN OB1-READER

Martijn Meeter[1], Joshua Snell[1], Jonathan Grainger[2]; *[1]Vrije Universiteit Amsterdam, Amsterdam, The Netherlands ; [2]Laboratoire de Psychologie Cognitive, Aix-Marseille University & CNRS, Marseille, France*

When reading a sentence, words must be fixated via eye movements, then recognized, and then integrated into a sentence-level meaning. These levels are typically studied separately. OB1-reader is an attempt to integrate these different levels into a coherent model of reading. Key features are: (i) relative position coding at the letter level; (ii) words are processed in parallel; (iii) visual attention allows the model to focus on particular words; (iv) saccade onset is influenced by word recognition, while saccade goal is determined by visual input to the model and predictability of the next word. Here, we review new developments of the model since its publication (Snell et al. 2018). First, we show that lexical activity generated in OB1 correlates with N400 amplitude generated by the same stimuli. Second, we propose a way to incorporate syntactic constraints in OB1 and show how this allows OB1 to simulate a number of experimental findings. Third, OB1 has been adapted to recognize and decompose words containing affixes thereby capturing several well-established effects of morphological complexity on word recognition.

SYMPOSIUM 8

PREFERRED RHYTHMS IN AUDITORY COGNITION

Organizers: Anne Keitel[1], Anne Kösem[2], Christina Lubinus[3], Ayelet N. Landau[4], Benedikt Zoefel[5]; *[1]University of Dundee, [2]Lyon Neuroscience Research Center (CRNL), [3]Max-Planck-Institute for Empirical Aesthetics, [4]The Hebrew University of Jerusalem, 5Centre de Recherche Cerveau et Cognition (CerCo)*

Symposium Abstract: The last two decades have seen huge progress in understanding rhythmic neural processes involved in auditory cognition, such as speech comprehension, music listening, or rhythm processing. However, most research has focussed on generic neural processes and has neglected individual variability. Recently, it has been suggested that preferred neural rhythms influence individual cognition by imposing limitations on perceptual processes, or by resulting in optimal auditory-motor regimes. It is therefore important to consider inter-individual and group variability that might lead to consistent differences in cognition. Talks in this symposium will address (1) the role of individual preferred rhythms in speech comprehension (C. Lubinus), (2) and in music tempo preferences (A. Keitel); (3) the impact of spontaneous motor rhythms on sensory processing and joint action (A. Landau); (4) the influence of temporal variability on auditory rhythm perception and associated neural tracking responses (A. Kösem), and (5) preferred rhythms for auditory perception (B. Zoefel). This symposium will bring together novel findings on the role of neural and behavioural preferred rhythms, and will extend the current generic perspective on auditory cognition.

EXPLAINING FLEXIBLE CONTINUOUS SPEECH COMPREHENSION FROM INDIVIDUAL MOTOR AND AUDITORY RHYTHMS

Christina Lubinus[1], Anne Keitel[2], Jonas Obleser[3], David Poeppel[4], Johanna M. Rimmele[1]; *[1]Max-Planck-Institute for Empirical Aesthetics, [2]University of Dundee, [3]University of Lübeck, [4]New York University*

When speech is too fast, the tracking of the acoustic signal along the auditory pathway deteriorates, leading to suboptimal speech segmentation and decoding of speech information. Thus, speech comprehension is limited by the temporal constraints of the auditory system. Here we ask whether individual differences in auditory-motor coupling strength in part shape these temporal constraints. In two behavioral studies, we characterize individual differences in the comprehension of naturalistic speech as a function of the individual synchronization between the auditory and motor systems and their preferred frequencies. Obviously, speech comprehension declined at higher speech rates. Importantly, however, both higher auditory-motor synchronization and higher spontaneous speech motor production rates were predictive of better speech-comprehension performance. Furthermore, performance increased with higher working memory capacity (Digit Span) and higher linguistic, model-based sentence predictability – particularly so at higher speech rates and for individuals with high auditory-motor synchronization. These findings support the notion of an individual preferred auditory-motor regime that allows for optimal speech processing.

THE ROLE OF PREFERRED NEURAL AND BEHAVIOURAL RHYTHMS IN MUSIC TEMPO PREFERENCE

Efstratios Koukouvinis[1], Anne Keitel[1]; [1]*University of Dundee*

Each brain area has a characteristic mix of intrinsic neural rhythms that generalise across participants. For example, the primary auditory cortex consistently shows intrinsic delta, theta, and beta rhythms. However, despite this generalisability, individual variability in the frequency and amplitude of brain rhythms exist, and these could influence our perception of auditory stimuli. It has been suggested that individuals have preferred perceptual and motor rhythms, which are connected across a wide range of different situations. We here tested whether individual intrinsic brain frequencies predict the preference for musical rhythms in an electroencephalography study. Our results show that individuals' theta frequency peak in auditory electrodes predicted their preferred tempo: The faster the individual theta rhythm, the faster were the musical rhythms that people liked to hear. A cautious interpretation is that preferred intrinsic neural rhythms could facilitate optimal auditory rhythm processing, which in turn affects preferences in music tempo. Preferred neural and perceptual rhythms suggest that tailoring auditory stimuli, such as music or speech, to the individual, might help in training and intervention contexts.

INTERNAL RHYTHMS AND EXTERNAL DRIVERS - RHYTHMIC COGNITION AS A BRIDGE BETWEEN THE SELF AND THE EXTERNAL WORLD

Leah Snapiri[1], Yael Kaplan[2], Nir Shalev[3], Ayelet N. Landau[1]; [1]*The Hebrew University of Jerusalem,* [2]*Haifa University,* [3]*Oxford University*

Rhythmic temporal structure originates endogenously, as observed in rhythmic patterns of neural activity and self-generated motor behavior. It can also be generated exogenously, for example, when we attend to the motion and speech of others. How do endogenous rhythms interact with the ability to attend and adjust to external rhythmic structure? In this talk we first show that individuals have a spontaneous rhythmic preference for motion, that is consistent over time and tasks. Then, we show that the degree to which external rhythms shape perceptual performance is influenced by individuals' spontaneous rhythmic preference. Finally, we show that when individuals performed a task together, two patterns emerge. First, joint action is characterized by a reduction in the rhythmic range of spontaneous motion. This suggests that individuals adapt their behavior to support optimal dyadic synchronization. Complementary to this pattern, individuals in the dyad presented a bias towards their personal rhythmic preference. Our findings provide an integrated view on cognition, encompassing both low-level sensory processes and joint motor action, and posit that rhythmic preferences impact performance in both personal and interpersonal scenarios.

TRACKING STOCHASTIC RHYTHMS IN AUDITION AND SPEECH

Pierre Bonnet[1], Mathilde Bonnefond[1], Anne Kösem[1]; [1]*Lyon Neuroscience Research Center (CRNL)*

During listening, neural oscillations track the temporal regularities of speech. Yet, it is often assumed that neural oscillations follow isochronous sensory rhythms, whereas natural speech is not a pure periodic signal, nor has a deterministic temporal structure. Here, we investigated how the brain tracks complex forms of temporal statistics in verbal and non-verbal stimuli. In a first study, we manipulated the temporal variability of sound sequences and asked participants to detect target sounds. We showed that auditory detection performance progressively declines with the temporal variance of the sensory context, but that temporal predictability effects are robust to a certain amount of temporal variability. In a second study, we investigate how the brain tracks the temporal statistics of naturally spoken sentences uttered in different languages, and with different groups of native-language listeners. First data show that neural activity accurately tracks the language-dependent speech dynamics, suggesting that temporal prediction mechanisms can operate on the statistics of natural speech.

PREFERRED RATES FOR RHYTHMIC ENTRAINMENT ECHOES IN AUDITORY PERCEPTION

Sylvain L'Hermite[1], Benedikt Zoefel[1] ; [1]*Université de Toulouse III Paul Sabatier*

Rhythmic entrainment echoes are rhythmic brain responses that are produced by a rhythmic stimulus and persist after its offset. Such echoes are important as they can evidence endogenous neural oscillations entrained by the stimulus rhythm. I will show results from four experiments, designed to test which stimulus rate produces strongest entrainment echoes in auditory perception. These results revealed strongest echoes between 6 and 8 Hz, reflected by a modulation of the detection of an acoustic target by the rhythm of a preceding stimulus. We also found that best moments for target detection (in or in anti-phase with the stimulus rhythm) depended on whether sound frequencies of entraining and target stimuli matched, in line with a tonotopical organisation of entrainment echoes. Nevertheless, for the same experimental condition, best moments were not always consistent across experiments, an observation that will be discussed. Together, auditory target detection depends on the rhythm of a preceding stimulus only if the

latter is presented between 6 and 8 Hz, demonstrating preferred rates for rhythmic entrainment echoes and corresponding oscillatory processes.

SYMPOSIUM 9

UNIFYING PERSPECTIVES ON PROACTIVE AND REACTIVE CONTROL TO UNCOVER PROMISE AND CHALLENGES OF THE DICHOTOMY

Organizer: Giacomo Spinelli[1]; *[1] University of Milan-Bicocca*

Symposium Abstract: In the last decade, the study of goal-oriented behavior has been increasingly influenced by the Dual-Mechanism of Control framework (Braver, 2012, TiCS). This framework proposes a distinction between 1) a proactive mode of processing whereby individuals maintain task-relevant information in an anticipatory fashion, and 2) a reactive mode whereby specific events re-activate task-relevant information on an as-needed basis, with the two modes having distinct behavioral and neural signatures. The proactive/reactive dichotomy has been used in as many areas as attentional control, visual attention, and memory. However, with this success, there has also been a diversification in the characteristics attributed to proactive/reactive control depending on the paradigm and area of study. For example, whereas individual-differences research suggests that proactive control is an effortful mode to engage, other research suggests that proactively anticipating conflict from a distractor is not particularly demanding. This symposium aims to bring together researchers from several areas relevant to proactive/reactive control and converge on a more unitary view of the dichotomy, its promise and the challenges that it faces.

EXAMINING THE RESOURCE REQUIREMENTS OF PROACTIVE AND REACTIVE CONTROL IN THE STROOP TASK USING A CONCURRENT WORKING-MEMORY LOAD

Giacomo Spinelli[1], Simone Sulpizio[1]; *[1]University of Milan-Bicocca*

Proactive and reactive control are assumed to differ in the amount of cognitive resources that they require. In the Stroop task, for example, proactively maintaining the task goal (i.e., color naming) would help to reduce any type of conflict a forthcoming word might produce, but doing so would require a rather large amount of resources. In contrast, reactively re-activating the task goal when a specific event occurs would not be as efficient at reducing conflict, but doing so would require little resources. Because cognitive resources are finite, one may assume that requiring individuals to allocate some of the available resources to a difficult secondary task would impair their ability to engage proactive control in the Stroop task, whereas it would have little or no impact on their ability to engage reactive control. To examine this idea, we present data from two experiments in which a Stroop task was performed concurrently with a secondary task creating a low vs. high load on working memory. The results only provided clear support to the idea that reactive control requires little or no resources. Implications for the distinction between proactive and reactive control will be discussed.

PROACTIVE AND REACTIVE CONTROL IN AGING BY MEANS OF THE DISTRACTOR CONTEXT MANIPULATION IN VISUAL SEARCH

Roberta Daini[1], Marco Petilli[1]; *[1]University of Milan-Bicocca*

We used a Distraction Context Manipulation (DCM) paradigm in a visual search task to verify: 1) that proactive control processes for distractor expectation are involved even in conditions of pop-out search; 2) how aging affects the distractor-expectation costs and benefits. In a first study, young adults were requested to find a target in three different blocks: one pure block without distractors; one mixed block (i.e., 1/3 of distractor-absent and 2/3 of distractor-present trials), with single-feature distractors; another mixed block, with feature-conjunction distractors. The effects of the recruitment of proactive control processes for distractor-expectation entailed slower responses, yet more accurate, on distractor-absent trials in the frequent-distractor blocks (versus pure block) in both feature and conjunction search. In a second study, we compared the performance of 3 age groups in a DCM color search task. We found longer response times as a function of age, but the same distractor-expectation cost in all 3 groups, suggesting that proactive mechanisms are preserved. Nevertheless, the analyses of distractor-present trials show differences among groups, suggesting that reactive control decreases with aging.

PROACTIVE AND REACTIVE CONTROL BEYOND PERFORMANCE IN THE AX-CPT: INSIGHTS INTO PROACTIVE RESPONSE PROCESSES

Corentin Gonthier[1], Agnès Blaye[2]; *[1]Nantes University, [2]Aix-Marseille University*

The AX-CPT remains the cornerstone of Dual Mechanisms of Control research, with performance on AY and BX trials reflecting the balance between proactive and reactive control. However, valuable insight into dual mechanisms can be gained by considering the processes leading up to a response, beyond just the performance which results from these processes. I will present the results of two series of experiments illustrating alternative approaches to proactive and reactive control. The first line of

research treated mechanisms of control as cognitive strategies and explicitly asked participants about which mechanism of control they used on a given trial in the AX-CPT, revealing unexpected trial-to-trial variations of control. The second line of research explored implicit proactive control (implemented without explicit intentionality) based on proportion congruency effects, and used mouse-tracking to investigate the trajectory of implementing proactive control within a trial, revealing changes and stability across cognitive development. These results highlight the need for detailed specification of cognitive processes involved in implementing proactive and reactive control, in order to reconcile discrepancies in the literature.

THE MULTIVARIATE SPATIO-TEMPORO-SPECTRAL SIGNATURES OF COGNITIVE CONTROL REPRESENTATIONS: AN EEG REPRESENTATIONAL SIMILARITY ANALYSIS STUDY

Giada Viviani[1], Antonino Visalli[2], Antonino Vallesi[1], Ettore Ambrosini[1]; *[1]University of Padua, [2]Fondazione Ospedale San Camillo IRCCS*

For the Dual-Mechanism of Control (DMC) model, cognitive control acts via two distinct modes, proactive and reactive control, but whether they can be distinguished at the neural level is far from being fully understood. To tackle this issue, we used Representational Similarity Analysis (RSA), a multivariate analytical technique that explicitly models theory-based representations, like those postulated by the DMC, and correlated them to observed brain patterns. We recorded 40 healthy adults' EEG during a spatial Stroop task, in which we manipulated both list-wide and item-specific proportion of congruency, estimating their trial-level values to assess proactive and reactive control, respectively. To enhance results' interpretability, we used an innovative spatio-temporo-spectral RSA approach using a 50-mm, 40-ms, 4-Hz searchlight. Then, using trial-level two-step regressions, we assessed the similarity with the control-related representations. We identified specific representational spatio-temporo-spectral fingerprints of both proactive and reactive control, suggesting that they are represented in a complex way and that multivariate multi-feature approaches better reveal them.

WHEN PROACTIVE IS REACTIVE AND REACTIVE IS PROACTIVE

Senne Braem[1]; *[1]Ghent University*

The proposal that cognitive control processes can be categorized in two different modes of control – proactive versus reactive control, led to several interesting insights and paradigms on the processes that define higher-order thought and goal-directed action. In parallel, theories promoting a learning perspective on cognitive control have emphasized that control processes are always both influenced by the goals we are pursuing, while also triggered by sensory stimuli or events, in an immediate or distant past. I will illustrate how such a perspective is at odds with a strict definition of proactive versus reactive control, and describe how research on proactive versus reactive control might sometimes be more telling about the causes and goals we, as researchers, chose to factor in or ignore, rather than the proactive or reactive nature of said control processes. Finally, I will propose new dimensions on which to organize putative proactive versus reactive control processes. With this talk, I hope to further stimulate research into the different kinds of behavior we study when investigating proactive versus reactive control, while acknowledging and addressing the potential pitfalls in labelling the underlying processes as such.

SYMPOSIUM 10

HOLDING INFORMATION IN MIND: THE CONTRIBUTION OF ACTION-PLANNING AND NON-MNEMONIC PROCESSES TO WORKING MEMORY PERFORMANCE

Organizers: Candice C. Morey[1], Phil Beaman[2]; *[1]Cardiff University, [2]University of Reading*

Symposium Abstract: Working memory is supported and sustained by peripheral functions, such as speech production, motor planning, and long-term knowledge, that are neither part of the memory system per se nor exclusively used in service of short-term recall. How much can well-known working memory phenomena be explained by the joint contribution of these peripheral mechanisms without recourse to specialist memory systems? In this symposium, we bring together a collection of new work examining a variety of influences on working memory performance, ranging from motor planning and action preparation to verbal labelling and the dynamics of supporting memoranda. Taken together, our collection of views include questioning whether models of working memory need to posit specialized functions for maintenance, considerations of a limited encoding resource that operates whenever tasks require temporary representation, and the contribution of different types of action plan to long-term learning, and choosing which items to remember.

NONWORD REPETITION: EVIDENCE FOR A KEY ROLE FOR ARTICULATORY PLANNING

Rob Hughes[1], Hannah Harvey[1], Jennifer Mills[1]; *[1]Royal Holloway, University of London*

Measuring the ability to repeat a nonword—nonword repetition (NR)—has had a major influence on the study of language processing and learning. A prominent view is that NR provides a relatively pure measure of a passive phonological store, uncontaminated by articulatory planning (or 'rehearsal'). The present experiments challenge this view and are instead consistent with a perceptual-motor approach to short-term memory. We found that articulatory suppression, but not finger tapping, markedly impaired NR. We also established a phonological similarity effect in NR: The order of consonants within a nonword containing a recurring vowel was reproduced more poorly than when the nonword contained changing vowels, further supporting a role for articulatory planning. We also report a Hebb repetition effect in NR, which offers a new tool for examining the relation between NR and word-form learning. Finally, we found that impairing articulatory planning also disrupted a nonword matching task that required the retention of a nonword but no vocal response. The findings question a passive phonological storage-based approach to NR and instead highlight the central role of articulatory planning in the retention and reproduction of verbal sequences.

THE DEVELOPING IMPACT OF VERBAL LABELS ON VISUAL MEMORIES IN CHILDREN

Clara Overkott[1], Alessandra S. Souza[2], Candice C. Morey[3]; *[1]University of Zurich, [2]University of Porto, [3] Cardiff University*

The capacity limitations of visual working memory may be bypassed by verbal labeling. In adults, labeling increases estimates of both quantity and quality of visual working memory. However, we do not know when children begin to use labeling and whether labeling similarly benefits visual memories of children under and over age 7, the age where majorities of children are observed engaging in verbal rehearsal. We assessed whether children benefit from prompted and spontaneous labeling opportunities, examining how labeling affects the storage of categorical (prototypical) and continuous (fine-grained) color information. Participants memorized colored candies for a continuous reproduction test either while remaining silent, labeling the colors aloud, or saying irrelevant syllables (thereby discouraging verbal labeling). Mixture modeling confirmed that both categorical and continuous representations increased with age. Our labeling manipulation showed that spontaneous labeling increased with age. For the youngest children, prompted labeling especially boosted categorical memory, whereas labeling benefited categorical and continuous memory similarly in the older age groups.

PREPARE FOR THE UNKNOWN: LINKING WORKING MEMORY AND PREPARATION FOR ANTICIPATED ACTIONS

Marlene Rösner[1], Melinda Sabo[2], Laura-Isabelle Klatt[2], Edmund Wascher[2], Daniel Schneider[2]; *[1]Department Ergonomics, Leibniz Research Centre for Working Environment and Human Factors, [2]Leibniz Research Centre for Working Environment and Human Factors*

Working memory can be defined as the cognitive interface between perception, long-term memory and action. In this study participants performed a working memory task in which memory contents were probed with one of two possible tasks (continuous report or recognition). A retrospective content cue marked which content was relevant and a second retrospective task cue indicated which task was going to be performed. Importantly, both cues could also be uninformative. On EEG level, mu/beta power (~10-25 Hz) with an estimated source in sensorimotor cortex contralateral to response side was used as correlate of action selection processes. EEG data following the content cue indicated the initiation of action preparation even though the task was not fully specified. Mu/beta power suppression after a selective task cue showed that the action code was updated in a task-specific manner. Thus, working memory seems to be able to flexibly store different types of information in higher-level codes to be optimally prepared for all possible action requirements.

WHAT MECHANISMS CONTROL THE STRENGTH OF RELEVANT AND IRRELEVANT CONTENT IN WORKING MEMORY

Hannah Dames[1], Vencislav Popov[1], Klaus Oberauer[1]; *[1]University of Zurich*

Working memory (WM) is efficient in removing outdated content: Instructing participants to remember or forget sequentially presented words in short lists results in poorer memory for words that are cued to-be-forgotten (TBF) than for to-be-remembered (TBR) words. What mechanisms regulate the memory strength of TBR and TBF items? Candidates include selective rehearsal, selective encoding, and rapid boosting of TBR items, selective removal of TBR items, as well as automatic updating and decay of all WM contents. In several experiments, we pitted these mechanisms against each other by investigating serial position curves of TBR and TBF items, and by manipulating the timing of memory instructions. For instance, increasing the time between the offset of a memory cue and the onset of the next word results in enhanced memory for both TBR and TBF words, speaking against time-based decay of TBF words and against selective encoding and rehearsal of TBR words. Instead, we conclude that rapid boosting selectively strengthens memory for TBR items. Further, encoding of items into WM depletes a limited resource that replenishes during

the post-cue duration, benefiting subsequent encoding of both TBR and TBF items.

AN ADVERSARIAL COLLABORATION: CONTRASTING TWO EXPLANATIONS FOR THE EFFECT OF WORKING MEMORY LOAD ON PROCESSING TASKS

David Greeno[1], Candice C. Morey[1], Vencislav Popov[2]; *[1]Cardiff University, [2]University of Zurich*

In complex span tasks whereby memory items are interleaved with a processing task, processing task RTs increase as list length increases (Joseph & Morey, 2021). We contrasted two explanations. In Joseph and Morey's reconfiguration hypothesis, upon presentation of each memory item, participants prepare/update a motor-plan to enable later output. Preparation times increase with each additional item causing increases in processing task RTs. In Popov and Reder's (2020) resource depletion account encoding of each memory or processing item depletes a fixed proportion of a limited resource pool. This gradually recovers but leaves fewer resources for encoding each subsequent item, thereby increasing processing task RTs. To distinguish between accounts we used a running span version of the complex span task. Memory items were interleaved with processing tasks but participants were unaware of list length. They then recalled the most recently presented N memory items. The reconfiguration hypothesis predicts an asymptote in RTs after serial position N+1 while resource-depletion predicts continued increases in RTs beyond serial position N+1. We will report results of pre-registered tests and consider implications for models of working memory.

SYMPOSIUM 11

DEFYING THE STANDARDS OF COGNITION: WHAT ABOUT EVOLUTION? [TAKE 1]

Organizers: Josefa N. S. Pandeirada[1], Sara B. Félix[1]; *[1]William James Center for Research, Department of Education and Psychology, University of Aveiro*

Symposium Abstract: This symposium brings together a diverse group of international researchers (USA and Europe) to present the most up-to-date outcomes on various topics (memory and language). At the surface, this might look like a disconcerted event, but they all share one goal: to study cognitive processes under the spotlight of evolutionary principles. Their work uses traditional experimental methods, but their framing, predictions, and discussions, were functionally determined. James Nairne (USA) will present provocative arguments on why and how we should adopt evolutionary considerations in cognitive research. Meike Kroneisen (Germany) will present novel results on survival processing. Gesa Komar (Germany) and Sara Félix (Portugal) will share some of their doctoral projects' results on the animacy effect in retrospective and prospective memory, respectively. Lastly, Pilar Ferré (Spain) will talk about the influence of animacy and discrete emotions on language processing. We expect this will be the first of many forthcoming symposia that will help the field defy traditional conceptions on how to explore cognition and promote the generation of groundbreaking research avenues.

THE CASE AGAINST EVOLUTIONARY COGNITIVE ANALYSIS

James S. Nairne[1] ; *[1]Purdue University, USA*

Everyone agrees that our cognitive systems are the product of evolution, guided by nature's criterion—improving inclusive fitness. Yet evolutionary reasoning plays little role in modern cognitive analyses. Evolution rarely appears in the indices of cognitive psychology textbooks and many cognitive psychologists are openly hostile to evolutionary reasoning. What accounts for this state of affairs? In this talk, I'll consider some of the main objections to evolutionary analyses—e.g., "just-so" stories, impoverished data, the lack of value added—and I'll assess their merits using standard cognitive research as the comparative "gold standard." I will conclude by making the case that evolutionary reasoning offers a way to not only understand but to uncover novel empirical phenomena. I'll use examples from our work on adaptive memory to illustrate the power and usefulness of adopting an evolutionary perspective.

HOW DOES SURVIVAL PROCESSING AFFECT STORAGE AND RETRIEVAL PROCESSES?

Meike Kroneisen[1], Edgar Erdfelder[2]; *[1]RheinlPfälzische Technische Universität Kaiserslautern Landau, Germany, [2]University of Mannheim, Germany*

Words judged for relevance in a survival situation are remembered better than words judged for relevance in a non-survival context. This survival processing effect has been explained by selective tuning of human memory during evolution to process and retain information specifically relevant for survival. According to the richness-of-encoding hypothesis, however, the survival processing effect arises from a domain-general mechanism, namely, a particularly rich and distinct form of encoding. Depth of encoding should influence how well items are stored and maintained in memory (Riefer & Batchelder, 1995). To test if survival processing influences mainly storage processes or if it also alters retrieval processes a multinomial processing-tree model (MPT) for a free-then-cued-recall paradigm was used (Rummel et al., 2016). This model allows to compare the contribution of storage and retrieval

processes to memory between different scenarios (survival vs. moving). Implications for theories of the survival processing effect are discussed.

THE ANIMACY EFFECT ON MEMORY: A TEST OF THE RICHNESS-OF-ENCODING ACCOUNT

Gesa Fee Komar[1], Laura Mieth[1], Axel Buchner[1], Raoul Bell[1]; *[1]Department of Experimental Psychology, Heinrich Heine University Düsseldorf, 40225 Düsseldorf, Germany*

Animates are better remembered than inanimates. The cognitive mechanism responsible for the animacy effect is yet to be identified. The richness-of-encoding account implies that animate words stimulate more ideas than inanimate words at encoding. These ideas facilitate recall by serving as retrieval cues. An important implication of the richness-of-encoding account is that manipulations of richness of encoding should affect the animacy effect. In Experiment 1, participants were asked to generate four ideas or one idea in response to animate and inanimate words. In Experiment 2, the one-idea-generation condition was contrasted with an unrestricted-idea-generation condition. In Experiment 3, the unrestricted-idea-generation condition was compared to a distractor-task condition in which idea generation was suppressed. Even though these richness-of-encoding manipulations affected free recall, the animacy effect was not modulated by whether rich encoding was facilitated or not. The results thus provided evidence against the richness-of-encoding account of the animacy effect.

(DIS)ENTANGLING THE ANIMACY EFFECT IN PROSPECTIVE MEMORY

Sara B. Félix[1], Marie Poirier[2], James S. Nairne[3], Josefa N. S. Pandeirada[1] ; *[1]William James Center for Research, Department of Education and Psychology, University of Aveiro, [2]Department of Psychology, School of Health and Psychological Sciences, City University of London, London, UK, [3]Purdue University, West Lafayette, USA*

An adaptive feature of human memory is its future-orientation, which allows one to retrieve information to anticipate future contingencies. Adopting a functionalist perspective, one could ask if memory for future intentions (prospective memory; PM) is sensitive to fitness-related variables, in this case animacy. In a series of studies, we explored if animate (vs. inanimate) targets would confer a PM advantage. Using nonfocal tasks (more attention-demanding), animate targets improved PM performance, as compared to inanimate targets. However, focal tasks (which aid a spontaneous processing of targets) have been failing to replicate such an advantage. The results are discussed in light of the potential proximate mechanisms that have been proposed to explain the animacy effect in retrospective memory (e.g., the attention-capture hypothesis). Importantly, these results suggest that PM (alike the already existent evidence in retrospective memory) is also sensitive to the fitness-relevant dimension of animacy, at least when performing more demanding tasks.

DO ANIMACY AND EMOTIONS GO HAND-BY-HAND ON WORD PROCESSING?

Pilar Ferré[1], Montserrat Comesaña[2], Sara B. Félix[3], Josefa N. S. Pandeirada[3]; *[1]Universitat Rovira i Virgili, Department of Psychology and CRAMC, Tarragona, Spain, [2]Human Cognition Lab, CIPsi, University of Minho, Braga, Portugal, [3]William James Center for Research, Department of Education and Psychology, University of Aveiro*

According to Evolutionary Psychology, fitness-relevant information is processed preferentially by humans. These include emotion-evoking (e.g., threatening and disgusting) and animate stimuli, among others. Research on word processing with deep and shallow orthographies reveals that affective (dimensional and discrete emotions) and semantic variables strongly influence cognition. Similar studies on intermediate-depth languages like European Portuguese (EP) are scarce due to a lack of normative databases, particularly regarding animacy. This work has two goals: i) to characterize 1,034 EP words (taken from the adaptation of the Affective norms for English words for EP; Soares et al.,2012) on five discrete emotions and on animacy; and, ii) to investigate which variables explain more variance on the behavioral measures of lexical decision times and naming data for a subset of these words (n=452; from Soares et al.,2019). These data will further enrich our knowledge regarding the interface between evolutionary-determinants and cognition.

SYMPOSIUM 12

BEYOND THE TRIED AND TRUE: MOVING BILINGUAL LANGUAGE PRODUCTION RESEARCH FORWARD

Organizer: Alex Titus[1]; *[1]Radboud University*

Symposium Abstract: Bilinguals, by definition, are capable of expressing themselves in more than one language, and they typically do so in rich, dynamic, and contextualized environments. But to what extent does the context in which a bilingual interaction takes place influence the cognitive and neural mechanisms involved in bilingual language production? Over the past decades, psychonomic research in this field has commonly made use of

experimental paradigms that ignore much of the linguistic, audiovisual, and multimodal richness of everyday interaction. By having leading experts in the field present a series of state-of-the-art approaches to a range of fundamental questions on the representations and processes residing in the bilingual mind, this symposium will showcase how the field of bilingual language production research is moving forward by incorporating context into the experimental equation. The list of talks below covers a diverse range of topics and approaches, while maintaining a consistent theme, thus promising an appealing and productive discussion. As such, it may also serve as a case study to psychonomic researchers in general that aim to find a balance between experimental control and ecological validity in their work.

THE INFLUENCE OF PRIOR LANGUAGE CONTEXT ON BILINGUAL LANGUAGE PRODUCTION

Mathieu Declerck[1]; *[1]Vrije Universiteit Brussel*

Bilingual language production has typically presumed that participants enter experiments as a clean slate, with regards to immediate prior language influences. In this talk, I would focus on whether, and if so how, prior linguistic contexts can influence subsequent bilingual language production. To this end, data will be discussed from a large variety of different, typically underrepresented, groups of bilinguals. Another aspect that has not received a lot of attention in the bilingual language production literature is sentence production, as the vast majority of research relied on single word production. Whether a sentence context yields different results, relative to a single word context, is an intriguing question that has resulted in diverging outcomes in different studies. This talk will provide unique insight into this discussion by mainly relying on studies that used a description task.

THE EFFECT OF SENTENCE CONTEXT AND CONVERSATION PARTNER ON BILINGUAL LANGUAGE CHOICE AND SWITCHING

Angela de Bruin[1], Veniamin Shiron[1]; *[1]University of York, United Kingdom*

Most cognitive research examining bilingual production has focused on tasks asking bilinguals to name pictures without context. Typically, cues instruct the bilinguals which language to use and when to switch. While these tasks continue to develop our understanding of bilingual production, they do not assess how bilinguals switch languages when they can use them more freely (for example, when talking with another bilingual who speaks the same languages). Furthermore, they do not capture how context might influence language choice and switching. In this talk, I will discuss a study examining how both sentence context and the interlocutor (conversation partner) influence language choice and switching during bilingual production. Bulgarian-English bilinguals named pictures in their language of choice in three conditions: without context, in (predictable or unpredictable) sentence contexts, and in interaction with a bilingual conversation partner. Language choice and switching frequency were influenced by the language use of the conversation partner and by the sentence context respectively. Together, these findings highlight the influence of context on the way bilinguals produce and switch languages.

CONVERSATIONAL LANGUAGE SWITCHING

Kalinka Timmer[1], Zofia Wodniecka[2]; *[1]Warsaw University, Poland, [2]Jagiellonian University, Poland*

To understand the mechanisms that help bilinguals to switch between languages, researchers typically use a language switching paradigm in which pictures are named in the first and second language based on arbitrary cues (e.g., colored lines). It has been found that switching from one language to another incurs a cost. However, in real life, speaking happens in communication - in response to a question - and switching languages seems to occur with seeming ease. We aimed to understand how bilinguals switch between languages within a conversation. By providing cues in the form of auditory questions instead of arbitrary color cues, we simulate real-life conversations while otherwise remaining faithful to the classical switching paradigm. Our results show that this methodology still allows for rigorous investigation of language control mechanisms, while being one step closer to real language use that takes place in a conversational context.

BILINGUAL SWITCHING BETWEEN LANGUAGES AND LISTENERS IN IMMERSIVE VIRTUAL REALITY

Alex Titus[1]; *[1]Radboud University*

Immersive Virtual Reality (VR) technology is increasingly used as a tool for psychological research. In the domain of bilingualism research, however, its use has long remained virtually non-existent. In this talk, I will discuss how immersive VR technology offers unique possibilities to answer fundamental questions about the neurocognitive mechanisms supporting bilingual language production. More than other methods, VR is shown to combine ecological validity, experimental control, and repeatability in experimental settings. Moreover, as a mode of display, it can relatively easily be combined with the collection of EEG, eye tracking, and motion capture data to track online linguistic and communicative processes in the bilingual mind. A series of recent experiments will be discussed that show the added value of VR in

the study of the mechanisms that allow bilinguals to switch between their languages.

SWITCHING BETWEEN LISTENERS DURING BILINGUAL LANGUAGE PRODUCTION

David Peeters[1], Ton Dijkstra[2]; *[1]Tilburg University, [2]Radboud University*

Perhaps the main advantage of being bilingual is the capacity to communicate with interlocutors that have different language backgrounds. In the life of a bilingual, switching interlocutors hence sometimes involves switching languages. We know that the capacity to switch from one language to another is supported by control mechanisms such as task-set reconfiguration. In this talk, I will discuss whether similar neurophysiological mechanisms support bilingual switching between different listeners, within and across languages. Analyses of behavioral and event-related potential data from six virtual reality experiments on Dutch-English bilinguals will show that switching languages consistently comes at a cost over and above the significant cost of switching from one listener to another. Analysis of event-related potentials will be shown to display similar electrophysiological correlates for switching listeners and switching languages. Together, these findings indicate that a possible bilingual advantage in executive control may not be due to the process of switching per se, and pave the way for the study of bilingual language switching in ecologically valid, naturalistic, experimental settings.

Talks – Friday

SYMPOSIA – 09H00 TO 10H40

SYMPOSIUM 13

SLEEP AND THE CONSOLIDATION AND UPDATING OF LINGUISTIC KNOWLEDGE

Organizers: Nicolas Dumay[1]; *[1] University of Exeter, UK*

Symposium Abstract: The notion that sleep and memory consolidation play a key role in language learning and processing has been around for at least two decades. This symposium aims to provide an overview of what we know and do not know, identify current directions in the field, and generate new ideas and ways to solve points of contention. D. Titone opens the ball by evaluating memory models in light of the literature on word acquisition in the native and non-native language. She also shows how prior knowledge and word properties together determine post-sleep memory. A.G. Samuel looks at the persistence of activation in lexical and sublexical representations, and whether sleep has an impact on these long-lasting by-products of perception. N. Dumay examines the influence of sleep on subphonemic mismatch effects in the visual-world paradigm and explores the idea that these index both sublexical plasticity and lexical learning. A. Takashima and C. Ekerdt look at the brain structures underpinning systems-consolidation of spoken words, from a developmental perspective. Finally, G. Gaskell reports on semantic priming and sentence memory experiments and argues that sleep plays a role also in supporting the maintenance and updating of linguistic knowledge.

VIEWING GENERAL MODELS OF MEMORY THROUGH THE LENS OF FIRST AND SECOND LANGUAGE NOVEL WORD LEARNING IN ADULTS

Debra Titone[1], Pauline Palma[1]; *[1]McGill University, Canada*

One of the tightropes we cognitively face is to rapidly learn and consolidate new information into memory, in a manner that enriches but does not completely disrupt what we already know. Indeed, this is exactly the situation faced by multilingual people in their acquisition and ongoing use of multiple languages – e.g., how do we acquire regular use of second language (L2) word representations without losing accessibility to first language (L1) word representations? In this talk, following Palma and Titone (2021, PB&R), we critically evaluate memory consolidation models and past work through the lens of novel L1 and L2 word learning in adults. We then review our work suggesting that the degree of prior L2 knowledge as well as the lexical characteristics of novel words jointly impact memory after a period of sleep (e.g., Palma et al., 2022, Language Learning). Taken together, we assert that viewing memory phenomena through the lens of multilingualism is a relatively untapped resource for advancing general models of memory.

HOW ACTIVE ARE SUBLEXICAL AND LEXICAL REPRESENTATIONS, 12 HOURS AFTER THEY HAVE BEEN USED TO UNDERSTAND SPEECH?

Arthur G. Samuel[1], Nicolas Dumay[2]; *[1]Basque Center on Cognition, Brain and Language, Spain; IKERBASQUE, Basque Foundation for Science; Stony Brook University, USA, [2]University of Exeter, UK*

During speech comprehension, listeners activate both lexical and sublexical representations. Sumner and Samuel (JEP:LMC, 2007) demonstrated that 15-20 minutes after such activation, perception of a nonword was facilitated by having heard a similar nonword

(e.g., jub-jup), but was inhibited by having heard a similar word (e.g., job-jop). This pattern demonstrates enduring activation of both lexical and sublexical information for 15-20 minutes. Here, we test for enduring activation after a 12-hour delay, either with sleep (PM-AM) or without sleep (AM-PM) during the delay. The lexical interference effect was robust after 12 hours, with or without sleep. The sublexical facilitation effect was not evident after 12 hours without sleep. After only three incidental exposures to a nonword, sleep appears to consolidate the item sufficiently to shift its later impact to a word-like inhibitory effect. Our results support longer-lasting residual activation of both lexical and sublexical representations than is assumed in existing speech recognition models. The pattern parallels recent findings for enduring activation of semantic interpretations of words with multiple possible meanings (e.g., Gaskell, Cairney, & Rodd, 2019; Cognition).

THE INTERACTION OF LANGUAGE AND SLEEP: WHERE WILL IT END?

Gareth Gaskell[1]; [1]*University of York, UK*

There is now a substantial body of evidence relating to sleep's involvement in language learning, for example in the case of the consolidation of novel words. However, less attention has been focused on how sleep might be relevant for the broader process of language comprehension in which none of the lexical elements are unfamiliar. Here, I will argue that sleep still has a subtle role to play in supporting the maintenance of discourse knowledge and the updating of lexical knowledge. In its strongest form, the account proposes that every sentence comprehension episode is the basis of a new associative memory that can then be consolidated over sleep if it is not first lost through interference. These episodic memories can then influence subsequent linguistic experience, alongside more crystallised linguistic knowledge. The episodic context account will be described in relation to recent studies from our lab using (1) word-meaning priming and (2) sentence memory

L2 WORD LEARNING IN CHILDREN, FROM A NEUROCOGNITIVE PERSPECTIVE

Atsuko Takashima[1], Clara Ekerdt[1], Willeke Menks[2], Guillén Fernández[3], James McQueen[2], Gabriele Janzen[4]; [1]*Donders Institute for Brain, Cognition and Behaviour, Radboud University, The Netherlands,* [2]*Donders Institute for Brain, Cognition and Behaviour, Radboud University and Max Planck Institute for Psycholinguistics, The Netherlands,* [3]*Donders Institute for Brain, Cognition and Behaviour, Radboud University Medical Centre, The Netherlands,* [4]*Donders Institute for Brain, Cognition and Behavioural Science Institute, Radboud University, The Netherlands*

Memory consolidation of novel words in adults recruits the hippocampus as well as neocortical regions, especially the left posterior middle temporal lobe, with a shift from the former to the latter with consolidation. Is this, however, the case in the developmental sample where the brain is still under maturation? In this study, we measured brain activation pattern and connectivity measures of 48 Dutch children in the age range 8 to 10 years (Young group) and 14 to 16 years (Teens group) to determine if they show a similar neural pattern as the adults. Our participants learned 30 novel words and were tested in the MRI scanner on the same day and again one week later. There was a slight decrease in the right hippocampal activation after one week of consolidation. However, we did not observe an increase in neocortical regions with consolidation. Interestingly there was a difference in the activation pattern for successful retrieval between the Young and the Teens. The white matter connectivity findings seeded from activity difference between the two groups also revealed a differential connectivity profile. Learning of novel words may be subserved by different structures of the brain during development.

tasks across intervals spanning between 20 minutes and 24 hours.

SYMPOSIUM 14

APPLYING COMPUTATIONAL METHODS IN READING AND VISUAL WORD RECOGNITION RESEARCH

Organizers: Jana Hasenäcker[1], Benjamin Gagl[2]; [1]*University of Erfurt, Germany,* [2]*University of Cologne, Germany*

Symposium Abstract: Recently, computational methods have gained much attention for predicting, simulating, and understanding human behavior. Reading research has traditionally capitalized on experimental approaches but is increasingly complemented by applying mathematical and computational methods developed in computer science. In this symposium, the five presentations combined experimental and computational methods to gain new insights into reading and visual word recognition processes. The talks encompass examples as diverse as orthographic networks to predict word reading performance across development, distributional semantics to explain pseudoword priming, language models to account for eye movement measures, combining computational modeling and machine learning to enhance effects in reading training, and test-retest reliability to investigate individual differences in sentence reading. By showcasing these possibilities

for integrating computational and experimental methods, we want to stimulate reading researchers to explore novel possibilities and combinations to increase our understanding of cognitions in reading.

A NETWORK SCIENCE APPROACH TO ORTHOGRAPHIC NEIGHBORHOOD DYNAMICS AND LEXICAL TUNING IN READING DEVELOPMENT

Jana Hasenäcker[1], Sascha Schroeder[2]; *[1]University of Erfurt, Germany, [2]University of Göttingen, Germany*

Psycholinguistic experiments have established that the speed and ease with which skilled adult readers identify written words is influenced by the number of orthographic neighbors. However, children learning to read do not come equipped with complete orthographic lexicons, including all neighbors, but grow their lexicons over the years. Theories of reading development, i.e. the Lexical Tuning Hypothesis, explicitly state that the growth of the orthographic lexicon results in changes in visual word processing.
To quantify changes in the growing lexicon, we employed graph theory to derive measures (degree, clustering coefficient, closeness centrality) from simulated age-stratified orthographic networks. We then used these measures to predict lexical decision and naming data of grade 1-6 children from the Developmental Lexicon Project. The network measures explained additional variance in response times and accuracies, but the exact effects differed across tasks and grades. The study shows that the overall structure of the orthographic lexicon, not only direct orthographic neighbors, impacts visual word processing and it illustrates how the application of network science to psycholinguistic data and questions can offer new insights.

LANGUAGE MODELS EXPLAIN WORD READING TIMES BETTER THAN EMPIRICAL PREDICTABILITY

Markus J. Hofmann[1], Lars Kuchinke[2], Ralf Radach[1]; *[1]University of Wuppertal, Germany, [2]International Psychoanalytic University Berlin*

While word predictability from sentence context is typically captured by cloze completion probability (CCP), language models provide computationally explicit explanations for memory consolidation and retrieval. We compared CCP with n-gram, topics and recurrent neural network (RNN) models to predict single fixation durations, gaze durations and total viewing times in an English and a German eye tracking sample. Linear item-level analyses revealed greater correlations of all language models with all eye-movement measures than CCP. When examining non-linear relations between the different types of predictability and reading times, n-gram and RNN probabilities of the present word more consistently predicted reading performance than topic models or CCP. For the effects of last-word probability on current-word viewing times, we obtained the best results with n-gram models, suggesting that such count-based models best capture processes still underway when the eyes move on to the subsequent word. For next-word probabilities, prediction-trained RNN models performed best for single-fixation durations. We discuss differences in the consolidation mechanisms of these models as reasons for their impact on differential cognitive processes.

THE MEANING OF WUG: HOW TO CAPTURE SEMANTIC EFFECTS IN PSEUDOWORD READING

Marco Marelli[1]; *[1]University of Milano-Bicocca*

Language is traditionally considered an arbitrary system, in which there are no principled associations between linguistic signs and meanings. However, recent evidence points to how linguistic systematicity might have been largely underestimated, and reliable associations between form and meaning might play a foundational role in language processing. Moving from these premises, in this talk I will show how unfamiliar letter strings can elicit semantic activation, and how this, in turn, affects reading. In order to computationally model meanings I will build from the assumption that semantic representations can be modelled as vectors in a high-dimensional space by training dedicated systems on large collections of text. Such an approach, namely distributional semantics, is particularly effective in modelling semantic memory, but typically focuses on words only. Here I will exploit recent computational developments to estimate the meaning evoked by sublexical orthographic chunks and, hence, by the pseudowords embedding them. In a series of experiments I will show how such an approach can reveal substantial semantic effects in pseudoword reading.

THE LEXICAL CATEGORIZATION TRAINING: USING NEURO-COGNITIVE MODELS AND MACHINE LEARNING TO INCREASE THE READING SPEED OF LANGUAGE LEARNERS

Klara Gregorová[1], Benjamin Gagl[2]; *[1]University of Würzburg, Germany, [2]University of Cologne, Germany*

Efficient reading is essential for societal participation. Here we propose an individualized diagnostics framework to focus training efforts on potential intervention responders. To introduce the framework, we (i) motivated a training procedure based on the Lexical Categorization Model (LCM), which describes pre-lexical orthographic processing in the left-ventral occipital cortex. 76 German language learners trained their lexical categorization abilities using lexical decisions with feedback. Reading

performance change indicated increased skill after training in most language learners. Next, we (ii) estimated each reader's lexical categorization capabilities. Finally, we (iii) explored numerous machine learning pipelines to find the optimal prediction of the individual benefit from the LCM training. The best-performing pipeline increased the group training effect from 23% to 43% reading speed. Interestingly, the selectivity of the procedure strongly depended on the LCM predictor. Thus, training lexical categorization can increase reading skills, and accurate computational descriptions of brain functions combined with machine learning can be a powerful combination for individualized reading interventions.

MEASUREMENT RELIABILITY OF INDIVIDUAL DIFFERENCES IN SENTENCE PROCESSING

Lena A. Jäger[1], *[1]University of Zurich*

Psycholinguistic theories generally assume similar cognitive mechanisms across different speakers. However, evidence has accumulated indicating that individual differences affect processing. Methodologically, the first step for a principled investigation of individual differences in sentence processing is to establish their test-retest measurement reliability, that is, the correlation of subject-level effects across multiple experimental sessions. We can't take this test-retest and cross-methodological measurement reliability as a given because of the so-called reliability paradox which states that test-retest measurement reliability at the individual level is necessarily lower for manipulations with high between-subjects reliability, that is, replicability at the group level (Hedge, 2017). However, it is likely that precisely effects with high replicability at the group level constitute the set of well-established psycholinguistic phenomena which build the foundation of sentence processing theories. I will present ongoing work in which we assess the test-retest measurement reliability of individual differences in a range of theoretically relevant phenomena in a range of different languages.

SYMPOSIUM 15

STATISTICAL MODELING OF TRAINING-RELATED COGNITIVE CHANGES

Organizers: Tanja Könen[1], Julia Karbach[2]; *[1]RWTH Aachen University, Germany, [2]University of Kaiserslautern-Landau (RPTU), Germany*

From a theoretical, methodological, and applied perspective, interventions are an informative study design. Cognitive psychology has long acknowledged the importance to not only evaluate whether and how training programs work on average, but also understand which individual, situational, and methodological characteristics make individual outcomes more likely. To advance our understanding of these factors, this symposium gives an overview of different modeling approaches and strategies with applications from multiple cognitive domains (e.g., executive-functioning, processing-speed, or working-memory training). The talks demonstrate (1) latent change modeling to analyze predictors of individual differences in change, (2) multilevel modeling and latent growth curve modeling to analyze the level of single training sessions, (3) diffusion modeling to gain insight into the underlying cognitive processes, and (4) machine learning to predict learning as a function of early training performance. Taken together, these approaches provide valuable correlative information about possible mechanisms moderating (e.g., compensation effects) or fostering training outcomes (e.g., scheduling protocols).

DAILY EFFECTS IN WORKING-MEMORY TRAINING IN ELEMENTARY SCHOOL CHILDREN

Tanja Könen[1]; *[1]RWTH Aachen University, Germany*

Research on working-memory (WM) training provided mixed evidence for training-related changes. Investigating effects on the level of single training sessions might help to identify possible day-to-day mechanisms fostering or reducing training outcomes (e.g., the role of daily well-being during training). In our study, 97 elementary school children (mean age=8.6, SD=0.6) performed either an adaptive or non-adaptive WM training (i.e. training or active control group) of 16 sessions over six weeks in a pretest–posttest–follow-up design. Analyses revealed a significant training effect (i.e. higher WM span) in the training group compared to the active control group, which was still reliable after three months. Transfer effects to one out of two untrained WM tasks and one out of two untrained flexibility tasks provided evidence for both domain-specific and domain-general processes. Multilevel modeling of within-person (single training sessions) and between-person effects in the training group revealed a relation of children's daily WM performance and well-being. Overall, the findings are in line with the Capacity–Efficiency Model (von Bastian et al., 2022) and the Cognitive Routine Framework (Gathercole et al., 2019).

TRAINING EXECUTIVE FUNCTIONS IN CHILDREN FROM DISADVANTAGED BACKGROUNDS: A LATENT CHANGE SCORE APPROACH

Verena E. Johann[1], Maki Kubota[2], Candice C. Morey[3], Nicolas Chevalier[4], Julia Karbach[1]; *[1]University of Kaiserslautern-Landau (RPTU), Germany, [2]UiT The Arctic University of Norway, [3]Cardiff University, United Kingdom, [4]University of Edinburgh, United Kingdom*

Several studies indicate that executive functions (EF) such as working memory (WM), inhibition, or flexibility can be improved by training. However, training data was typically analyzed by means of analyses of variance to assess transfer effects but these statistical approaches are limited by different issues such as the mostly complex error structure of longitudinal data. Thus, we aimed at evaluating the effects of an EF training as well as potential predictors of training success such as motivation using latent change score models. In our study, 155 children (mean age = 8.73 years) from low SES environments were randomized into an EF training group or an active control group. They underwent a pretest followed by 16 training sessions and a posttest. We found that the EF training group improved flexibility and WM to a greater extent than the control group. Moreover, facets of intrinsic motivation and metacognitive awareness significantly influenced the development of EF during training. We conclude that EF training might be beneficial for enhancing flexibility and WM in children from disadvantaged backgrounds and that factors such as motivation contribute to explain inconsistent results regarding transfer effects.

THE IMPACT OF COGNITIVE TRAINING ON PERCEPTUAL DECISION-MAKING: A DIFFUSION MODEL APPROACH

Alice Reinhartz[1], Tilo Strobach[1], Thomas Jacobsen[2], Claudia C. von Bastian[3]; *[1]Medical School Hamburg, Germany, [2]Helmut Schmidt University, Germany, [3]University of Sheffield, UK*

The goal of cognitive training is to enhance existing cognitive performance or counteract its decline. To maximize the effectiveness of training it is crucial to better understand why it can be effective. Therefore, in this study, we investigated the cognitive changes induced during processing speed training using a drift-diffusion model to gain insight into the cognitive processes involved when training simple perceptual decision-making tasks. Main parameters of the drift-diffusion model are speed of evidence accumulation (drift rate), response strategies and amount of evidence required for a decision (boundary separation), as well as stimulus encoding and response execution (non-decision time). We applied this model to data of a previously published training study (von Bastian & Oberauer, 2013) in which 30 participants were asked to complete 20 training sessions over the course of four weeks. All participants trained three perceptual decision-making tasks: a numerical-, a figural- and a face-matching task. The results indicate changes in boundary separation early on in training and improvements in drift rate throughout the 20 sessions, suggesting that the efficiency of cognitive processing can be enhanced through training.

AUTONOMY IN TRAINING SCHEDULES IS BENEFICIAL FOR ON-TASK LEARNING: IMPLICATIONS FOR THE DISTRIBUTION OF COGNITIVE TRAINING SESSIONS

Domenico Tullo[1], John M. Cote[2], Yi Feng[2], Anja Pahor[3], Yue J. He4, Aaron R. Seitz[1], Susanne M. Jaeggi[1]; *[1]Northeastern University, USA, [2]University of California, Irvine, USA, [3]University of Maribor, Slovenia, [4]University of California, Riverside Brain Game Center, USA*

We assessed whether participants' cognitive training habits and regimens predicted on-task learning; specifically, (a) spacing, or the average time between training sessions and (b) consistency, or the variance in time between training sessions. Adults (N=196) completed 20 online cognitive training sessions using an n-back task. Performance was defined as the session's mean n-level, or n items held in working memory. Data were analyzed via latent growth curve modeling, which demonstrated that training data fit a logarithmic trend. Smaller gaps between sessions and greater variance in time between sessions were associated with increased on-task learning. These results have implications for scheduling protocols suggesting that (a) shorter times between training sessions and (b) flexibility in scheduled session times, are beneficial for learning. As such, decreased intervals between sessions reflect benefits demonstrated in skill learning. Autonomy in training may reduce time burden and thus, increase motivation for users to engage at their leisure. The role of individual differences in spacing and consistency in cognitive training, which may further emphasize the importance of tailored training schedule protocols, will be discussed.

A MACHINE LEARNING APPROACH TO PREDICT COGNITIVE TRAINING TRAJECTORIES

Yi Feng[1], Martin Buschkuehl[2], Susanne M. Jaeggi[3]; *[1]University of California, Irvine, USA, [2]MIND Research Institute, USA, [3]Northeastern University, USA*

The benefits of cognitive training vary from person to person. Few studies have focused on the inter-individual variability during training, even though this variability has shown to contribute to the differences in training outcome. Furthermore, individual differences in initial performance might influence later learning trajectories. In our study, 4th and 5th graders completed a multi-week intervention that combined executive function and math fact fluency training. Investigating multivariate and non-linear relationships, we implement machine learning models to capture individual differences across continuous time points. Specifically, we examine the underlying patterns of learning trajectories, and predict learning as a function of individuals' performance in early training sessions.

We also use cluster analysis to divide participants' training trajectories into distinct categories. Three research questions will be addressed and discussed: 1) How do participants differ in their learning trajectories? 2) To what extent and how does initial performance predict the subsequent learning trajectories?, and 3) How many and which of the early sessions are most predictive for subsequent learning?

SYMPOSIUM 16

FEATURES, OBJECTS, AND FEATURE BINDING IN WORKING MEMORY

Organizers: Laura-Isabelle Klatt[1]; *[1]Leibniz Research Centre for Working Environment and Human Factors*

Symposium Abstract: At the core of the endeavor to understand the structure of working memory (WM) representations lies the question how separate features, constituting an object, are bound together to allow for a coherent object representation. Moreover, this is tightly linked to the question whether individual features or bound objects determine the capacity limits of working memory. This symposium highlights behavioral, computational, and neural evidence that elucidates how features, objects and feature conjunctions are represented in WM. Suaad Said Al Hadhrami and Paul Bays will talk about the role of location and time in feature binding, respectively. Hiu Wah Cheung will discuss to what extend the automaticity of feature binding depends on whether the to-be-bound information is intrinsic (belonging to the object) or extrinsic (contextual). Further, Laura-Isabelle Klatt will show how cross-modal feature conjunctions are encoded and maintained in WM; thus, providing a multisensory perspective on the binding problem. Finally, Viola Störmer will explore the role of meaningfulness in visual WM, demonstrating that the capacity for simple features increases when those features belong to real-world objects.

ROLE OF LOCATION IN BINDING FEATURES IN VISUAL WORKING MEMORY

Suaad Said Al Hadhrami[1], Lea Bartsch[1], Klaus Oberauer[1]; *[1]Cognitive Psychology Unit, University of Zurich*

The nature of multi-featured object representations in visual working memory (VWM) remains unclear. Here, we aim to test two competing hypotheses. One is that all object features are integrated into an object file. The other is that locations are critical for maintaining the binding of visual features of an object in VWM. We developed a hybrid paradigm that bridges the VWM and object-file literatures. A set of multi-featured objects were presented simultaneously, followed by a retention interval in which placeholders either moved or stayed. Participants were then given one feature as a cue and prompted to report the other two features. Applying multinomial process tree (MPT) models to evaluate these competing accounts of the memory representations, we found that the data are better explained by the object file framework rather than the spatial binding hypothesis. The current findings suggest that motion does not disrupt memory for objects (i.e., maintenance of bindings between nonspatial features, and of these features with locations, are possible regardless of the objects' motion).

ROLE OF TIME IN BINDING FEATURES IN VISUAL WORKING MEMORY

Paul Bays[1], Sebastian Schneegans[1], Jessica M V McMaster[1]; *[1]Department of Psychology, University of Cambridge*

Previous research has supported a privileged role for location in binding, indicating that memory for an object's position in space acts as the key to accessing its non-spatial features. However, humans are able to correctly recall feature conjunctions of objects that occupy the same location at different times. In this talk I will review previous studies comparing memory for simultaneously and sequentially presented stimuli, and present evidence from our lab that temporal order can occupy a similar privileged role as spatial location in feature binding. I will show results from an experiment in which spatial and temporal cues provide competing routes to recall, and discuss possible computational and neurophysiological bases for binding by time as well as space.

THE AUTOMATICITY OF FEATURE BINDING IN WORKING MEMORY

Hiu Wah Cheung[1], Nicolas Geeraert[1], Vanessa M. Loaiza[1]; *[1]Department of Psychology, University of Essex*

The automaticity of feature binding (e.g., integrating color and shape into coherent objects) may depend on whether the to-be-bound information is intrinsic (belonging to) or extrinsic (contextual). Furthermore, extrinsic binding may be more automatic for Eastern participants who process information more holistically than Westerners. This pre-registered study aims to (1) confirm that intrinsic is more automatic than extrinsic binding by replicating the results of Experiment 1 in Ecker and colleagues (2013); (2) determine whether the cultural differences proposed by the Analytic and Holistic Framework impact feature binding in working memory (WM). Accordingly, Easterners and Westerners will complete a visual WM task wherein colors are integrated within (i.e., intrinsic) or as backgrounds (i.e., extrinsic) of to-be-remembered shapes. Both cultural groups will show similarly greater hits for intrinsic than extrinsic stimuli overall, confirming that intrinsic binding is relatively more automatic. Furthermore, Easterners will show greater hits for extrinsic stimuli than Westerners if extrinsic binding is more

automatic for Easterners. These results will thus determine two factors that may moderate the automaticity of feature binding.

ENCODING AND STORAGE OF CROSS-MODAL FEATURES IN WORKING MEMORY: A MULTISENSORY PERSPECTIVE ON THE BINDING PROBLEM

Laura-Isabelle Klatt[1], Ceren Arslan[1], Stephan Getzmann[1], Edmund Wascher[1], Daniel Schneider[2]; *[1]Leibniz Research Centre for Working Environment and Human Factors, Dortmund, [2]Leibniz Research Centre for Working Environment and Human Factors, Dortmund, Germany*

Object representations are often informed by input from multiple senses. Depending on task and stimulus type, the integration of such cross-modal features can rely on top-down attention or occur pre-attentively. In this talk, I will present behavioral and neural evidence showing how this interplay between attention and multisensory integration affects the representation of cross-modal features in working memory. Specifically, I will show results from a multisensory delayed-match-to-sample task. Participants were always presented with audio-visual memory items but maintained (a) only auditory or (b) visual features, or (c) their conjunction. At recall, visual and auditory probe features could be congruent or incongruent. Preliminary behavioral results show that, when focusing on one modality, response times are not affected by probe congruency. Conversely, accuracy decreases for incongruent probes across all conditions, suggesting that task-irrelevant features are still represented to some degree in the visual and auditory condition. Ongoing EEG data analysis aims at tracking multisensory integration and unraveling whether attentional modulations are reflected in the (dis-)engagement of sensory regions.

THE ROLE OF MEANINGFULNESS IN VISUAL WORKING MEMORY: REAL-WORLD OBJECTS PROVIDE AN EFFECTIVE SCAFFOLD FOR REMEMBERING SIMPLE VISUAL FEATURES

Viola Störmer[1]; *[1]Department of Psychological and Brain Sciences, Dartmouth College*

Decades of research have shown that the ability to hold information in visual working memory is limited, and several influential theories have postulated that this limit is fixed to a certain number of objects or a fixed resource pool. Recent studies have challenged this view by demonstrating that the capacity to remember meaningful stimuli, such as images of real-world objects, is increased relative to simple features. In this talk, I will review behavioral and neural evidence further exploring the role of meaningfulness in visual working memory. In particular, I will discuss how different encoding strategies can modulate this meaningfulness benefit, and present novel data showing that real-world objects do not only increase capacity by allowing the extraction of additional relevant features, but increase working memory capacity for basic visual features that are not meaningful themselves, such as color, by acting as a particularly strong memory hook. Together, these results suggest that meaningful stimuli are particularly effective in unlocking additional working memory capacity.

SYMPOSIUM 17

BILINGUAL LEXICO-SYNTACTIC PROCESSING: RECENT UPDATES ON LEXICAL ACCESS, CODE-SWITCHING AND LANGUAGE ATTRITION

Organizers: Montserrat Comesaña[1], Cristina Flores[2]; *[1]Psychology Research Center (CIPsi), University of Minho, Portugal, [2] Centro de Estudos Humanísticos (CEHUM), School of Letters, Arts and Human Sciences (ELACH), University of Minho, Portugal*

Symposium Abstract: The way bilinguals access abstract lexical and syntactic representations of both languages and how this access changes across the lifespan has been focus of intense research since the last four decades (Bialystok et al. 2008). The aim is not only to inform and refine theories and models of bilingual language processing and representation but also to identify specific processes that first and second or foreign language teaching should focus on to improve language proficiency or to prevent loss of language competences. In this symposium, we present current studies on this issue, which have focused on different levels of language representation (lexical and morpho-syntactic). Using fine and coarse-grained analyses, the studies investigated lexical access and modelling, code-switching or language attrition, considering the impact of linguistic and non-linguistic factors on language processing in adult bilingual speakers. The aim of this symposium is to contribute to our understanding of bilingual language development by connecting results and discuss recent updates from studies on natural and instructed second language acquisition, code-switching in highly proficient speakers and language attrition in returnee heritage speakers.

WHEN ANOTHER LANGUAGE MEANS ANOTHER GENDER: HOW ARE THE MASCULINE AND FEMININE VALUES ENCODED DURING BILINGUAL LEXICAL ACCESS?

Ana Rita Sá-Leite[1]; *[1]University of Santiago de Compostela*

There is no semantically driven reason for a noun to be considered masculine or feminine. This arbitrariness creates situations in which the gender value of a given noun varies from one language to

another (i.e., heterogeneric nouns such as "tree", which is masculine in German ["Baum"], but feminine in Portuguese ["árvore"]). Dozens of works have studied this phenomenon by using naming and translation tasks. Gender congruency effects are consistently obtained and thus heterogeneric nouns show higher response times in comparison to homogeneric nouns. However, until recently, these studies were restricted to late learners and tested exclusively the effect of the first language (L1) over the second (L2), without considering language proficiency. Researchers concluded that bilinguals share a gender system in which situations of facilitation and interference arise during gender encoding in the L2. Yet, recent studies have shown a more complex picture in which the bilingual gender system is quite dynamic, and hence the interaction between gender nodes during lexical access can go both ways (L1 to L2, L2 to L1) and seems to change according to variations on the language balance (i.e., the difference in proficiency between both languages).

THE HOW AND THE WHEN OF SEMANTIC ILLUSIONS IN FIRST AND SECOND LANGUAGES

Montserrat Comesaña[1], Ana Isabel Fernandes[2], Cristina Flores[3], Juliana Novo[4], Ana María Bautista[5], Juan Haro[6], Pilar Ferré[6]; *[1]CIPsi, University of Minho, Portugal, [2]University of Minho, Portugal, [3] Centro de Estudos Humanísticos (CEHUM), School of Letters, Arts and Human Sciences (ELACH), University of Minho, Portugal, [4]University of Porto, Portugal, [5]Basque Center on Cognition, Brain and Language, Spain, [6]University of Rovira i Virgili, Spain*

The nature and processing of semantic illusions –SI- (when speakers fail to notice an anomalous word in a sentence that is contextually perfectly aligned with the world knowledge), have been largely studied during first language comprehension. Although this issue is not free of controversy the findings seem to sustain The Node Structure Theory (Shafto & MacKay, 2000), according to which SI is a phonological and/or semantic priming effect which occurs due to phonological and/or semantic links existing between the correct and the anomalous word. However, the question as to whether the same underlying mechanisms can be found in bilinguals regardless of the age of language acquisition and the language dominance remains unexplored. The aim of this study was to examine this issue on sequential European Portuguese-German and early-balanced Spanish-Catalan bilinguals (and their respective control groups) using a self-paced reading paradigm. The sentences' language and the type of target word used (correct vs. anomalous) were manipulated. Results showed a similar pattern in early-balanced bilinguals but not in sequential bilinguals where the percentage of SI varied as a function of language dominance.

CODE-SWITCHING IN NEURODEVELOPMENTAL CONDITIONS: A SCOPING REVIEW

Carmen Parafita[1], Drasko Kašćelan[2]; *[1]University of Leiden, [2]University of Leeds*

There have often been concerns about bilingualism and language mixing in neurodivergent populations. While research in neurotypical bilinguals has shown that code-switching is not a sign of confusion but rather that it reflects the use of available resources at the time of speaking, no comprehensive overview of code-switching has been done in neurodivergent individuals. In this scoping review, we aim to: (i) identify neurodevelopmental conditions in which code-switching has been investigated; (ii) identify approaches used to explore code-switching in this population; (iii) describe the demographic and bilingualism-related characteristics of investigated populations; (iv) outline any comparisons in code-switching practices between neurodivergent and neurotypical bilinguals; (v) outline attitudes towards code-switching in the investigated population. To address these objectives, we followed the scoping review protocol outlined in Kašćelan and Parafita Couto (2022). Our findings show that this topic has been scarcely investigated and that work on code-switching across neurodevelopmental conditions requires immediate attention.

ON DOMINANCE SHIFT, LANGUAGE ATTRITION AND LANGUAGE REACTIVATION IN BILINGUAL RETURNEES

Cristina Flores[1], Chao Zhou[2], Carina Eira[1]; *[1]karCentro de Estudos Humanísticos (CEHUM), School of Letters, Arts and Human Sciences (ELACH), University of Minho, Portugal, [2]University of Lisbon, Portugal*

This study analyzes the degree of language balance in three groups of bilingual speakers of Portuguese and German: a group of Portuguese heritage speakers (HSs) living in Germany, another who returned to Portugal, and Portuguese late learners of German L2. Based on the DIALANG vocabulary size placement test, applied in German and in Portuguese, and on extralinguistic variables extracted from a background questionnaire, the results confirm high degrees of unbalanced language dominance favoring the societal language (SL) in HSs without the experience of return, and a leveling of language dominance in returnees. Language balance in returnees is the consequence of some loss of proficiency in the former SL (German) and reactivation of the heritage language (Portuguese). Current relative amount of contact with the two languages is correlated with language dominance only in the HSs and the late L2 speaker groups, whereas age of return and length of residence in Portugal explain language dominance in returnees.

Self-reported proficiency is also predictive of language dominance and may be taken as complementary indicator.

SYMPOSIUM 18

MAPPING MULTIPLE DIMENSIONS IN THE HUMAN NEOCORTEX

Organizers: Zohar Tal[1]; [1]*Proaction Lab, CINEICC, Faculty of Psychology and Educational Sciences, University of Coimbra, Portugal*

Symposium Abstract: Our ability to process the rich sensory information we encounter during our everyday lives relies on an effective organization of these inputs at different levels of processing hierarchy. Organizing information in multidimensional spaces is a rather widespread strategy within the brain, for example, in sensory cortices which show topographical mapping of neural preferences along particular sensory dimensions. Recent works have revealed that the organization of more abstract information beyond sensory cortices also follows multidimensionality, as can be found for example in the superimposed mapping of different cognitive dimensions such as numerosity, object size and time duration. In this symposium, we will discuss the fundamental role of multidimensional mapping in the human brain, by presenting a variety of behavioural and neuronal studies focusing on different aspects of mapping multiple dimensions. These include the facilitation of solving sensory ambiguity, cross-modal mapping in the sensory-deprived brain, organization of object knowledge at the behavioural and neuronal levels, with topographically organized mapping of different dimensions of object related information.

THE NEURAL ORGANIZATION OF VISUAL INFORMATION IN THE AUDITORY CORTEX OF THE CONGENITALLY DEAF

Zohar Tal[1]; [1]*Proaction Lab, CINEICC, Faculty of Psychology and Educational Sciences, University of Coimbra, Portugal*

In congenital deafness, sensory-deprived cortex can be recruited to represent sensory information belonging to other modalities, a process known as cross-modal plasticity. Previous studies have indicated that the auditory cortex of congenitally deaf is recruited during visual tasks, but it is not clear to what extent these cross-modal responses represent low-level visual spatial information or map the visual field. We addressed this question in an fMRI case-study, aiming to map retinotopic features in the auditory cortex. Two congenitally deaf and one hearing participant went through a conventional retinotopy fMRI experiment designed to map the visual system. Using population receptive field (pRF) modelling, we revealed retinotopic-related responses in the auditory cortex of the deaf, but not in the hearing. These responses, that were mostly lateralized to the right hemisphere, represented the contralateral visual field, and were characterized by large receptive fields, centred to near foveal areas. Interestingly, these responses to visual stimuli predominantly reflected negative BOLD signals in the auditory cortex of the deaf, suggesting that visual information might be represented through cross-modal deactivation signals.

MODELLING EYE-POSITION DEPENDENT GAIN FIELDS AT 7T

Alessio Fracasso[1]; [1]*School of Neuroscience and Psychology, University of Glasgow, Scotland*

The ability to move has introduced animals with the problem of sensory ambiguity: the position of an external stimulus could change over time because the stimulus moved, or because the animal moved its receptors. This ambiguity can be resolved with a change in neural response gain as a function of receptor orientation. Here, we developed an encoding model to capture gain modulation of visual responses in high field (7T) fMRI data. We characterized population eye-position dependent gain fields (pEGF). The information contained in the pEGFs allowed us to reconstruct eye positions over time across the visual hierarchy. We discovered a systematic distribution of pEGF centers: pEGF centers shift from contra- to ipsilateral following pRF eccentricity. Such a topographical organization suggests that signals beyond pure retinotopy are accessible early in the visual hierarchy, providing the potential to solve sensory ambiguity and optimize sensory processing information for functionally relevant behavior.

NEURAL AND BEHAVIOURAL SIGNATURES OF THE MULTIDIMENSIONALITY OF OBJECT PROCESSING

Jorge Almeida[1]; [1]*Proaction Lab, CINEICC, Faculty of Psychology and Educational Sciences, University of Coimbra, Portugal*

Understanding how we recognize everyday objects requires unravelling the variables that govern the way we think about objects and the way in which our representations are organized in the brain. A major hypothesis is that the organization of object knowledge follows key object-related dimensions, analogously to how sensory information is organized in the brain. Here, we present a principled way to explore the multidimensionality of object processing. Specifically, we extracted object-related dimensions from human subjective judgments on a large set of manipulable objects. We demonstrated that the extracted dimensions are: cognitively interpretable – i.e., participants are able to label them; cognitively relevant for object processing – i.e., categorization decisions are guided by these dimensions; and important for the neural organization of knowledge – i.e., they are good predictors of the

neural signals elicited by the presentation of objects. This shows that multidimensionality is a hallmark of the organization of information in the brain.

CONTENTOTOPIC MAPPING: TOPOGRAPHIC ORGANIZATION OF OBJECT MANIPULATION INFORMATION

Stephanie Kristensen[1], *[1]Proaction Lab, CINEICC, Faculty of Psychology and Educational Sciences, University of Coimbra, Portugal*

Our mental representation of knowledge about objects could be organized along multiple dimensions, capturing different properties of the objects. Previously, we have shown that the knowledge about the ways one manipulates an object (for example: grasp-type or force-level applied during object manipulation) explain behavioural similarity judgments. Here, we aimed to study whether these dimensions are represented differently in the brain, and if these representations are topographically organized. In an fMRI study, participants were presented with sequences of object images sorted along two manipulation dimensions. We performed whole-brain population receptive field (pRF) modelling and obtained bilateral topographic maps, in the dorsal and ventral occipital cortex for both dimensions. We identified a linear progression in the preferred dimensional value along the cortical surface, as well as the direction/orientation of these linear changes. Importantly, the two dimensions resulted in different maps, that were consistent across individual participants. Our results show that the neural representation of object-related information is topographically organized in accordance with multidimensionality of objects representational space.

TALKS & BLITZ-TALKS – 12h00 to 13h20

TALKS 13
WRITING

THE WRITTEN LANGUAGE NETWORK FROM PROFICIENCY TO DISABILITY: DATA-DRIVEN EVIDENCE FROM A TRANSDIAGNOSTIC DIMENSIONAL GRAPH MODELLING

Elise Lefèvre[1], Lynne Duncan[2], Abdessadek El Ahmadi[3], Pascale Colé[4], Eddy Cavalli[1]; *[1]Laboratoire d'Etudes des Mécanismes Cognitifs, Université Lumière Lyon 2, [2]Psychology, Dundee University, [3]Laboratoire de Neuroscience Cognitive, Aix-Marseille Université, [4]Laboratoire de Psychologie Cognitive (UMR7290), CNRS & Aix-Marseille Université*

Written abilities are mastered to different proficiency levels by students, with some of the extreme cases being diagnosed with dyslexia. The transdiagnostic framework offer a way of investigating neurodevelopmental disorders as a continuum by leaving out diagnostic information and using instead a data-driven network analysis to explore the complex cognitive network. A total of 199 French-speaking participants (Age in years: range = 15-30; M = 18.61) took part in this study, 104 with dyslexia and 95 without. First, we found that individuals with dyslexia were over-represented at the lower end of the spelling and reading fluency distributions. The distribution of reading comprehension scores did not differ between individuals with dyslexia and typical readers. Second, we take advantage of the network modelling that allow to finely describe the complex organization of the written abilities with phonological and semantic abilities. These results show the relevance of continuous transdiagnostic analyses in the study of reading and writing skills. The modelled network confirms the relationship between phonological skills, reading fluency and spelling and the relationship between semantic skills and reading comprehension.

A LARGE DATABASE FOR TABOO WORDS IN 14 LANGUAGES

Fritz Günther[1], Marco Marelli[2], Simone Sulpizio[2]; *[1]Humboldt-Universität zu Berlin, [2]University of Milano-Bicocca*

Taboo words are a unique linguistic behavior characterizing all linguistic communities, with many different socio-emotional functions. Psychological literature on taboo words furthermore suggests that they are processed in a particular way. Nevertheless, the psychological literature on taboo words is rather scarce, and almost entirely based on English data. Here we present a new taboo word database in 14 languages, coming from 18 labs in 17 countries. The resource contains: a) a list of taboo words in each language, collected in a free generation task, b) word frequencies in this task as well as in written corpora, and c) ratings on prominent lexico-semantic dimensions (valence, arousal, concreteness, age of acquisition, tabooness, and offensiveness). Among other things, we find i) considerable overlap as well as differences in the most common taboo words for each individual dataset, ii) a tendency for the most taboo and offensive words to include slurs and words related to (especially female) sexuality, iii) a clear dissociation between production frequency and written corpus frequency, and iv) a strong tendency for taboo words to be very infrequent in written corpora while scoring very low on valence and very high on arousal.

COGNITIVE MODERATORS OF WRITING-INTERVENTION EFFICACY

Naymé Salas[1], Mariona Pascual[2]; *[1]Universitat Autònoma de Barcelona, [2]Universidade de Lisboa*

Even in highly-effective educational interventions, a non-trivial proportion of students does not show signs of improvement. This study intended to account for cognitive factors that may be partly responsible for non-responders to self-regulated strategy development (SRSD) writing interventions. SRSD has been found to be effective for improving writing skills in various meta-analyses. Our own SRSD intervention data showed that, while it was generally successful, 10-19% of students were non-responsive to treatment. We conducted secondary data analyses on a sample of 408 4th-grade students who had taken part in an SRSD intervention to teach opinion-essay planning. We examined whether pretest levels of key cognitive skills (e.g., IQ, working memory) moderated the impact of the intervention on gains in text quality. Preliminary findings revealed that working memory and verbal short-term memory (but not IQ, inhibition, or processing speed) significantly moderated children's gains in text quality, even after accounting for pretest scores. We discuss theoretical and educational implications. We also propose a novel, data-driven approach that aims to use moderator information to reduce failure rates of educational interventions.

THE INNER STRUCTURE OF THE WORLD'S WRITING SYSTEMS

Daniel Zagar[1], Teng Guo[2]; *[1]University of Lorraine & ATILF (CNRS), [2]ATILF (CNRS) & University of Lorraine*

Writing represents speech. The relationship between them is commonly conceptualized by the association of written symbols with linguistic units such as words, syllables, or phonemes. This mechanism is derived from the process of phonetization (Gelb, 1952), which was invented independently by Sumerians, Chinese, and Maya. It has enabled writing to evolve from logographic to "full" writing, i.e., writing that can represent everything expressed by words. However, this conception has not led to a consensus among grammatologists on the inner structure of writing, leaving questions about the classification of the world's writing systems unanswered. In this study, we present a new conception of the inner structure of writing that considers "the combination of indices" (Boltz, 2000) as a second cognitive mechanism that allowed for the development of full writing alongside phonetization. We demonstrate how all writing systems resulting from the first grammatogenies used both processes to adapt writing to their language. Finally, we discuss how this new conception can inform the way learning to read is modelled.

TALKS 14
COGNITIVE CONTROL I

WITHIN-TRIAL CONFLICT-TRIGGERED ADJUSTMENT OF COGNITIVE CONTROL IN THE COMBINED WORD-WORD INTERFERENCE AND STROOP TASK

Patrycja Kałamała-Ligęza[1], Michał Ociepka[1], Adam Chuderski[1]; *[1]Jagiellonian University in Krakow*

Sequential congruency effects observed in conflict tasks initially suggested conflict-driven adaptation of control, but later were explained by sequential learning and priming mechanisms. To eliminate sequential explanations, we combined in a single conflict task trial the classic Stroop conflict with word-word interference (WWI; two or three different words presented concurrently; e.g., "RED GREEN PINK" in blue ink, as compared to "RED RED RED"). WWI was meant to elicit rapid conflict detection preceding Stroop conflict resolution. In 7 experiments (each $N \approx 80$), the WWI presence substantially decreased the Stroop effect. Additional manipulations suggested that neither perceptual grouping nor response priming could explain the entire WWI effect. Finally, this effect was a function of WWI size (e.g., "RED GREEN RED" vs. "RED GREEN PINK"), suggesting that conflict-triggered adjustment of control is sensitive to the magnitude of preceding conflict. The results suggest that conflict detection is used to probe environmental demands and to adjust control accordingly. However, in line with our previous theoretical model of the Stroop, various factors contribute to the congruency effects, and conflict adaptation is only one of them.

QUALITY OVER QUANTITY: FOCUSING ON HIGH-CONFLICT TRIALS TO IMPROVE THE RELIABILITY AND VALIDITY OF ATTENTIONAL CONTROL MEASURES

Luca Moretti[1], Iring Koch[2], Claudia von Bastian[3]; *[1]RWTH Aachen, [2]RWTH AAchen, [3]University of Sheffield*

Conflict tasks such as the Stroop and the Simon are commonly employed to measure attentional control. Recent studies however, have consistently failed to find meaningful correlations between performance in these paradigms. While such findings may question the construct validity of attentional control measures, some authors have argued that the observed low correlations may also result from measurement error, as congruency effects typically display poor reliability in conflict tasks. In the present study we thus sought to improve the psychometric properties of the congruency effect in a spatial Stroop and a Simon task (N = 195), with the idea that more reliable attentional control measures should correlate across paradigms. Basing on well-replicated findings from experimental research, we argue that response conflict, and thus the need for attentional control, is weak in slow responses and following incongruent trials. We thus predicted that excluding these trials from analyses should improve the psychometric properties of the congruency effect. After controlling for these factors, not only we

found excellent split-half reliability for the congruency effect in both paradigms, but we could also show robust between-task correlations.

EXPLAINING DUAL-ACTION BENEFITS: INHIBITORY CONTROL AND REDUNDANCY GAINS AS COMPLEMENTARY MECHANISMS

Tim Raettig[1], Lynn Huestegge[1]; *[1]University of Wuerzburg*

Executing two actions at the same time usually results in performance costs. However, recent studies have also reported dual-action benefits: under certain circumstances, doing two things at once can yield *improved* performance in terms of lower reaction times and lower error rates. Here, we present a novel theoretical framework that can account for such effects by assuming that 1) performing only one of two possible actions may necessitate the inhibition of the initially activated, but unwarranted second action, leading to single-action costs and 2) dual-action execution may benefit from statistical facilitation based on redundant, response-related features of the stimulus. The resulting model of multiple action control allows for context-dependent inhibitory coding (i.e., actions are sometimes cognitively represented in terms of what *not* to do) and handles inhibition via explicit cognitive control codes; it is complementary to existing theories of countermanding - in particular, the Pause-Then-Cancel framework by Diesburg and Wessel (2021) - but includes further testable specifications of processes (and their components) which were previously only treated implicitly.

TASK-ORDER REPRESENTATIONS IN DUAL TASKS CAN BE ACTIVATED BY PARTIAL TASK-ORDER INFORMATION

Torsten Schubert[1], Daniel Darnstaedt[1], Leif Langsdorf[1], Sebastian Kuebler[1]; *[1]Martin-Luther University Halle-Wittenberg*

Recent studies showed that task-order representations schedule the processing order of component tasks during dual tasking. Evidence for this assumption stems from findings showing that in dual tasks with a variable order of component tasks, performance is improved in trials with repeated processing order (same order) compared to trials with reversed order relative to the previous trial (different order). Here, we tested which partial information from a dual-task pair is necessary to activate task-order representations in dual tasks. In several experiments, we presented different pieces of information of a dual-task pair, i.e. the sequence of 2 sensory stimuli, of 2 motor responses, of 2 sensory-motor task streams, partial task 1 or task 2 information and asked which of these information pieces leads to a processing advantage in same-order compared to different-order trials. The findings show a processing advantage after presenting 2 sequential sensory stimuli, after task 1 information, and after the sequence of two task streams. This suggests that task-order representations are activated by any partial information of a previous dual-task pair, which unequivocally specifies the sequential order of the two tasks during dual tasking.

BLITZ-TALKS 3
LANGUAGE I

BILINGUALS ARE LESS SENSITIVE TO GENDER STEREOTYPE VIOLATIONS IN THEIR SECOND LANGUAGE

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The present event-related potential (ERP) study provides first insights into the neurophysiology of stereotype processing in bilingualism by examining if bilingual speakers are less sensitive to social norms communicated in gender stereotypes when operating in the non-native (L2) compared to the native (L1) language. We tested 63 (31 women, 32 men) Polish (L1) – English (L2) highly proficient unbalanced (L1-dominant) bilingual speakers in a semantic decision task to semantically-correct (e.g., *The factory produces a top-selling dollhouse for porcelain dolls.*), semantically-anomalous (e.g., *Movies are directed by a dollhouse and its trainees.*), stereotype-congruent (e.g., *The girl got her dream dollhouse from her parents.*), and stereotype-incongruent (e.g., *The boy got his dream dollhouse from his parents.*) sentences in L1 and L2. The preliminary results show ERP modulations by sentence type in the Late Positive Complex time frame (600–800 ms), whereby stereotype-incongruent sentences evoked more robust amplitudes relative to stereotype-congruent items, yet only in L1. In L2, in contrast, the two conditions converged, thus suggesting a reduced sensitivity to gender stereotype violations in L2 relative to L1.

VOCABULARY SIZE MODULATES LINGUISTIC PREDICTION IN ADULT L2 SPEAKERS OF ENGLISH

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Prediction in comprehension is modulated by linguistic ability. For example, L1 speakers with higher and lower vocabulary scores preactivate a likely continuation in the presence of supporting context (preactivating *treasure* when hearing (1) *The pirate hides* the treasure). However, speakers with smaller vocabularies also consider less likely (action-related) competitors (*bone* in *The pirate hides* the treasure), suggesting that activation of less likely referents increases with language uncertainty. Here we ask if

vocabulary size modulates predictive abilities in L2 speakers of English. The design followed Borovsky et al. (2012). Materials crossed 2 agents (*pirate*;*dog*) and 2 actions (*hides*;*chases*). L2 learners (N=23; L1 Spanish) heard transitive sentences (Fig 1) while viewing 4 objects varying in expectancy with respect to the agent and action (Fig. 1). PPVT test measured vocabulary size. Participants with higher vocabulary launched a higher proportion of anticipatory fixations to the most likely continuation (*treasure*) sooner than those with lower scores; only speakers with lower scores also considered less likely competitors, suggesting that L2 speakers generate predictions, but these are less robust in those with lower L2 skill.

A SYLLABLE-BASED INTERVENTION TO IMPROVE PHONEMIC AWARENESS AND READING IN CHILDREN WITH DEVELOPMENTAL LANGUAGE DISORDER (DLD)

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With fragile phonological representations, children with developmental language disorder (i.e., "DLD" ; Bird et al., 1995 ; Bishop et al., 2016) risk failure when learning to read (Catt et al., 2002 ; Snowling et al., 2019). The present study investigated whether an innovative intervention, based on teaching letters-to-syllable relationships (Vazeux et al., 2020), can improve phonemic awareness skills and reading performances of children with DLD. A single case experimental methodology (SCED) with an AB design was used (Gast et al., 2014 ; Kratochwill et al., 2010). Three French-speaking children participated in all 14 sessions of the protocol, comprising nine sessions with no intervention and five sessions with intervention. Phoneme awareness and reading performances were assessed by repeated measures made throughout the protocol. The results demonstrated that each participant significantly improved his/her performances in at least one task (Vazeux et al., 2023). These findings are promising for children at risk of reading disability and extend current knowledge concerning syllable-based teaching for developing literacy.

NOVEL WORD LEARNING, MORPHOLOGY AND STATISTICAL LEARNING

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Most novel words that speakers learn are morphologically complex (e.g., columnist, whistleblower). Nevertheless, it is still unclear whether morphemes facilitate word learning. In particular, affixes (e.g., pre- and -ness) could do so in at least two ways; because they are associated with meaning or because they are frequent clusters of letters. This information is statistical in nature and might thus be captured via statistical learning. To investigate this, we conducted a novel word learning experiment with Italian native speakers, who learned words that have (i) existing suffixes (rugob-enza, akin to spoot-er in English), (ii) non-meaningful endings matched in frequency (rugob-ondo, spoot-ew, and (iii) non-meaningful, low-frequency endings (rugob-allo, spoot-ov). They also completed a visual statistical learning task. The results show that items with high-frequency endings were learnt the best. However, the strongest correlation with statistical learning was observed in low-frequency and suffixed condition. We discuss these results in the context of ongoing debates about the role of statistical learning in reading.

THE EFFECT OF LOG FORWARD TRANSITIONAL PROBABILITY ON VERB PRODUCTION

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Once a speaker has started to speak, some words are more probable than others. After “The fox is”, the verb “hunting” is more probable than the verb “sleeping”. Studies have shown that listeners can make use of the probability of a word given previous words to predict what they are about to hear. The current study investigates whether speakers use probabilistic knowledge of word co-occurrences to facilitate word production. Eighty-one participants (72 of which were included in the analysis) saw a written noun followed by an image of an action they had to name using a single verb. This verb either had a high or a low probability of co-occurring with the preceding noun. Participants were 51 ms faster at naming verbs in the high than in the low probability condition. According to the model, we can be 95% certain that the effect lies between -11.76 ms and -94.12 ms. This result suggests that speakers make use of probabilistic knowledge to facilitate production. Current models of word production do not involve mechanisms that can explain prediction in production and need to be extended to account for this finding.

A CROSSMODAL COMPARISON OF LANGUAGE-BRAIN ENTRAINMENT IN SPOKEN AND SIGNED LANGUAGES

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Entrainment–the phase synchronisation of neural activity with the incoming speech signal–supports spoken language processing. We investigated whether entrainment extends to sign language as well. We used MEG to record brain activity of two groups of hearing participants–15 expert signers and 15 sign-naive individuals–while they watched videos in 2 spoken languages (Spanish and Russian) and 2 signed languages (Spanish Sign Language and Russian Sign

Language). Each video was recorded with motion capture to provide kinematic information of different articulators on the body and face. We measured coherence between the preprocessed MEG data and the speech envelope (for spoken language) or the speed vector of the right hand (for sign language), and used cluster-based permutation tests to assess statistical differences across experimental conditions. We find language-brain entrainment in both spoken and signed languages, but its specific characteristics are modulated by language modality. Entrainment in signed languages is not as strong and is limited to the delta frequency band (1- 4 Hz). Overall, language temporal structure seems to play a less important role in sign language processing compared to spoken language.

THE PSYCHOPHYSIOLOGY OF INTERPRETING EMOTIONAL LANGUAGE

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Little attention has been devoted to the psychophysiological correlates of interpreting (i.e., translating orally) affect-laden content, while such examination could provide crucial insights into affective language processing in highly cognitively-taxing task requirements that interpreting is assumed to be. Here, we tested how professional interpreters process affect-laden and neutral content when interpreting. Using a multi-method approach, we employed psychophysiological measures (electrodermal activity and heart rate) and a self-report tool to study emotional reactivity to negative, neutral, and positive sentences, interpreted both from participants' native language (L1; Polish) into their foreign language (L2; English), and in the opposite direction. In the two experiments, we additionally modulated the modality of sentence presentation (auditory in Experiment 1 vs. audio-visual in Experiment 2). Preliminary results suggest more pronounced physiological arousal and self-reported emotional states in response to affect-laden content, relative to neutral sentences, observed for both interpreting directions. The outcomes may offer a novel contribution to cognitive and affective aspects of bilingual processing in interpreting.

DISTINCT COMPONENTS OF STROOP INTERFERENCE AND FACILITATION IN CHINESE: THE ROLE OF PHONOLOGY AND RESPONSE MODALITY

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According to multi-stage accounts, Stroop effects are the result of different conflict/facilitation components. Augustinova et al. (2019) used French stimuli and found evidence of task, semantic, and response components in Stroop effects with manual and vocal responses. However, the role of a phonological component in Stroop effects was not investigated. Furthermore, as far as we are aware no studies have so far investigated distinct Stroop components using Chinese stimuli. The current study used therefore Chinese colour words, colour-associated words, homophones, and neutral stimuli to investigate the phonological, task, semantic, and response components in Stroop effects. Forty participants conducted a vocal and a manual Stroop task. Both tasks revealed semantic conflicts, but no task conflicts were found. Importantly, only the vocal Stroop task revealed phonological conflicts/facilitation. Response modality effects in Stroop interference/facilitation were attributed to both phonological conflicts/facilitation and semantic conflicts. Task conflicts and response conflicts/facilitation were not affected by response modality. Implications of these findings for models of the Stroop task will be discussed.

BLITZ-TALKS 4
DECISION MAKING II

ACTION PREDICTION IS BIASED BY CONTEXTUAL CUES IN CHILDREN WITH CEREBRAL PALSY BUT NOT IN CHILDREN WITH DYSPRAXIA

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Understanding others' actions entails the use of internal motor representations. Here, we tested to what extent motor impairments in neurodevelopmental (Developmental Coordination Disorder, DCD) and neurological (Cerebral Palsy, CP) disorders impact on social perception. Children and adolescents with DCD, CP or typical development (TD) were asked to predict the unfolding of videos representing actions or moving geometrical shapes by using previously learned contextual expectations (priors). TD performance was biased by contextual priors in both tasks, and the same effects were obtained for CP, despite their extensive motor deficits. Conversely, DCD participants failed to use prior expectations to predict actions but not geometrical shapes. Hence, all groups comparably relied on prior expectations for the prediction of non-social events. These results suggest that motor planning deficits in DCD and CP may reflect the alterations of different mechanisms, which differently impact on social perception. They support the notion that anticipatory action planning deficits in DCD are due to a general action prediction deficit that prevents them to anticipated and adapt to environmental changes.

MORAL FLEXIBILITY: METACOGNITIVE PROCESSES OF SOCIAL INFLUENCE ON MORAL JUDGEMENT

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Haidt's (2001) Social Intuitionist Approach to Moral Judgment not only claims for the prevalence of intuitive over reasoned judgments but also for the importance of social influence. However, social influence in moral judgement has been less investigated, which is unfortunate since we rarely make moral judgments in a social vacuum, but rather in interaction with others. Drawing from social influence (e.g., Mercier & Sperber, 2011) and moral judgement research (Bago et al., 2019; Mata, Vega, Ferreira & Vaz, 2020) we explored the impact of others' moral judgments on one's own judgments. Furthermore, we manipulated the moral views of different social sources and we used a 2-response paradigm (Thompson et al., 2011) to investigate the dynamics of the conflict of others judgements on one's own moral judgments. Our results suggest that depending on the Self vs Other conflict level, moral intuitions may progress into judgments without deliberation (low conflict) or people may engage in more reflected reasoning (high conflict) revising their original responses. Subjective confidence on one's own moral judgment mediated this effect.

HIGHER EMOTIONAL VALUES OF THE OPTIONS, BUT NOT UTILITARIAN ONES, MAKE MORAL DECISIONS MORE DIFFICULT

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The underlying value differences of the options, both emotional and reasoning ones, are considered to determine our decisions in moral dilemmas. But is that all? People often feel it more difficult to make decisions in situations where both options are emotionally preferred, compared to where both are useful. Hence we hypothesize that average emotional value of the options, but not reasoning ones, makes a decision more difficult. In this study, we made fictional characters depicted by realistic photos and stories. After being evaluated for their emotional and utilitarian values, characters were presented in pairs and participants were told to imagine that in a situation of emergency, they must choose to save only 1 from the 2, and then rate the difficulty of the decision. Using linear mixed-effect model, we found that both emotional and utilitarian value differences are negatively correlated to perceived difficulty, as most would expect. More importantly, only higher average emotional value of the pair, not utilitarian ones, adds more difficulty to the decision. These results prove that high emotional value produces additional obstruction to moral decisions and there is no such counterpart in reasoning process.

DUAL-TASK ON THE GO: THE EFFECT OF WALKING ON INHIBITORY CONTROL AND DECISION MAKING UNDER RISK

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The simultaneous execution of a cognitive and a motor (dual-task) is known to significantly impact participants' performance compared to single-task conditions, often producing effects of cognitive-motor interference (CMI). Despite substantial evidence in the motor domain, the effect on high-order cognitive functions remains largely unexplored. In this pre-registered study we aimed to replicate previous evidence on inhibitory control (stop-signal task) and extend it to decision-making (loss aversion in a gambling task). Participants underwent single and dual-task sessions, the latter combining each cognitive task with walking at normal, slow, and fast speed on a treadmill. Dual-task effects (%) were computed separately for each task and the resulting values were tested to assess (1) the presence of CMI across conditions and (2) the impact of different walking speeds on its magnitude and direction. The results of bayesian t-tests show substantial evidence in favor of CMI for both tasks, with worse SST inhibition and increased loss-aversion. Our data did not provide conclusive evidence regarding the effect of different walking speeds, and further studies are thus required to better characterize CMI effects in similar conditions.

THE EFFECTS OF ANXIETY AND ITS INTERPLAY WITH SOCIAL CUES WHEN PERCEIVING AGGRESSIVE BEHAVIORS

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Among the many changes resulting from anxiety, one is the enhancement of our sensory-perceptual processes. This increased weight given to sensory input makes us less reliant on learned expectations when interpreting our visual environments. Although adaptive, this reduced weight of expectations might carry undesirable effects. Specifically, this could hinder how we perceive/interpret our visual world in normal (safe) situations, such as social interactions. With this in mind, we investigated this possibility by collecting decision measures and gaze patterns of participants (N=71) asked to identify aggression in ambiguous actions. As emotional cues, a dynamic observer face was simultaneously presented, expressing different reactions (fear and neutral). Importantly, participants completed this task under safe and threat-of-shock conditions. Contrary to our hypotheses, we showed that neither sensitivity nor criterion were affected by threat

of shock. However, participants spent a greater time gazing at cues when under threat compared to safe conditions. This might entail some hitherto unknown possible difficulties in extracting cues when under threat. The implications of these findings are discussed considering current literature.

TO BE ME OR TO BE THE ROBOT? IDENTIFYING VALUES WHICH GUIDE SOCIAL DECISION MAKING IN A MODIFIED VERSION OF THE CYBERBALL GAME

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Social inclusion is a pivotal value in our society. It is not clear how it affects decision-making processes when contrasted with competing values. Moreover, direct interaction with others may impact the alignment of behavior with values. In our study, we investigated the effect of mediated action on social exclusion behavior in a screen-based modified version of the Cyberball game. N=34 participants played two rounds: once as themselves and once as the iCub robot. We manipulated the conflicting values as follows: one of the other "players" was committing many errors in the game, while the other was never committing errors. The task in the game was to be as efficient as possible, as a team. Thus, participants needed to choose between social inclusion (tossing the ball to the erring partner) vs. performance efficiency (maximizing efficiency by tossing to the efficient player). Results showed that when playing as iCub, participants were more likely to follow the social inclusion value at the cost of performance efficiency. This result might suggest that when actions are "mediated", participants feel less social pressure on the value promoted by the task (efficiency). This study has implications for the design of value-aware AI systems.

FRAMING FEEDBACK: HOW FAILURE STILL HARMS LEARNING

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Contemporary literature celebrates failure as an enhancer of learning, memory and correction. However, recent research has demonstrated that failure feedback undermines knowledge acquisition when compared to success or feedback-free conditions (Eskreis- Winkler & Fishback, 2019). Two experiments were performed to replicate the tune-out effect and test its limit conditions (total N =540). The effect was fully replicated in experimental conditions similar to the original study denoting its robustness. The second study used the same paradigm but added percentual information about how other participants performed to the success ("You answered correctly") and failure feedback ("You answered incorrectly"). These new details framed the participant's success or failure feedback in a favorable (e.g., "90% of participants got this answer wrong") or unfavorable context (e.g., "10% of participants got this answer wrong"). Framing of feedback didn't influence the tune-out effect. Contrary to the findings of the original study, both failure conditions had better performances than the feedback-free condition. Despite the detrimental effect of errors on performance, these results suggest that feedback remains indispensable for effective learning.

BLINK SYNCHRONIZATION INCREASES OVER TIME AND PREDICTS PROBLEM-SOLVING PERFORMANCE IN VIRTUAL TEAMS

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Virtual collaboration in teams is more important than ever in our digital working world. To solve problems, teams need to develop a shared problem representation. Synchronizing a shared mental model is key to good team performance. In this study, we therefore tracked blink synchronization between two team members via eye tracking and its effect on problem-solving performance in a virtual setting. Therefore, we examined 37 dyadic teams, which completed a short familiarization phase and a problem-solving task. We assumed that teams would achieve blink synchronization after familiarization, which in turn would impact their performance. We further awaited blink synchronization to increase over time. Our results show that the strength of blink synchronization predicted teams' problem-solving performance. Furthermore, an increase in blink synchronization emerged over time. We discuss our findings in the context of blink synchronization as a proxy for dopamine transmission and its role in shared mental modelling during problem-solving.

TALKS 15
HIGHER COGNITIVE FUNCTIONS I

NONVERBAL BEHAVIORAL CUES AND PERSONALITY TRAITS IN CONCEALING HOSTILE INTENTIONS

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Preventing criminal activity is crucial for society, especially following terrorist attacks. The present study investigates whether nonverbal behavioral cues to hidden hostile intentions during the approach phase of shooting attacks can be detected. Thirty-five participants (eighteen women) enrolled as mock passengers had to make a traverse of a security checkpoint while concealing either a fake gun or their phone. Participants were instructed to go through an environment akin to an airport security checkpoint, either to shoot a dummy dressed as a security agent or to present the screen of their phone. During the crossing, they had to mark 2 stops notified by one

of the experimenters, a first stop of 30s, then a second of one minute. For each stop, the experimenter indicated when the participant had to stop and when he could resume walking. The whole crossing was video recorded by 4 cameras. They allowed the participants to be filmed from different points of view: Overlooking the beginning of the course, overlooking the first stop, overlooking the second stop and on the upper torso of the dummy. In this experiment, 13 nonverbal behaviors were examined. The results will be presented and discussed at the ESCOP2023 congress.

WHY IS OUR OPINION THE ONLY ONE THAT MATTERS? CONFIRMATION BIAS AND SOCIAL APPROVAL CUES IN FAKE NEWS DETECTION ACCURACY AND CREDIBILITY PERCEPTION

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The effect of confirmation bias is well-presented in different studies: information is perceived as more credible if it confirms personal beliefs and vice versa. However, the limitations of this effect are not defined yet. We test whether users' beliefs affect the news credibility and fake news recognition accuracy and search for the limits of this effect: whether social (dis)approval signals can reduce the confirmation bias effect. We study this limit in a laboratory experiment where we record participants' eye movements while offering them to read fake and true news accompanied by either approving or disapproving user comments (N = 50, (22 male, M_{age} 25,7 (6,2)). From a total of 1850 trials, we calculate individual-level accuracy of fake news recognition (understood as the hit rate) and message credibility (measured on a six-point scale) as dependent variables. We find a strong influence of confirmation bias on perceived credibility of news (b = 0.311 , t = 3.294), while the valence of comments does not mediate the effect of confirmation bias on accuracy. We also find that fake news detection accuracy is significantly higher in the trials where participants change their responses after rereading (b = 0.377, t = 2.094).

DOES MUSIC TRAINING PROVIDE NON-MUSICAL BENEFITS? EVIDENCE FROM AUDITORY, LINGUISTIC, AND SOCIO-EMOTIONAL PROCESSING

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There is a growing body of research on the effects of music training. While near transfer effects to domains tightly related to music are often taken for granted, the evidence about potential far transfer to non-musical domains remains controversial. Given the tight association between music, cognitive and socio-emotional processing we sought to fill in this knowledge gap by focusing on the following points: (1) a meta-analysis of longitudinal studies on neurobehavioral effects of music training on auditory and linguistic processing, in which we found a small positive neurobehavioral enhancement of music training on both domains; (2) a cross-sectional study analyzing associations between children's emotion recognition skills and socio-emotional adjustment, showing that higher emotion recognition in prosody relates to better socio-emotional adjustment; and (3) a longitudinal study inspecting music training effects on near transfer domains, and a wide range of socio-emotional abilities. The observed near transfer to auditory and motor skills was not paralleled by far transfer to socio-emotional processing. This led us to conclude that the empirical evidence for far transfer in musical training is non-existent or weak at best.

TALKS 16
MEMORY UPDATING

FAST AND OBLIGATORY UPDATING OF ITEMS IN DECLARATIVE AND PROCEDURAL WORKING MEMORY

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It is commonly held that attending to items facilitates their encoding into working memory (WM). This implies that the content of WM is updated with new input as part of directing attention to it. On the other hand, much research shows that WM updating is rather slow and effortful, suggesting that shielding WM representation against incoming input, rather than its updating into WM, is the default. To resolve this discrepancy, we suggest that while updating item-to-context associations is costly, updating a single item is fast and is automatically carried out as part of directing attention, for example, as part of response selection. Participants performed a choice-RT task in which stimuli appeared within frames and needed to update their WM with the most recent red item that appeared in each frame. The need for updating was manipulated so that some trials required updating and others did not. Two lines of experiments, using both declarative (letters) and procedural (task cues) materials, showed that updating a single item is quicker than not-updating. This slow-down of the not-update condition is explained by the need for a time-consuming removal process in this condition.

REMOVAL OF OUTDATED INFORMATION IN WORKING MEMORY UPDATING

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Working memory (WM) updating is the process of using new information to replace the old one in WM. Here we investigated whether the outdated information was fully removed from WM in updating process. We compared a full updating condition to (1) an updating without encoding condition (removal only), (2) an updating without removal condition (encoding only), and (3) a no updating condition. The updating time in Experiment 1 was self-paced, and it was varied over five levels from 0.1 s to 4.8 s in Experiment 2. The results showed that removing old items from WM did not improve the accuracy of recall of to-be-maintained items, suggesting that the to-be-forgotten items might not be removed from WM. Then we used Memory Measurement Models (M^3) to analyze the effect of removal. The modelling results indicated that only the item-position binding was gradually removed in the updating process, whereas the item memory still remained in WM and continued to interfere with the to-be-maintained items.

FORGETTING IN WORKING MEMORY: DOES INTERFERENCE'S LEVEL OF ATTENTION MATTERS?

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Two main accounts have been proposed to explain forgetting in working memory: (i) The attentional capture account assumes that forgetting occurs when more attention is required by a concurrent processing. (ii) The interference account assumes that forgetting is the consequence of the superposition of several distributed representations, regardless of the level of attention engaged. To contribute to the ongoing debate, we used a novel approach by varying the amount of attention required by interference. We designed two separate experiments with four experimental conditions each. The main difference between experiments was their complexity (i.e. easy - hard) and the main difference between conditions was the level of attention required by interference (i.e. explicit processing of the distractors, no explicit processing of the distractors, distractors presented under the threshold of consciousness, and no distractors). Our results indicated lower performance in the condition in which participants explicitly processed the distractors, favoring the attentional capture account. Our findings and their theoretical implications will be further discussed.

RECOGNIZED ITEMS RESIST INTENTIONAL FORGETTING: A RETRIEVAL ACCOUNT OF ITEM-METHOD DIRECTED FORGETTING

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In item-method directed forgetting, words designated as to be forgotten (F) are not remembered as well as words designated as to be remembered (R). For decades, the idea that only R items are rehearsed, with F items left to decay, has been captured by the single-process selective rehearsal account. More recently, in the two-process active forgetting account, a second, effortful process has been proposed that diverts attention from items followed by an F cue, prior to the differential rehearsal favouring the R items. We propose a new version of the single-process account, arguing that a retrieval check—retrieval of the just-presented item—occurs upon presentation of an R cue but does not occur upon presentation of an F cue, and that this retrieval check underlies the directed forgetting effect. In two experiments, we report evidence consistent with this account, as well as evidence that questions the additional process of a resource-demanding withdrawal of attention from F items.

TALKS 17
EMOTION I

A NOVEL COGNITION-BASED DIAGNOSTIC SUPPORT-SYSTEM: USING MACHINE-LEARNING ANALYSIS TO DIAGNOSE ANXIETY AND DEPRESSION

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Anxiety and depression show high comorbidity, shared symptoms, and high heterogeneity within each disorder, suggesting that their underlying mechanisms need to be better characterized and understood. We examined a new framework for characterizing and differentiating between anxiety and depression based on the biased cognitions that uniquely characterize each disorder. In two samples (Study 1: 125 participants with nonclinical anxiety/depression; Study 2: 86 patients, 25 controls), we employed a battery of tasks that rigorously assess selective attention, spatial attention, expectancy, interpretation, memory and cognitive control. Data were analyzed using designated machine-learning random forest algorithms. The algorithms reached 66%-80% classification accuracy in two different models for differentiating symptomatic vs. healthy individuals, as well as depression vs. anxiety groups, solely

based on cognitive task performance. The replicability of the findings stands as a proof-of-concept for the support-system to be utilized as part of the psychiatric diagnosis. Possible benefits are increased diagnostic specificity and precision, leading to more fine-tuned individually-tailored therapy.

COGNITIVE-AFFECTIVE MAPS AS A NOVEL RESEARCH TOOL TO ASSESS ATTITUDES AND BELIEFS

Andrea Kiesel[1], Lisa Reuter[1], Julius Fenn[1], Wilhelm Gros[1], Sabrina Livanec[1], Michael Gorki[1], Michael Stump[1]; *[1]University of Freiburg*

Intervention studies aim to change attitudes and belief structures, and shall, e.g., change the evaluation of contested issues. We propose a novel research tool, Cognitive-Affective Maps (CAMs) to measure attitudes as a network. Each concept is affectively connotated as positive, negative, neutral, or ambivalent and concepts can be related to each other by lines characterizing supporting or opposing relations. We review four studies in which we used CAMs as dependent variable in online studies: In a pre-post comparison, we investigated whether participants' cognitive-affective representations of the corona pandemic changed more due to leisure walking than in a control group. Additionally, we applied CAMs to explore students' attitude change over the course of an ethics seminar. Further, we explored whether network parameters of CAMs are suitable to predict perceived coronavirus threat. And fourth, we induced a change of attitudes by asking participants to first draw a CAM on a controversial topic and then presenting them with a CAM with an opposing assessment of this topic. We conclude that CAMs are useful as stand-alone research measurement as well as in mixed-measure studies.

DO BILINGUALS PROCESS EMOTION DIFFERENTLY IN THEIR NON-NATIVE LANGUAGE? IMPACTS OF PROFICIENCY ON WORD PROCESSING ACROSS STIMULUS VALENCE AND AROUSAL

Michelle Stankovic[1], Britta Biedermann[1], Takeshi Hamamura[1]; *[1]Curtin University*

Evidence shows bilinguals employ different decision-making strategies in their non-native language, which is thought to result from reduced emotion processing (known as the Foreign Language Effect). However, no consensus has been reached on how emotion processing interacts with bilingual L2 proficiency. We measured German-English bilinguals' reaction time for a valence judgement (n = 175) and arousal judgment (n = 154) task across two experiments. Participants judged 44 words in both their L1 and L2 to evaluate whether they displayed a valence-arousal processing advantage that has consistently been found in monolingual research. The valence-arousal advantage was found in the (more difficult) arousal task, but not the valence task. However, across both tasks bilinguals showed a different processing pattern for L1 compared to L2 words, suggesting bilinguals may process emotion components of words differently across languages. Using a linear mixed effects model, we further analysed L2 data and found that self-reported L2 proficiency interacted with valence and arousal, which we did not find for objective proficiency (e.g., LexTale vocabulary test), potentially suggesting that subjective proficiency might influence emotion processing.

THE RELATIONSHIP BETWEEN RHYTHMIC ABILITIES AND MUSIC REWARD SENSITIVITY

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Rhythm is a core feature of music that arises as a natural human propensity since infancy and is involved in several cognitive (e.g. memory, attention) and affective processes (e.g. arousal, emotions, feeling of communion). Moreover, it is thought to modulate music reward responses through its strong movement-inducing component. This study investigates the association between individual differences in multidimensional rhythmic abilities and music reward (i.e., musical hedonia). We measured (expected N=100, 18-35 years old) rhythmic competence through rhythm production (finger tapping), perception (CA-BAT) and memory (MET) tasks. We measured music reward sensitivity (eBMRQ questionnaire) while controlling for musical expertise (Gold-MSI questionnaire). Preliminary results (N=30) show that rhythm perception is positively correlated with musical hedonia. We expect to confirm the positive association between rhythmic abilities and music reward sensitivity, and disentangle possible differences depending on rhythmic and reward dimensions, and musical expertise.

TALKS – 14h20 to 16h20

TALKS 18
LEARNING

IS STATISTICAL LEARNING A FIXED INDIVIDUAL ABILITY? USING PREDICTIVE EYE MOVEMENTS TO MEASURE SENSITIVITY TO DIFFERENT LEVELS OF REGULARITIES

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Statistical learning (SL), the ability to extract regularities from sensory input, has been taken to predict a range of cognitive functions. Research tying individual SL performance to cognitive functions presupposes that SL is a fixed individual ability within a domain and can be reliably measured by established tasks. We test this assumption and ask whether visual SL performance reflects a fixed individual ability or is it protocol dependent. We tracked predictive eye-movements toward predictable vs. unpredictable stimuli in a Whack-a-mole computerized game, where mole locations included transitional probabilities (TPs) with different levels of noise (from TP=0.9 to TP=0.4). Each participant was exposed to all TP levels twice, once ordered from high to low and once from low to high. Learning was defined as the difference in predictive fixations towards predictable vs. unpredictable targets. Our results show that participants' SL performance was modulated by the direction of TP changes, with significantly better learning when increasing TP levels were followed by decreasing TP levels. These findings demonstrate the complexity in determining individual's SL ability. The implications for SL research will be discussed.

THE ROLE OF VARIABLE RETRIEVAL IN EFFECTIVE LEARNING

Katarzyna Zawadzka[1], Ewa Butowska[1], Maciej Hanczakowski[2]; *[1]SWPS University, [2]Adam Mickiewicz University*

One of the main aims of memory research is to devise learning strategies that would support effective knowledge acquisition. So far, this research has settled on the golden standard of learning guidelines indicating that the optimal way of studying involves repeated spaced retrieval attempts, followed by feedback presenting correct responses. Here we show that the effectiveness of learning via spaced retrieval practice depends on the variability of queries used to elicit retrieval across learning sessions. In a series of experiments, participants learned translations of foreign vocabulary, with foreign words embedded in contextual sentences hinting at the meaning of these words. These sentences were then either kept constant or varied from one learning cycle to another. We demonstrated that compared to constant queries, the effectiveness of learning is further boosted if different queries are employed on each learning opportunity. However, these benefits are not appreciated by the learners, who at the end of the learning task erroneously predicted better final test performance when learning with constant cues. Together, our findings should be taken into account when further developing guidelines for effective learning practices.

DO PREQUESTIONS SUPPORT LEARNING MORE THAN LEARNING OBJECTIVES?

Judith Schweppe[1], Philipp Radloff[1], Alexander Fenzl[1]; *[1]University of Passau*

Giving students questions that they typically cannot answer before a lesson or before reading a text has been demonstrated to improve learning of the upcoming lesson or text. This prequestion effect has been attributed to focusing of attention as well as to additional benefits of (unsuccessful) attempts to answer the questions. In our experiment, we tested whether prequestions also provide greater benefits compared to learning objectives stated prior to text reading and whether a potential benefit is restricted to overlapping questions in a final test. Like prequestions, learning objectives should help focus learners' attention but unlike prequestions not prompt answering attempts. 156 participants were either presented with open-ended questions or with learning objectives before reading a textbook excerpt or just read the text in a control condition. In the final test, they answered old and new multiple-choice questions. There was a trend toward an advantage of prequestions over learning objectives in both old and new questions and over reading only in old questions. The findings indicate that prequestions may benefit learning over and above focusing learners' attention.

MIND WANDERING BOOSTS PREDICTIVE PROCESSES

Teodóra Vékony[1], Bence C. Farkas[2], Bianka Brezóczki[3], Matthias Mittner[4], Gábor Csifcsák[4], Péter Simor[5], Dezso Németh[1]; *[1]Lyon Neuroscience Research Center, INSERM, Lyon, France, [2]Université Paris-Saclay, UVSQ, INSERM, CESP, Villejuif, France, [3]Eötvös Loránd Unversity, Institute of Psychology, Trosmø, Norway, [4]UiT The Arctic University of Norway, Department of Psychology, Trosmø, Norway, [5]Eötvös Loránd Unversity, Institute of Psychology, Budapest, Hungary*

The phenomenon of mind wandering (MW) is a pervasive feature of human cognition, where individuals disengage from external tasks and focus on internal thoughts. This state has been linked to decreased task performance and reduced processing of external stimuli. While previous studies have explored the costs of MW, the potential benefits are less clear. This study aimed to investigate the possible advantages of MW by examining its relationship to statistical learning. Specifically, we hypothesized that MW would enhance the processing of stimulus-outcome dependencies in the environment. Participants of this online study completed a probabilistic serial reaction time task, which assessed general skill learning and implicit statistical learning. Between learning blocks, participants evaluated their mind wandering status through thought probes. Results showed that state-MW impaired general skill learning but facilitated the efficient extraction of predictable patterns, leading to improved statistical learning. Our findings

suggest that MW may have adaptive functions by promoting the extraction of environmental patterns to help evaluate future outcomes.

CHRONOTYPE AND TIME-OF-DAY: NO EVIDENCE FOR DIFFERENTIAL EFFECTS ON CONTROLLED AND AUTOMATIC PROCESSES AT MEMORY RETRIEVAL

Nicolas Rothen[1]; [1]*UniDistance Suisse*

An individual's chronotype determines their peak of circadian arousal. Morning-types have their peak in the morning. Evening-types have their peak in the evening. Empirical evidence suggests better performance when controlled cognitive processes are tested on-peak in comparison to off-peak testing. By contrast, better performance is observed for automatic cognitive processes when they are tested off-peak in comparison to on-peak testing. Crucially, this line of research mostly relied on separate tasks to assess controlled and automatic cognitive processes which—given separate analysis strategies for the separate tasks—may result in a confirmation bias. The primary goal of this study was to control for a potential confirmation bias by means of a continuous identification with recognition task which allows to simultaneously assess controlled and automatic processes. Preliminary results based on 160 participants suggest that there is no differential influence on controlled and automatic processes as a function of chronotype and time of day. It seems that current theories in the field may not withstand stricter testing and analysis strategies which consider controlled and automatic processes within the same task.

TALKS 19

COGNITIVE AGING II

NEUROPHYSIOLOGICAL EXAMINATION OF DECISION-MAKING IN THE AGING BRAIN: AN ERP STUDY FROM DIFFERENT CONTEXTS OF DECISION

Carina Fernandes[1], Inês Macedo[2], Fernando Barbosa[2], João Marques-Teixeira[2]; [1]*Faculty of Human and Social Sciences, University Fernando Pessoa; Laboratory of Neuropsychophysiology, Faculty of Psychology and Education Sciences, University of Porto,* [2]*Laboratory of Neuropsychophysiology, Faculty of Psychology and Education Sciences, University of Porto*

According to the Affect–Integration–Motivation (AIM) framework, decisions are preceded by affective, integrative, and motivational processes, which may be affected by aging. As the Monetary Incentive Delay (MID) task allows tapping into these mechanisms, we used its version for EEG studies to investigate the neural correlates of age differences in gain/loss anticipation, value integration, motivation, and reward processing. Data was recorded from 77 participants (20–80 years old), and we analyzed the Cue-P3, Contingent Negative Variation, Target-P3, Feedback-related Negativity, and the Feedback-P3 elicited by different events of the MID task. The results support the AIM framework, suggesting that aging altered affective processes (as shown by a significantly reduced Cue-P3 in the older group), while preserving integration and motivation processes. Moreover, the results suggest that the anticipation and processing of gains are preserved in aging, whereas the anticipation and processing of losses are altered. Based on these findings, we adapted our MID task to elicit decision making under social and uncertainty contexts, and further explore how aging modulates decision-making under different contexts.

OLDER ADULTS CAN CATCH UP WITH YOUNGER ADULTS IN ASSOCIATIVE MEMORY IF THEY IMPROVE MEMORY ENCODING

Sophie Nolden[1], Yee Lee Shing[1]; [1]*Goethe-University Frankfurt am Main*

Older adults tend to have difficulties in episodic memory, particularly in associative and source memory. In the current study, we aimed to test to what extent older adults' impairments in associative and source memory could be overcome by more exposure during encoding. Eighty-eight younger (18 to 30 years old) and 59 older adults (65 to 89 years old) intentionally encoded word pairs that consisted of a visual word and a spoken word (female or male voice). Participants were then asked to recognize the spoken word (item memory), recall the associated visual word (associative memory), and recall the speaker (source memory). About half of the participants did an additional round of encoding. Our results revealed good item memory and rather poor associative and source memory, with younger adults outperforming older adults in the latter two memory types. When older adults did an additional round of encoding, performance in the associative memory tests improved to the level of younger adults. In the source memory test, older adults benefited less from more exposure during encoding. We conclude that more exposure during encoding can attenuate older adults' associative memory deficit but not their deficit in source memory.

TEMPORAL PREPARATION IN AGING: A DISSOCIATION BETWEEN AUTOMATIC AND CONTROLLED PROCESSES?

Lucie Attout[1], Giovanna Mionni[2], Mariagrazia Capizzi[3], Pom Charras[1]; [1]*EPSYLON, Université Paul Valery 3 de Montpellier,* [2]*Department of General Psychology, University of Padova, Italy,* [3]*Mind, Brain and Behavior Research Center (CIMCYC), University of Granada, Spain*

The ability to predict when a stimulus is more likely to appear – Temporal preparation (TP) - is fundamental for optimal processing. TP can be achieved through four distinct components considered

as requiring more or less controlled processes. The impact of aging on these four abilities, and specifically on the more controlled forms of TP, have been poorly investigated. In this study, after validating in young adults (N=120) a protocol assessing the four TP components in a simple detection task, we tested whether TP was preserved in a group of elderly participants. Bayesian analyses provided evidence for a specific alteration of the endogenous orienting system, that is, the ability to benefit from symbolic cues; but preserved abilities for the foreperiod and for more automatic processes such as sequential effects or regular rhythmic sequences. Overall, these results suggest a specific alteration of the more controlled and resources demanding form of TP in elderly participants (endogenous temporal orienting). These results have specific implications such as understanding the impact of aging on temporal preparation but also more global implications as the understanding of the nature of the four components.

AN EXAMINATION OF SEQUENTIAL ANOVAS AS A TOOL FOR RESEARCH ABOUT AGE-RELATED DIFFERENCES IN COGNITIVE PERFORMANCES

Meike Steinhilber[1], Prof. Dr. Beatrice Kuhlmann[2], Prof. Dr. Anna-Lena Schubert[1]; *[1]University of Mainz, [2]University of Mannheim*

Sequential Probability Ratio Tests (SPRTs) are a highly efficient alternative to fixed sample designs. SPRTs use a likelihood ratio as a test statistic which is computed continuously whenever new data points are added. After each iterative data collection step, SPRTs decide whether the evidence is sufficient to accept the null or alternative hypothesis or whether more data points are needed. SPRTs control for alpha and beta error rates. We show in simulation studies that the one-way sequential ANOVA is more efficient than a classical fixed ANOVA. In 87% of the simulated 120,000 cases, the sequential sample sizes are smaller than the fixed sample sizes. On average, 56% of the data can be saved using the sequential design. Here, we reanalyze existing datasets and investigate whether the simulated benefits of SPRTs transfer to a selection of age-related cognitive performance research. We will present guidelines for using SPRTs from a practical point of view.

MULTILINGUAL EXPERIENCE AFFECTS RESTING-STATE FUNCTIONAL CONNECTIVITY IN (COGNITIVE) AGING

Vincent DeLuca[1], Toms Voits[1], Kirill Elin[1], Jon Andoni Dunabeitia[2], Janine Rook[3], Jubin Abutalebi[4], Jason Rothman[1]; *[1]UiT the Arctic University of Norway, [2]Universidad Nebrija, [3]University of Groningen, [4]Università Vita-Salute San Raffaele*

Multilingualism has been observed to foster compensatory mechanisms (reserves) toward cognitive aging (CA). However, little research has identified how degree of engagement in multilingual experience affects CA, or how these effects manifest across the adult lifespan. Other lifestyle factors have also been found to affect CA (e.g., exercise, education), but multilingual effects on CA have rarely been examined while considering these. The present study examined effects of multilingualism on CA across a large age range, accounting for additional lifestyle factors. Multilingual native speakers of Norwegian (n = 90, *m*age = 49.3, range 19-82) were administered questionnaires tapping into multilingualism and other lifestyle experiences. Resting-state EEG (rs-EEG) was also measured. Continuous measures of multilingual experience (MLD) were calculated. Functional connectivity (coherence) was calculated from Rs-EEG data and regressed against MLD, age, and other demographic variables. Preliminary results show significant interactions of MLD and age on gamma coherence across several electrode regions. The results indicate that higher degree of multilingualism contributes to increased compensatory effects against CA across the adult lifespan.

TALKS 20
FACE PROCESSING

APPROACHING EMOTIONAL FACES: DIFFERENTIAL ELECTROPHYSIOLOGICAL DYNAMICS FOR FILTERED STIMULI BY LOW AND HIGH SPATIAL FREQUENCIES

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It has been demonstrated that looming motion interacts with threatening emotional cues at the initial stages of visual processing. However, the neural mechanisms are unclear. Some literature suggests parallel neural pathways underlie this, and that a rapid pathway reliant on magnocellular inputs might be responsible. The current study therefore aimed to investigate this neural mechanism by using filtered emotional faces in low (LSF) and high spatial frequencies (HSF). Using EEG/ERP techniques, we conducted two experiments measuring the time course of neural responses to LSF, HSF, and unfiltered angry and neural faces in approaching and receding motions. Experiment 1 used a passive-viewing paradigm. Interestingly, apart from overall differential responses to the LSF and HSF faces, early ERPs such as the P1 and N170 showed no modulation by emotion or motion. Experiment 2 prompted direct attention to the facial expression. We found distinct modulations on the P1, N170, and EPN by emotion and motion at each spatial frequency, supporting that separate neural pathways exist during this initial processing. Furthermore, we showed that attentional focus is critical for early processing of visual information in different spatial frequencies.

THE MINIMAL EXPOSURE DURATION REQUIRED FOR DETECTING MEANINGFUL INFORMATION IN HUMAN FACES

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The visual system can detect as little as a single photon. What is the system's minimal exposure threshold to detect meaningful information? In six experiments, we used a new tachistoscope that enables sub-millisecond presentations to determine in which order various facial attributes unfold in perception. Participants discriminated the location of a face from that of a scrambled face in unmasked presentations. Above-chance discrimination required ~2.5 ms of stimulation. An advantage for upright over inverted faces arose with 4.4 ms, for both perceptual processing and awareness. EEG Event-related potential (ERP) and multivariate pattern (MVPA) analyses found evidence of face processing and awareness with 4.3 ms of exposure, but only revealed emotion processing at the longest presentations, once participants could reliably perceive faces. Finally, whilst MVPA found evidence of face and emotion processing at shorter durations than ERPs, it could not decode either factor with shorter durations than 4.3 ms. In sum, both the holistic configuration and the emotional expression of a face have the same minimal required exposure as that for faces to reach awareness, suggesting awareness is required for processing meaningful information.

PERCEIVED ETHNIC TYPICALITY MODULATES THE OWN-GROUP RECOGNITION BIAS

Malvina Brunet[1], Maja Becker[1], Maité Brunel[2], Jacques Py[1], Colin Tredoux[3] ; *[1]Université Toulouse Jean-Jaurès, France, [2]Université de Lille, France, [3]University of Cape Town, South-Africa*

Humans are experts in face recognition, but this ability is prone to bias. One of these is the Own-Group Recognition Bias (OGRB), where individuals are better at recognizing faces from their own ethnic group compared to other groups. Research on OGRB is based on distinguishing individuals into ethnic groups perceived as different. However, phenotypic variability within these categories has rarely been addressed. Groups are studied as homogeneous categories, typically based on geographical affiliation. In this study, we aimed to investigate how perceived phenotypic variability within different groups might affect OGRB. European participants (*N*=171) completed a face recognition task with created stimuli of African, European and North-African faces with varying levels of ethnic variability. To manipulate perceived variability, we used faces rated as more or less physically typical of their ethnic group. Our results indicate that both the ethnic group and the level of ethnic typicality affected face recognition (*d*=0.49). Specifically, the OGRB tends to diminish when faces are highly typical of their group. We will discuss the need to consider ethnic groups as diverse entities and to include within-group variability in further studies.

THE MODULATORY EFFECT OF EXPECTATION ON EARLY FACE PERCEPTION AND ITS ASSOCIATION WITH EXPERTISE – NEURAL AND BEHAVIORAL EVIDENCE

Inês Mares[1], Fraser W. Smith[2], Emily Goddard[3], Lianne Keighery[3], Louise Ewing[4], Marie L. Smith[3]; *[1]William James Center for Research, ISPA - Instituto Universitário, [2]School of Psychology, University of East Anglia, Norwich, UK, [3]Department of Psychological Sciences, Birkbeck College, University of London, UK, [4]School of Psychology, University of East Anglia, Norwich, UK.*

It is not clear whether one's broad expertise modulates the widely observed effects of context and expectation in early perception. Here we tackle this question directly: contrasting expectation-related effects associated with *categories* of high-expertise (faces) vs low-expertise (cars), and with *individual level ability* (face ability quantified with a gold-standard measure). After training a large sample (N=67) to reliably associate a color cue with an object category (face/car) they categorized target images preceded by a valid or invalid color cue (75% valid). A similar task was also completed while EEG was recorded (here, an orthogonal detection task was completed on catch trials to avoid behavioural confounds). Findings reveal that behaviorally, face (but not car) expectation facilitates category detection, which is correlated with individual level ability. Multivariate pattern analysis of the EEG signal also confirms clear effects of category expectation from 100ms post stimulus, with significant decoding of the neural response to expected vs. not, when viewing identical images. These results provide clear evidence that expectation modulates early perception and supports a role for higher-level expertise in perception.

CONCEALED FAMILIAR FACE DETECTION WITH EEG IN RAPID SERIAL VISUAL PRESENTATION

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Classical concealed information tests (CITs) are in some circumstances able to detect concealed information, but vulnerable to countermeasures that participants can use to shield concealed information from detection. Rapid serial visual presentation (RSVP) has proven effective against such countermeasures, and can thus substantially reduce type-II error. Research to date has relied on classic univariate analyses of EEG data. Here we investigated whether RSVP-based CIT with multivariate analysis (decoding) of the EEG is potentially more effective for detecting 'concealed knowledge' of familiar face. 29 participants searched for a target face in an RSVP task while a familiar face (one of their parents' faces), or one of two control faces also appeared. Using neural-network decoding, we detected concealed information for each

individual with an average hit rate of 61.8% and an average correct rejection rate of 72.7%, while accuracy was around chance level when we decoded one control face from the other. In comparison, univariate analyses were only able to detect familiar face recognition in 19 participants. Our findings suggest that neural-network decoding makes RSVP-based CIT a more reliable method to detect concealed information.

FACE AGE IS MAPPED INTO THREE-DIMENSIONAL SPACE

Mario Dalmaso[1], Stefano Pileggi[1], Michele Vicovaro[1]; [1]*University of Padova*

People can represent temporal stimuli as spatially connoted dimensions arranged along the three main axes (horizontal, sagittal, and vertical). For instance, past and future events are generally represented, from individuals' perspectives, as being placed behind and in front of them, respectively. Here, we report that such a 3-D representation can also emerge for facial stimuli of different ages. In three experiments, participants classified a central target face, representing a single individual at different age stages, as younger or older than the reference face of 40 years. Manual responses were provided with two keys placed along the horizontal axis (Experiment 1), the sagittal axis (Experiment 2), and the vertical axis (Experiment 3). The results indicated that the younger faces were represented on the left/back/upper side of the space, while the older faces were represented on the right/forward/lower part of the space. Furthermore, in all experiments, the latencies decreased with the absolute difference between the age of the target face and that of the reference face (i.e., a distance effect). Overall, this work suggests that the spatial representation of time includes social features of the human face.

TALKS 21
MEMORY II

REPETITION LEARNING DEPENDS ON EXPLICIT RETRIEVAL FROM EPISODIC MEMORY: EVIDENCE FROM BEHAVIORAL AND NEUROIMAGING STUDIES

Philipp Musfeld[1], Olga Kozlova[2], Yvanna Yeo[2], Keisuke Fukuda[3]; [1]*University of Zurich,* [2]*University of Toronto Mississauga,* [3]*University of Toronto Mississauga; University of Toronto*

A classic demonstration of long-term learning by repetition is the *Hebb effect:* Immediate recall performance improves for memory sets presented repeatedly amidst non-repeated sets. Although long claimed to reflect implicit learning, recent findings with computational modeling demonstrated that participants exhibited learning only after becoming aware of the repeated sets. Here, we obtained converging evidence from an EEG study: Participants were presented with 150 visual arrays, two of which were repeated every ~5th trial. On each trial, we measured 1) working memory performance, 2) participant's assessment of memory set repetition and 3) recorded an EEG at encoding. Our behavioral results replicated previous findings, showing that learning of repeated memory sets occurred only after participants recognized their repetition. Additionally, we found strong ERP signatures of explicit recollection of past encounters (P600) during encoding of repeated stimuli only after participants reported awareness of their repetition; prior, ERPs were indistinguishable from unrepeated sets. We conclude that repetition learning requires explicit retrieval of previous encounters from episodic memory to initiate formation of stable long-term memories.

DISTRACTOR PROCESSING HAS NO IMPACT ON THE HEBB REPETITION EFFECT IN COMPLEX SPAN TASKS

Claudia Araya[1], Klaus Oberauer[2], Satoru Saito[1]; [1]*Kyoto University,* [2]*University of Zurich*

The Hebb repetition (HR) effect refers to the increase in recall accuracy of repeated lists compared to non-repeated lists. It has been widely studied in simple span memory tasks to understand the relationship between short-term and long-term memory. In the case of complex span tasks, the interruption of list presentation by distractor task processing could interfere with the learning of repeated lists. Nonetheless, our previous research demonstrated the HR effect for complex span tasks. In addition, learning transfers from a complex span task to a simple span task and vice versa. These results lead to the question: How are distractors in a complex span HR task being processed? One possibility is that the distractors do not become a part of the long-term memory representation for the repeated sequences. We tested that hypothesis through an online experiment (*n= 180*) with three conditions of repetition: Repeating only the items of the memory list, repeating only the distractors, and repeating both items and distractors. The repetition of distractors, although processed in working memory, had no impact in HR learning, implying that the distractors are excluded from the long-term memory trace of learned sequences.

THE INTERDEPENDENCE OF THE MEMORY REACTIVATION OF ITEMS AND TASK RULES

Yağmur Damla Şentürk[1], Nursima Ünver[2], Can Demircan[1], Tobias Egner[3], Eren Günseli[1]; [1]*Sabancı University,* [2]*University of Toronto,* [3]*Duke University*

Working memory (WM) governs the representations of goal-directed behaviors. The relationship between the storage of task-relevant items and task rules has been under debate, as some studies suggest that they are independent, whereas others propose they are interdependent. We tested these accounts by investigating

the effects of task rules on the reactivation of task-relevant items using contralateral delay activity (CDA), an EEG index of WM storage of items. Participants (N=45) stored targets for recognition or a size comparison task. Targets were repeated for six trials to enable their handoff to long-term memory (LTM). Critically, the task rule changed during some target repetitions, which allowed testing whether updating the task rules triggers the reactivation of task-relevant items. First, there was a CDA for novel items, suggesting they are stored in WM. Second, the CDA amplitude decreased with target repetitions suggesting the handoff to LTM. Lastly, CDA increased again on task-switch compared to task-repeat trials, suggesting the reactivation of task rules triggers the reactivation of task-relevant items in WM. Thus, this study shows that WM reactivation of LTM is interdependent for task rules and task-relevant items.

EXPECTATIONS ABOUT RETENTION INTERVAL TUNE FORGETTING IN VISUAL WORKING MEMORY.

Joost de Jong[1], Sophia Wilhelm[1], Elkan Akyürek[1]; *[1]University of Groningen*

Working memory has limited capacity. As a consequence, working memory needs a mechanism that drops information when it has become irrelevant. Humans can use explicit cues to forget irrelevant information, but in real life, explicit forgetting cues might be rare. Instead, we mainly forget information as time passes and information recedes into irrelevance. Crucially, sometimes information becomes outdated more quickly and we need to forget it more quickly. In two experiments, we tested whether forgetting rate is tuned to how quickly information becomes irrelevant. Participants were presented a color and after a 1- or 3-second interval they were either probed on that color or presented a new color. We varied the 'probing' probability per block, with either increasing, constant or decreasing probing hazard over time. Consistent with our hypothesis, we found forgetting to be fastest in blocks with decreasing probing hazard. Mixture-modelling suggests adaptive forgetting was driven by dropping items wholesale. In sum, in the absence of explicit forgetting cues, humans can learn to completely drop information from working memory by the time it has likely become irrelevant.

LOW-LEVEL FEATURES OF IMAGES FADE IN LONG-TERM MEMORY

Henrik Singmann[1], Eda Mizrak[2]; *[1]UCL, [2]University of Sheffield & University of Oxford*

Forgetting details of past events over time is a common experience. We may forget high-level features, such as the name of someone we met at a party, or low-level features, like how bright the day was yesterday. Recently, Cooper et al. (2019, Psych. Science) found that when participants were asked to recreate the brightness of previously presented real-world scenes, their responses were biased towards less brightness than the original image. This memory bias towards fading has implications for understanding memory and preserving memories over time. However, Rivera-Aparicio et al. (2021, PB&R) found that blurriness or vividness can be remembered more clearly after immediate testing. The difference between these studies is the number of images they tested. We conducted experiments varying the number of images (i.e., set-size) participants had to remember before being asked to recreate the brightness. We found that fading occurs only when participants need to remember more than three images, suggesting that this effect may be limited to long-term memory. These findings replicate that low-level features of memories fade in long-term memory and explain the discrepancy between previous research.

HOW DOES SEMANTIC ELABORATION BENEFIT LONG-TERM MEMORY?

Joscha Dutli[1], Klaus Oberauer[1], Lea M. Bartsch[1]; *[1]University of Zurich*

Introducing the levels of processing framework, Craik and Tulving (1975) found increased memory performance when the semantic meaning rather than the phonemic structure of words was processed at encoding. They further established the semantic elaboration effect – describing the finding that memory items are retrieved better when they have been processed with a congruent rather than an incongruent orienting question. This has been taken as evidence that the operations carried out at encoding determine later memory performance. In a series of experiments, we found that semantic elaboration establishes strong retrieval cues (as measured by cued recall tests), but that congruency effects are absent or small and inconsistent in free recall. Hence, establishing strong retrieval cues through semantic elaboration does not seem to guarantee that these retrieval cues are available later on. We found that providing the target words in an old/new recognition test results in a memory benefit of semantic elaboration, suggesting that previously established retrieval cues can be activated and used in recognition memory. We discuss the implications of our results for theories explaining memory performance as a function of encoding operations.

TALKS 22
MOTOR COGNITION II

TEMPORAL GENERALIZATION REVEALS A CLOSE RELATIONSHIP BETWEEN THE PREPARATION OF SELF-INDUCED ACTION AND THE PERCEPTION OF ITS SENSORY OUTCOME

Yifei He[1], Edward Ody[1], Tilo Kircher[1], Benjamin Straube[1]; *[1]Philipps University Marburg*

Self-induced actions differ from their externally-triggered counterparts in producing an efference copy that predicts their sensory outcomes. To date, empirical evidence for this prediction remains correlational at best. Here, we leveraged EEG-based MVPA methods (temporal generalization) to examine the action-perception relationship. Participants' button presses were either self-induced (active) or externally-triggered (passive); they led to identical audio-visual stimuli (100 ms delay) that were followed by unimodal auditory/visual stimuli to perform an auditory/visual intensity judgment task (brighter or louder). We decoded task modality within active and passive conditions, based on EEG time-locked to the button press (-1000–600 ms). During stimulus perception, we observed decreased decoding accuracy for active vs. passive conditions. During motor preparation (-200–0 ms), task was more decodable for the active condition; most importantly, temporal generalization showed that EEG from this window decodes stimulus perception from 150 ms onwards only when button presses were active, indicating a pattern similarity between both processes. Our finding provides solid empirical evidence for the efference copy during self-induced actions.

TOWARDS UNDERSTANDING HOW REINFORCEMENT FROM SENSORIMOTOR PREDICTABILITY INFLUENCES BEHAVIOR AT DIFFERENT LEVELS OF PROCESSING

Noam Karsh[1], Bat-Sheva Hadad[2], Erez Freud[3], Zoha Ahmad[3], Andrei Teodorescu[1], Liora Eliraz[1]; *[1]Tel-Hai Academic College, [2]University of Haifa, [3]York University*

An action's sensory effect holds valuable information about one's control over the action and the external environment ("I did that"). The evaluation of such control-relevant information (e.g., action effect temporal contiguity) is grounded within the motor system. Specifically, a minimal discrepancy between a sensory prediction model and the actual sensory feedback indicates the motor program's success in predicting its sensory consequences. Previous work provides empirical and theoretical support that such successful manipulation of the environment is rewarding, reinforcing motor programs that their sensory consequences are successfully predicted (cf. motivation from control). I will present findings suggesting that the impact of sensorimotor predictability on behavior has a broader scope than we have previously thought. Specifically, our recent studies indicate that temporally contiguous action effect enhances the end-point precision of a continuous movement, with a greater magnitude for children than adults. In addition, it increases action tendency and supports inhibitory control efforts. Finally, I will suggest how an own-action sensory effect may influence behavior at different levels of processing.

EVIDENCE FOR COMPOSITIONAL ACTION REPRESENTATION IN TASKS WITH LOW DIMENSIONAL OVERLAP

Lynn Huestegge[1], Tilo Strobach[2]; *[1]University of Würzburg, [2]MSH Medical School Hamburg, Germany*

We ask how complex (dual-action) behavior is mentally represented in dual tasks. According to a compositional (Structuralist) account, component action remains structurally intact when combined with another action. In contrast, a holistic (Gestalt) account posits that dual-action requirements are represented holistically and entirely distinct from its component action requirements. Finally, a contextual change account assumes that contextual change (e.g., from single- to dual-action) impedes response retrieval, similar to response repetitions while switching tasks. We analyzed trial-by-trial effects in a single-/dual-task switch paradigm. Relevant comparisons of performance between complete switch trials (e.g., two single tasks) and partial repetition trials (e.g., from dual to single) revealed partial repetition benefits (e.g., a manual response in a current dual-task trial benefitted from having executed a manual response in a previous single-task trial). Therefore, dual actions in the present dual-task setting are represented in a compositional, Structuralist fashion likely resulting from low between-task dimensional overlap. The results will be discussed within a theoretical framework of flexible representation of behavior.

BINDING OF CONTINUOUS PROPERTIES OF ACTIONS AND AUDITORY ACTION EFFECTS

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Recent approaches to action control suggest that features of actions are bound to, and retrieved by coincidentally occurring stimuli. Empirical support for these approaches mainly comes from studies focusing on action properties that are task-relevant and categorical in nature (e.g., decision categories such as responding "left" vs. "right"). In four experiments, we explored whether binding and retrieval also arises for continuous response features, i.e., force and response duration. Our results provide evidence that binding and retrieval may indeed occur for these parameters, but corresponding

effects are relatively small when these properties are task-irrelevant. Introducing an additional task requiring participants to heed different force levels resulted in more pronounced binding and retrieval effects. In summary, these results generalize binding and retrieval to continuous properties of motor actions.

RESPONSE PRECUEING IN A CROSSMODAL CONTEXT

Denise N. Stephan[1], Iring Koch[1]; *[1]RWTH Aachen University*

In the response precueing paradigm a cue indicates the subset of possible stimuli and thus required responses and allows to prepare for those. Classic response precueing studies used visuo-spatial cues and targets combined with manual responses, while neglecting possible crossmodal influences. To this end, we developed a novel crossmodal response precueing paradigm combining visual and auditory bimodal precues with visual or auditory unimodal targets. We tested the paradigm in two successive experiments (N= 66). In the second experiment, in addition the cue target interval was manipulated, confirming that the cues were used for preparation. While our data hints towards an advantage for visual over auditory targets, it overall indicates a general advantage for auditory cues irrespective of target modality. This interaction might be caused by the higher alerting quality of auditory cues, requiring active attention to process visual targets as effectively. Interestingly, the established advantage of hand over finger cues diminish with our non-spatial cues. This may be due to the fact that the spatial features responsible for cue-pattern advantages did not overlap. This assumption will be tested in further research.

CONFIDENCE IN ACTION: ON HOW MONITORING SHAPES PERCEPTUAL UNCERTAINTY

Remi Sanchez[1], Karen Davranche[2], Thibault Gajdos[2], Andrea Desantis[1]; *[1]ONERA, [2]Laboratoire de Psychologie Cognitive, UMR 7290, CNRS*

Recent models of metacognition argue that confidence integrates information across the perception-action cycle. We conducted three pre-registered experiments to investigate the role of the motor preparation of perceptual decisions on confidence. Participants reported the orientation of a Gabor and indicated the level of confidence on their response. A visual cue displayed before the Gabor induced the planning of an action that could be congruent/incongruent with the response side and/or compatible with the effector subsequently used to report the Gabor. Confidence consistently increased when participants prepared spatially incongruent actions compared to congruent, irrespectively of effectors primed or accuracy. In Experiment 3, we used electroencephalography. Event Related Potentials analyses and in particular changes in the P2 component suggested that the planning of incongruent actions led to a larger involvement of attentional resources required for response inhibition which in turn impacted post-decisional markers of confidence (Error Positivity). These findings suggest that confidence computations are in part driven by how well individuals monitor their own actions, independently of how well they perceive sensory information.

TALKS 23
ATTENTION

ANTICIPATORY SACCADES REVEAL TASK-SPECIFIC TEMPORAL ANTICIPATION AND PROACTIVE MONITORING OF ACTION EFFECTS – AN ONLINE EYE TRACKING STUDY

Christina U. Pfeuffer[1], Sarah Lukas[2]; *[1]Catholic University of Eichstätt-Ingolstadt, [2]PH Weingarten*

Actions that are contingently followed by certain effects become bi-directionally associated with their effect features. By anticipating desired effects, we are able to select/plan corresponding actions and to proactively shift our attention towards the location of their future effects according to their expected delay (anticipatory saccades). Such anticipatory saccades prepare the future comparison of expected and actual effect and reflect a proactive effect monitoring process. Here, we used anticipatory saccades (between target offset and effect onset) to assess whether effects can be associated, anticipated, and proactively monitored task-specifically. In a task switching paradigm, correct left/right responses caused effects at predictable locations. For task 1, a correct left (right) response was associated with a short (long) effect delay (200/800 ms). Action-effect delay mappings were reversed for task 2. Most importantly, the first anticipatory saccade per trial towards a future effect occurred earlier when the effect delay was short rather than long. Thus, participants formed task-specific action-effect delay associations and task-specifically anticipated and proactively monitored the timing of their actions' future effects.

EMOTIONAL MODULATION OF THE GAZE CUEING EFFECT

Manon Mulckhuyse[1]; *[1]Leiden University*

Research on emotional modulation of attention in gaze cueing has resulted in contradictory findings. Some studies found a larger gaze cueing effect (GCE) in response to a fearful gaze cue, whereas others did not. A recent study explained this discrepancy within a cognitive resource account, in which perceptual demands of the task promote a bias towards either a local (discrimination task) or global (localization task) processing strategy. During local processing, the integration of emotional expression with gaze direction is assumed to be impaired, whereas during global processing integration is assumed to be facilitated. In a series of online experiments, we investigated the cognitive resource account.

Results showed faster orienting in response to a fearful face cue in a detection and localization task, but this effect diminished in a discrimination task. Inducing local and global processing strategies did not affect emotional modulation of attention. In contrast, Bayesian analyses provided evidence of absence of such an effect, demonstrating that local or global processing strategies cannot explain the mixed findings obtained in emotional modulation of gaze cueing.

SEARCHING FOR THE GOLDEN GAZE: HOW CONVERSATION PARTNERS ARE JUDGED DEPENDING ON GAZE BEHAVIOR - AND CONTEXT

Anne Böckler-Raettig[1], Eva Landmann[1], Lynn Huestegge[1]; *[1]Würzburg University*

Though the sensitivity to conspecifics' gaze is considered key in successful interactions, less is known about the 'semantics of gaze' in communication and cooperation. In two studies, listeners of dyadic conversations displayed various forms of *gaze behavior*, manipulated in terms of blink frequency, gaze direction, and direction and frequency of gaze shifts while listening to a speaker who told neutral or negative personal experiences (*emotional context*). Participants evaluated the listeners by freely attributing traits/states to them (experiment 1) or by rating them according to core trait/state categories identified in experiment 1 (experiment 2). We found systematic and distinct effects of gaze behavior on listener evaluation. E.g, rapid blinking and rapid changes in gaze direction were associated with restlessness, bewilderment, and irritation. Downward gaze, in contrast to sideways or upward gaze, was evaluated positively (e.g., as empathic, attentive, likable and open), especially in emotionally negative conversations. Our studies contribute to deciphering the role of gaze behavior in interactions and emphasize the context-dependency and semantic flexibility of gaze.

EXECUTIVE ATTENTION DEVELOPMENT AND TACTILE SENSORY PREDICTION: PERSPECTIVES FOR UNDERSTANDING NEURODEVELOPMENTAL DISORDERS

Marie Anquetil[1], Anne-Lise Marais[2], Victoria Dumont[2], Nadège Roche-Labarbe[2], Sandrine Rossi[1] ; *[1]University of Caen Normandie, LPCN UR-7452 UNICAEN, F-14000 Caen, France, [2]University of Caen Normandie, COMETE UMRS-1075 INSERM-UNICAEN, F-14000 Caen, France*

The first sensory experiences allow us to learn the patterns of the environment and form sensory predictions (SP). SP allows for effective suppression of the brain's processing of irrelevant sensory stimuli. Atypical SP has been demonstrated in neonates and children at risk [1,2], its relation with executive attention (EA) development still remains unknown. Atypical tactile SP at an early age could predict later attention dysfunction, both of them being part of the symptomatology of neurodevelopmental disorders [3]. In this study, we used 128-channel EEG to measure event-related potentials (ERPs) in a tactile oddball paradigm in 4 years old children (N=26). We compared the results with ERPs and performance in the Child-ANT, a child-friendly computerized task assessing EA [4], and with behavioural assessments of EA. We found that the children with a weaker suppression of the N140 response to repeated tactile stimuli have a higher response to cognitive conflict at the Child-ANT (N2 amplitude in incongruent condition), and a higher composite score at the BRIEF-P questionnaire reflecting impaired executive functions, which underlie EA. These results are the first to demonstrate a link between tactile sensory prediction and attention.

ATTENTION AND MEMORY EFFECTS OF GAZE AND ARROWS: IS GAZE SPECIAL?

Belén Aranda Martín[1], Juan Lupiáñez[1]; *[1] University of Granada*

Eyes are key for social communication, allowing humans to infer thoughts and intentions. While gaze may share attentional qualities with non-social directional stimuli, such as arrows, it also elicits unique effects possibly linked to the ability to convey intentionality. Gaze seems to not just orient attention to where but also to what the other person is looking at, potentially affecting the processing of gazed objects. In this study, we tested this hypothesis by using a version of the spatial interference paradigm. In each trial, participants had to identify gaze or arrow direction while irrelevant objects appeared on the same and opposite sides of the target. Our results replicated the attentional dissociation for arrows and gaze—respectively standard and reversed spatial congruency effects—and revealed important memory effects: participants showed better recognition of both pointed and gazed objects as compared to non-indicated ones. These findings provide insights into the interplay between orienting and memory and challenge the idea that gaze has a distinct effect on processing irrelevant objects compared to arrows. The nature of the attentional dissociation between gaze and arrows remains unsolved, requiring further research.

ATTENTIONAL BLUR AND BLINK: EFFECTS OF ADAPTIVE ATTENTIONAL SCALING ON VISUAL AWARENESS

Shuyao Wang[1], Aytaç Karabay[2], Elkan Akyürek[1]; *[1]University of Groningen, [2]New York University Abu Dhabi*

Attentional scaling is a mechanism allowing us to allocate our attention flexibly to larger or smaller regions, the role of which in visual processing has been established in previous studies. However, little is known about its role in modulating visual awareness. This study investigated how attentional scaling can be adaptively controlled and influence visual awareness. We employed

an attentional blink (AB) paradigm that highlights the temporal limits of attentional selection. The first target's location was either explicitly cued, block-wise or trial-wise, or implicitly learned. Narrow attentional scaling resulted in discrete awareness, whereas broader one produced gradual awareness. Mixture modeling was used to assess second target awareness across attentional scaling conditions. We found that participants were able to adjust attentional scaling through both explicit block-wise cues and implicit learning, leading to a gradual awareness (attentional blur). Trial-wise cues did not allow attentional scaling, causing more discrete target perception overall (attentional blink). Our study thus showed that attentional scaling could be adaptively controlled during the AB, leading to qualitatively different perceptual awareness.

TALKS 24
NUMERICAL COGNITION

EMBODIED COGNITION ON SNARC: THE EFFECTS OF HAND POSITION ON FOOT RESPONSES

Hakan ÇETİNKAYA[1], Müberra MAÇİN[2], Ezgi PALAZ[2], Seda DURAL[2]; *[1]Yaşar University, [2]Izmir University of Economics*

The embodied cognition framework proposes that the SNARC effect is grounded in our bodily experiences and the sensory-motor processes used to interact with the physical world. The palm-down hand position is usually associated with left-to-right finger counting, shown to be linked to the MNL, and is a typical posture in SNARC studies. Therefore, we predicted that the hand position might play a role in the SNARC. Thus, we examined the effect of various hand positions on SNARC performance using a parity judgment task that involves responding with the feet. Equal participants (Ntotal=60) were randomly assigned to one of three hand-position groups: palm-up, palm-down, or fingers interlaced. The SNARC slopes were compared to zero using one-sample t-tests and their Bayesian counterparts. Hence, the only significant SNARC effect was found in the palm-down position ($t(19)=-2.26$, $p=.04$; $BF10=3.54$, indicating a moderate evidence). These findings suggest that the palm-down position may provide proprioceptive cues of MNL-compatible hand position, which, in turn, facilitate the emergence of the SNARC effect. Therefore, the current study presents further evidence for the significant role of embodied cognition in spatial-numerical processing.

SPATIAL FREQUENCIES MODULATE SPATIAL-NUMERICAL ASSOCIATIONS

Xin Li[1], Jochen Laubrock[1], Arianna Felisatti[1], Martin H. Fischer[1]; *[1]University of Potsdam*

Previous research established associations of smaller vs. larger quantities with one's left vs. right side, respectively (Spatial-Numerical Association, or SNA). Its origins are currently debated. We hypothesize that this association originates from the Brain's Asymmetric Frequency Tuning (BAFT). According to BAFT, processing coarse vs. fine visual detail activates low vs. high spatial frequency channels in the visual system. These channels preferentially activate the right vs. left hemisphere, respectively. Here, we explicitly tested the BAFT hypothesis. Participants made speeded responses to either small or large numerosities. With standard dot patterns, we replicated a typical SNA effect. However, this effect disappeared when we controlled the spatial frequency of dot patterns. Our study provides the first direct evidence in favor of BAFT and points towards biological origins of SNA.

IS THE SNARC A LINEAR EFFECT?

Michele Vicovaro[1], Mario Dalmaso[2]; *[1]Department of General Psychology, University of Padova, Italy, [2]DPSS, University of Padova, Italy*

In research on the SNARC effect, participants classify numbers (usually the integers from 1 to 9) using lateralized response keys. ΔRT, the difference between the mean response times for right and left-side keys, is computed for each number. The SNARC is commonly measured by the slope of the regression line between the numbers and ΔRTs. The usage of the linear model is strictly connected with the hypothesis of a left-to-right mental number line, by which the ΔRTs are expected to decrease gradually (i.e., linearly) with number magnitude. However, the linear model is routinely applied without a careful consideration of its assumptions. Usage of a linear regression coefficient as a measure of the strength of the SNARC may corroborate the wrong impression that the effect itself is linear, while linearity pertains only to the model used to quantify it. In a large-scale online study using parity judgment and magnitude comparison tasks, we identified deviations from the linearity assumption and gained insights into the SNARC effect's nature. Furthermore, we explored alternative measures of the SNARC that do not rely on linearity.

THE TIME DEPENDENT EFFECTS OF MENTAL NUMBER LINE COMPATIBILITY UNDER DIFFERENT REPRESENTATIONAL CONTEXTS ON SPACE NUMBER ASSOCIATIONS

Ezgi Palaz[1], Hakan Çetinkaya[2], Seda Dural[1]; *[1]Izmir University of Economics, [2]Yaşar University*

Space-number associations (SNAs) usually refer to an increase from left to right. Responses are faster when the stimulus-response (S-R) relations are MNL-compatible (small-left/large-right). However, the direction of an SNA may be confounded by the representational context in effect. We studied the effects of S-R practices (MNL-compatible: small-left/large-right, and MNL-incompatible: large-left/small-right) under different representational

contexts (ruler: left-to-right increasing, clock: right-to-left increasing), as well as the transiency of these effects. A typical parity judgment task tested participants thrice (5 minutes, day, and week) after the S-R practices. The findings indicated that although the context effect was not significant, the effects of S-R practices varied in 5-min and day conditions. In the 5-min condition, the incompatible group showed a reversed SNARC, while the compatible group no SNARC. A day after, the reversed SNARC in the incompatible group disappeared, and a regular SNARC emerged in the compatible group. The results will be discussed regarding the changes in the long-term memory representations of SNAs and the memory consolidation processes of spatial numerical practices.

MEASURING GRIP FORCE FLUCTUATIONS DURING MENTAL ARITHMETIC

Oliver Lindemann[1], Alexej Michirev[2]; *[1]Erasmus University Rotterdam, [2]German Sport University Cologne*

New studies showed that the motor force with which participants hold an object is affected by simultaneously performed cognitive tasks due to language-inducted motor activations or spatial shifts of attention. The present study investiagted whether the measurement of spontaneous grip force fluctuations is suitable to track the perceived task difficulty during mental arithmetic. We examined moreover the presence of embodied signatures of the processing of numerical concepts in the grip force profiles over time. Participants were instructed to grasp and hold a force sensor while solving simple addition and subtraction problems with single-digit numbers. We observed an increased grip force during subtractions and during problems with negative result. Interestingly, these effects of problem difficulty were already visible at an early stage of the mental calculations, hundreds of milliseconds before participants gave the actual response. Grip force was moreover linearly modulated by the size of the first number in the arithmetic problem. The results demonstrate that the recoding of spontaneous grip force fluctuations provides a promising tool to study mental arithmetic and the effects of task difficulty during cognitive processing.

AGE-RELATED DIFFERENCES IN HOW NEGATIVE EMOTIONS INFLUENCE MATHEMATICAL COGNITION: A MEG STUDY

Camille Lallement[1], Thomas Hinault[2], Patrick Lemaire[1]; *[1]Aix-Marseille Université LPC & CNRS, [2]NIMH U1077 INSERM-EPHE-UNICAEN*

Previous research found decreased arithmetic performance under negative emotions and smaller deleterious effects of negative emotions in older than in young adults. Unknown are the neural correlates of such deleterious effects and whether these correlates change with age during aging, two issues that we addressed in the present study with magnetoencephalography (MEG). Young and older participants accomplished a computational estimation task under emotionally neutral or negative conditions. Behavioral data replicate previous findings of poorer arithmetic performance in the negative condition, particularly and even more so in young participants. MEG data revealed a decrease and a temporal shift in the activations of frontal, parietal, and occipitotemporal regions known to be crucial for arithmetic following strong activation of affective systems in the negative condition. Older adults showed weaker activations of the affective systems than young adults in the negative condition, accompanied by stronger and earlier activations of regions involved in arithmetic but also in cognitive control. These findings help further our understanding of mechanisms via which negative emotions influence arithmetic performance during aging.

SYMPOSIA – 16h40 to 18h20

SYMPOSIUM 19 - BERTELSON

MECHANISMS OF APPETITIVE AND AVERSIVE CONTROL: FROM COST-BENEFIT INTEGRATION TO COMPUTATIONAL PSYCHIATRY

Organizers: Eliana Vassena[1,2]; *[1]Experimental Psychopathology and Treatment, Behavioural Science Institute, Radboud University Nijmegen, The Netherlands; [2]Donders Institute for Brain, Cognition, and Behaviour, Radboud University Medical Center, Nijmegen, The Netherlands*

Symposium Abstract: Computational approaches to motivated behavior describe the mechanisms underlying control allocation and decision-making in appetitive contexts (when we strive to obtain rewards) and aversive contexts (when we attempt escaping threats or punishments). Rooted in decades of empirical work, models of control have focused on understanding how environmental and internal factors affect behavior, converging towards a critical tenet: core drivers - such as prospective benefits, punishments and inherent effort - must be integrated. The nature of this integration remains highly debated. Understanding its mechanistic foundation holds the promise to better tackle pathological alterations of motivated control, as observed across neuropsychiatric disorders. This symposium tackles the mechanisms of integration of critical control drivers: value and (effort)cost of information gathering, tracking of volatile threats, momentary fatigue, integration of reward and punishment, and altered sensitivity to reward and effort. Each talk harnesses the explanatory power of computational modeling to capture motivated control integration in a quantitative precise

manner, exploring opportunities and challenges for computational psychiatry applications.

THE VALUE AND COSTS OF GATHERING INFORMATION AND THEIR IMPLICATIONS FOR ATTENTION CONTROL

Jacqueline Gottlieb[1]; *[1]Department of Neuroscience, The Kavli Institute for Brain Science, The Zuckerman Institute for Mind Brain and Behavior, Columbia University, New York, NY, 10032*

Gathering reliable information is vital for survival. Recent studies have begun to explore how humans and experimental animals actively pursue information and the key role of this process in top-down attention control. However, a significant challenge concerns the distinction between information value and costs. Information is beneficial and intrinsically valued for reducing uncertainty, but obtaining and processing information entails significant costs of time and cognitive effort. Value and cognitive costs are naturally associated (higher value motivates higher effort) and their distinct computational and behavioral signatures have been difficult to identify. I will describe recent inroads we made into this question using computational modeling and neurophysiological recordings in the monkey parietal cortex. I will show that uncertainty- and reward-modulations are conveyed by distinct populations of cells. Reward modulations can enhance or suppress neural activity depending on context, and they differ based on whether information is exploited for operant reward gains or intrinsically valued as a good in itself. Finally, the results can be understood in a reinforcement metal learning framework that distinguishes between the valuation and implementation of an attentional policy, suggesting that top-down attention control emerges from an integrative theory of executive function.

NEURAL AND COMPUTATIONAL MECHANISMS OF MOMENTARY FATIGUE AND PERSISTENCE

Dr. Matthew Apps[1]; *[1]Centre for Human Brain Health, University of Birmingham, UK.*

Everyday people do demanding tasks that require the exertion of effort. This exertion can lead to sensations of fatigue. Cognitive research typically examines proxies of fatigue by measuring changes in behaviour with time-on-task, or takes subjective ratings of sensations of fatigue after extended periods of exertion. However, fatigue may fluctuate constantly and rapidly, increasing during exertion, and subsiding with rest. As a result, existing approaches have yet to uncover moment-to-moment fluctuations in fatigue, nor the underlying neural and computational mechanisms. Here, I present a new framework for momentary changes in fatigue. Across a range of studies I outline the computational mechanisms underlying how both sensations of fatigue and motivation fluctuate in physically and cognitively effortful tasks. In addition, I show how fronto-striatal systems track moment-to-moment changes in fatigue and fluctuations in the motivation to exert effort.

THE ELUSIVE RELATIONSHIP BETWEEN MENTAL HEALTH PROFILES AND VALENCE-RELATED BIASES IN REINFORCEMENT LEARNING

Zoe Koopmans[1], Stefano Vrizzi[1], Stefano Palminteri[1]; *[1]École normale supérieure et Institut National de la Santé et Recherche Médicale*

Experiential learning to maximise reward, and minimise punishment, is the theoretical basis of reinforcement learning (RL). Although both might seem computationally similar, their contrasting affect modulates learning behaviour. Humans tend to integrate incoming feedback with a positive valence more than feedback with a negative valence. This positivity bias is hypothesised to be further altered by mental health states. Additional to valence bias, we posit context-dependent value encoding as a relevant modulator of behaviour, and behavioural signatures of mental health profiles. In this study, we investigate how RL-based valence bias might be related to mental health profiles characterised by three novel psychiatric dimensions (Anxious depression, Compulsivity and Substance abuse), while fully accounting for contextdependent value encoding. While there is no robust evidence for a relationship between latent behavioural features and mental health profiles, we suggest the behavioural traits this task elicits, and our model characterises, might lack temporal sturdiness. This is supported by thorough replication but poor interindividual reliability of behavioural measures. In conclusion, we present a rationale for a reappraisal of task elicited mental health studies without reliability analysis. Furthermore, we advocate for systematic state versus trait analysis in task-related mental health approaches.

COMPUTATIONAL APPROACH TO MOTIVATION DISORDERS

Mathias Pessiglione[1], *[1]Motivation, Brain & Behavior (MBB) lab, Paris Brain Institute (ICM) Pitié-Salpêtrière Hospital, Paris, France*

Motivation deficits such as apathy are pervasive in neurologic and psychiatric diseases. They are currently assessed with psychometric scales that do not give any mechanistic insight susceptible to guide therapeutic intervention. Another approach has emerged lately that consists in phenotyping the behavior of patients in motivation tests, using computational models based on decision theory. Recent studies have established a mapping between specific neural components and distinct computational variables. Thus, fitting computational models to patients' behavior might allow

inferring the dysfunctional mechanism in both cognitive terms (e.g., hyposensitivity to reward) and neural terms (e.g., lack of dopamine). In this talk, I will present investigations that provide proofs of concepts for such a computational approach to motivation disorders. I will start with the case of dopamine and reward in Parkinson's disease, and then extend the approach to identify the computational features of other pathological conditions, such as hypersensitivity to effort during major depressive episode. In the end, computational phenotyping of motivation deficits should help adjust treatments for a more personalized medicine.

SYMPOSIUM 20

THE PSYCHOLINGUISTICS OF UNDERSTUDIED LANGUAGES

Organizers: Fernanda Ferreira[1]; [1]*University of California, Davis*

Symposium Abstract: Psycholinguistics has been dominated by the study of English and a few closely related Indo-European languages. Very little work has been done on the vast majority of languages across the globe. It has recently been pointed out that such a focus on one (or a few related) language(s) very much hinders cognitive science as a field (Blasi et al, in press). An increased investigation of understudied languages should be valuable for our understanding of what characteristics of language processing and linguistic representation may generalize and what aspects may be specific to particular languages or language groups. This symposium aims to help to diversify psycholinguistics and cognitive psychology more generally and hence to contribute to the development of psycholinguistic theorizing. The talks in the symposium address many issues of language processing and linguistic representation. The languages included in the research reported in this symposium include Hebrew, Murrinhpatha (a non-Pama-Nyungan Australian language), Pitjantjatjara (a Pama-Nyungan Australian language), Papiamentu (an Iberian-lexifier Creole), Hindi, Basque, Japanese, and Yélî Dnye (of Papua New Guinea).

EFFORT AND EFFORTLESSNESS IN THE DEVELOPMENT OF HEBREW WORD RECOGNITION: AN EXPERIMENTAL INVESTIGATION USING PUPILLOMETRY

Adi Shechter[1], David L. Share[1]; [1] *University of Haifa and Edmond J. Safra Brain Research Center for the Study of Learning Disabilities*

Rapid and seemingly effortless word recognition is a virtually unquestioned characteristic of skilled reading, yet the definition and operationalization of the concept of cognitive effort has proven elusive. We report convergent findings regarding the cognitive effort invested in word recognition by using pupil dilation as an index of cognitive effort. We previously observed a greater degree of cognitive effort for reading unfamiliar words compared to familiar words, among Hebrew-speaking adults (N = 30) and children (N = 30) (Shechter & Share, 2021). We also found that children invested more effort in reading than adults, as indicated by larger and sustained pupillary responses. However, within age analyses comparing faster (N= 10) and slower (N= 10) performers revealed that in both age groups, the faster readers demonstrated accelerated pupillary responses compared to slower readers, although both groups invested a similar overall degree of cognitive effort (Shechter, Hershman, & Share, 2022). Currently, we apply pupillometric methods to the study of printed word learning. This work has the potential to open up new avenues of research in the study of skill growth in word recognition and other domains of skill learning.

SENTENCE PLANNING AND PRODUCTION IN TWO AUSTRALIAN INDIGENOUS FREE WORD ORDER LANGUAGES

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Australian Indigenous languages possess many typologically unique features that are rarely studied in experimental psycholinguistics, with one notable feature being free word order. In the current paper we present two experiments investigating sentence planning and production in two Australian free word order languages – Murrinhpatha (non-Pama-Nyungan) and Pitjantjatjara (Pama-Nyungan). Adult native speakers of each language (Murrinhpatha, N = 43, Pitjantjatjara, N = 49) described a series of pictures depicting two-participant events while their eye-movements to the agent and patient referents were tracked. The agent and patient referents were manipulated for humanness (± humanness). Consistent with their free word order status of their languages, participants produced all possible word order combinations (excluding VOS in Murrinhpatha), with some variation predicted by humanness of the agent and patient referents. An analysis of eye-movements revealed that, in comparison to past studies on languages with less word order flexibility, Murrinhpatha and Pitjantjatjara speakers engaged in earlier relational encoding, evenly distributing their attention between agent and patient referents within the first 600ms post picture onset.

CHARACTERIZING PAPIAMENTO-DUTCH CODE-SWITCHING

Brechje van Osch[1], M. Carmen Parafita Couto[2]; [1]*UiT The Arctic University of Norway,* [2]*Leiden University and University of Vigo*

In this talk we will discuss how existing theoretical approaches stemming from different linguistic traditions may account for code-switched speech, with a specific focus on Papiamento-Dutch code-switching, an under-studied language combination. Papiamentu (an Iberian-lexifier Creole) is the first language of more than 80% of the population on the Caribbean islands Aruba, Bonaire, and Curaçao (the so-called ABC islands) (Kester, 2011), where it is an official language alongside Dutch and English. It is also spoken by around 100,000 Antillean migrants who reside in the Netherlands (Jacobs and Muysken, 2019). Addressing code-switching within the nominal domain (Determiner-Noun-Adjective combinations), we will present findings from a series of studies that investigate how Papiamento-Dutch bilinguals produce, judge, and process bilingual structures with different word orders. The results of the studies highlight the importance of taking extralinguistic factors into account, and the need for a data-driven, cross-disciplinary approach to the study of code-switching.

DOES LITERACY ENHANCE RETRIEVAL OF CONCEPTUAL REPRESENTATIONS?

Susana Araújo[1], Falk Huettig[2]; *[1]University of Lisboa, [2]Max Planck Institute for Psycholinguistics, Nijmegen*

Understanding the cognitive processes and representations which are shaped by learning to read and write is an important task for cognitive science. We conducted two experiments (one in Hindi, the other in Portuguese) with people of varying literacy levels to examine the hypothesis that reading experience sharpens the strength and precision of conceptual representations, allowing for their faster access and retrieval. We tested whether literacy influences conceptually driven naming, by examining visual naming of categories of stimuli in an under-studied non-WEIRD population of neurotypical illiterate adults (compared to matched literates). We observed that higher levels of literacy and formal education resulted in faster naming of (depicted) concepts, especially when conceptual involvement was more prominent and complex. Naming abstract concepts (e.g., colors) posed a much greater challenge to illiterate people than the naming of concrete concepts (e.g., every-day objects), whilst literates did not show such a strong category distinction. Our findings indicate that literacy acquisition shapes cognitive systems at the interface of visual and language processing, and may have a role in grounding abstract and concrete concepts.

THE TIME COURSE OF SENTENCE PLANNING IS SHAPED BY CROSSLINGUISTIC DIFFERENCES IN CASE MARKING

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It is not well understood how language processing adapts to the grammatical characteristics of different languages and which principles apply universally, primarily due to the lack of comparative crosslinguistic studies. We discuss a series of experiments, covering a wide range of languages, on the processing of verb-argument dependencies. Three production studies show that different forms of so-called ergative case systems (singling out agents as opposed to all other arguments) lead speakers to commit to utterance plans earlier than systems with unmarked agents (Hindi, Basque vs. German, and Yélî Dnye [Papua New Guinea] vs. Japanese). Such commitment is indicated in eye movements for intensive relational encoding to determine verb properties at the outset of planning. A study on German verb-medial and -final sentences suggests this is driven by a close link between agents and verbs (through case or adjacency). Neural activity in the EEG θ and α/β bands in Basque and Hindi shows that early commitment decreases processing load, suggesting a crosslinguistic trade-off between dependency signaling and flexibility in production. A broader coverage of diverse grammatical systems is needed to understand how grammar and processing interact.

SYMPOSIUM 21

COGNITIVE AND AFFECTIVE FACTORS UNDERLYING VACCINE DECISION-MAKING

Organizers: Stephan Lewandowsky[1], Angelo Fasce[2]; *[1]University of Bristol, [2]University of Coimbra*

Symposium Abstract: Vaccine hesitancy constitutes a long-standing phenomenon that hinders vaccination campaigns around the world. In this symposium, we will explore the cognitive and affective antecedents of vaccine hesitancy, with empirical results from five studies. (1) The validation of a psychometric instrument that is available in four languages and sheds light on the determinants of health professionals' vaccination behaviours. (2) A study using text modeling and psychological measures to identify distinctive profiles among hesitant individuals, thus enabling more targeted communications. (3) Experimental results, obtained in real consultations, to assess the impact of motivational interviewing on physicians' communication skills when interacting with hesitant parents with alternative lifestyles. (4) An experiment in which the framing of messages was manipulated to investigate how reactance motivates resistance to scientific information about vaccines. (5) A series of experiments in which the effectiveness of a novel intervention to tackle vaccine hesitancy, based on empathetic rebuttals, was tested. These investigations have been carried out

within the framework of two research projects funded by the European Commission: JITSUVAX and VAX.TRUST.

INTERNATIONAL VALIDATION OF THE PRO-VC-BE—AN INSTRUMENT MEASURING PSYCHOSOCIAL DETERMINANTS OF HEALTH PROFESSIONALS' VACCINE CONFIDENCE

Amanda Garrison[1], Linda Karlsson[2], Lisa Fressard[1], Stephan Lewandowsky[3], Angelo Fasce[4], Dawn Holford[3], Philipp Schmid[5], Cornelia Betsch[5], Fernanda Rodrigues[4], Emma Anderson[3], Frederike Taubert[5], Michelle Barden[3], Arnaud Gagneur[6], Eve Dubé[7], Peter Nynäs[8], Anna Soveri[2], Pierre Verger[9]; *[1]South-eastern Health Regional Observatory (ORS PACA), [2]University of Turku, [3]University of Bristol, [4]University of Coimbra, [5]University of Erfurt, [6]Université de Sherbrook, [7]Institut National de la Santé Publique du Québec, [8]Åbo Akademi University, [9]South-Eastern Health Regional Observatory (ORS PACA)*

Healthcare professionals (HCPs) play a key role in public vaccine uptake. However, research shows that HCPs with lower confidence in vaccinations are less willing to recommend vaccines to their patients. A comprehensive tool—the Pro-VC-Be—that measures vaccination confidence and vaccine-recommendation behaviours among HCPs has recently been developed and validated in French-speaking countries. In the present study, we have adapted the tool to be applicable in a wider range of countries and assessed the validity of this adapted tool—called the I-Pro-VC-Be—in HCP samples from France (N = 1213), Germany (N = 603), Portugal (N = 557), and Finland (N = 375). The results indicated that the I-Pro-VC-Be have good construct validity (the same factor structure as the original Pro-VC-Be) and criterion validity (the constructs predicted recommendation behaviours). In addition, the questionnaire showed measurement invariance between countries, indicating that the I-Pro-VC-Be measures the constructs in the same way in each country and is suitable for cross-national comparison of HCP vaccination confidence.

DETERMINING THE COGNITIVE FACTORS DRIVING ANTI-VACCINATION ATTITUDES FROM LINGUISTIC EXPRESSION

Dawn Holford[1], Angelo Fasce[2], Stephan Lewandowsky[1], Ezequiel Lopez-Lopez[3], Stefan M. Herzog[3]; *[1]University of Bristol, [2]University of Coimbra, [3]Max Planck Institute of Human Development*

Vaccine opposition tends to cluster around repeated argument themes that tap into different cognitive and affective motivations to believe those arguments—known as "attitude roots". Previous work identified 11 such attitude roots present in linguistic expressions of anti-vaccination argument. In our pre-registered study (data collection currently ongoing), we investigate whether psychological markers of individuals' attitude roots map onto their own linguistic expression of vaccine opposition. We recruited participants (target N = 570) with negative vaccination attitudes and asked them to explain in writing why they held this attitude. Participants then completed 11 different individual difference measures that represented the psychological constructs for the 11 attitude roots. We expect that participants who score higher on an attitude root's psychological construct will be more likely to produce reasons against vaccination that contain linguistic expressions of that attitude root.

CREATING A FAMILY-CENTRED APPROACH TOWARDS VACCINATION IN PORTUGAL

Joana Mendonça[1], Ana Patrícia Hilário[1]; *[1]Universidade de Lisboa*

Although Portugal has one of the highest childhood vaccination rates in Europe, there has been an increase of anti-vaccination groups in Portugal along with two outbreaks of measles in 2017. Findings from the VAX.TRUST project suggests that Portuguese vaccine hesitant parents usually rely on natural living practices as an immunity booster and an alternative to vaccination. These parents' 'alternative lifestyles' are often not acknowledged by healthcare professionals who draw on a paternalistic model of communication not responsive to individual characteristics and needs, and thus fostering vaccine hesitancy. Therefore, with the aim to improve the communication skills of healthcare professionals in their interaction with vaccine hesitant parents in-person educational sessions were developed. This was anchored on an evidence-based approach–motivational interviewing–which is based on a person-centred framework, replacing the current paternalistic one. It is expected that this intervention will increase the communication skills of healthcare professionals, and their perceived confidence when approaching vaccine hesitant parents. The results of this intervention will be available and shared accordingly at the time of the conference.

THE EFFECT OF PSYCHOLOGICAL REACTANCE AND MESSAGE FRAMING ON RESISTANCE TO SCIENTIFIC INFORMATION ABOUT VACCINES

Anna Soveri[1], Linda Karlsson[1], Angelo Fasce[2], Dawn Holford[3], Philipp Schmid[4], Jan Antfolk[5], Stephan Lewandowsky[3], Saara Nolvi[1], Max Karukivi[1], Hasse Karlsson[1], Linnea Karlsson[1]; *[1]University of Turku, [2]University of Coimbra, [3]University of Bristol, [4]University of Erfurt, [5]Åbo Akademi University*

Trait reactance (i.e., an individual's tendency to react with opposition when they feel their freedom of choice has been taken away) has been identified as a psychological motivation for science rejection. In the present experiment, we investigate the relationship between reactance and resistance to scientific information in the

context of vaccination by examining whether highly reactant individuals have already made their vaccination decisions before they have information about the vaccine. More specifically, we will provide vaccine-related information in two steps and measure if people's willingness to get vaccinated changes with more information, and whether the size of the change is related to their level of trait reactance. We also investigate whether potential effects of reactance are dependent on message framing (reactance eliciting, reactance mitigating, and neutral). The study has been preregistered and the data will be collected in the beginning of 2023. The study will provide information that can be used to develop effective vaccine-communication strategies.

THE EMPATHETIC REFUTATIONAL INTERVIEW: AN INTERVENTION TARGETING COGNITIVE AND AFFECTIVE MOTIVATIONS TO BELIEVE VACCINE MISINFORMATION

Dawn Holford[1], Stephan Lewandowsky[1], Philipp Schmid[2], Angelo Fasce[3], Alisa Srirat[1]; *[1]University of Bristol, [2]University of Erfurt, [3]University of Coimbra*

Effective corrections of misinformation need to go beyond simply refuting flaws in the misinformation and show an understanding of the cognitive and affective factors that motivate people to believe in it. In 5 experiments (total N = 2252), we tested a novel, multi-component intervention that addressed these motivational factors by eliciting individuals' concerns about vaccinations, affirming an individuals' cognitive or affective motivations, and only then correcting misinformed beliefs in a sensitive way and presenting factual vaccination information. We tested this intervention first individually against active control conditions, and then as a combined intervention against (i) a single active control and (ii) two partial interventions and a control. Overall, using a combination of empathy, sensitive corrections, and facts, helped increase vaccine acceptance while maintaining trust and support for the presented misinformation correction. Partial interventions that included some elements of refutation and facts presentation were also more effective than the control at addressing misinformation, but did not receive as much support from participants as the full intervention.

SYMPOSIUM 22

INFORMATION EXCHANGE BETWEEN THE WORKING MEMORY AND LONG-TERM MEMORY SYSTEM

Organizers: Melinda Sabo[1], Sam Verschooren[2], Eren Günseli[3], Ana Rodriguez[4], Vanessa M. Loaiza[5]; *[1]Leibniz Research Centre for Working Environment and Human Factors, [2]Humboldt University, Ghent University, [3]Sabancı University, [4]University of Zurich, [5]University of Essex*

Symposium Abstract: Although the strong relationship between working memory (WM) and long-term memory (LTM) is widely acknowledged, important questions concerning the nature of information exchange between the two systems are still unanswered. The current symposium seeks to explore potential solutions to some of these questions. Sam Verschooren will focus on evidence pointing towards the existence of a WM gating mechanism regulating information flow from LTM and perceptual sources. Similarly, Eren Günseli's talk will explore why reactivating LTM contents to WM might be beneficial when faced with perceptual distractors and how this mechanism might be subject to inter-individual differences. The necessity of reactivating LTM representations to WM will be further emphasized in the talk of Melinda Sabo, who will discuss how attentional selection guides goal-directed memory retrieval with the help of WM. Beyond information exchange, already stored LTM content can also boost WM performance through retrieval of the actual binding episode – a finding, which will be highlighted in the talk of Ana Rodriguez. Finally, Vanessa Loaiza will examine how WM binding deficits occurring in older age can be overcome in the context of a Hebbian learning paradigm.

EVIDENCE FOR A SINGLE MECHANISM GATING PERCEPTUAL AND LONG-TERM MEMORY INFORMATION INTO WORKING MEMORY

Sam Verschooren[1], Yoav Kessler[2], Tobias Egner[3]; *[1]Humboldt University, Ghent University, [2]Ben Gurion University of the Negev, [3]Duke University*

An influential view of working memory (WM) holds that its contents are controlled by a gating mechanism that allows for relevant perceptual information to enter WM when opened, but shields WM contents from interference when closed. In support of this idea, prior studies using the reference-back paradigm have found behavioral costs for opening and closing the gate between perception and WM. WM also frequently requires input from long-term memory (LTM), but it is currently unknown whether a similar gate controls the selection of LTM representations into WM, and how WM gating of perceptual vs. LTM sources of information relate to each other. To address these key theoretical questions, we devised a novel version of the reference-back paradigm, where participants switched between gating perceptual and LTM information into WM. We observed clear evidence for gate opening and closing costs in both cases. Moreover, the pattern of costs associated with gating and input source-switching indicated that perceptual and LTM information is gated into WM via a single gate, and rely on a shared

source-selection mechanism. These findings extend current models of WM gating to encompass LTM information, and outline a new functional WM architecture.

INDIVIDUAL DIFFERENCES IN WORKING MEMORY REACTIVATION OF LONG-TERM MEMORIES PREDICT PROTECTION AGAINST ANTICIPATED INTERFERENCE

Eren Günseli[1]; [1]*Sabancı University*

We bring previously acquired information to mind by reactivating memories. However, the factors that modulate memory reactivation remain unknown. We tested the effects of anticipating perceptual interference on reactivating long-term memories (LTM) in working memory (WM) using EEG. Participants saw a previously studied object that was tested after a brief retention interval. On some blocks, the retention interval contained perceptual distractors. We found that half of the participants reactivated memories in interference blocks (WM preparers) and the other half in no-interference blocks (LTM preparers), as measured by contralateral delay activity. Interference costs on behavior were smaller for WM preparers, suggesting that preparing against interference is more effective via WM vs the LTM. Moreover, contralateral alpha suppression, an index of spatial attention, disappeared during retention in anticipation of interference, mostly in WM preparers. These results indicate that individuals stopped attending to reactivated memories when anticipating interference, presumably to prevent the involuntary encoding of perceptual distractors. Together, these results suggest that reactivating LTMs in WM protects memories against interference.

ATTENTIONAL SELECTION IN GOAL-DIRECTED MEMORY RETRIEVAL. THE HIDDEN ROLE OF THE WORKING MEMORY SYSTEM

Melinda Sabo[1], Daniel Schneider[1]; [1]*Leibniz Research Centre for Working Environment and Human Factors*

Goal-directed long-term memory (LTM) retrieval involves the selection of task-relevant information, and it was shown to elicit fronto-parietal activations. Since this network was also linked to attention, this raises the question whether adaptation to a new set of top-down goals during LTM retrieval is supported by attentional selection. Our study aimed to test this assumption. Subjects were required to learn associations between objects and two positions. Next, the same objects were presented, together with a cue, indicating the relevance of only one vs. both previous positions. Thus, the selective cue condition demanded the adaptation of the LTM content to a new behavioral goal, while in the neutral cue the goal remained unchanged. The EEG decoding results of the second phase yielded a stronger increase of decoding accuracy after the selective cue. Likewise, a stronger theta power increase was observed after the selective cue, revealing the need for more attentional control resources for selecting the relevant position. We conclude that goal-directed retrieval requires the reactivation of LTM content, which is then transferred to working memory, where relevant information is selected via attention.

WHAT CHARACTERIZES THE LONG-TERM MEMORY REPRESENTATIONS THAT CONTRIBUTE TO WORKING MEMORY PERFORMANCE?

Ana Rodriguez[1], Lea Bartsch[1]; [1]*University of Zurich*

Previously, we found that episodic long-term memory (eLTM) enhances WM performance when both novel and previously learnt word pairs must be retained on a short-term basis. However, in case in which prior knowledge is experimentally manipulated (e.g., through pre-learnt word pairs like shoe-fish), the question remains, whether this prior knowledge boosts WM performance through a general item activation in semantic LTM (e.g., for the singleton words of shoe and fish) or whether it is the representation of the episode, including the binding between the single elements that is retrieved to WM (e.g., shoe-fish). To resolve this, we tested whether there is more to the availability of an episode in LTM (including the binding of item information to a context) than the availability of item activation in semantic LTM. Across two experiments we show that rather than general item activation, it is indeed the episode that contributes to WM performance specifically – yet only in case it is relevant to the task. If the WM task entails the recall of a list of words in serial order (shoe – fish – wine), the inclusion of words that were pre-learnt as pairs did not yield any benefit on neither recall nor recognition performance.

THE IMPACTS OF LONG-TERM REPETITION LEARNING ON AGE-RELATED BINDING DEFICITS IN WORKING MEMORY

Vanessa M. Loaiza[1]; [1]*University of Essex*

Although adult age differences in working memory (WM) are well known, prior work suggests that binding of intrinsic, conjunctive features (e.g., a shape's color) is less impaired than extrinsic, relational features (e.g., a shape's background color). The current project investigated whether this asymmetry in WM binding deficits is evident when individually calibrating encoding presentation rates (Experiments 1 and 2) and whether long-term repetition (i.e., Hebbian) learning improves binding memory for younger and older adults alike (Experiment 3). Each experiment comprised a visual WM task wherein three intrinsic (colored shapes) or extrinsic (shapes on colored backgrounds) items were presented at encoding, followed by immediate retrieval from three options for

each presented item: the target, a lure presented during the trial but not with that color, and a brand new item to the trial. The results suggest that older adults required slower presentation rates than younger adults to achieve similar retrieval from WM, but this pattern did not distinguish between intrinsic and extrinsic stimuli. Importantly, younger and older adults showed a similar benefit of long-term repetition to WM, indicating the malleability of binding deficits.

SYMPOSIUM 23

STUDYING (EMBODIED) EMOTIONS AND SOCIAL CONNECTEDNESS ACROSS DISCIPLINES

Organizers: Julia Folz[1], Christopher Riddell[1]; *[1]Leiden University*

Symposium Abstract: Emotions play a crucial role in building connections with others. The ability to express one's own and to appropriately respond to others' emotions has profound implications for social relationships. Different disciplines have examined the link between emotions and social connectedness using different time-scales, methods and considering different populations. While these individual insights are informative within their specific disciplines, an integrative approach can provide a more holistic understanding of this topic. This symposium will therefore feature diverse talks on emotions and social connectedness drawing from clinical, developmental, biological and social psychology. Speaker 1 will begin by introducing the development of basic emotions across ontogeny. Speaker 2 will then zoom in on brain activity related to a specific emotional response - blushing. A more applied perspective on the role of embodied emotions in judging politicians' trustworthiness will be provided by Speaker 3. Speaker 4 will highlight the role of connectedness to the self and to others in loneliness. Lastly, Speaker 5 will provide new perspectives on affective touch in depersonalization, informing sensory tactile-based interventions.

RECOGNITION OF BASIC EMOTIONS IN CHILDHOOD IS INFLUENCED BY PARTICIPANT-, TASK- AND STIMULUS-RELATED FEATURES: A META-ANALYTIC REVIEW

Christopher Riddell[1], Milica Nikolic[2], Elise Dusseldorp[1], Mariska E. Kret[1]; *[1]Leiden University, [2]University of Amsterdam*

Children's ability to accurately recognize emotional signals produced by those around them represents an important developmental milestone. A plethora of studies have examined when, and in which order, children acquire such knowledge. However, few attempts have been made to analyse this body of work quantitatively. Therefore, this meta-analysis examined the age-related trajectories of emotion recognition across childhood and the extent to which typically developing children's recognition of emotional cues (in the face, voice and body) is influenced by a host of participant-, task- and stimulus-related factors. A total of N=129 individual studies on 2-12-year-old children's recognition abilities were included. Accuracy across all emotion categories was above chance and improved with age. It was also moderated by region of study and task type. For specific emotions, happiness was the easiest emotion to recognize and disgust and fear were the most difficult. Task- and stimulus-related moderator variables also influenced specific emotion categories differently. These findings suggest a pattern broadly typical of previous qualitative reviews, and will be discussed in the context of children's burgeoning socioemotional development.

INTER-GROUP CONFLICT AFFECTS INTER-BRAIN SYNCHRONY DURING SYNCHRONIZED MOVEMENTS

H. Nathan Gamliel[1], M. Nevat[1], H. Z. Gvirts Probolovski[2], M. Karklinsky[3], S. Han[4], S.G. Shamay-Tsoory[1,5]; *[1]Department of Psychology, University of Haifa, Haifa, Israel; [2]Department of Behavioral Sciences and Psychology, Ariel University, Ariel, Israel; [3]Department of Computer Science and Applied Mathematics, Weizmann Institute of Science, Rehovot, Israel; [4]School of Psychological and Cognitive Sciences, PKU-IDG/McGovern Institute for Brain Research, Peking University, Beijing, China; [5]The Integrated Brain and Behavior Research Center (IBBRC), Israel*

Interpersonal synchrony refers to alignment in time of interacting individuals. Recent neuroimaging findings indicate that the inferior frontal gyrus (IFG) — a core region of the observation-execution system — is not only activated during tasks that involve synchrony, but also coupled between interaction partners, suggesting a key role for the IFG in mediating interpersonal synchrony. In this study we investigated whether inter-brain synchrony (IBS) is modulated by inter-group relationships. We examined this question in the context of the Israeli-Palestinian conflict — one of the world's most prolonged and intractable conflicts. Using functional Near Infra-Red Spectroscopy (fNIRS) hyperscanning, we measured IBS among ingroup vs. inter-group dyads (same-nationality dyads and Jewish-Palestinian dyads, respectively) while they performed a task entailing 2D movement synchrony. The results point to an increase in behavioral synchrony and greater enjoyment in the ingroup dyads, compared to the inter-group dyads. Critically, IBS in the left IFG significantly increased throughout task and it was higher among ingroup compared to inter-group dyads. Our findings highlight the effect of group membership on IBS plasticity.

"FEEL" THAT YOU CAN TRUST POLITICIANS? THE ROLE OF BODILY RESPONSES AND THEIR SENSATION IN TRUST JUDGMENTS

Julia Folz[1], Chujun Lin[2], Milica Nikolic[3], Mariska Kret[1], Piotr Winkielman[4]; *[1]Leiden University, [2]Dartmouth College, [3]University of Amsterdam, [4]University of California San Diego*

Voting for politicians in elections comes with a challenge: without knowing their personalities, we have to trust them to overcome selfish tendencies (e.g., engage in corruption) and take decisions for the common good. If no additional information is available, pictures in political campaigns can become the sole basis of trust judgments. Here, trustworthiness might not only be inferred from a politician's physical appearance. Accounts on the embodiment of emotions suggest that automatic bodily responses to affective displays, such as a smile on a campaign picture, may provide internal feedback and guide trust decisions. In the current study, we aim to examine whether smile mimicry to politicians' photos might indeed act as a mechanism in evaluating the trustworthiness of unknown US politicians who are convicted of corruption versus not. To further elucidate whether an accurate perception of bodily changes strengthens the integration of embodied smiles in trust judgments, a moderating role of interoceptive abilities, measured via the heart beat discrimination task and the MAIA-2, is explored. The findings of this study contribute to the growing literature on the role of emotions and their embodiment in political behaviour.

LENSES OF LONELINESS: INNER AND OUTER EMOTIONAL ASPECTS OF CONNECTION

Andrew Arnold[1]; *[1]Royal Holloway, University of London*

Social connection is a vital homeostatic need—and emotional clarity is currency for connection, both inner and outer. Here we deconstruct the experience of loneliness—perceived social isolation—through two lenses: emotional mimicry and self-reported interoceptive body trust. One manifests as the enactment of smile mimicry—a common, affiliative signal—conducive for seeding social connection. We show, with facial electromyography, that implicit smile mimicry is impaired in loneliness, but not in depression or introversion. Another lens of the incidence of loneliness is more intrapersonal—subjective body trust, an aspect of interoceptive sensibility. Interoception—perception and regulation of bodily states—increasingly appears critical for selfhood and emotional clarity, but it's relationship with the deleterious perception of loneliness remains indistinct. Our meta-analysis of a large dataset shows that diminished body trust is the key interoceptive sensibility feature of loneliness. Through outer and inner lenses, loneliness affects the individual, and one might surmise, may deconstruct emotional roots of the collective. Perhaps integrating inner and outer appraisals of our frailties can promote social connection, which we all need.

ESTRANGED FROM ONESELF, ESTRANGED FROM OTHERS: DEPERSONALISATION EXPERIENCES MODULATE VICARIOUS AFFECTIVE TOUCH AND SELF TOUCH

Anna Ciaunica[1], Jyothisa Mathew[2], Ophelia Deroy[3], Merle Fairhurst[2]; *[1]University of Lisbon, [2]Bundeswehr University Munich, [3]Ludwig Maximilian University Munich*

Depersonalisation (DP) is characterized by distressing feelings of being detached from one's self, body and emotions, often described as being "out of touch" with oneself. We conducted two online experiments looking at the relationship between non-clinical experiences of DP and vicarious affective touch and self-touch. In Experiment 1 we found that people with lower occurrences of DP rate the perceived pleasantness of imagined social touch as received by the self higher than if received by the other. By contrast, we found no difference in the perceived pleasantness of affective touch imagined as being received by the self vs the other in people with more DP experiences. In Experiment 2, we designed a new affective self-touch intervention to explore the effect of affective self-touch stroking on one's dorsal forearm on the perceived pleasantness and vividness of tactile experiences as being received by the self and others. We found that both low and high DP participants, following the affective self-touch intervention, report significantly higher ratings of vividness of tactile perception. These findings may have key implications for potential sensory tactile-based interventions for people experiencing distressing feelings of DP.

SYMPOSIUM 24

LEARNING (ABOUT) WORDS AND THEIR MEANINGS

Organizers: Xenia Schmalz[1], Tanja C Roembke[2], Tatiana Logvinenko[3], Heike Mehlhase[1], Alexandra Schmitterer[4]; *[1]Department of Child and Adolescent Psychiatry, Psychosomatics, and Psychotherapy, University Hospital, Ludwig-Maximilians-University Munich, Germany, [2]Institute of Psychology, RWTH Aachen University, Germany, [3](1) Sirius University of Science and Technology, Russian Federation, (2) Department of Child and Adolescent Psychiatry, Psychosomatics, and Psychotherapy, University Hospital, Ludwig-Maximilians-University of Munich, Germany, [4]University of Paderborn, Germany; DIPF Leibniz Institute for Research and Information in Education, Germany*

Symposium Abstract: Reading and spelling relies on the ability to learn, understand, and retrieve words. In this symposium, we present 5 studies focussing on different facets of learning and retrieving word knowledge. In the first two studies, we use experimental learning paradigms to assess how the visual-orthographic characteristics of words affect their learning in German-speaking primary school children. Contributions 3-4 focus on learning the meanings of words, in a behavioural learning study in German-English bilinguals (3) and in an ERP-study with Russian-speaking adolescents (4). The final contribution tracks the structure of semantic-lexical knowledge across childhood in German readers. Thus, we provide an in-depth investigation of various item- and participant-level factors that explain how readers can learn and use words, which is an integral aspect of literacy.

PAAZ OR PAHZ? THE RELATIONSHIP BETWEEN GRAPHOTACTIC KNOWLEDGE AND ORTHOGRAPHIC LEARNING

Xenia Schmalz[1], Heike Mehlhase[1], Kristina Moll[1], Gerd Schulte-Körne[1], Huachen Wang[2]; *[1]Department of Child and Adolescent Psychiatry, Psychosomatics, and Psychotherapy, University Hospital, Ludwig-Maximilians-University Munich, Germany, [2]School of Education, Macquarie University, Sydney*

Statistical learning ability may facilitate reading acquisition. To date, however, we know little about the causal chain that leads from statistical learning ability to successful reading. Here, we examine several potential mediators: sensitivity to legal letter patterns, orthographic learning, and orthographic knowledge. We tested 100 German primary school children on tasks measuring each of these potential mediators and on a standardised reading and spelling test. We found evidence for parts of the causal chain, leading from orthographic learning to orthographic knowledge and reading and spelling ability. However, we found no evidence for a link between sensitivity to graphotactic regularity or any of the reading-related skills. Thus, the causal role of statistical learning of letter clusters remains elusive.

SOUND-SYMBOL LEARNING AND THE RELATIONSHIP TO SPELLING IN FIRST GRADE CHILDREN

Heike Mehlhase[1], Jan Luis Sigmund[1], Gerd Schulte-Körne[1], Kristina Moll[1]; *[1]Department of Child and Adolescent Psychiatry, Psychosomatics, and Psychotherapy, University Hospital, Ludwig-Maximilians-University Munich*

Early spelling depends on the ability to understand the alphabetic principle and to translate speech sounds into visual symbols (letters). Thus, the ability to associate sound-symbol pairs might be an important predictor of spelling development. Here, we examine the relation between sound-symbol learning (SSL) and early spelling skills. The SSL-study is part of a longitudinal study assessing the development of spelling skills from kindergarten (T1: N = 445) until Grade 3. At T2 (mid of Grade 1), each child is tested on reading and spelling skills, on well-known cognitive predictors of literacy skills, and on the SSL-task, which requires the serial application of newly learned sound-symbol correspondences. We are still in the data collection phase. Correlation and regression analyses will be used to assess the predictive role of SSL in spelling. We expect that SSL will predict spelling skills after controlling for well-known cognitive predictors of spelling. Moreover, we expect better performance on the SSL task in good spellers compared to poor spellers. The results lead to a better understanding of spelling development. The SSL-task might be useful for early identification of spelling difficulties.

THE IMPACT OF OVERLAPPING MAPPINGS ON THE ACQUISITION AND RETRIEVAL OF WORD MEANINGS

Matilde E Simonetti[1], Tanja C Roembke[1], Megan G Lorenz[2], Iring Koch[1]; *[1]Institute of Psychology, RWTH Aachen University, Germany, [2]Augustana College*

Studying statistical word learning in conditions mimicking bilingualism could give us further insights into how statistical regularities are accumulated if multiple overlapping mappings are acquired. Thus, our study investigates statistical acquisition of words with multiple overlapping mappings, and how their learning differs from words that only map onto one meaning. Participants (N = 56) completed a cross-situational word learning task, in which they acquired both one-to-one (1:1; one word maps onto one object) and one-to-two-mappings (1:2; one word maps onto two objects) in learning phase 1 (LP1). In learning phase 2 (LP2), each word acquired as part of LP1 received one new meaning, thus allowing us to investigate how easily both 1:1 and 1:2 mappings are remapped. In addition to accuracy, we will analyse reaction times as a measure of retrieval ease of word meanings. We predict that even as it will be harder to acquire 1:2 than 1:1 mappings, it will generally be easier to remap 1:2 than 1:1 mappings. In addition, we predict that 1:2 words will be harder to retrieve than 1:1 mappings due to the competition of the two associated referents. Data collection is currently ongoing.

THE ROLE OF CONTEXTUAL CONSTRAINTS ON WORD MEANING RETRIEVAL IN READING

Elena Semenova[1], Alexandra Berlin[1], Anastasia Streltsova[1], Tatiana Logvinenko[2]; *[1]Sirius University of Science and Technology, Russian Federation, [2](1) Sirius University of Science and*

Technology, Russian Federation, (2) Department of Child and Adolescent Psychiatry, Psychosomatics, and Psychotherapy, University Hospital, Ludwig-Maximilians-University of Munich, Germany

Vocabulary contributes greatly to the reading comprehension, and at the same time, reading facilitates vocabulary learning. It is unclear, (1) how vocabulary learning processes rather than vocabulary skills are related to the process and outcome of reading comprehension; (2) what amount of contextual clues are sufficient to retrieve the meaning of a new word; (3) how the meaning retrieval from a context is reflected on the neurophysiological level. Here, we investigated meaning acquisition during reading in adolescents with different reading comprehension abilities (N = 40, aged 13 – 17). Participants read sentences containing pseudowords embedded in the context with no (1), little (2), or sufficient (3) amount of lexical clues to its meaning. EEG (128 channels), eye-movements and behavioral responses were recorded. First, we expect both task accuracy and reaction times to be strongly correlated to the reading comprehension performance after controlling for vocabulary skills. Second, we expect attention to the lexical clues (measured as visual fixations) to be an important predictor of efficiency in word-meaning unraveling. Finally, we expect N400 ERP to be modulated by the level of context constrain.

THE DEVELOPMENT OF THE THEMATIC SUPERIORITY EFFECT ACROSS MIDDLE CHILDHOOD

Alexandra Schmitterer[1]; *[1]University of Paderborn, Germany; DIPF Leibniz Institute for Research and Information in Education, Germany*

Recent studies show that young children but not adults are more sensitive to thematic than taxonomic relations in lexical retrieval tasks (i.e., thematic superiority effect; Unger et al., 2019). When and why does this effect subside? We present cross-sectional data of lexical retrieval tasks from preschool children, primary school children and adults. First, we expect to replicate the thematic superiority effect in German. Second, we assume that the difference between thematic and taxonomic sensitivity will be smaller in primary school children compared to preschool children - indicating a continuous development of this effect. Third, the Co-Occurrence Account (Sloutsky et al., 2017) assumes that taxonomic relations are derived from thematic relations. Since thematic knowledge (i.e., lexical representations based on collocations) has been found to drive vocabulary development, we assume that interindividual differences in vocabulary size should explain interindividual differences in the thematic superiority effect. Finally, since reading experience drives vocabulary development, we explore whether we can also link interindividual differences in reading fluency to variability in the thematic superiority effect.

Talks – Saturday

SYMPOSIA – 09H00 TO 10H40

SYMPOSIUM 25 – Invited Keynote

RECENT ADVANCES IN RESEARCH ON AUTOBIOGRAPHICAL MEMORY

Organizers: Dorthe Berntsen[1], *[1]Aarhus University*

Symposium Abstract: From being a relatively understudied area, autobiographical memory now is an aspect of memory that is extensively studied in a range of different domains of psychology, including clinical, developmental, neuropsychological, cognitive, personality and social psychology. This symposium provides a taste of some recent advances in the study of autobiographical memory, focusing on new insights on retrieval processes, the recollective experience of autobiographical memory, and how memory for the personal past relates to other aspects of memory and cognition. The symposium approaches these questions from both developmental, clinical, neurocognitive and individual differences perspectives. Individual talks address how involuntary (spontaneous) versus voluntary (strategic) retrieval forms relate to memory development in early childhood, to positive and negative dimensions of psychosis in schizophrenia and to the ability to imagine the personal future. Talks also address how autobiographical memory should be located in the conceptual space of episodic, semantic, and other commonly studied forms of memory as well as individual differences in the experience of autobiographical memory and how they relate to other mental dispositions.

VERBALLY REPORTED SPONTANEOUS MEMORIES IN YOUNG CHILDREN

Peter Krøjgaard[1], *[1]Aarhus University*

Asking direct questions like “Tell me all you remember about X” is the predominant method when examining autobiographical memories in young children. To respond to such questions, children will have to engage in strategic retrieval involving a deliberate and cognitively demanding search process. However, spontaneous retrieval is an important, yet until recently, largely overlooked, alternative mode of retrieval requiring less cognitive effort. Spontaneous retrieval is based on simple associations, typically triggered by distinct cues in the context, and as such neither a result

of questions asked nor of deliberate search strategies. Although most parents probably have experienced their children having spontaneous recollections, and even though involuntary memories—the 'adult' equivalent to spontaneous recall—have been examined extensively, surprisingly little is known about young children's spontaneous memories. I will review recent evidence on young children's spontaneous recollections. The findings suggest that spontaneous retrieval may be an ontogenetic forerunner of strategic retrieval of past events and thus an important component to a more complete understanding of the development of autobiographical memory.

INVOLUNTARY AUTOBIOGRAPHICAL MEMORIES AND THOUGHTS ABOUT THE FUTURE IN EVERYDAY LIFE: RESULTS FROM INTERVIEW STUDIES OF CHILDREN AND ADULTS

Lia Kvavilashvili[1], Ruth Ford[2], Heather Waddington[1], Ioanna Markostamou; *[1]University of Hertfordshire; [2]Anglia Ruskin University*

Although research on involuntary autobiographical memories and spontaneous future thinking is growing steadily, very little is known about the nature and prevalence of spontaneous past and future thoughts in children. In this talk, we will report findings from two studies in which 5-, 7-, and 9-year-old children and young adults completed a structured interview about their everyday experiences of involuntary autobiographical memories (Study 1) and three types of spontaneous thoughts about the future (Study 2): upcoming events, future intentions and hypothetical scenarios. Although some age differences were obtained in both studies (mainly between 5-year-olds and adults), the majority of participants claimed familiarity with the phenomenon in question, reported experiencing it occasionally to regularly, and were able to provide valid examples of such experiences in their everyday life. The relative age invariance in metamemory for involuntary memories and future thoughts suggests their ubiquity in everyday life and supports the idea that developmentally they precede voluntary forms of memory and prospection.

DIFFERENTIATING AUTOBIOGRAPHICAL MEMORY COMPONENTS' RELATIONSHIP WITH PSYCHOSIS DIMENSIONS

Mélissa C. Allé[1], *[1]University of Lille*

Autobiographical memory has been found to be severely impaired in schizophrenia. Yet, recent studies found that involuntary remembering presents a remarkable opposite pattern, showing an enhancement of some features of autobiographical memories in people being part of the psychosis continuum. Intending to disentangle these discrepancies, we thoroughly investigated how various dimensions of autobiographical memory (i.e., involuntary memory, autobiographical recollection, self-concept and self-awareness) vary as a function of positive-and negative-like symptoms of psychosis. We found that both positive and negative dimensions of psychosis to be related to an increase in involuntary autobiographical memories, and at the same time, to lower self-concept clarity and self-awareness. Positive and negative dimensions of psychosis also correlated oppositely with autobiographical recollection characteristics, measured at both trait and state levels. Positive-like symptoms (in particular hallucination-proneness) showed a stronger and more consistent pattern of correlations than negative ones. Cognitive mechanisms underlying the different relationships between autobiographical memory and psychosis dimensions will be discussed.

EXPANDING LABORATORY-BASED CONCEPTS OF MEMORY FOR AUTOBIOGRAPHICAL MEMORY AND BEYOND

David C. Rubin[1], *[1]Duke University*

I present a model that places episodic, semantic, and other commonly studied forms of memory studied in the laboratory into a conceptual space that can also account for phenomenon that occur outside the laboratory including autobiographical memory. The space is defined by three dimensions required for Tulving's episodic and semantic memory. An implicit–explicit dimension contrasts both episodic and semantic memory with common forms of implicit memory. A self-reference dimension contrasts episodes that occurred to one person with semantic knowledge. A scene dimension contrasts episodes that occurred in specific contexts with context-free semantic information. Because the dimensions have properties that extend throughout the conceptual space, they go beyond that needed for semantic and episodic memory to forms of well-studied existing and yet to be studied forms of memory. Empty locations in the space can be filled with existing phenomena that lack a clear place in current theories of memory, including reports of episodic-like memories for events reported to but not witnessed by a person, fictional narrative accounts, déjà vu, and implicit components contributing to personality, the self, and autobiographical memory.

INDIVIDUAL DIFFERENCES IN THE EXPERIENCE OF AUTOBIOGRAPHICAL MEMORIES

Dorthe Berntsen[1], *[1]Aarhus University*

The study of autobiographical memory generally has followed the leads of cognitive psychology more broadly and studied memory

characteristics that apply across people rather than individual differences. The typical autobiographical memory study examines memories for individual events, or theoretically motivated categories of memories, compared across conditions or groups. By its nature, such research treats individual variability as error variance, which is radically different from an approach that examines stable individual tendencies across different types of memories of past events. The Autobiographical Recollection Test (ART) was introduced to examine individual differences in the experience of autobiographical memories. The ART comprises seven theoretically motivated and empirically supported interrelated aspects of recollecting autobiographical memories: reliving, vividness, visual imagery, scene, narrative coherence, life-story relevance, and rehearsal. I present evidence that the ART predicts recollective qualities of individual memories, memory confidence, but not accuracy, the tendency to engage in various forms of spontaneous cognition, characteristics of dreams and dreaming, as well as positive affect and wellbeing.

SYMPOSIUM 26

WRITING FLUENCY: EXPLORING ITS DEVELOPMENT, IMPACTS, DETERMINING FACTORS, AND VARIABILITY

Organizers: Lisa Haake[1], Joachim Grabowski[1]; *[1]Department of Psychology*

Symposium Abstract: Writing fluency has become a crucial component and predictor of individual writing competence that unveils information about the cognitive effort a writer must exert during text composition: When the cognitive demands of a writing task at hand exceed the available resources, writers slow down, pause, or commit errors, thus prompting a less fluent text compilation. In contrast to reading or speaking, for instance, where by and large performance is the result of automatized processes, most writing processes require actively merging retrieved knowledge and skills as fluently as possible. While in the literature the definition of the concept is vague, and its contribution to text quality has not been fully clarified, empirical findings suggest that writing fluency is affected by experience with and knowledge about writing that varies with handwriting/typing skills, linguistic experience, language proficiency, available cognitive resources, and between text genres. The present symposium aims at synthesizing current understandings of and recent findings on the construct of writing fluency. In doing so, we seek to contribute to future directions in teaching and learning how to write.

WRITING FLUENCY: FROM GRADE 2 TO UNIVERSITY STUDENTS

Afra Sturm[1]; *[1]Literacy Centre, University of Applied Sciences Northwestern Switzerland*

The basis for this presentation are three independent studies, conducted in the German part of Switzerland: Study 1: The central aim (N=317) was to clarify how writing fluency can be fostered in grade 4/5 (integrated in text generation). Study 2: One goal of this cross-sectional study (N=450) was to assess writing and reading fluency of students in grade 2–9. Study 3: This study (N=254) compared writing fluency among freshmen in two programs (education and social work). All studies assessed writing fluency with the same measurement, consisting of a 3 minute writing activity. In study 2 a fluency reading test was also used. In study 1 regression analyses were completed to determine the relationship between writing fluency and text quality (narrative and instructive texts): In grade 4 correct syllables accounted for 17 % resp. 16 % of the variance in students' overall writing scores. Comparing fluency over all studies, older students outperformed younger students on all the scoring indices. With regard to gender differences, girls outperformed boys on measures of writing fluency at all grade levels. Reading fluency correlates moderately to strongly with writing fluency, depending on the indices.

PEN MOVEMENT FLUENCY IN STRUGGLING FIRST GRADE WRITERS COMPOSING TEXT BY HAND

María Arrimada[1], Jens Roeser[2], Mark Torrance[2]; *[1]Departamento de Psicología, Sociología y Filosofía, Facultad de Educación, Universidad de León, España, [2]Department of Psychology, School of Social Sciences, Nottingham Trent University, Nottingham, UK*

Pen movement fluency during text composition can be captured in terms of stops – count and duration of periods when the pen-tip is stationary, lift duration – time when pen exerts no pressure on the page controlling for displacement distance – and velocity fluctuation – count of non-essential velocity peaks when the pen is moving.
These measures were taken from 161 first grade students writing narratives with smart pens. 36 were identified as struggling writers on the basis of slow learning and poor text quality in multiple written-composition tasks completed during their first school semester. We compared this group with their peers at two timepoints, separated by 10 weeks. During this period struggling writers received additional support in transcription. Analysis with Bayesian mixed-effect mixture models found evidence for longer lifts and stops in struggling students, with a decrease in duration for both groups, particularly in struggling students. Velocity fluctuation also decreased substantially but was similar for both groups. These findings suggest effects of written-composition ability on fluency

tend to be associated with orthographic retrieval and other pre-motor processing rather than with motor control.

EXPLORING WRITING PROCESS FLUENCY IN TWO LANGUAGES AND TWO GENRES AND ITS RELATION TO TEXT QUALITY

Nina Vandermeulen[1], Maria Levlin[1], Christian Waldmann[2], Eva Lindgren[1]; *[1]Umeå University, [2]Linnaeus University*

The aim of this study on 158 upper-secondary students' writing processes was two-fold. First, we explored whether language (L1, Swedish/L2, English) and genre (argumentative/ narrative) have an impact on a set of fluency-related aspects of the writing process. Second, we related the process to the text quality and explored effective writing process patterns. A total of 33 keystroke logging variables related to several writing process aspects (general production and timing, higher order pauses, lower order pauses, production speed, and revision) in various episodes of the process (beginning-middle-end) was taken into account. We used mixed model analyses to explore effects of language and genre on the process, and multiple regression analyses to explore effective writing process patterns. Results showed that students adopt a different writing approach according to the language in which they write and the task genre. Moreover, we identified effective writing process patterns for each language-genre combination. A reduced set of four to five fluency-related predictor variables could explain between 56% and 69% of the variance in text quality.

THE EFFECT OF EXECUTIVE CONTROL SKILLS ON WRITING FLUENCY AT VARYING LANGUAGE PROFICIENCY LEVELS

Lisa Haake[1]; *[1]Department of Psychology, University of Hannover*

The present study examined how low-level executive control skills contribute to writing fluency in descriptive and essay writing at varying language proficiency levels. Sixty students completed two writing prompts in English as a foreign language. Recorded keystroke data was used to assess pausing, production, and revising features of the writing process. Further, participants completed an English placement test, a copy task, and multiple executive control paradigms, assessing inhibition, shifting, and updating skills. Mixed effect models revealed significant interaction effects between inhibition skills and language proficiency on fluency measures related to revising: Students with good language and inhibition skills revised less frequently and produced more characters between revisions while inhibition skills had no effects on revising at low proficiency levels. However, executive control skills had no effects on pausing behavior and production rates. Results suggest that the effect of executive control skills on writing fluency is not independent but seems to depend on language skills.

FLUENCY MANIPULATION THROUGH REAL-TIME FEEDBACK DURING TEXT PRODUCTION, AND ITS EFFECTS ON PRODUCT AND PROCESS MEASURES

Emily Dux Speltz[1], Jennifer Godbersen[1], Evgeny Chukharev-Hudilainen[1]; *[1]Department of English, Iowa State University*

Text production fluency is often measured as the number of characters produced in a period of time. However, recently proposed measures that are based on the duration of inter-keystroke intervals at various linguistically-relevant locations (e.g., sentence-initial, word-initial, word-medial) and on transitions of the point of inscription during text production (i.e., cursor movements within the text) provide more fine-grained insight into the nature and causes of dysfluencies. Since dysfluencies are often theorized to negatively affect the quality of writing, it is desirable to attempt interventions that explicitly target fluent text production. In this presentation, we discuss operationalizations of production fluency measures based on concurrent keystroke and eye-movement data, and present a series of experiments that directly manipulate text-production fluency by encouraging or suppressing behaviors associated with pausing and inscription-point transitioning. Our findings indicate that fluency is amenable to direct manipulation through real-time feedback. However, the effects of fluency manipulation on written-product measures, such as writing quality, are complex and dependent on task and participant characteristics.

SYMPOSIUM 27

COGNITIVE OR AUTOMATIC? UNPACKING THE NATURE OF MISMATCH NEGATIVITY AS AN ERP COMPONENT

Organizers: Thomas Lachmann[1], Ann-Katrin Beck[1]; *[1]University of Kaiserslautern-Landau*

Symposium Abstract: Mismatch negativity (MMN) is an event-related potential (ERP) component that reflects the brain's response to unexpected or deviant stimuli. The question of whether MMN is automatic or cognitive in nature is a thoroughly controversial issue in the literature. Some researchers argue that MMN reflects a purely automatic process that occurs pre-attentively and reflects the brain's ability to detect changes in the environment without conscious recognition. Others argue that MMN does reflect cognitive processes that require attention and awareness, as the brain must actively compare the deviant stimulus with previous standard stimuli to detect the mismatch. Recent studies have

provided evidence for both automatic and cognitive aspects of MMN. Overall, it seems that MMN is a complex ERP component that involves both automatic and cognitive processes. While MMN can be generated without attention, it may be modulated by attention and cognitive resources, suggesting that the brain may use both automatic and cognitive processes to detect and respond to unexpected stimuli in the environment.

N1 PREDICTION IS IMPAIRED IN AUTISM WHEN FAST UPDATING IS REQUIRED

Merav Ahissar[1], Yarden Weiss[1], & Nathaniel Zuk[1]; *[1]The Hebrew University, Jerusalem*

Autism diagnosis has increased immensely, and its estimated prevalence is now ~2 % of the population. Though diagnosed mostly for difficulties in non-verbal communication, autism is also associated with atypical perceptual and motor performance. We have recently proposed that people with autism are slow in their updating both perceptual priors (Lieder et al., Nat. Neurosci 2019) and motor programs (Vishne et al., Nat. Comm. 2021). We now reasoned that slow-updating may be manifested in the magnitude of EEG responses. We tested it in N1 responses to tones. We designed a novel protocol where effective predictions can be made only with fast update: sounds were presented in 5-tone blocks, with either 0.5. 1. or 1.5 s inter-tone intervals. Each block had a fixed interval, but the order of the blocks was random, with 10, 15 or 20 s inter-block intervals. Hence the timing of the first tone in each block was surprising; in the 0.5s block - so was the timing of the second tone – since participants could not predict which block is presented. However, following the second tone, the timing of the remaining 3 tones was fully predictable. In neurotypical adults, the magnitude of N1 fully matched this dynamics – no reduction between first and second response, and a step reduction in the third. By contrast, in carefully matched (for age and reasoning skills) people with autism – reduction was continuous and gradual. We conclude that people with autism do not quickly update their perceptual predictions for stimulus timing.

FLEXIBILITY OF NEURONAL PROCESSES: EFFECTS OF COGNITIVE RESOURCES ON VMMN

Ann-Kathrin Beck[1], Daniela Czernochowski[1] & Thomas Lachmann[1,2]; *[1]Cognitive and Developmental Psychology, University of Kaiserslautern-Landau; [2]Centro de Ciencia Cognitiva, Facultad de Lenguas y Educacion, Universidad Nebrija, Madrid, Spain*

Several studies suggest that the system underlying the auditory mismatch-negativity (MMN) categorizes a continuous auditory input at an abstract level; it is assumed that the auditory MMN reflects automatic and pre-attentive processing of information. In contrast, automatic acquisition of novel visual categorical information is evident relatively late (around 350–600 ms after stimulus presentation). Hence, we present the result of three experiments investigating whether the visual system, reflected by the visual mismatch-negativity (vMMN), exhibits such early categorization. In Experiment 1 and Experiment 2, an oddball paradigm and a Bayesian analysis of vMMN was employed with the aim to test whether or not categorical information modulate the vMMN. Based on these results, in Experiment 3 an oddball paradigm was combined with a n-back task. In Experiment 1 and Experiment 2 categorical information did not modulate the vMMN, whereas in Experiment 3 categorical information did modulate the vMMN. Note, that in all experiments the encoding of categorical information was task-irrelevant. Thus, the results suggest that the system underlying the vMMN can exhibits early categorization. However, the results also emphasize the flexibility of the neuronal processes to encode categorical information depending on cognitive resources.

THE DEVIANT, THE NOVEL, AND THE RARE EVENT: REVISITING DIFFERENT MECHANISMS OF AUTOMATIC CHANGE DETECTION IN AUDITION

Stefan Berti[1], *[1]Department of Psychology, Johannes Gutenberg-University Mainz, Mainz, Germany*

Automatic detection of rare events in the environment is an important prerequisite for adaptive behavior, especially in a dynamically changing world. For auditory information processing, this function is often studied in terms of the processing of deviant stimuli and the associated mismatch negativity (MMN) in the human event-related potential (ERP). However, deviants are not the only relevant rare events that must be reliably detected. Comparing auditory information processing of different rare stimuli suggests that different mechanisms enable the detection of potentially relevant changes in the environment. A comparison of three studies applying different stimulus types (deviants, novels, and rare stimuli) shows that the MMN is only one mechanism of auditory change detection. At the same time, the ERPs also reflect an interesting dynamic of these different mechanisms. The auditory system seems capable to switch effectively between different modes of change detection. Unfortunately, there is little systematic research of these different mechanisms together. One open question for future research is how these mechanisms interact to enable efficient detection of different changes in the environment.

WHAT CAN WE LEARN FROM THE MOTOR-SENSORY OMISSION RESPONSE? INSIGHTS INTO PREDICTION AND SIMILARITIES TO THE MMN

Tjerk T. Dercksen[1, 2], Andreas Widmann[1, 3], & Nicole Wetzel[1, 2, 4]; *[1]Research Group Neurocognitive Development, Leibniz Institute for Neurobiology, Brenneckestraße 6, 39118, Magdeburg, Germany; [2]Center for Behavioral Brain Sciences, Universitätsplatz 2, D-39106, Magdeburg, Germany; [3]Wilhelm Wundt Institute for Psychology, Leipzig University, Neumarkt 9-19, D-04109, Leipzig, Germany; [4]University of Applied Sciences Magdeburg-Stendal, Osterburgerstraße 25, 39576, Stendal, Germany*

When a motor action is reliably coupled to a stimulus, that is, an action effect, the unexpected omission of that stimulus results in a brain response that is measurable using EEG. This is thought to be the result of a forward model that predicts the sensory stimulus, where in the case of omission a mismatch between prediction and (lack of) input results in a prediction error response. In contrast to omission MMN studies, the omission response from actioneffect couplings is elicited at long and irregular interstimulus intervals and shows distinct components that are robustly elicited across studies. In my talk, I will discuss these omission responses based on two studies. In the first study, motor-auditory omission responses will be discussed when sound predictions are identity-specific and identity-unspecific. Whereas previous research had only shown omission activity in response to identify-specific predictions, this study reveals attenuated and selective activity also for identity-unspecific predictions. This has been shown in adults and 6-8-years-old children. The second study demonstrated a motor-somatosensory omission response for the first time. In combination, this allows for a detailed analysis of motor-sensory omission including aspects of attention and development in which parallels with the stimulus-evoked MMN will be further explored.

FUNCTIONAL SIGNIFICANCE OF VMMN: PREDICTIVE MODEL UPDATING?

Motohiro Kimura[1]; *[1]National Institute of Advanced Industrial Science and Technology (AIST), Tsukuba, Japan*

When individuals observe an object changing its position along with certain rules, the brain automatically forms a prediction regarding the future position of the object. Because of such prediction, when the object deviates from the rules, the brain automatically generates prediction error responses, visual mismatch negativity (VMMN). Regarding the functional significance, VMMN has been theoretically associated with the updating of predictive model, but empirical evidence is still sparse. To address the relationship between VMMN and model updating, we examined the relationship between VMMN and a prediction-related illusion called representational momentum (RM). That is, the present study regarded the size of RM modulation caused by stimulus deviations as the correct value of the degree of model updating and examined the relationship between the sizes of VMMN and RM modulation caused by stimulus deviations. The results showed that the sizes of VMMN and RM modulation showed a roughly similar trend, supporting the significant involvement of VMMN in the model updating. However, they did not show completely the same trend, suggesting that VMMN does not represent the whole processes regarding the model updating; rather VMMN would represent a part of the model updating processes or a triggering of the model updating processes.

MARKOV CHAINS AS A USEFUL NARRATIVE FOR INVESTIGATING THE PREDICTIVE PROCESSING OF EVENT SEQUENCES

Erich Schröger[1] & Nina Coy[1]; *[1]Wilhelm Wund Institute for Psychology, Leipzig University*

Events not conforming to a rule inherent to a sequence of events elicit prediction error signals of the brain (e.g. Mismatch Negativity, MMN), rule conforming events elicit match signals (e.g. stimulus-specific adaptation, SSA). MMN, SSA and the like are often explained within predictive processing theories according to which the brain utilizes detected rules to predict the forthcoming event. Despite the fact the respective (e.g. MMN) experiments are often designed in terms of event probabilities, the rules are actually characterized by the transition probabilities between events. A mathematical model describing and generating event sequences are Markov chains. On the basis of the current event and the transition probability matrix, the next event can be predicted, it's accuracy depending on the distribution of the transition probabilities. Here, we unfold this idea for MMN research. We argue that the transition probability matrix can be regarded as a proxy of the generative model / memory that the brain uses to predict the next event. The detected regularities are suggested to correspond to (a subset of) the entries of the matrix. We show results for interesting transitions beyond the standard to deviant transition.

SYMPOSIUM 28

INTERACTION OF PERCEPTUAL ATTENTION AND ATTENTION TO INFORMATION HELD IN WORKING MEMORY

Organizers: Agnes Rosner[1], Evie Vergauwe[2]; *[1]Leibniz University Hannover, [2]University of Geneva*

Symposium Abstract: We can attend to information in the world (perceptual attention) and to information we currently keep in working memory (attention to remembered episodes or concepts). It has been proposed that both forms of attention interact on a shared representation in memory, a so-called priority map (Awh,

Belopolsky, Theeuwes, 2012; Theeuwes, 2018). So far, this interaction is not well understood. On the one hand, there is convincing evidence that information in working memory can affect perceptual attention. Items held active in working memory can function as search templates for perceptual attention (Oberauer, 2019; Olivers, Peters, Houtkamp, & Roelfsema, 2011). On the other hand, the evidence for an influence of perceptual attention on information currently held active in memory is mixed. This symposium aims to discuss recent research on when and how information held in working memory interacts with perceptual attention and what we can learn about attention to information in memory from studying its interaction with perceptual attention. This symposium will bring together researchers using a variety of behavioral paradigms, ranging from visual search to immediate recall, and methods including eye-tracking and EEG.

IS THE VALUE EFFECT IN WORKING MEMORY DRIVEN BY PREFERENTIAL ENCODING? AN EXAMINATION USING EYE-TRACKING

Amy L. Atkinson[1], Richard J. Allen[2], Amanda H. Waterman[2], Tom Beesley[1]; *[1]Lancaster University, [2]University of Leeds*

There is now strong evidence that individuals can direct their attention towards particularly valuable information in working memory. One possibility is that this effect results from participants preferentially encoding high value information. We examined this using eye-tracking. In Experiment 1, participants were presented with simultaneous arrays of coloured shapes. After a brief delay, the outline of one shape was presented and participants recalled the colour using a colour wheel. Prior to the encoding phase, participants were either told that one item was more valuable than the rest or that all items were equally valuable. Results showed that participants fixated on the location of the high value item for longer during encoding relative to low value items in the array. Participants also fixated longer on high value items relative to the condition where all items were equally valuable. Follow-up experiments then examined this in a variety of task contexts. Taken together, these experiments provide evidence that value effects in working memory at least partially reflect preferential encoding of high value information.

HOW DOES PERCEPTUALLY PRESENTED INFORMATION AFFECT PRIORITIZED INFORMATION IN WORKING MEMORY?

Caro Hautekiet[1], Naomi Langerock[1], Evie Vergauwe[1]; *[1]University of Geneva*

In the past years, researchers have investigated how perceptually presented information affects prioritized information in working memory. However, the results remain unclear. On the one hand, several studies found that information in the focus of attention in working memory is protected from passively presented perceptual interference, while performance for other information outside the focus of attention is diminished by the presented interference (e.g., van Moorselaar et al., 2015). On the other hand, multiple studies demonstrated that information in working memory is substantially affected by the presented interference and that this is particularly the case for information in the focus of attention (e.g., Allen & Ueno, 2018). In this talk, a series of 5 experiments will be presented that demonstrate that information in working memory, be it in the focus of attention or not, is not as vulnerable to perceptual interference as commonly assumed.

NO EFFECT OF WORKING MEMORY ON LEARNING AND STORING INFORMATION

Jan Theeuwes[1]; *[1]Vrije Universiteit Amsterdam*

Priority maps are winner-take-all neural mechanisms that are thought to guide the allocation of covert and overt attention within visual space. Within these maps, attentional priority is coded as weights on a topographic representation of physical space. Research has shown that through statistical learning, these weights of the spatial priority map are adjusted to the regularities that exist in the outside world. While previous studies have shown that working memory affects attentional selection, the current study shows that learning and storing information regarding the regularities in the environment is not affected by the current working memory content or load. Indeed, whether or not visual or spatial working memory was full had no effect on attentional selection processes. The results suggest that learning to extract and store regularities from the environment operates outside working memory, suggesting that it relies more likely on long-term memory processes.

WHICH INFORMATION IS RETRIEVED FROM WORKING MEMORY IN AN ASSOCIATIVE-RECOGNITION TEST? EVIDENCE FROM EYE MOVEMENTS

Ruhi Bhanap[1], Klaus Oberauer[1], Agnes Rosner[2]; *[1]University of Zurich, [2]Leibniz University Hannover*

The focus of attention (FoA) is a selection mechanism in working memory that can hold one item-context binding (e.g., item and location). This requires people to strategically prioritize which information to attend to at each timepoint. Research on the looking at nothing (LAN) behaviour has shown that eye movements can reveal this prioritization as people shift their attention to a location associated with the retrieved information even if the position is blank. In this study, we employed LAN to study which retrieval

strategy participants engage in when two item-location bindings are relevant for memory retrieval. During encoding, participants saw four word-pairs in four locations on screen. During retrieval, they heard two words and had to indicate whether the words came from one pair (one location) or from two pairs (two locations). Participants can either choose to retrieve only one or both word pairs at different timepoints. LAN was observed only at the first probe indicating the use of a retrieval strategy in which one word-pair was selected in the FoA.These results show that studying the link between perceptual attention and attention to information in memory with eye movements provides insights into working memory retrieval.

THE CUEING BENEFIT: A SHARED MECHANISM IN PERCEPTION AND WORKING MEMORY?

Sizhu Han[1], Anna Schubö[1]; *[1]Philipps-Universität Marburg*

Cues can influence attention by directing it toward both perceptual and working memory information. Early studies have shown that presenting cues prior to a perceptual task can act as memory templates, helping to select task-relevant information (i.e., the target) and ignore the task-irrelevant information (i.e., distractors). More recent research has shown similar benefits when cues point to information held in working memory, known as the "retro-cue benefits". However, it is unclear whether these cueing benefits in perception and working memory share the same underlying mechanisms. This may be due to that the cueing strategies may differ depending on the cognitive demands of the task. To address this, we manipulated task difficulties in two attention tasks (i.e., the cued visual search or the retro-cue paradigm) and recorded EEG simultaneously. For both tasks, our results provided converging evidence that cues can enhance the target when the task is easy (i.e., low cognitive demands), but they can suppress the distractor when the task is difficult (i.e., high cognitive demands). This conclusion suggests that the human brain can flexibly switch between attention strategies to meet the demands of the task at hand.

SYMPOSIUM 29

INNOVATIVE EYE-TRACKING APPROACHES IN LANGUAGE LEARNING AND BILINGUAL PROCESSING RESEARCH

Organizers: Irina Elgort[1], Marc Brysbaert[2]; *[1]Victoria University of Wellington, [2]Ghent University*

Symposium Abstract: Language researchers have used eye-tracking methods since the beginning of the so-called third era of eye-movement research, which began in the 1970s with the advent of new-generation eye-tracking technologies and software that enabled more efficient and effective data collection, processing, and analysis. This, in turn, facilitated the development of theories and models of reading and language processing behaviour, supported by empirical evidence obtained in eye-movement studies. However, the body of eye-tracking evidence associated with language learning and acquisition is still relatively small, with this research direction starting to gain momentum only recently. Another fast-growing research direction is comparative bilingual eye-tracking studies that aim to amass fine-grained evidence for charting the time course of first-language (L1) and second-language (L2) processing and comprehension. The present symposium presents the latest evidence from eye-tracking studies, obtained using innovative methods of data collection and analysis, that illuminates aspects of language acquisition and bilingual processing. The symposium also proposes minimum reporting standards for eye-tracking research in SLA and bilingualism.

THE MULTILINGUAL EYE-MOVEMENTS CORPUS (MECO) AS A SOURCE OF EVIDENCE ON THE TIME-COURSE OF BILINGUAL PROCESSING

Victor Kuperman[1], Noam Siegelman[2]; *[1]McMaster University, [2]Hebrew University of Jerusalem*

The Multilingual Eye-Movements Corpus (MECO) release 1.0 contains open-access data from over 500 readers reading texts in their L1 (a total of 13 L1s) and in English. This eye-tracking record comes with a broad test battery of English component skills of reading and rich demographic data. Jointly, these data enable researchers to map out the time-course of bilingual processing as a function of the reader's English proficiency as well as their proficiency in their L1. Generalized linear mixed-effects multiple regression models were used to analyze fixation and saccadic patterns in the MECO eye-movement record, with the participant's English proficiency and language background as co-variates. We report analyses of (i) the time-course of word length and frequency effects on eye-movement patterns as a function of the participant's proficiency, and (ii) the effects of linguistic distance between the reader's L1 and English. We show that (i) individual proficiency in English component skills of reading is a better predictor of the eye-movement behavior than one's L1 background, and (ii) linguistic distance does not exert a systematic influence on reading fluency or accuracy.

PROCESSING OF L1 AND L2 WORD COMBINATIONS: PROBING THE ROLE OF LEXICAL FIXEDNESS

Irene Fioravanti[1], Marco Silvio Giuseppe Senaldi[2], Alessandro Lenci[3], Anna Siyanova-Chanturia[4]; *[1]Università per Stranieri di Perugia, [2]McGill University, [3]Università di Pisa, [4]Te Herenga Waka – Victoria University of Wellington; Ocean University of China*

Phraseological models distinguish word combinations in terms of lexical fixedness, a concept that refers to whether or not a word within a phrase can be substituted with a synonym. Seeking to shed further light on the issue of lexical fixedness, the present study explores the processing of Verb+Noun free combinations and Verb+Noun collocations by first (L1) and second language (L2) speakers of Italian. Verb+Noun free combinations and Verb+Noun collocations were embedded in sentence contexts (original condition). In the modified condition, the verb within free combination and collocation was substituted with its close synonym. We sought to answer the following research questions: Do L1 and L2 speakers of Italian process free combinations and collocations in the two conditions (original and modified) differently? Does L2 proficiency affect the processing of target combinations? Our results suggest that the degree of lexical fixedness does indeed affect the processing of word combinations in L1 and L2, lending support to phraseological models. Our results further point to the conclusion that higher proficiency L2 learners may process word combinations in a way similar to L1 speakers.

DO L2 LEARNERS ACQUIRE NEW FORMULAIC LANGUAGE DURING NATURAL READING: EVIDENCE FROM EYE-TRACKING

Kathy Conklin[1], Suhad Sonbul[2], Dina El-Dakhs[3], Gareth Carrol[4]; *[1]University of Nottingham, [2]Umm Al-Qura University, [3]Prince Sultan University, [4]University of Birmingham*

Eye-tracking technology provides a rich moment-to-moment data source while reading, giving researchers a window into the mind. The current study employs eye-tracking during story reading to explore nonnative (L2 English, L1 Arabic) speakers' learning of formulaic language (i.e., multiword linguistic patterns). Formulaic language makes up as much as half of spoken discourse, yet little is known about how the processing system treats novel patterns and how rapidly a sensitivity to it arises in natural contexts. We explored whether nonnative speakers demonstrate sensitivity to a type of formulaic language–binomials. Existing binomials ('time and money') were seen once in their forward and then reversed, while novel binomials ('wires and pipes') were seen two or four times and then reversed. Results showed no advantage for existing binomials over their reversed forms. For the novel binomials, the nonnative speakers read subsequent encounters significantly faster than initial ones for both frequency conditions. The final reversed form led to faster reading, suggesting that L2 speakers process the reversed form of a novel binomial as another encounter, ignoring the established order.

WHAT LIES BENEATH? TESTING THE LOCUS OF CROSS-LANGUAGE IDIOM MEANING ACTIVATION DURING READING

Irina Elgort[1], Lingli Du[1], & Anna Siyanova-Chanturia[1]; *Te Herenga Waka - Victoria University of Wellington*

Although cross-language activation of figurative meanings of idioms has received some attentions in the last decade, the locus of this activation remains uncertain. Does cross-language idiom meaning activation arise via a lexical route (word-by-word translation activation) or a conceptual route (whole phrase meaning activation)? Primed lexical decision studies suggest that a conceptual route is possible, but eye-tracking studies that represent more ecologically valid processing during reading have, so far, been less successful in distinguishing between the two routes. We argue that this uncertainty could be due to the use of experimental eye-tracking paradigms that manipulate targets ('draw a snake and add' □ 'feet' / 'hair') instead of primes ('draw a snake and add feet' / 'ask questions and make comments' □ 'unnecessary'). We first validated a novel idiom priming paradigm that compared eye-movements in L1 (English) reading on meaning probes, preceded either by idioms or by control phrases. We then used this paradigm to test the processing of translated Chinese idioms by Chinese-English bilinguals. Eye-movements on meaning probes preceded by word-for-word translations of the idioms or paraphrased idioms (e.g., 'add feet to a snake') were compared with those preceded by control phrases. We report preliminary findings for 30 Chinese-English bilinguals.

REPORTING PRACTICES IN SECOND LANGUAGE AND BILINGUAL EYE-TRACKING RESEARCH

Aline Godfroid[1]; *[1]Michigan State University*

Eye-tracking research has taken hold in Second Language Acquisition (SLA) and bilingualism, with over 145 journal articles published to date. Together with the increase in empirical research, the field has seen a growing concern with the methodological aspects of eye tracking (Conklin et al., 2018; Godfroid, 2020), yet a comprehensive picture of methodological practices in second-language (L2) eye-tracking research is still lacking. In this talk, I will present the findings of a methodological synthesis of the L2 and bilingual eye-tracking literature (k = 145), focusing on reporting practices. The results indicate that reporting standards differ widely. Methodological details that are essential for replicating a study are generally provided in 30% to 70% of the studies, but range from virtually absent in all studies (e.g., checks on data quality) to perfect reporting. By taking stock of reporting practices, I aim to advance a Minimal Reporting Standard for eye tracking in SLA and bilingualism, following a similar initiative in judgment and decision making research (Fieder et al., 2019). Such common standards are

essential to enhance replication and reproducibility of eye-tracking research as a part of the Open Science movement.

SYMPOSIUM 30

THE ROLE OF PARAFOVEAL PROCESSING DURING READING

Organizers: Aaron Vandendaele[1]; [1]*Ghent University*

Symposium Abstract: When we read, our eyes move quickly from one word to the next, fixating on most of them to identify and process their meaning before moving on. However, it is still unclear how much information readers can extract and process from words that are captured by the parafovea, the area of the eye just outside of the fovea where we focus. This debate, known as the "serial versus parallel processing" debate, has been a topic of discussion in the literature for some time, with different theories ranging from strict seriality (processing one word at a time) to unrestricted parallelism (full processing of multiple words at once). In recent years, both theoretical and methodological advances have revitalized this debate. This symposium aims to present different perspectives and evidence from different sides of the serial versus parallel processing spectrum.

WHAT TRANSPOSED-WORD EFFECTS TELL US ABOUT THE MECHANISMS THAT ASSOCIATE WORD IDENTITIES TO A SENTENCE-LEVEL REPRESENTATION

Aaron Vandendaele[1], Jonathan Mirault[2]; [1]*Ghent University,* [2]*Aix-Marseille Université*

Word transpositions have increasingly been used to study canonical word order processing in a natural reading setting. A consistent finding is that participants find it harder to reject a non-grammatical sentence that was created by transposing two adjacent words in a correct sentence (e.g., The white was cat big) compared to one that was created from an incorrect sentence (e.g., The black ran dog big). We propose that the mechanism which drives this phenomenon is a combination of noisy bottom-up parallel processing and top-down constraints from the sentence-level representation. In this talk, we will give further support for this hypothesis, detailing three key findings: I) in an eye movement study recorded within a virtual reality set-up, transposed words did not encourage participants to skip critical words or re-fixate these words more than when no transposition was present. II) Transposed-word effects are influenced by the orthographic relatedness of adjacent words. III) When forcing participants to read serially, transposed-word effects could still be obtained. These results are then discussed within a parallel processing framework.

NEURAL EVIDENCE FOR LEXICAL AND SEMANTIC PARAFOVEAL PROCESSING DURING READING

Yali Pan[1]; [1]*University of Birmingham*

Despite the low visual acuity, information can still be extracted in the parafovea. However, in which detail this information is extracted is a hot debate. Participants read one-line sentences while brain activity and eye movements were recorded by MEG and an eye tracker. The target word in a sentence was manipulated either on the lexical level in Experiment 1 (low/high lexical frequency, e.g., waltz/music) or semantic level in Experiment 2 (congruent/incongruent with the context, e.g., blue jacket/blue brother). We tagged the target word subliminally at 60 Hz --- the technique of Rapid Invisible Frequency Tagging (RIFT). Coherence between the tagging signal and brain activity during pre-target fixation indexed the neural excitability associated with parafoveal processing. We found that the pre-target coherence was modulated by the lexical and semantic information of the parafoveal target word. Furthermore, the degree of parafoveal processing predicted individual reading speed. These results indicate an extensive and deep parafoveal processing that supports fluent reading, providing neural evidence for the parallel processing model.

EXECUTIVE FUNCTIONS AT THE EARLY YEARS OF SCHOOLING PREDICT READING PERFORMANCE AND THE SIZE OF THE PERCEPTUAL SPAN SEVEN YEARS LATER

Jochen Laubrock[1], [1] *Potsdam University*

We present new data from our longitudinal study of perceptual span development, now including five waves from grades 1-3 to grades 8-10. Initial Matthew effects were followed by stable increased individual differences for higher-level measures. What cognitive predispositions cause these differences? Here we focus on the influence of executive functioning on developmental growth curves. We show that early executive functioning boosts the development of the perceptual span during reading. Relating executive functioning at the first wave to developmental growth rates and asymptotic performance seven years later, we demonstrate that children who initially performed 1 SD above rather than below average in early reading and executive functioning ultimately developed a 23% larger perceptual span (or 1.6 letters more foresight) and a 67% higher reading rate. The efficient operation of executive functions is a strong developmental determinant of perceptual-span size and reading efficiency.

PARALLEL PROCESSING OF SYNTAX: FLANKER EFFECTS AND FIXATION-RELATED POTENTIALS

Joshua Snell[1], Carolin Vetter[1], Jeremy Yeaton[2], Jonathan Mirault[3], Jonathan Grainger[3]; *[1]Vrije Universiteit Amsterdam, [2]University of California, Irvine, [3]Aix-Marseille Université*

Can readers confine their attention to single words? And if not, what kinds of information are processed across multiple words in parallel? I will report behavioral and EEG data to show that syntactic information is processed from multiple words simultaneously, even when this is detrimental to the task at hand. In Experiments 1 and 2, readers made syntactic categorizations (noun/verb) for target words that were shown for only 50 ms and that were replaced by post-masks. In spite of these constraints (whereby readers could barely recognize the target), responses were strongly influenced by the congruency of task-irrelevant flanking words. Flanker congruency also impacted brain activity as early as 100 ms after stimulus onset. In Experiment 3, readers read sentences, whereby, during the fixation on a target word, we manipulated the syntactic compatibility of the upcoming word. Again, syntax impacted brain activity as early as 100 ms after the target fixation onset. The present results evidence syntactic processing beyond single words, both in- and outside the natural reading setting.

THE TIMING OF SEMANTIC PROCESSING IN PARAFOVEA: EVIDENCES FROM A RAPID PARALLEL VISUAL PRESENTATION STUDY

Lisa S. Arduino[1], Maria Martelli[2], Silvia Primativo[1]; *[1]Lumsa University, [2]University La Sapienza*

In this study we adopted the Rapid Parallel Visual Presentation Paradigm consisting in the simultaneous presentation of pair of words, one in fovea (W1) and one in parafovea (W2) in order to study the timing of the parafoveal semantic processing. In three experiments, we manipulated word frequency, semantic relatedness between the two words and the effect of stimulus duration (150 ms, 100 ms, 50 ms). Accuracy on W2 was higher when W1 and W2 were both of high-frequency and semantically related. W1 reading times were i) faster when both words were highly-frequent but only in the semantic relation condition (150 ms); ii) when W2 was highly frequent and semantically related to the foveal word (100 ms). When the stimuli were presented for 50 ms, the reading times were reduced when W1 was highly frequent and, crucially, in the semantic relation condition. Our results suggest that it is possible to extract semantic information from the parafovea very rapidly (within 100 ms) and, potentially, in parallel to the processing of the foveal word, especially when the cognitive load required for the latter is reduced, as is the case for high-frequency words. The results are discussed in terms of word recognition and eye movements' models.

TALKS & BLITZ-TALKS – 12h00 to 13h20

TALKS 25
LONG-TERM MEMORY INFLUENCES IN WORKING MEMORY

HOW DOES SEMANTIC MEANING BENEFIT VISUAL WORKING MEMORY OF SPATIAL LOCATIONS?

Tomer Sahar[1], Nurit Gronau[2], Tal Makovski[2]; *[1]Haifa University and The Open University of Israel, [2]The Open University of Israel*

Real-world objects are better remembered in Visual Working Memory (VWM) than visually similar stimuli, stripped of their semantic meaning. However, the exact nature of this advantage remains unclear. Here we asked whether meaning enables more object locations to be remembered or whether it improves the precision of VWM representations. Participants were presented with a stream of 4 (Experiment 1&2) or 6 (Experiment 3) real-world items or their scrambled counterparts. Each item was presented at a unique location on an imaginary circle, and the task was to reproduce one item (the target) location. Overall, location memory was consistently better for real-world items compared to their scrambled counterparts. However, mixture-modeling analyses revealed no evidence for improved location precision, as the precision of the report was reliably similar for both types of stimuli. Instead, we found that participants were less likely to make swap errors for meaningful objects. We suggest that the item's meaning supports an effective identity-location binding, which translates to increased memory capacity. Importantly, these results challenge the notion that meaning increases detail memory, such as the precise location of an item.

ASSOCIATIONS INCOMPATIBLE WITH PRIOR KNOWLEDGE HINDER WORKING MEMORY PRECISION

Nuno D. Sobrinho[1], Alessandra S. Souza[1], *[1]Center for Psychology at the University of Porto*

Recent research showed that prior knowledge about object-color associations facilitates detailed memory for colors in working memory. Participants studied objects for a color wheel test, that could have colors congruent with prior knowledge (e.g., a yellow banana), incongruent with it (a blue banana), or neutral (no association; a red book). Participants remembered more detailed colors in the congruent than incongruent and neutral conditions. The present study assessed if prior knowledge could also facilitate the retention of details of the object's shape. Participants (N = 72) studied congruent, incongruent, and neutral stimuli for an immediate color and shape test. To assess detailed shape memory, we

implemented a six-choice recognition test containing two versions of the target object (original and modified), two versions of an intrusion object (appeared in a different location), and two versions of a new object. Coarse memory of the shape (original + modified) improved for congruent objects, whereas detailed shape memory was hindered for incongruent compared to neutral objects. This study showed that prior knowledge can produce costs. Incompatible associations may consume more working memory resources.

THE ROLE OF WORKING MEMORY FOR MENTAL OPERATIONS ON INFORMATION IN LONG-TERM MEMORY

Duygu Yücel[1], Betül Türk[2], Eren Günseli[1]; *[1]Sabanci University, [2]Cankaya University*

Working memory (WM) is claimed to operate on newly received information. However, its role in mental operations for information in long-term memory (LTM) is unknown. By utilizing the relationship between working memory and perception, we developed a novel behavioral index to measure LTM reactivation in WM. In the learning phase, participants studied 8 color-position associations. In the experimental phase, each trial started with the presentation of a novel position and a color retrieval cue. At the end of each trial, participants responded whether the received probe position matched any of the memory positions (recognition) or was equidistant to both memory positions (integration). Before these tasks, participants completed a secondary perceptual discrimination task by reporting the orientation of a tilted line. Given that positions held in WM result in enhanced perceptual discrimination, we hypothesized that reactivated LTM positions should result in faster detection performance compared to irrelevant positions. Enhanced detection performance for LTM positions was observed only in the integration condition, suggesting that stronger memory reactivation is more important for mental operations compared to mere remembering.

THE CONTRIBUTION OF EPISODIC LONG-TERM MEMORY TO PERFORMANCE IN TESTS OF WORKING MEMORY

Klaus Oberauer[1], Lea M. Bartsch[1]; *[1]University of Zurich*

When participants do a test of working memory (WM), we cannot expect their episodic long-term memory (eLTM) to remain silent. Performance in a WM test could therefore rely in part on eLTM. This creates a problem for WM research, because we don't know to what extent experimental effects are due to mechanisms of WM or of eLTM, and to what extent individual differences in tests of WM capacity reflect differences in eLTM. We can leverage proactive interference (PI) to diagnose the contribution of eLTM to performance in several WM tests. Episodic memory keeps a record of all events initially encoded into memory, which renders it vulnerable to PI. By contrast, no-longer relevant information is efficiently removed from WM, thereby preventing PI across trials. We will present experiments in which we varied PI between trials in five tests of WM. We found PI specifically for set sizes that challenge WM capacity in two test paradigms: Memory for object-word pairs, and for object-color conjunctions. We found little or no evidence for PI even at large set sizes for three other paradigms: Memory for object-location conjunctions, memory for location-color conjunctions, and memory for lists of verbal items.

TALKS 26
EMOTION II

EMOTIONS AND THE SENSE OF SELF: THE ROLE OF EMOTIONS IN BODY DETACHMENT AND HOW MINDFULNESS CAN HELP RECONNECTING TO OUR BODY

Franziska Schroter[1], Petra Jansen[1]; *[1]University of Regensburg*

Emotions were found to affect our body boundaries, e.g., by causing greater susceptibility to the rubber hand illusion (RHI). To further investigate this relation, we studied the role of dissociative symptoms in two studies and explored whether meditation can restore disbalances of the bodily self in a 3rd study. In all studies, the RHI included synchronous and asynchronous trials and was measured using a questionnaire and the proprioceptive drift. In study 1, sad or neutral pictures were presented before the RHI and dissociative symptoms were assessed in 122 students. Study 2 investigated the influence of low/high arousing emotional vocalizations on the RHI in adolescent patients with low or high dissociative symptoms and healthy controls (N = 75). Study 3 examined the effects of a short meditation on the RHI and interoceptive abilities in 111 students. Our results suggest that dissociation plays a large role in the relation between emotions and the bodily self, and that meditation can help stabilizing the sense of self only in subjects with high interoceptive awareness. We conclude that mediation combined with meta-cognitive interoceptive skills training may be a promising treatment for patients with dissociative symptoms.

SATISFACTION OVER PLEASURE: INVESTIGATING THE ROLE OF PRIOR MINDFULNESS MEDITATION PRACTICE IN REDUCING EMOTIONAL INTERFERENCE

Surabhi Lodha[1], Rashmi Gupta[1]; *[1]Indian Institute of Technology Bombay*

The current study examined the role of sustained mindfulness practice in reducing emotional interference under different perceptual load conditions. Individuals with prior experience in mindfulness meditation and those without meditation experience participated. Participants were required to respond to a target letter in a visual search task in high and low perceptual load conditions.

They were instructed to ignore the distractors (Experiment 1: happy or angry faces; Experiment 2: pleasurable or unpleasurable IAPS images), which were present in 25% of total trials. Results indicated that mindfulness meditators reduced the interference from positive distractors and processed negative distractors more than non-meditators without compromising the task performance under high load. The findings suggest that mindfulness meditators have more attentional resources since negative emotion requires more attentional resources than positive emotion. Additionally, mindfulness might improve attentional control for positive and pleasurable emotions, reflecting a diminished need in meditators to seek satisfaction from external pleasurable distractions. Findings have practical implications for managing hedonic compulsive behaviours.

DOES PERSONALITY MODULATE THE SIZE DISTORTION OF EMOTIONALLY PRIMED SQUARES?

Amandine Guillin[1], Dorine-Vergilino-Perez[1], Laurence Chaby[2]; *[1]Université Paris Cité, Vision Action Cognition, F-92100 Boulogne-Billancourt, France, [2]Sorbonne Université, CNRS, Institut des Systèmes Intelligents et de Robotique, ISIR, F-75005 Paris / Université Paris Cité, F-92100, Boulogne-Billancourt, France*

Human behaviour is primarily driven by goal achievement and threat avoidance. These motivations are underpinned by action tendencies that are thought to modulate our visual perception by decreasing (approach tendencies) or increasing (avoidance tendencies) the perceived distance between oneself and the environment. Emotional stimuli are known to induce approach-avoidance tendencies, leading to reassuring or threatening faces being judged closer to oneself than neutral faces, and positive words being judged larger in size than neutral or negative words. However, the extent to which action tendencies impact our visual perception of neutral stimuli following exposure to emotional stimuli remains largely unexplored, as well as the influence of personality traits on these action tendencies. We conducted three studies to investigate the priming effect of emotional stimuli (anger, happiness, or disgust) on size estimations of squares, and examined how individual traits may moderate these effects. Our results provide new insights on size distortions of emotionally primed neutral stimuli and on the influence of personality on this phenomenon.

EMOTION AND MOVEMENT: SUPERIOR MEMORY FOR EMOTIONAL BUT NOT FOR MOVING STIMULI

Hanna Chainay[1], Adam W. Cox[2], Paul Foret-Bruno[1], Inés Tchekemian Lanaspa[1], Isabella Zsoldos[1], Patrick S.R. Davidson[3]; *[1]Laboratoire d'Etude des Mécanismes Cognitifs, Université Lyon 2, [2]School of Psychology, University of Ottawa, [3]University of Ottawa*

Two effects on memory have been described in the literature: emotional enhancement of memory (EEM) and dynamic superiority effect (DSE) (i.e., a moving visual stimulus is better remembered than a static stimulus). However, the DSE has only been studied using complex visual stimuli (e.g., video clips). Thus, the objective of the present study was to examine whether the DSE can be observed with simple visual stimuli (i.e., isolated moving stimuli) and whether people's emotional memory can be affected by stimulus movement. We conducted three experiments, two using a free recall task, Experiment 1a (140 participants) and 1b (32 participants), and one using a recognition task, Experiment 2 (32 participants). Participants viewed negative, positive and neutral stimuli in two movement conditions, dynamic and static, and then had to recall or recognize them. In all experiments, an EEM was observed with negative stimuli being better recognized and recalled than positive and neutral stimuli. However, in no experiment was observed a significant effect of movement or interaction between valence and movement. Thus, our data confirm that emotions affect memory performance but do not bring evidence of movement effects on memory of simple stimuli.

TALKS 27
HIGHER COGNITIVE FUNCTIONS II

SOCIAL INTERACTION DIFFERENTIALLY IMPACTS THE TIME COURSE OF IMPLICIT AND EXPLICIT SENSE OF AGENCY

Crystal Silver[1], Ben Tatler[1], Rama Chakravarthi[1], Bert Timmermans[1]; *[1]University of Aberdeen*

Sense of Agency (SoA) is the responsibility felt over actions and their effects, called *Social* Agency (SA) in social contexts. Whether and how SA differs from SoA is largely unknown, especially in direct social interaction: the others' reaction is the effect of my action. Two experiments compared SA and SoA, manipulating action-effect intervals (200-2100ms). For SA participants were told they were interacting with a partner via webcams. For SoA participants were told they were interacting with videos. Participants pressed a key at a time of their choice, then watched a hand on screen do the same after a certain interval. SA/SoA were measured implicitly through Temporal Binding (TB), the subjective compression of actions-effect intervals; and explicitly by participants rating how *related* the reaction was to their action. Implicit results showed greater TB for SA than SoA across all intervals. Explicit SoA exceeded SA for short intervals, then linearly decreased as interval duration increased. In contrast, SA explicit results increased over interval durations, peaking around 1000ms before decreasing. Results suggest not only that overall SA is stronger than SoA, but that this relationship is modulated by action-effect intervals.

ON PREVENTIVE BEHAVIOR: AN EXPERIMENTAL INVESIGATION ON SELF-PROTECTION

Vincent Lenglin[1], Fabrice Le Lec[2], Joël Santos[3]; *[1]Catholic University of Lille, [2]University of Lille, [3]EDHEC*

Preventive behavior in a sense of self-protection is defined as the action taken by an agent, at a cost, to mitigate the probability of an adverse consequence. Yet, even though these behaviors are widespread in economic life, it has never been studied in a controlled environment. We propose to do so by first clarifying the theoretical predictions in various theoretical frameworks (expected utility, rank-dependent utility, prospect theory), and second to test experimentally these predictions. More specifically, we study the cost that makes the decision-maker indifferent with a fixed change of the probability of the adverse consequence. At the theoretical level, we show that under expected utility, the intensity of prevention action decreases with the probability of the adverse consequence, while for rank-dependent expected utility and prospect theory, the main determinant of prevention is the derivative of the probability weighting function, leading to a U shape form of prevention. Experimentally, our results suggest that prevention is mostly driven by the shape of the probability weighting function, a result that seemed to have been overlooked in the literature, that has mostly focused on the curvature of the utility function.

METACOGNITION FACILITATES THEORY OF MIND THROUGH OPTIMAL WEIGHTING OF TRAIT INFERENCES

Emily L. Long[1], Caroline Catmur[2], Stephen M. Fleming[3], Geoffrey Bird[1]; *[1]University of Oxford, [2]King's College London, [3]University College London*

We considered the association between Theory of Mind and metacognition in terms of the 'Mind-space' framework, a theoretical approach which posits that trait inference (representation of the qualities of the mind giving rise to the mental state) is important in accurate mental state inference. We tested the role of metacognition in the weighting of trait inferences, as well as hypotheses about predictors of accurate trait inference. Participants completed a trait inference judgement-of-confidence task alongside the Interview Task, which assesses the accuracy of trait and mental state inferences. Higher metacognitive sensitivity was associated with reduced error in mental state inference. Additionally, confidence in trait inference was shown to modulate the relationship between the error of that inference and the error of accompanying mental state inferences. This effect was larger with lower metacognitive sensitivity. Furthermore, the accuracy of trait inference was predicted by the participant's similarity to the target, but this similarity benefit was reduced in participants whose self-perception was inaccurate. Results support claims made by the Mind-space theory and elucidate processes underlying mental state inference.

CAUSAL EVIDENCE FOR A CONTRIBUTION OF THE LEFT EXTRASTRIATE BODY AREA TO THE PERCEPTION OF INTERACTING HUMAN DYADS

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One crucial skill for navigating our complex social world lies in understanding the interactions we observe. Recent psychophysical and neuroimaging studies provide parallel lines of evidence that the human visual system is attuned to rapidly and efficiently perceive dyadic interactions. This work implies, but does not yet demonstrate, that focal activity in regions of visual cortex is selectively and causally related to the efficient visual perception of interactions. Here, we adopt a multi-method approach to close this important gap. First, using a large fMRI dataset (N=92), we found that the left-hemisphere body-selective Extrastriate Body Area (EBA) responds more to face-to-face than non-facing dyads. Second, we replicated a behavioural marker of sensitivity to interaction: categorisation of facing dyads is more impaired by inversion than non-facing dyads. Third, we used fMRI-guided transcranial magnetic stimulation to show that online stimulation of the left EBA, but not a nearby control region, abolishes this selective inversion effect. Activity in left EBA, thus, appears causally necessary for the efficient perception of static cues to dyadic social interactions.

BLITZ-TALKS 5
PERCEPTION, ATTENTION & LEARNING

THE ROLE OF KINEMATICS IN THE ACQUISITION OF NUMBER MEANING IN KINDERGARTEN?

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Several studies have shown that the acquisition of number meaning is related to finger motor representations. However, the role of finger kinematics remains unknown, and clarify it was the purpose of the present study. Forty-three children enrolled in the middle class of kindergarten took part in the study. They were divided into two equivalent groups and compared on the acquisition of number meaning after a 2-week program designed to teach them a song about the numbers 1-9, scaffolded by visual supports. Each visual

support included the symbolic representation of the number, the picture of an animal, person or object that rhymed with the prononciation of the number in French, and either a static image (static group) or a point-light display (PLD group) of the finger representation. Results showed no difference between the two groups on the learning of the song and the acquisition of numbers regarded as easy (i.e., 1, 2, 3, 4) but the PLD group performed significantly better for numbers regarded as difficult (i.e., 6, 7, 8, 9). This finding suggests that the presentation of action kinematics could be important in the learning of number meaning and opens up new perspectives for children who have difficulty acquiring number meaning.

THINK POSITIVE! THE IMPACT OF DISEASE THREAT ON HUMAN BISTABLE MOTION PERCEPTION

Ana Cláudia Magalhães[1], Fábio Silva[1], Inês Lameirinha[1], Mariana Rodrigues[1], Sandra C. Soares[1]; *[1]Universidade de Aveiro*

Our tendency to perceive bistable point-light walkers (PLWs) as approaching (facing-the-viewer bias) seems to be modulated by physical threats (e.g., angry faces). This has been interpreted through the lens of the "error management theory", as failing to detect a threat as approaching is riskier than the opposite. However, no study has explored how disease threat - linked to the behavioral immune system (BIS) - might affect one's approach-avoidance bias. Thus, throughout three experiments, we investigated whether disease-signaling cues (i.e., face with surgical mask [Exp 1], sickness sound [Exp 2], face with disease cue [Exp3]) altered how we perceive the motion direction of an ambiguous PLW. Results showed that disease did not modulate the perception of approach-avoidance behaviors of social agents. However, a tendency indicative of a "wishful seeing" bias was present in the latter Experiments. Contrary to other types of threat, this suggests that disease might instead trigger a positivity (not negativity) perceptual bias, indicating a preference to avoid possible infection sources. This study provides insight into how the BIS may influence approach-avoidance biases, highlighting the need for future research in this area.

MUSICAL TRAINING EXPERTISE REDUCES AUDIOVISUAL SPATIAL VENTRILOQUISM

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There is growing interest in the effects of expertise on multisensory perception. Recent findings suggest that musicians may be more accurate when integrating auditory and visual stimuli in the temporal domain. We investigated whether musicians also exhibit more accurate multisensory integration in the spatial domain. Musicians and non-musicians participated in an auditory localisation experiment that measured ventriloquism and spatial recalibration using brief flashes and noise bursts as stimuli. Musicians were significantly less susceptible than non-musicians to ventriloquism, as their auditory localisation judgements were less influenced by a brief flash that was horizontally displaced by 10 degrees. However, there were no significant effects of musical training for unimodal localisation or for susceptibility to recalibration. We replicated all of these results in an additional, independent experiment, and the effect of musical training on ventriloquism was large and consistent across experiments. Our results suggest that audiovisual spatial integration is refined in musicians, possibly due to top-down influences on perception. Current work in our lab is expanding on these findings via Bayesian causal inference modelling.

ATTRACTIVENESS AND SOCIAL APPEAL OF SYNTHETIC VOICES

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Text-to-speech (TTS) generators create increasingly naturalistic voices. We investigated the attractiveness and social appeal of synthetic voices as compared to human ones. In a short online experiment, 75 US participants rated the attractiveness, social appeal, and emotion (forced-choice between happy, sad, angry, other) of synthetic (generated with murf and lovo systems) and human voices speaking the same sentence. Participants were also asked to sort the stimuli as "human" or "AI-generated". While human voices were well recognized (Correct Responses: 85.6%), participants barely recognized synthetic ones (CR: 55.2%). Interestingly, linear mixed models showed that human voices were considered slightly more attractive and socially appealing than synthetic ones, and, whatever the source of the voice, the ones perceived as "angry" were the least attractive and socially appealing. These results suggest that synthetic voices can sometimes fool listeners but are not yet as attractive or socially appealing as human ones.

LET'S AGREE THEY DISAGREE: THE MIDSCALE DISAGREEMENT PROBLEM IN PSYCHOLINGUISTIC RATINGS AND ITS IMPLICATIONS

Dimitri Paisios[1], Nathalie Huet[1], Elodie Labeye[1] ; *[1]CLLE*

Increasing interest in the role of sensorimotor information in lexical-semantic processing has translated into a recent proliferation of psycholinguistic ratings (e.g. perceptual strength, body-object interaction - BOI). These norms are often used for stimulus selection and control in experiments to ensure methodological validity. Along with megastudies, their increasing availability has also paved the

way for large-scale and high-powered regression analyses which considerably advance our understanding of how words are processed. Despite their importance, however, the ratings in themselves have been subject to surprisingly little methodological consideration. Using BOI norms collected by our team, we first illustrate the largely overlooked *midscale disagreement problem* in psycholinguistic ratings which results from computing averages on Likert-scale responses. Through examples from the published literature, we then derive three major implications which likely affect the reliability of a great number of studies. We conclude by offering some best-practices for the use and interpretation of the ratings, and open further avenues for research on the subject.

ATTENTIONAL RIGHTWARD BIAS IN CHILDREN DURING WORD RECOGNITION USING THE FLANKERS TASK PARADIGM

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Prior research with adult participants reported a rightward bias in the reading version of the flankers task. Here we investigated the developmental trajectory of this bias. We tested two groups of French primary school children from grades 1-2 and grades 4-5, and one group of adult participants. In the related flanker conditions the central target word was flanked by the same word either on the left (park park ####), the right (#### park park), or on both sides (park park park) – referred to as the "bilateral flanker" condition. In the unrelated conditions, the repeated flanker words were replaced by a different unrelated word. In the analysis of standardized RTs, there was a three-way interaction between the three groups of participants and the impact of flanker relatedness as a function of the position of the related flankers. This three-way interaction reflected the significantly greater increase in effects of flanker relatedness between Cycle 2 and Cycle 3 for the bilateral flanker and the right flanker conditions compared with the left flanker condition. This suggests that the rightward bias is driven by attentional asymmetries that develop during the process of learning to read.

ENDOGENOUS SPATIAL AND TEMPORAL ORIENTING OF ATTENTION IN A TEMPORAL RESOLUTION TASK

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Adaptive behavior requires predicting where and when a relevant event might occur and to orient attention accordingly. Here, we compared endogenous spatial and temporal attention in a temporal resolution task in which participants had to identify whether a short gap appeared or not between two visual stimuli. Spatial and temporal orienting cues were purely symbolic (i.e., shapes and colors). In a first session, participants performed the spatial and temporal orienting tasks separately, whereas in a second session spatial and temporal cues were combined. Results showed that spatial orienting effects were significant in both sessions, with more efficient temporal resolution for valid as compared to neutral and invalid trials. Temporal orienting did not benefit behavior either in isolation or jointly with spatial cues. In a follow-up experiment, significant temporal orienting effects were observed when the task only required a fast response to the target regardless of whether it contained or not contained the gap. Overall, these findings point to important differences between endogenous spatial and temporal orienting that should be taken into account in the studies combining both attentional cues.

SPATIAL REGULARITIES EMBEDDED IN A NOVEL AUDITORY-BIOFEEDBACK VISUAL SEARCH TASK BIAS SUBSEQUENT FREE VIEWING BEHAVIOR

Sebastiano Cinetto[1], Elvio Blini[2], Andrea Zangrossi[1], Maurizio Corbetta[1], Marco Zorzi[1]; *[1]Università degli Studi di Padova, [2]Università degli Studi di Firenze*

We investigated the feasibility of a novel visual search task (VS) and the impact of target location regularities in a subsequent free viewing and spatial judgment task. The VS task utilized an auditory biofeedback system which decreased in volume as the participant's gaze approached an invisible target. Participants were randomly assigned to one of two groups and exposed to frequent targets in either the left or right hemispace. The study evaluated spatial attention biases before and after the VS task during rest, image viewing, and landmark task. The results showed that participants were able to successfully find and fixate the invisible target in the VS task within 5 sec. on average. Participants' performance improved during the task, particularly with targets in the biased hemifield, suggesting a task learning effect and the unfolding of statistical learning. Crucially, the developed visual search bias transferred post VS task to rest and image viewing conditions, as mirrored by a shift of fixations toward the biased hemifield. In conclusion, the novel VS task correctly guided the gaze towards the given targets and induced statistical learning which transferred to subsequent free viewing behavior.

TALKS 28
EMBODIED COGNITION

IS THIS A REAL PERSON? COGNITIVE AND EMBODIED FACTORS CONTRIBUTING TO OUR BELIEFS OF REALITY

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Technological advances make the distinction between artificial (e.g., computer-generated images of faces) and real stimuli increasingly difficult. However, the factors driving our beliefs when confronted with ambiguous stimuli remain largely unknown. After introducing the problem and existing literature on the effect of "fiction" on cognition and emotions, as well as on the psychological mechanisms contributing to beliefs in fake news, we will present two studies (n = 150, online; and n = 70, with EEG) investigating stimulus and participant-based variables, such as attractiveness and physiological arousal, that predict the belief that a stimulus (face images) is considered real or fake (artificially generated). We also report links between reality beliefs tendencies and dispositional traits, such as narcissism and paranoid ideation. These findings will be discussed in the context of upcoming societal challenges related to the proliferation of AI-generated content.

SYNTAX SHAPES THE SENSORIMOTOR ACTIVATION DRIVEN BY NOUN-ADJECTIVE PAIRINGS: EVIDENCE FROM A GRASP-COMPATIBILITY TASK

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The present study investigated the role of syntax on the sensorimotor activation elicited by nouns using a grasp compatibility task. We assessed 2 languages with different syntactic structures, Italian in Experiment 1 and English in Experiment 2. Adjective-noun pairs were shown on the screen, with the adjective presented always in prenominal position. In Exp. 1 the adjective-noun order violated the syntactic rule, while in Exp. 2 the syntactic rule was met. Adjectives indicated either a disadvantageous quality of the object graspability (e.g., sharp) or the object colour (e.g., red). Participants categorized the object nouns as natural or artifact, performing a precision or a power reach-to-grasp movement. The grasp response could be compatible or incompatible with the size of the object denoted by the noun. In Exp. 1, no difference emerged between RT on compatible and incompatible trials. In Exp. 2, results showed slower responses on compatible than incompatible trials with disadvantageous adjectives, while a standard compatibility effect emerged when colour adjectives preceded natural object nouns. The findings suggest that adjectives can shape the sensorimotor activation elicited by object nouns, only when the syntax is correct.

EMBODIED COGNITION, FAST AND SLOW: THE CRUCIAL ROLE OF TIMING FOR SENSORIMOTOR SEMANTIC ACTIVATION

Olesia Platonova[1], Alex Miklashevsky[2], *[1]Hearing Institute, Pasteur Institute, Paris, France, [2]Potsdam Embodied Cognition Group, University of Potsdam*

Embodied cognition claims that sensorimotor representations are necessary for semantic processing. Previously, we found activation of perceptual semantics in lexical decisions. Our data suggested the crucial role of timing for this activation to appear. Here, we explicitly examined this hypothesis. Participants performed a lexical decision task for pairs of adjectives of three perceptual modalities (visual, auditory, or tactile), for example, '*white* + *loud*'. Here, in a series of follow-up analyses, we used a median split of those data into early vs. late responses and fast vs. slow participants. We examined effects of perceptual modalities in this new data structure. Activation of perceptual semantics was more pronounced in (1) earlier than in later responses and (2) in faster than in slower participants. This result was observed across two identically designed experiments (in Russian and in German). Our results provide further evidence for an early activation of perceptual semantics in word processing: Shorter time lags between stimuli presentations and responses resulted in stronger activation of perceptual semantics. This pattern was found in both within- and between-participant distributions of reaction times.

MOTOR FLUENCY AND PREFERENCE JUDGMENTS: MODULATING THE EFFECT OF TYPING EXPERTISE ON THE LIKEABILITY OF LETTER DYADS

Mara Stockner[1], Giuliana Mazzoni[1], Francesco Ianì[2]; *[1]Sapienza University of Rome, [2]University of Turin*

The perception of action-related stimuli can activate the covert simulation of the action. In line with this, fluency perception stemming from the motor system seems to affect cognition. For instance, fluent (rather than non-fluent) letter dyads lead to higher preference ratings. This can be attributed to the automatic activation of the motor program of typing, even when the action is *not* performed. Experiment 1 aimed to replicate previous results on embodied preference judgments for letter dyads (Beilock & Holt, 2007), classifying participants by expertise based on their typing speed. In Experiment 2, we investigated the possibility to eliminate fluency effects with a motor interference task. Our results show higher preference judgments for fluent (vs. non fluent) dyads in slow typists (Exp 1), while in Exp 2 slow typists preferred both types of dyads more than fast typists. The interfering task accentuated the difference in preference rates between fast and slow typists. Results are discussed referring to the existing literature on sensorimotor simulation in motor and cognitive tasks.

TALKS 29

DECISION MAKING III

DECIDING WHEN TO HELP OTHERS DEPENDS ON THE EXPECTED VALUE OF THE ENVIRONMENT

Todd A. Vogel[1], Luke Priestly[2], Jo Cutler[1], Nima Khalighinejad[2], Neil Garrett[3], Matthew A. J. Apps[1], Matthew F. Rushworth[2], Patricia L. Lockwood[1]; *[1]University of Birmingham, [2]University of Oxford, [3]University of East Anglia*

In everyday life, ongoing behaviours are interrupted with alternatives such as being asked to cook dinner while watching TV. The mechanisms that drive *when* people decide to act are influenced by one's environment, but whether these same mechanisms are involved when deciding to help others is unknown. Three samples of participants (Study 1 (online), n = 323, replication, n = 301; Study 2 (in-person), n = 55) were shown opportunities to make effortful actions to earn rewards for themselves or another person while watching a movie. Participants decided in two different environments: poor environments where average reward values and probabilities were lower, and rich environments where average reward values and probabilities were higher. For all groups, the richness of the environment affected decisions about when to help others more strongly than decisions to help oneself (ps < .001). Specifically, as the expected value (reward value * probability) increased, people were more likely to help others in a poor environment compared to a rich one. These robust findings help understand prosocial and self-benefitting behaviours as environments change, and ultimately for increasing prosociality.

FACING THE (ILLUSIONARY) TRUTH: CORRUGATOR ACTIVITY SUBSTANTIATES AFFECTIVE COMPONENT IN THE REPETITION-INDUCED TRUTH EFFECT

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People tend to judge repeated information as more likely being true compared to new information. A key explanation for this phenomenon, called the illusionary truth effect, is that repeated information can be processed more fluently, causing it to appear more familiar and trustworthy. To consider the function of time in investigating its underlying cognitive and affective mechanisms, our design comprised two retention intervals. 75 participants rated the truth of new and repeated statements 10 minutes as well as 1 week after first exposure while spontaneous facial reactions were assessed via electromyography. Our data demonstrates that repetition results in specific facial responses indicating decreased negative affect, mental effort, and increased familiarity (i.e., relaxations of the musculus corrugator supercilii and frontalis), and subsequently increases the probability of judging information as true. The results moreover highlight the relevance of time: both truth effect and facial electromyographic activities decrease significantly after a longer interval.

SEARCH THE DIFFERENCES IN AN ILLUSIONARY CONTEXT

Valeriia Karpinskaia[1], Filippova Margarita[1], Andrianova Natalia[1]; *[1]Saint-Petersburg State University*

At some level, visual illusions and non-illusory objects are handled by the visual processor equally. The question remains as to whether processing visual illusions at higher levels may interfere with the performance of other cognitive tasks. In our study, we made use of the 'spot the difference' task to help address this question. In order to determine the illusionary difference in size, we used as stimuli Ponzo illusions and Delboeuf illusions. These were set against controls without an illusion and with a 10% difference in size. We found that participants made more errors and responded more slowly in illusionary contexts than in both control conditions. We suggest that the nature of this slowdown and errors in our experiments is similar to what happens in the experiments with an unconscious fixation on the wrong decision: the observer fixes the illusory difference as a mistake, which has an inhibitory effect on the search for other (non illusory) differences. Thus, the effectiveness of the 'spot the difference task in an illusionary context decreases not only in comparison with the situation of equal stimuli, but also in comparison with the situation of actually different stimuli. Financial support RSF №22-18-00074

THE COSTS AND BENEFITS OF OPTING OUT DURING PERCEPTUAL DECISION-MAKING

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The purpose of this study was to examine how perceptual decision-making under time pressure changes as a function of the decision context. Particularly, we examined how the inclusion of an opt-out option affects the performance. In this study, participants were required to compare the flicker frequency of simultaneously presented stimuli. We designed an adaptation of the decision task under time pressure, with an additional response option to skip a trial without incurring a penalty. We hypothesized that, with an option to skip, participants would strategically opt out of trials in which they were uncertain, thus reducing their error rates and improving their overall performance. We conducted two experiments, varying the cost associated with error. We found that timing ability correlated with decision accuracy in the high-cost regime, but only when there was no opt-out possibility. With a strict deadline and a high cost for errors, late responders were able to perform better than early responders, presumably because they

were less affected by the time pressure and integrated more perceptual information. However, by giving participants the option to escape, the impact of time pressure was equilibrated across all participants.

TALKS 30
LANGUAGE II

CONTEXTUALIZED WORD EMBEDDINGS CAPTURE COMPOUND WORDS' IMPLICIT RELATIONAL INTERPRETATIONS

Marco Ciapparelli[1], Marco Marelli[1]; *[1]University of Milano-Bicocca*

According to psycholinguistic theories, processing a compound word ("snowman") involves its automatic decomposition into its constituents ("snow", "man"), then connected by an implicit semantic relation ("made of") to obtain a plausible interpretation ("man made of snow"). However, the appropriate relation is often not univocal and must be selected from a set of competitors. In this study, we investigated whether contextualized word embeddings (cwe) capture human intuitions on compounds' interpretations. We used BERT-base to obtain cwe of compounds in context (e.g., "We built a [snowman] in our garden"). Then, we systematically replaced compounds with paraphrase variants in which candidate relations were made explicit (e.g., "We built a [man made of snow] in our garden"). We then computed the similarity between the original compound cwe and its multiple variants. We find that these similarities predict participants' interpretations (i.e., the probability of selecting a given relation) and their degree of conflict. Thus, we show that cwe can be leveraged to generate semantic representations for linguistic units that are not directly observable in text, but which influence compounds' interpretation and processing.

GRAMMATICAL GENDER EFFECTS ARE REFLECTED IN THE DISTRIBUTIONAL STRUCTURE OF LANGUAGE

Luca Onnis[1], Alfred Lim[2]; *[1]University of Oslo, [2]University of Nottingham Malaysia*

Does sex-based grammatical gender on inanimate nouns "rub off" on concepts, such that Italian speakers conceptualize 'spoon' as more masculine than Spanish or French speakers do? We probed 148 semantic word embeddings - meaning representations derived from distributional semantics models (FastText and Word2Vec). We selected inanimate nouns from 3 gendered languages (Italian, Spanish, French) plus a non-gendered control (English). The grammatical gender in Italian was the opposite in Spanish and French. We measured the meaning (cosine) similarity of each word to semantically-gendered reference words, such as 'male' and 'female'. In the gendered languages (but not in English), word meanings were more similar to the reference word congruent with the word's grammatical gender ($F(2,142)=49.71$, $p<.001$). Thus, grammatical gender may color lexical semantics by way of the sub-lexical and context distributional similarity of words. Masculine/feminine semantic features are present in *inanimate* words of gendered languages via language statistics without incorporating sensorimotor experience. To confirm these results, we are extending this analysis to 136 distinct gendered language pairs and 16 different languages.

STATISTICAL LEARNING IN READING: A NEW LOOK AT PHONICS INSTRUCTION

Teng Guo[1], Samantha Ruvoletto[1], Marie Boyer[1], Daniel Zagar[1]; *[1]ATILF (CNRS & University of Lorraine)*

There is substantial evidence that statistical learning (SL) is linked to reading ability by enabling the detection of grapheme-phoneme-correspondence (GPC) regularities. However, there are few investigations of how children extract GPC regularities from print-to-sound mappings in reading. We trained 168 kindergarteners during 100-minute learning sessions on 8 regular letters-to-syllable associations. One set of associations contains 8 GPC regularities (i.e., a "rich" orthographic environment), while the other set contains only four GPC regularities (i.e., a "poor" orthographic environment). Pretests and posttests were administered to assess the development of letter knowledge, syllable reading, and phonemic awareness. Results showed that children trained in the "rich" orthographic environment increased their phonemic awareness significantly more than those who were trained in the "poor" one. These findings provide evidence that regular and informative letters-to-syllable associations enable prereaders to extract GPC regularities. Our findings warrant a discussion about phonics instruction and have led to a new theoretical framework for the cognitive processes involved in the early stages of learning to read (Guo et al., 2023).

VISUAL EXPERIENCE ALTERS THE SENSITIVITY TO THE DISTRIBUTION OF WORDS IN NATURAL LANGUAGE

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Whether visual experience may affect the sensitivity to semantic distributional cues from natural language is an open issue that ignites a fervent debate. Here, we aimed to address this issue by conducting an independent reanalysis of data from Bottini et al. (2022), in which early blind and sighted participants performed an auditory lexical decision task. Since previous research has shown that semantic neighborhood density – the mean distance between a target word and its closest semantic neighbors – can influence

performance in lexical decision tasks, we investigated whether vision may alter the reliance on this semantic index. We demonstrate that early blind participants were more sensitive to semantic neighborhood density than sighted participants, as indicated by the significantly faster response times for words with higher levels of semantic neighborhood density displayed by the blind. These findings suggest that an early lack of visual experience may lead to enhanced sensitivity to the distribution of words in natural language, deepening in turn our understanding of the strict interplay between linguistic and perceptual experiences in the organization of conceptual knowledge.

TALKS – 14h20 to 16h20

TALKS 31
READING

ORTHOGRAPHIC AND PHONOLOGICAL CODE ACTIVATION IN DEAF AND HEARING READERS

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Deaf readers provide unique insights into how the reading circuit is modified by altered linguistic and sensory input. We investigated whether reading-matched deaf and hearing adults exhibit different ERP effects associated with activation of orthographic and phonological codes. In a visual masked priming paradigm, participants performed a go/no-go semantic categorization task, and target words were preceded by orthographically-related (transposed letter - TL) or phonologically-related (pseudohomophone - PH) masked non-word primes and were contrasted with the same target words preceded by letter substitution (control) non-words primes. Hearing readers exhibited typical N250 and N400 priming effects (greater negativity for control compared to TL or PH primed targets), and the TL and PH priming effects did not differ. Deaf readers showed a reversed N250 priming effect for TL primes but standard effects for PH primes. Across all participants phonological awareness correlated with the early PH N250 priming effect: larger priming was associated with greater phonological skill. We suggest that the reversed N250 TL effect for deaf readers arises from differences in how visual and lexical forms interact during word recognition.

ORTHOGRAPHIC ENCODING IN DEAF READERS OF SPANISH: THE WHAT MATTERS MORE THAN THE WHERE

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Deaf skilled readers offer the opportunity to examine how reading takes place in the absence of phonological representations, and how this impacts orthographic encoding. We performed four ERP experiments with a group of 20 prelingually deaf skilled readers of Spanish and a matched group of 20 hearing readers. The experiments examined the role of letter position and identity by comparing real words with transposed letter and replaced letter pseudowords (Exp1), and letter strings with transposed and replaced letters (Exp2), visually similar letters (Exp3) and different cases (Exp4). Behaviourally, both groups showed similar patterns across conditions. The ERP results revealed that, compared to hearing readers, deaf readers were more sensitive to orthographic mismatch, especially letter identity: during word reading, replaced letters caused longer-lasting disruption in the lexical phase; for letter strings, they had earlier effects of letter identity, regardless of visual similarity or changes in case. These differences between deaf and hearing readers are not due to variations in low-level visual perception; rather they reflect a system driven by the orthographic – but not the phonological – properties of the visual input.

IS LETTER POSITION CODING A UNIQUE SKILL IN DEVELOPING READERS?

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To read words in alphabetic scripts, we must encode the relative order of the letters. Notably, this process of letter position coding is flexible. For instance, the masked transposed-letter prime like jugde activates JUDGE to a larger degree than a replacement-letter prime like jupte (a transposed-letter effect). Here we examined whether the transposed-letter effect relates to reading skill (via a standardized test) in a masked priming lexical decision task with Grade 6 children. Targets (e.g., RITME, the Catalan for rhythm) were preceded by identity primes (ritme), transposed-letter primes (rimte), or replacement-letter primes (risle) in a sandwich priming paradigm. Results showed that transposed-letter primes were more effective than replacement-letter primes, but less than identity primes. More important, while the overall error rates and response times were modulated by the readers' reading skill, we found no evidence of a modulating role of reading skill on the size of the priming effects. These findings suggest that the initial moments of the encoding of letter position in word in normally developing children are not affected by their reading abilities.

AN EXAMINATION OF MODELS OF READING MULTI-MORPHEMIC AND PSEUDO MULTI-MORPHEMIC WORDS USING SANDWICH PRIMING

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Rastle et al. (2004) reported that true (e.g., hunter) and pseudo (e.g., corner) multi-morphemic words prime their stems to nearly the same degree in a conventional masked priming lexical decision task and, equally importantly, to a larger degree than form primes do (e.g., brothel-BROTH). These results support the assumption of "decomposition" models that primes like hunter and corner automatically activate representations for both their stem (e.g., hunt, corn) and affix (e.g., -er). The present experiments, using Rastle et al.'s stimuli, were designed to examine a number of models of the relevant processes by using a more sensitive priming technique, sandwich priming. Although Rastle et al.'s pattern was replicated using the conventional procedure, two sandwich priming procedures only affected (i.e., increased) the priming effect from true multi-morphemic primes, a result not readily explained by any current models. The data appear to be most consistent with there being a process that involves activating/inhibiting multiple representations including the affix's representation (e.g., -er) with the ultimate lexical decision being based on the process of resolving the pattern created by the activated representational units.

UNCOVERING THE FOUNDATIONS OF READING: THE EMERGENCE OF ORTHOGRAPHIC PROCESSING

Maria Fernández-López[1], Manuel Perea[1]; *[1]University of València*

Letters are processed differently than other visual objects in terms of location-invariance, showing stronger transposition-letter (TL) effects: in same-different tasks the difference between RTFG-RFTG and RSLG-RFTG is larger than the parallel effect for symbols/digits. This dissociation presumably arises from the development of letter-specific processing with literacy. To examine the emergence of location invariance, two studies were conducted. The first study used a laboratory analog of learning to read, where adults learned to read and write in an artificial script. Results showed that the size of the TL effect in a same-different task was similar before and after learning the new script, suggesting that location-invariance does not fall naturally in the first moments of learning to read. In the second study, we examined whether experience with specific orthographic structures—bigrams—would boost location-invariance. Participants were exposed, for a few minutes, to a stream of artificial words with four bigrams occurring frequently. Results showed that TL pairs with frequent bigrams were more error-prone than those with infrequent bigrams. Thus, location-invariance can emerge through exposure to orthographic regularities.

IS READING THE SAME AS TRANSLATION IN YOUNG MULTI-LECTAL SPEAKERS?

Björn Lundquist[1], Anya Vinichenko[1], Maud Westendorp[1]; *[1]UiT The Arctic University of Norway*

We investigate multiliteracy in young Western Norwegian speakers who are exposed to four different written lects (a generation with uniquely high levels of written lg exposure): (1) Nynorsk (1st written lg acquired); (2) Bokmål (dominant lg in society); (3) dialect writing (text messages and chat forums); and (4) English. The four different written forms often directly interleave with spoken discourse in practice. But do speakers need to `translate´ written forms into their native dialect, or do written forms map directly to a single phonological dialect grammar? 97 9th grade students (15 yrs) from western Norway participated in a speeded production task, where a noun phrase (e.g. "a green banana") in lgs (1), (2) or (4) above, was shown on a screen for 1100ms while a question (e.g., "what did he buy") was heard. The question was always spoken in the local dialect, in which they were also told to respond. We analysed onset latencies, increase in pupil size, and several disfluency measures, against a range of linguistic measures. The results show that speakers map their speech directly to several written languages without showing signs of a process of translation. Multiliteracy is not the same as multilingualism more generally.

TALKS 32
COGNITIVE MODELING

BIASES ARE THE NORM (WHEN CONTEXT IS PRESENT IN PERCEPTION OR MEMORY)

Andrey Chetverikov[1]; *[1]University of Bergen*

Perception and memory are often biased by context. Serial dependence, tilt illusion, interference in visual working memory, and many other similar biases have been described over the years. Why do they occur? And why are there both repulsive biases and attractive ones, sometimes even in a single study? Despite significant progress in understanding their neurophysiological mechanisms and many attempts to describe them algorithmically, their computational (in Marr's classification) explanation remains elusive. I have recently proposed a demixing model that provides a normative explanation for both repulsive and attractive biases based on the simple idea that observers infer object properties from a mixture of sensory signals without knowing which object caused which signals. Surprisingly, biases turn out to be an inevitable part of the strive for optimality in a noisy environment. Here, I will focus particularly on the role of sensory noise and between-item similarity to discuss the model predictions and the relevant empirical data.

COGNITIVE MODELING OF QUANTITATIVE JUDGMENTS USING NATURALISTIC STIMULI

David Izydorczyk[1], Arndt Bröder[1]; [1]*University of Mannheim*

When modeling quantitative judgments by exemplar-, rule-, hybrid models, or the Mapping Model, researchers typically rely on synthetically constructed stimuli. The reason is that the computational models operate on defined feature or cue structures of the stimuli to derive predictions and to fit the models to the data and estimate their parameters, respectively. For example, exemplar models rely on the similarity between judgment objects and stored exemplars which is defined as a formal function of the cues. We build upon the categorization literature in which cue dimensions of naturalistic objects are extracted from similarity judgments via multidimensional scaling (MDS) procedures. In a first proof-of-concept study, we show that an MDS analysis of a set of artificial stimuli constructed from four cues fully recovered these cues and led to similar cognitive modeling results as the original cues. In a second study, we had participants judge the airspeed velocities of various birds for which MDS-extracted features were generated by an independent sample. The model parameters of a hybrid model replicated the finding that different training regimes affect cognitive processing (exemplar vs. rule) thereby validating our approach.

"MEMOIR: A MATLAB EXPERIMENTAL TOOLBOX OPTIMIZED FOR THE MEMORY MEASUREMENT MODEL (M3) TO ADVANCE INDIVIDUAL DIFFERENCES RESEARCH IN WORKING MEMORY"

Jan Göttmann[1], Daniel Schneider[2], Gidon Frischkorn[3], Anna-Lena Schubert[1]; [1]*University of Mainz,* [2]*IfADo Dortmund,* [3]*University of Zurich*

The memory measurement model framework (M3; Oberauer & Lewandowsky, 2018) encompasses a series of cognitive measurement models that identify parameters related to distinct working memory processes in typical working memory tasks (e.g. simple/complex span tasks and memory updating tasks).Given the vital role of working memory processes in numerous cognitive domains, the M3 framework is of significant interest for individual differences research. To apply the M3 framework in individual differences research, we developed MEMOIR, a MATLAB toolbox with customized experiments in different content domains for the M3 Model framework. We conducted simulations to determine the most critical experimental features for improving subject parameter recovery and the estimation of M3 parameters in simple and complex span as well as updating tasks. Furthermore, we provide general recommendations for further experimental development given the M3's high flexibility. We also present applications of the toolbox, relating M3 parameters to individual differences in intelligence and working memory capacity. Taken together, MEMOIR enables wider applications of cognitive modeling in individual differences research.

AN INTRODUCTION TO DYNAMIC STRUCTURAL EQUATION MODELS USING STAN: A PRACTICAL GUIDE FOR COGNITIVE RESEARCHERS

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Although research investigating time dynamics of complex systems are a mainstay in epidemiology, economics, and certain sub-disciplines in psychology, longitudinal data is becoming more commonly available in cognitive psychology as well. Dynamic Structural Equation Models (DSEMs) are a powerful statistical tool for modeling longitudinal data, merging time-series analysis, multilevel modeling, and structural equation modeling. Mplus is a widely used software for estimating DSEMs, but it has some limitations in terms of flexibility, scalability, and availability. Stan is a statistical modeling language generally not bound by such limitations. However, modeling with Stan can be a challenging task for researchers not familiar with the statistical language. We highlight the most important aspects from our upcoming tutorial paper: we introduce the DSEM framework, possible applications in cognitive science, and finally present a base-model (a bivariate lag-1 model) in Stan and possible model extensions including latent-variable modeling and mediation analysis. Our goal is to present our tutorial as a clear and practical guide for researchers who want to take advantage of Stan as a powerful toolbox to specify and fit DSEMs.

CHALLENGES TO VALIDATING MODEL PARAMETERS IN THE DIFFUSION MODEL: A STUDY ON CONVERGENT AND DISCRIMINANT VALIDITY

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The Diffusion model (Ratcliff, 1978) constitutes a popular cognitive model that is used to analyze data from binary reaction time tasks. Arguably most of its popularity stems from the fact that each model parameter is assumed to reflect one specific information-processing aspect of a decision. In order to interpret the model parameters as such measures, validation studies supporting the convergent and the discriminant validity of each parameter are needed. While most of these validation studies have established good convergent validity for the drift rate *v*, the threshold separation *a*, and the starting point *z*, the discriminant validity of these parameters as well as both validity types for t_0 seem less clear. In a first experiment, we found empirical evidence for high convergent validity of t_0 but also surprisingly low discriminant validity of *v* and *z*. Here, we present a follow-up study which explicitly focuses on the low discriminant

validity of *v* and *z*. Specifically, we use a stimulus contrast manipulation that is supposed to only affect encoding and thus t_0, and test whether the results of the first experiment are likely due to design details of the first experiment or indeed due to low discriminant validity of *v* and *z*.

TIME TO JUMP: EXPLORING THE DISTRIBUTION OF NOISE IN EVIDENCE ACCUMULATION AS A FUNCTION OF TIME PRESSURE

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The diffusion model (DM; Ratcliff, 1978) assumes that decisions originate from a continuous evidence accumulation process which is subject to Gaussian noise. The Lévy flight model (LFM; Voss et al., 2019) modifies this by assuming that accumulation noise follows a more heavy-tailed distribution, allowing for jumps in evidence accumulation. The heavy-tailedness of the noise distribution is governed by the additional parameter α. A previous study found α to be lower under speed instructions. Building upon this finding, we also compared speed versus accuracy conditions using a letter-number discrimination task. To explore the behavior of α under different levels of time pressure, we additionally imposed a response deadline of 500 ms in one condition. We found that, for most participants in the accuracy condition, accumulation noise was (nearly) normally distributed. By contrast, for most participants under severe time pressure, α-values were remarkably low, i.e., even lower than those reported in previous studies. Comparisons of the fit of different variants of the DM and LFM alongside implications for modeling decision processes under (deadline-based) time pressure are discussed.

TALKS 33
BILINGUALISM II

CROSS-LANGUAGE ACTIVATION OF IDIOM MEANINGS: EVIDENCE FROM FRENCH- VIETNAMESE-AND INDONESIAN-ENGLISH BILINGUALS

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The aim of the present study was to determine whether bilinguals activate the figurative meaning of an idiom that is specific to one language when they are exposed its translation in their other language. We used a cross-modal priming task in which participants heard L2 English sentences that ended with an idiom translated from their L1. They then saw a visually presented stimulus that was either related to the meaning of the L1 idiom, a matched control word, or a nonword, and made a lexical decision. Three experiments were run, each with a different group of bilinguals (French-English, Vietnamese-English, and Indonesian-English), and each with a monolingual English control group. In all three studies, the effect of relatedness for bilinguals and monolinguals differed, demonstrating cross-language activation of idiom meanings. Evidence was obtained that suggested that culture-specific information in idioms influenced processing.

FREE OR FORCED LANGUAGE CHOICE IN LANGUAGE-SWITCHING AND ITS TRANSFER TO NON-LINGUISTIC TASK-SWITCHING - AN ERP STUDY

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Several previous studies showed transfer effects between language control and domain-general control. The present study investigated whether enhancement of cognitive control previously found after forced language-switching (i.e., limited by external demands such as color cues) can also be seen after voluntary language-switching. Participants completed a non-linguistic task-switching paradigm before and after language-switching training. Half of the participants were forced to switch languages while naming pictures, while the other half chose their language freely. The behavioral results showed no significant change in switch costs across sessions between the two groups. However, the forced switching group revealed reduced mixing costs compared to the voluntary switching group after training. A significant change in P3 mixing costs further supported this effect. The transfer of linguistic switching training to non-linguistic switching in mixing costs indicates that externally induced language-switching requires sustained but not necessarily transient cognitive control. Together, the results suggest that only language-switching driven by external demands enhances domain-general cognitive control.

ACCOUNTING FOR MULTILINGUAL PROFILES DURING PRESURGICAL MAPPING OF GLIOMA PATIENTS

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Is there a neural network common to all languages spoken by a multilingual person? FMRI studies with healthy individuals provide inconsistent findings: some suggest a neural overlap across languages, while others contradict this claim. Answering this

question is critical when planning the surgical treatment of bilingual brain tumor patients. We tested 10 highly proficient Spanish-Basque bilingual patients with gliomas affecting the language-dominant hemisphere and a group of healthy controls. Results from healthy participants reconcile with previous evidence showing a common system for L1 and L2, but also regions that respond differently in terms of language-dependent activation and lateralization patterns. The left lateralization shown by L1 is not as evident when we map the L2: L2 needs the recruitment of regions contralateral to the language-dominant hemisphere. Conversely, patients show a bilateral pattern for L1 and L2 suggesting that the compensatory engagement of contralateral networks is required to preserve bilingual speech production. These findings support the implementation of personalized surgical strategies that consider patients' linguistic profiles to preserve language function in an integral multilingual fashion.

TWO MEMORY ROUTES FOR LEARNING WORDS? SCHEMA CONSISTENCY EFFECTS ON SOURCE MEMORY DURING L2 WORD LEARNING

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It has been shown that experiences that match a learner's prior knowledge (so-called 'schemas') are not only retained better, but may even use a different memory route than those unconnected to prior knowledge. In particular, such 'schema-consistent' content might be learned with less involvement of episodic memory, and be instead encoded directly into semantic memory. We investigated this for L2 word learning in two experiments in which participants learned words of an unknown language, Italian (Exp. 1) or Mandarin (Exp. 2). In Exp. 1, words were either cognates (i.e. overlapping in form and meaning) with the participants' native language (L1) or not. In Exp. 2, the words' phonemes did also exist in the L1 or not. Memory for the voice (male / female) by which a word had been spoken (*source memory)* served as an established indicator of episodic memory involvement. The results showed, first, that schema-consistent items (cognates, or phonetically 'easy' words) were recalled better than inconsistent ones. Critically, though, source memory followed the same pattern, contrary to what the 'schema' account predicts. These results are more in line with a competing one-route view that stresses the importance of attentional resources.

BILINGUAL SENTENCE PLANNING: LINGUISTIC AND COGNITIVE EFFECTS ON GRAMMATICAL PLANNING SCOPE

Mikael André Albrecht[1], Allison Wetterlin[1], Linda Wheeldon[1]; *[1]University of Agder*

Fluent spoken sentences are planned incrementally. The amount planned prior to speech onset depends on both linguistic and cognitive factors. We investigate the impact of such factors on L2 English and L1 Norwegian sentence planning in a sentence-based language switching paradigm. The effects of switching and morphosyntactic overlap on planning scope were investigated. 64 participants described pairs of moving pictures eliciting either complex-initial sentences (e.g., an A and a B go up) or simple-initial sentences (e.g., an A goes above a B). The sentences comprised either definite NPs (similar structure in both languages) or indefinite NPs (dissimilar structure in Norwegian and English). Onset latencies and eye fixations were recorded. Both data sets show smaller effects of phrase structure on switch trials compared to non-switch trials, consistent with a reduced planning scope when cognitive load increases. In contrast, morphosyntax affected production independently of switching. Overall, the results show that language switching affects planning scope and that the effects of phrase structure manifests in the early stages of pre-verbal planning. Language switching, meanwhile, affects gaze patterns later in the production process.

RE-THINKING L1/L2 SIMILARITIES AND DIFFERENCES IN ENGLISH PROFICIENCY: INSIGHTS FROM THE ENGLISH READING ONLINE (ENRO) PROJECT

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Studies into second language (L2) reading typically employ targeted experiments designed to detect how the behavior of L2 readers differs from that of their native language (L1) counterparts. Here we present a new data resource – labelled ENglish Reading Online (ENRO) – which enables a re-estimation of not only L1-L2 differences, but also similarities, in a broader empirical context. ENRO includes data on reading and listening comprehension from N=7,338 university-level advanced learners and native speakers of English representing 19 countries. The database also includes estimates of reading rate and seven component skills of English, as well as rich demographic and language background data. Using the ENRO data we provide a bird's-eye view of L1-L2 comparisons and examine the relative role of various predictors of reading and listening comprehension and reading speed. Various analyses point to substantially more overlap than differences between L1 and L2 speakers, suggesting that English reading proficiency is best considered across a continuum of skill, ability, and experiences spanning L1 and L2 speakers alike. Further pointers will be provided to how the publicly available ENRO data can be mined in future research.

ATTENTION AND MEMORY

I REMEMBER ME THE BEST, ALWAYS? EVIDENCE FOR SELF-PRIORITIZATION IN WORKING MEMORY BINDING USING A VISUO-SPATIAL WORKING MEMORY TASK

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Research demonstrates preferential processing for self-associated stimuli for a range of mental functions (Sui & Humphreys, 2017). But, relatively less is known about whether such prioritization also persists for internal representations (Yin et al., 2019) or manifests tangible advantages in maintenance, manipulation, or processing of information in Working Memory. In the current study, we asked participants to associate social labels (self, friend, stranger) with arbitrary geometrical shapes (triangles, quadrilaterals, and pentagons) as done in (Sui et al., 2012) and tested them for maintenance of properties (shape, location, or a combination) of the target stimuli during a delayed match–to–sample visuospatial task, interfered with a simple arithmetic task. Participants demonstrated a distinct advantage with faster responses for self-associated stimuli not only for the maintenance of single features (identity, location) but also for their bounded combination (exemplar-identity & location). Our findings are in line with the proposal that self-reference can aid in binding information across several processing levels (Sui & Humphreys, 2015) and has major implications in understanding the role of self-reference in cognition.

THE EFFECTS OF INVOLUNTARY AND VOLUNTARY INTERNAL ATTENTION ON DIFFERENT TYPES OF WORKING MEMORY CONTENTS

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Internal attention can be involuntarily or voluntarily directed to working memory (WM) contents. However, it is unknown whether it operates differently depending on the nature of those representations. In two experiments (n=61), the voluntariness of retro-cues was manipulated and participants memorized an array of three/four items. They were asked to retrieve perceptual -color- or semantic -category- information. Data were modeled with a drift-diffusion model. Drift rates evidenced that independently of retro-cue voluntariness, a cost on invalid trials was present when retrieving perceptual contents, while semantic categories evidenced a benefit of valid retro-cues. In turn, regardless of the content to be retrieved, non-decision times revealed benefits and costs only when participants voluntarily attended to retro-cues. In conclusion: first, voluntary and involuntary attention induce analogous effects on the quality of WM contents, while the nature of such representations is what conditions whether benefits or costs are observed; and second, regardless of the processing level of WM contents, the retrieval in advance of such representations only seems to be possible when internal attention is voluntary.

EXPLORING THE RELATION BETWEEN ATTENTIONAL SELECTION, SUPPRESSION AND VISUAL WORKING MEMORY DEVELOPMENT

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Visual working memory (VWM) improves from childhood to adulthood yet the factors driving this improvement remain under investigation. While past research has shown that neural efficiency in deploying selective attention is positively related to VWM performance over development (Shimi, Nobre, & Scerif, 2015), the role of neural differences in suppressing distractors has not been explored. This talk presents new data from an experiment examining the neural activity involved in target selection and distractor suppression as they relate to VWM. Participants completed two tasks; one requiring selective response to a target while ignoring a distractor, and one requiring recognition of a probe from a previously-presented memory array. Analyses focused on ERP components related to target selection and suppression. Results shed light on the mechanisms constraining VWM capacity over development.

LONG-TERM REWARDS IN WORKING MEMORY: A QUESTION OF ENCODING OR MAINTENANCE?

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There is a strong interest in the links between working memory and long-term memory. Yet, the role of intentions and long-term recall's relevance in this relationship is still unclear. In a first study, we conducted two experiments to investigate whether and how the intention to remember in the long-term modulates working memory maintenance. We manipulated intentions by warning participants of the final delayed recall or not (Experiment 1), and by rewarding either immediate or delayed correct recalls (Experiment 2). We found no evidence that intentions changed the working memory maintenance mechanisms and strategies used, yet the cognitive load (Experiment 1) and items' value (Experiment 2) effects on delayed recalls were increased with a higher intention to remember at long-term. In an ongoing follow-up study (Experiment 3), participants are rewarded based on delayed recall of high- or low-value items studied in a working memory task. We manipulate the time at which the items' value information is given, before their encoding or during their maintenance. The results should provide insight into whether intentions modulate encoding processes, maintenance processes, or a combination of the two.

VALUE-DRIVEN PRIORITISATION IN WORKING MEMORY; DO THE EFFECTS EXTEND INTO LONG-TERM MEMORY?

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Attention, working memory (WM), and long-term memory (LTM) are cornerstones of cognition, with accumulating evidence for an interactive relationship between these components. One theme to emerge in parallel literatures is that WM and LTM can each be improved for prioritised items that are allocated with higher experimental 'value'. However, there is little consistent evidence regarding whether WM-based effects of value-based prioritisation automatically translate into LTM. We examined this question in a set of experiments in which prioritisation was directed via value in a visual WM task, followed (after a delay) with a surprise LTM test. Value-based prioritisation effects were reliably observed in WM. However, we found relatively minimal evidence of automatic continuation into LTM, with any observed effect dependent on the item originally being tested in the WM phase. Thus, the benefits of attentional prioritisation in working memory can be somewhat ephemeral and do not always translate into longer term performance.

HOW DOES LONG-TERM MEMORY BENEFIT WORKING MEMORY?

Eda Mizrak[1], Sanjay Manohar[1]; *[1]University of Oxford*

Humans have the remarkable ability to hold onto information – preserving it in working memory (WM) where it is ready for ongoing thought and action. Although WM has a limited capacity to store only a small amount of information, we can expand this capacity by leveraging existing knowledge in long-term memory (LTM) in certain situations. For example, when novel stimuli are encoded alongside familiar stimuli, WM retention is enhanced compared to encoding a list of only unfamiliar stimuli. However, the mechanism behind this benefit remains unclear. To gain a better understanding of this phenomenon, we conducted a series of studies. Firstly, we compared it to a well-established retro cue benefit. Secondly, we developed novel methods to assess whether the benefit arises during encoding or retrieval. Our findings revealed that the LTM benefit is distinct from the retro-cue benefit and that it most likely occurs during retrieval. We suggest that familiar stimuli reduce retrieval interference for other items that were encoded with them, which is responsible for the observed benefit.

TALKS 35
CHILD DEVELOPMENT II

"EXPLORATION-EXPLOITATION DILEMMA" IN CHILDREN'S DECISION-MAKING: A LONGITUDINAL STUDY

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As organisms gather information and use it to obtain rewards, they balance the strategies of exploring new information and exploiting what they already know. Although young children are known to explore more than adults, little is known about how and when exploitative strategies emerge over the course of development. To shed light on this issue, we tracked changes in the decision-making patterns of 142 children over a period of three years, from age four to six. The experiments used a simplified version of a four-armed bandit task (Blanco & Sloutsky, 2021). We evaluated the relative influences of reward-seeking (exploitation), random exploration (low cognitive demand exploration), and systematic exploration (high cognitive demand exploration that maximizes information gain). Our results show that systematic exploration, instead of random exploration, dominates young children's behavior at age four and gradually transitions into reward-seeking behavior as age increases. We conclude that systematic exploration is the main driver of decision choices during the preschool period and discuss these findings in light of the development of selective attention (Sloutsky, 2010) and goal-directed behavior (Johnson et al., 2013).

ROLE OF DOMAIN-GENERAL AND DOMAIN-SPECIFIC COGNITIVE FACTORS IN PREDICTING ARITHMETIC ABILITY IN CHILDREN: A CROSS-SECTIONAL INVESTIGATION

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Mathematics ability plays a crucial role in children's academic achievement. Studies have propounded domain-general and domain-specific approaches to understand the cognitive underpinnings of mathematical ability. However, the specific cognitive factors involved in mathematical ability are poorly understood. Therefore, the present research attempts to investigate the role of domain-general (executive function and spatial ability) and domain-specific (approximate number system) in predicting arithmetic ability among young children. Based on specific inclusion criteria, a total of 49 students were selected from 3rd and 4th grades and were divided into three groups, namely: low math ability (N = 7), moderate math ability (N=33), and high math ability (N=9). Dot number comparison, reverse Corsi block, Stroop task, and mental rotation tasks were used to measure approximate number system, visuospatial working memory, inhibition, and spatial ability, respectively. Results of a series of Kruskal Wallis tests revealed that children only differed in visuospatial working memory, with the high

math achieving group having a higher visuospatial working memory span. Results have been discussed in light of the literature.

CHILDREN'S UNDERSTANDING OF OTHERS' LOGICAL INFERENCES. TWO NEW THEORY OF MIND TASKS*

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Despite the variety of mental states that are investigated in the field of Theory of Mind (ToM), children's understanding of others' logical inferences (LIs) has been neglected in the literature. To fill this gap, two new tasks were developed differing in the complexity of the LIs that children had to attribute to the other. The sample consisted of 480 students aged from 4 to 16 years. Participants were tested in the two ToM_LI tasks and, to test their concurrent validity, in two false belief tasks (1st-2nd order) as well as a deductive reasoning task including all types of logical forms (MP, MT, DA, AC). Results showed that children begin to correctly attribute LIs to others at the age of 6 years. Also, performance in the two ToM_LI tasks correlated significantly with performance in the false belief tasks, as well as with the total score in deductive reasoning. Overall, the results highlight the developmental sensitivity of the new ToM_LI tasks and suggest that they may be useful to provide a more comprehensive picture of children's understanding of the mind's functioning. The theoretical and practical implications of the results are also discussed. *The research project was supported by the Hellenic Foundation for Research and Innovation (H.F.R.I. Project Number: FM17-13).

AGE-RELATED DIFFERENCES IN THE PROCESSING OF INTERACTIVE BIOLOGICAL MOTION IS UNDERSCORED BY ALTERNATIVE BRAIN CONNECTIVITY

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Recognizing and understanding the contents of others' social interactions is an important ability that relies on deciphering multiple sources of information; for example, body and face information, and inferring others' hidden intentions. Although work has made important steps towards characterizing the brain basis of this ability in adults, its developmental underpinnings are virtually unknown. To address this, we used fMRI to investigate which kinds of social information support superior temporal sulcus (STS) responses to interactive biological motion (i.e. 2 point-light human figures interacting) at different developmental time-points in adults and children. These results reveal a striking developmental difference: children show supportive functional connectivity with key regions of the mentalizing network, while adults show stronger reliance on regions associated with body- and dynamic social interaction/biological motion processing. We suggest that adults employ efficient action-intention understanding via body and biological motion information, while children show a stronger reliance on hidden mental-state inferences as a potential means of learning to better understand others' interactive behavior.

TIME ESTIMATION AND EXECUTIVE FUNCTIONS IN CHILDREN AND ADOLESCENTS WITH AND WITHOUT IDIOPATHIC MILD INTELLECTUAL DISABILITY

Elsa Gourlat[1], Cédric Albinet[1], Anne-Claire Rattat[1], Benoît Valéry[1] ; *[1]Laboratoire Sciences de la Cognition, Technologie, Ergonomie (SCoTE), Université de Toulouse, INU Champollion, 81012 Albi Cedex 9, France*

Although few scientific studies have documented deficits in duration estimation and executive functions (EF) in mild intellectual disability (MID), no study has yet examined whether these cognitive deficits may be related. In the present study, MID and typically developing individuals (N=187) aged from 10 to 20 completed a battery of 11 experimental tasks assessing three EFs (inhibition, cognitive flexibility and working memory updating) and duration estimation abilities. Preliminary results (1) support the hypothesis of decreased performance on most of the executive tasks and duration estimation tasks in MID individuals, (2) highlight a delayed developmental curve of these capacities in MID individuals compared to typically developing ones, (3) show significant correlations between performance on some executive (mostly updating) and duration estimation tasks. Finally, temporal deficit in MID individuals disappeared after having controlled for the updating performance. Considering these results, it can be suggested that cognitive training targeting updating could improve duration estimation abilities in individuals with MID and thus their quality of life, which is a major societal issue.

NEURAL MARKERS OF OBJECT-SCENE CONGRUENCE IN ADULTS AND YOUNG INFANTS

Genevieve L. Quek[1], Manuel Varlet[1], Zhen Zeng[2], Jordan Ratcliffe[1], Pauline Trichet[3], Jessica L. L. Chin[1], Tijl Grootswagers[1]; *[1]Western Sydney University, [2]Chinese University of Hong Kong, [3]AgroParisTech*

Humans are highly sensitive to co-occurrence statistics in visual environments. Scene backgrounds that are semantically consistent with a foreground object facilitate our ability to recognize and remember objects, and drive enhanced object representations in the brain. Behavioural and eye-tracking data suggest this sensitivity to object-scene relations emerges during the first year of development, yet the neural basis for semantic consistency effects in young infants has yet to be established. To this end, we recorded

scalp EEG in a large group of infants (2-12 months) and adult observers while they viewed upright and inverted objects superimposed on congruent or incongruent backgrounds (e.g., dolphin on water vs. dolphin on grass). Neural decoding of adult data revealed strong object category representations that were facilitated by congruent backgrounds from 150-300ms. In contrast, decoding of infant brain data suggested that object category representations were mainly evident for upright, congruent object-scene pairings, and much less so in the other conditions. These findings advance the newly-emerging field of infant brain decoding and shed new light on the rapid acquisition of scene/object knowledge in the first year of life.

TALKS 36
COGNITIVE CONTROL II

TRANSITION VS. END-STATE: ELUCIDATING THE CONTENT OF IDEOMOTOR EFFECT ANTICIPATIONS

Solveig Tonn[1], Moritz Schaaf[2], Wilfried Kunde[2], Roland Pfister[1]; *[1]University of Trier, [2]University of Würzburg*

Research on ideomotor action control has repeatedly demonstrated that actions are represented in terms of their perceivable effects. While it is thus well established by now *that* effect anticipations are decisive for planning and executing goal-directed movements, it has remained surprisingly vague *which* effect anticipations underlie ideomotor action control. Contemporary accounts of ideomotor action control usually emphasize the importance of goals, i.e., desired states of sensory input after action execution. However, we propose that previous findings can also be explained by the representation of transitions, i.e., the change from current to desired state. The results of a series of experiments lend converging support to transitional instead of goal-based representations, thereby providing an important step towards a mechanistic formulation of ideomotor action control.

SHORT-TERM BINDING OF SELF-RELEVANT STIMULI IN ACTION CONTROL

Marcel Pauly[1], Dirk Wentura[1], Christian Frings[2]; *[1]Saarland University, General Psychology & Methods Unit, [2]Trier University, General Psychology & Methods Unit*

Various empirical findings (like the self-prioritization effect; Sui et al., 2012) suggest that self-relevance enhances stimulus processing. The underlying mechanisms are not yet fully understood. Some studies suggests that self-relevance might have influences on binding processes (Sui & Humphreys, 2015; Schäfer et al., 2020). We tested the latter assumption by examining stimulus-response binding in an action control paradigm in two studies. In an S1R1-S2R2 task (Hommel, 1998), subjects performed two responses to self-relevant and non-self-relevant stimuli. The first response was determined by an (arbitrary) cue stimulus. The second response was a decision, whether shown stimuli were self-relevant or referring to another person. We varied both stimulus repetition and response repetition orthogonally and were thus able to assess the binding between target stimuli and response. The results in both experiments showed significant binding effects but no significant differences between both conditions (i.e., self, other). Nevertheless, faster responses were detected in self-relevant trials (i.e., the self-prioritization effect). Our results indicate that SR-bindings are not substantially influenced by self-relevance.

EXAMINING THE LINKS BETWEEN ANXIETY SYMPTOMS AND ERROR MONITORING: A NETWORK ANALYSIS

Anna Grabowska[1], Magdalena Senderecka[1]; *[1]Jagiellonian University*

Alterations in error processing are observable in a range of anxiety-related disorders. Numerous studies investigating the link between anxiety symptoms and error monitoring have yielded inconsistent results, which may be due to differences in anxiety symptoms studied and covariates accounted for. We address both these challenges using network analysis. We estimated four regularized Mixed Graphical Models in non-clinical population (N=155, aged 18-40) to explore conditional dependence between: 18 anxiety-related individual differences; error-related negativity (ERN) and two ERN components estimated via Independent Component Analysis; and covariates (sex, age, handedness, latency and lateralization of ERN). ERN was related to intolerance of uncertainty (IU), ordering, hoarding, obsessing and STAI score, and to IU, obsessing and STAI-T score after covariate adjustment. The ERN components were related to: self-esteem, IU, ordering, STAI, rumination; and STAI, washing, thought suppression respectively. Latency and lateralization showed strong relations with ERN and anxiety symptoms and decreased the centrality score of ERN. These findings suggest that anxiety symptoms have varying effects on different aspects of error processing.

SPATIAL CODES FOR DIFFERENT REFERENCE FRAMES: THE WHAT, WHEN AND HOW

Pamela Baess[1], Christina Bermeitinger[1]; *[1]University of Hildesheim, Germany*

A longstanding question in the field of spatial compatibility effects recruits to the idea whether multiple spatial compatibility effects are simultaneously possible. These different compatibility effects are indicative of different reference frames used in spatial cognition.

Previous studies postulated that simultaneous Simon effects are in principle formed but only one Simon effect was effectively found, depending on the exact experimental manipulation (Umiltà & Liotti, 1987). Other studies showed that multiple Simon effects were obtained when participants were given informative cues or the general spatial layout beforehand (Roswarski & Proctor, 1996). These findings are at odds with recent findings reporting simultaneous Simon effects without any additional information provided (Baess et al, 2022). The present study investigates these differences by contrasting both versions of the Simon tasks within the same group of participants. Therefore, the versions of the Simon task in earlier studies were combined with the stick-figure manikin Simon task in two experiments. The talk will report the results of this direct comparison and highlight the role of experimental manipulations for obtaining multiple Simon effects.

TOWARDS A BETTER UNDERSTANDING OF IMPULSIVITY IN CHILDREN WITH ADHD BY DISSOCIATING THE EXPRESSION AND THE INHIBITION OF IMPULSIVE RESPONSES

Aurelie Grandjean[1], Isabel Suarez[2], David DaFonseca[3], Laurence Casini[1] ; *[1]LNC, Aix-Marseille Université, Marseille, France, [2]Departamento de Psicología, Universidad del Norte, Baranquilla, Colombia, [3]Child and Adolescent Psychiatry Unit, APHM, Marseille, France*

In a previous experiment, we investigated “interference control” in children with Attention Deficit Hyperactivity Disorder (ADHD) by using a Simon task and our data have suggested that children with ADHD were both more susceptible to reacting impulsively and less efficient at suppressing impulsive actions. The aim of the present work was to determine the effect of different manipulations known to improve the behavior of these children, on the interference control. Through three different studies, we investigated the effect of 1/ methylphenidate (MPH), the most often prescribed medication, 2/ a cognitive behavioral therapy centered on attentional and metacognitive functions, and 3/ an enhancement of motivation by delivering positive feedback after a successful trial. The main findings were that 1/ MPH improved the selective inhibition of impulsive actions but did not modify the response impulse, 2/ the cognitive behavioral therapy improved interference control by improving both processes, 3/ increasing motivation improved the efficiency of impulsive motor action inhibition but increased impulsive response. Put together, these results help to a better understanding of both ADHD and links between inhibition, attention and motivation.

VISUALLY-GUIDED FORAGING IN VIRTUAL WORLDS: DOMAIN-GENERAL PROPERTIES OF SEARCH BEHAVIOUR

Sarah Salo[1], Dr Matt Roser[1], Dr Alastair D. Smith[1]; *[1]University of Plymouth*

Psychological assays of human search behaviour primarily focus on the visual search paradigm. Despite suggestion that it represents a simple and controlled model of naturalistic foraging behaviour, few studies have addressed search in large-scale space. Here we present a novel hybrid of search and foraging in a large fully immersive virtual scene. Across five experimental manipulations, participants physically explored an array in search of multiple targets hidden beneath containers that differed in colour and form. More targets were successfully gathered when search was guided by a single feature, irrespective of explicit instruction about predictive cues. Target distribution reliably affected the trade-off between patch exploitation and exploration, also regardless of instruction. These data suggest that visual attention drives search strategy, even when exploration requires a complex organisation of movements. Analyses of individual difference revealed that executive function was associated with inspection of uncued items, whilst spatial working memory predicted erroneous revisits. A relationship between verbal working memory and search strategy implicated potential verbal underpinning for aspects of optimal foraging behaviour.

SYMPOSIA – 16h40 to 18h20

SYMPOSIUM 31

MINDS WITHOUT IMAGERY: EXPLORING COGNITION AND LANGUAGE IN APHANTASIA

Organizers: Laura Speed[1], Ken McRae[2]; *[1]Radboud Univeristy, [2]University of Western Ontario*

Symposium Abstract: Recent research has discovered a unique and intriguing condition in which people do not consciously experience visual imagery, called aphantasia. The absence or marked weakening of visual imagery is thought to be experienced by approximately 4% of the population. Although research into this condition is growing, there remains a great deal we do not know about aphantasia. Since visual imagery is a crucial aspect for many cognitive processes including episodic and autobiographical memory, future thinking, and language comprehension, this suggests that cognition and language may be fundamentally (or at least quantitatively) different in people with and without aphantasia. In this symposium we present new research that sheds light on this under-researched condition, allowing a greater understanding of aphantasia and its implications for cognition and language. Across five talks, the authors present behavioural, neural, and interview

data that helps elucidate the nature of thought in aphantasia, and how aphantasia can inform theories of language and cognition.

BLIND IMAGINATION: THE COGNITIVE AND NEURAL SIGNATURES OF APHANTASIA

Fraser Milton[1]; [1]*University of Exeter*

Aphantasia is a recently described condition in which people report a deficit of visual imagery. The current talk will present recent evidence aiming to characterize the cognitive and neural signatures associated with aphantasia. Examples of material that will be discussed include impaired episodic autobiographical memory as well as problems with atemporal and future imagination whilst performance on standard visual imagery tests and visual working memory appear preserved. Brain imaging evidence will also be presented including the results of task-based fMRI looking at neural differences in visual imagery of famous faces and places, as well as visual working memory between people with aphantasia and control participants with normal visual imagery. I will also consider the results of resting state analyses which indicate that there is reduced functional connectivity between visual areas and prefrontal cortex in people with aphantasia. Implications of these results will be considered.

THE ROLE OF MENTAL IMAGERY IN READING: EVIDENCE FROM APHANTASIA

Laura Speed[1]; [1]*Radboud Univeristy*

Visual simulation is thought to underlie reading comprehension. If aphantasics do not possess visual imagery, this may affect the way they read. To test this, we asked a group of aphantasics and controls to read a story and answer questions related to their experience of the story. Responses on the Story Appreciation Questionnaire showed aphantasics did not differ from controls in appreciation or liking of the story, or their experience of positive affect or negative emotion, but aphantasics did have lower ratings on reported evoked interest. Using the Story World Absorption Scale, we found aphantasics had lower attention, emotional engagement, mental imagery, and transportation when reading the story than did controls. Finally, with the Transformative Reading Scale aphantasics had significantly lower scores on enactment-imagery and sympathy than controls. To summarise, whilst aphantastics and controls appear to enjoy a story to the same extent, individuals without visual imagery have more difficulty becoming absorbed and engaged in the story, and have reduced emotional engagement and sympathy with story characters. This suggests visual imagery plays a crucial role in the experience of reading and engaging with a story world.

HOW DO PEOPLE WITH APHANTASIA THINK? BEYOND VISUAL-VERBAL COGNITION

Carla J. Dance[1], Jules Simner[1]; [1]*University of Sussex*

For people with aphantasia, visual imagery is absent or markedly impaired. Although we have a growing understanding of how aphantasia influences day-to-day life, we know little about how people with aphantasia think. Given their lack of imagery, some have assumed that people with aphantasia must think verbally. Presenting findings from the Sussex Imagery Lab, this talk will overturn this assumption by showing that aphantasics experience lower levels of visual- and verbal-based thinking (including a reduced inner monologue). We will also show that aphantasics report a unique cognitive profile, characterised by specific traits (e.g., global bias). Additionally, we ask the related question of whether aphantasia influences how people worry, a process that tends to involve both imagery- and verbal-based thinking. These findings will be discussed in relation to the broader aphantasia and visual imagery literature, showing overall that cognition styles are diverse and go beyond simply verbal- and imagery-based thinking.

SOME THINGS ARE BETTER LEFT UNSAID – JUST NOT FOR EVERYONE: NO VERBAL OVERSHADOWING EFFECT IN APHANTASIA

Merlin Monzel[1], Jennifer Handlogten[2]; [1]*University of Bonn,* [2]*Unaffiliated*

The verbal overshadowing effect (VOE) originally refers to the phenomenon that the verbal description of a memorized complex visual stimulus impairs the subsequent recognition performance for this same stimulus. Theoretical explanations range from assumed interference between different mental representations, the activation of different mental processes to a provoked shift in recognition criterion. In our study, 118 participants with aphantasia (= lack of visual imagery) and 119 controls participated in a verbal overshadowing paradigm. The results showed that the VOE did not occur in people with aphantasia, although the effect was replicated in controls. In fact, people with aphantasia who had described the visual stimulus performed better upon recognition. It is interpreted that in people with aphantasia, there is no visual process or content that can be interfered with, and that people with aphantasia do not become more insecure after verbalization, probably due to a greater expertise in using language.

THE DIVERSITY OF IMAGINATION WITH APHANTASIA

Wesley Nixon[1], Alec Figueroa[2], Reshanne Reeder[1]; [1]*Edge Hill University;* [2]*Unaffiliated*

Visual mental imagery is the mental simulation of visual sensory information (i.e., the "mind's eye"). Imagery is a multidimensional construct (e.g., vividness, precision, control), is often used in conjunction with other mental senses, can elicit emotions, and can assist with memory tasks. Due to the popularity and accessibility of the Vividness of Visual Imagery Questionnaire (VVIQ), vividness is the most dominantly investigated dimension of imagery. The VVIQ is also currently the "gold standard" to classify individuals as having a blind mind's eye (aphantasia). This leaves much to be explored about the subjective, internal worlds of individuals with aphantasia. In my talk, I will present insights from over 60 interviews with aphantasics, using quantitative and qualitative methods. I will describe their rich imaginative experiences including memory, dreaming, emotions, other mental senses, and alternative strategies for representing visual information. Finally, I will discuss alternatives to the VVIQ that will allow researchers to better investigate the diversity of imagination with aphantasia.

SYMPOSIUM 32

COGNITIVE SCIENCE OF CULTURE: LITERACY AS A CULTURAL OBJECT WITH IMPACT OUTSIDE THE WRITTEN DOMAIN

Organizers: Tânia Fernandes[1]; *[1]Faculdade de Psicologia, Universidade de Lisboa, Portugal*

Symposium Abstract: The acquisition of cultural functions implies the orchestration of several, already-available cognitive systems. Due to the limits of brain plasticity and their cognitive consequences, such evolutionary-older cognitive systems are also shaped in very specific ways by the cultural functions on which they participate. We will present a line of research which we called Cognitive Science of Culture and will focus on a specific cultural function as a case study, i.e., literacy. We will contribute to the understanding of how literacy modulates visual low-level processes and voice recognition, how learning a particular script shapes brain responses to other visual categories, and how literacy might contribute to increasing the quality and depth of critical thinking. These findings will be discussed in the context of neural plasticity and neural recycling and on how they can contribute for a better understanding of typical and atypical development and the putative deficits found outside the written domain.

COGNITIVE SCIENCE OF CULTURE: SETTING THE STAGE TO A LESS-WEIRD STUDY OF THE IMPACT OF CULTURE IN OTHER COGNITIVE SYSTEMS

Tânia Fernandes[1]; *[1]Faculdade de Psicologia, Universidade de Lisboa, Portugal*

Several cognitive systems participate in the acquisition of novel cultural functions, that is, functions that are optional, recent in the history of humankind, which require explicit and formal instruction and intensive continuous training. Such fine-tuning of evolutionary-older cognitive processes also lead to changes in these systems due to the limits of brain and cognitive plasticity. In this talk, I will introduce the Cognitive Science of Culture. The general aims of this field are to investigate how cultural functions, like literacy, modulate cognitive and brain functioning outside their specific domain, focusing on the interplay between the cultural and other cognitive systems and the bidirectional impact of one over the others. I will operationalize the construct of culture at this micro-level, distinguishing it from the concept adopted in Cultural Psychology and Neurosciences, and demonstrating the theoretical and empirical relevance of this research for understanding the limits of neuroplasticity and what might go wrong in reading development. This line of research will hopefully offer a less-WEIRD (Western, Educated, Industrialized, Rich, and Democratic) investigation of the nature of the human brain and mind.

THE NEUROSCIENCE OF READING - HAS A FOCUS ON THE ROMAN ALPHABET LED US ASTRAY?

Alexis Hervais-Adelman[1]; Falk Huettig[2]; *[1]Neurolinguistics, Department of Psychology, University of Zurich, Switzerland; [2]Max Planck Institute for Psycholinguistics, Nijmegen, The Netherlands*

Writing is a cultural artefact which has had a profound impact on human development. It is natural that the mechanisms of reading and writing should have elicited substantial interest among cognitive scientists. However, a substantial majority of what is known about the neuroscience of reading has been derived from work focusing on languages written using the Roman alphabet, although billions of individuals read languages that are not written using the roman alphabet; indeed, many are not even rendered in alphabetic scripts. We will present functional magnetic imaging research carried out on literate and illiterate speakers of Hindi, a language written in Devanagari - an Abjad. We show that brain responses in individuals literate in Devanagari globally converge with those of alphabetic literates, but that the consequences of learning Devanagari for visual responses to other categories of visual input, such as faces and houses, are not the same as those that have been reported for alphabetic literacy. Furthermore, we find no evidence of previously-reported functional adaptations to phonological processing areas. This research underscores the vital importance of examining multiple scripts in elucidating the neural basis of reading.

THE LENS OF LITERACY ON A PERCEPTUAL ILLUSION: THE EBBINGHAUS ILLUSION IS ENHANCED IN READERS

Miguel Domingues[1], Régine Kolinsky[2, 3] & Tânia Fernandes[1]; *[1]Faculdade de Psicologia, Universidade de Lisboa, Portugal; [2]Fonds de la Recherche Scientifique-FNRS ; [3]Université libre de Bruxelles, Belgium*

Learning to read is an intensive visual activity that, via perceptual learning, leads to changes on functioning of early visual brain areas, including V1. Given that the Ebbinghaus illusion depends on V1, we hypothesized that learning to read could influence the susceptibility to this size illusion. We explored this hypothesis with a size discrimination task, where adults (Experiment 1: illiterate, ex-illiterate, and literate) and children (Experiment 2: preliterate preschoolers and first-graders) decided which of two circles was the largest. In both experiments (regardless of age), non-readers were less susceptible to the illusion than readers. The present work revealed a paradoxical result: unschooled illiterate adults and preliterate children were better than their reading peers on size judgment of inner circles surrounded by inducers, showing a larger resistance to the Ebbinghaus illusion.

DOES LITERACY IMPACT THE PERCEPTION OF VOICE IDENTITY?

São Luís Castro[1], Ana Mesquita[1]; *[1]University of Porto, Portugal*

Literacy can serve as a powerful organizer of the speech stream by providing a means to segment the acoustic flow into words and, in alphabetic scripts, into clear-cut boundaries between words and their phonological constituents, the vowels and consonants reified in letters. But does literacy also affect how the suprasegmental properties of speech are processed? Here we examine this question through the lens of voice identity perception. After reviewing available evidence on the hypothetical link between literacy and voice perception, we present a study comparing adult literates with or without dyslexia in a voice identity recognition task in the native language (Portuguese) and in a non-native language (Mandarin). The question is whether the availability of phonological knowledge afforded by language familiarity and literacy, but presumably impaired in dyslexia, facilitates the perception of the speakers' identities. We did not find the advantage of the native vs. non-language that had been reported in previous studies. However, we found an effect of group in that the dyslexic adults had more difficulty than the non-dyslexics in recognizing the speakers' identities (no interaction). Thus, a tentative conclusion is that literacy also affects the processing of voice identity.

CULTURAL DIFFERENCES WITHIN OUR OWN WALLS? LITERACY, CRITICAL THINKING AND VULNERABILITY TO MISINFORMATION

Régine Kolinsky[1,2], Camila Arnal[1,2], Habiba Bouali[1,2]; Julia Justino[1,2]; José Morais[2], Myrto Pantazi[2], & Olivier Klein[2]; *[1]Fonds de la Recherche Scientifique-FNRS; [2]Université libre de Bruxelles, Belgium*

As literacy is a "mindtool" that facilitates access to information and the acquisition of new knowledge, it impacts many perceptual and cognitive abilities, including knowledge and precision of semantic concepts, syntactic processing, verbal memory, executive functions and logical thinking. This raises the question of whether literacy also contributes to increasing the quality and depth of critical thinking and thus would help decreasing vulnerability to misinformation. We will present data on adults and adolescents with quite different levels of literacy. In addition to the peculiarities of the reading profile of participants with low literacy levels, we will discuss their over-gullibility to information, including disinformation such as that presented by conspiracy theories.

SYMPOSIUM 33

CITIZEN SCIENCE IN COGNITIVE PSYCHOLOGY

Organizers: Eva van den Bussche[1], Gethin Hughes[2], Bert Reynvoet[3]; *[1]KU Leuven, [2]University of Essex, [3]KU Leuven - Campus Kortrijk*

Symposium Abstract: Citizen science actively involves non-professional or "citizen" scientists in research at different stages of the research process. The European Commission has highlighted several advantages of citizen science, including an increase in relevance, creativity and transparency of research and its outcomes. It forms an integral part of the EU's Open Science policy priority. Horizon 2020 led to over 2000 projects involving societal engagement and Horizon Europe will continue on this path. However, whereas fields such as biology and environmental sciences are increasingly using citizen science approaches, this is far less common in psychology and in cognitive psychology in particular. This symposium therefore aims to bring together researchers with experience with citizen science, in cognitive psychology but also in adjoining fields. Because citizen science in cognitive psychology is still extremely rare, this symposium will allow us to explore the possibilities (and pitfalls) of citizen science for our domain, but also to learn from other domains and how they have implemented citizen science. Ultimately, this symposium aims to provide first steps towards an implementation of citizen science in cognitive psychology.

CITIZEN SCIENCE IN COGNITIVE PSYCHOLOGY: OPPORTUNITIES, CHALLENGES AND APPLICATION

Kirsten Verhaegen[1], Gethin Hughes[2], Bert Reynvoet[3], Eva Van den Bussche[1]; *[1]KU Leuven, [2]University of Essex, [3] KU Leuven - Campus Kortrijk*

Over the past decades, the citizen science approach has proven its opportunities and strengths in fields such as biology and environmental sciences. However, in psychology, and cognitive psychology in particular, the method remains largely unexplored. In the first part of the talk, I will provide an introduction to citizen science and apply its principles to the context of cognitive psychology. I will zoom in on specific challenges that citizen science faces within cognitive psychology, such as the unique role of humans as both participants and active co-creators. In a second part, I will present an application of citizen science in cognitive psychology where we studied the impact of embodiment on learning. Teachers co-constructed the general research questions and the experimental design of this study, which was then conducted in an experimental setting. Future steps will include a second study using an ecological paradigm in classrooms. Using this application, we argue that implementing citizen science provides cognitive psychology with the potential for direct impact on society, answering relevant and timely questions and, ultimately, being of service to the very people that make scientific research possible.

A CITIZEN SCIENCE APPROACH TO MEASURING COGNITION IN CHILDREN: LEARNINGS FROM BBC TERRIFIC SCIENTIFIC

Josie Booth[1], Naomi Brooks[2], Trish Gorely[3], Ross Chesham[2], Colin N. Moran[2]; *[1]University of Edinburgh, [2]University of Stirling, [3]University of the Highlands and Islands*

Partnering with BBC Terrific Scientific - a citizen science project involving children in real academic studies - we investigated the impact of physical activity (PA) intensity on children's cognitive ability. Together, we developed the "Exercise investigation". This included resources for teachers (https://www.bbc.co.uk/teach/terrific-scientific/KS2/zmtxy9q) and pupils, and a secure website for online cognition tasks (inhibition, verbal and visuo-spatial working memory) and questionnaires (demographics and wellbeing). Online tasks were completed before and after 3 different outdoor activities: 15 mins sitting/standing outside (control); 15 mins of self-paced PA; a near maximal exhaustion activity. 11613 pupils registered. Sufficient data was obtained from 5463 pupils in 332 UK primary schools. Self-paced PA improved cognition and wellbeing in comparison to other activities but effect sizes were small. This was not mediated by fitness, although the methodology meant this aspect could not be validated. Citizen science is useful to study cognition in children in large samples. Technology access, accessibility, and teacher support needs to be considered in citizen science approaches.

CITIZEN SCIENCE AS AN AVENUE OF INTERDISCIPLINARY RESEARCH

Loreta Tauginienė[1]; *[1]Hanken School of Economics*

Citizen science aims both to solve certain society-relevant issues through co-creation and other participatory approaches and to contribute to scientific value (Haklay et al., 2021). Taking this into consideration, diverse outcomes of citizen science might be expected from the transition of research and policy towards sustainability (Petridis et al., 2017; West & Pateman, 2017), to participatory innovation (Hecker et al., 2018), and social innovation (Butkevičienė et al., 2021) up to increased scientific literacy and responsive education (Bonney et al., 2016; Miczajka et al., 2015; Wals et al., 2014; Scanlon & Papathoma, 2020). These imply that citizen science can both produce an impact on society in a more effective and efficient way (so as to deal with the grand challenges) and reshape the scientist's routine in how the research should be conducted to evidence the linkage of science and society (making science enterprise more responsible). In discussing both of these implications, the aim is to present epistemic challenges of citizen science in the light of interdisciplinarity.

CITIZEN SCIENCE BETWEEN METHODOLOGICAL INNOVATION AND AWARENESS RAISING

Stefania Milan[1]; *[1]University of Amsterdam*

Citizen science entails the involvement of laypersons as data generators, alongside the more traditional roles of research or experimental subjects. Without departing from scientific validity and potentially intervening at any stage of the research process, citizen science can, among others, expand the amount of data that can be collected and analyzed within the remit of a project. But while the benefits for scholars are clear, little is known about the added value of citizen science for the individuals and communities involved in a participatory research process. This contribution presents the lessons learnt from three projects exploring people's engagement with big data and technology: DATACTIVE and Algorithms Exposed (ALEX), funded by the European Research Council, and the IN-SIGHT project, supported by the Dutch Research Council. It illustrates how citizens have been invited to participate in various stages of the research process, and the methodological innovation this move inspired. It also shows how involvement in a research

project has the potential to contribute to awareness raising among the citizenry. In other words, citizen science generates citizens who are more and better informed, and overall, empowered.

GETTING INSIGHT INTO MATHEMATICAL PROBLEMS IN CHILDREN WITH DEVELOPMENTAL COORDINATION DISORDER (DCD): A (SEMI)-CITIZEN SCIENCE APPROACH

Bert Reynvoet[1]; *[1]KU Leuven - Campus Kortrijk*

Citizen science and cognitive psychology seem difficult to combine. Whereas cognitive psychology is characterized by well controlled experiments conducted in the lab, citizen science aims at involving citizens in different stages of the research cycle leading to the loss of experimental control. Still, it might be an interesting endeavor to pursue. I will present a strand of research in collaboration with special education need teachers and math teachers involved in the math education for children developmental coordination disorder (DCD). Children with DCD experience difficulties with math, especially with complex math skills that involve executive functions. Our studies aimed at getting more insight into the underlying problems in different math skills and adhered to several principles central to the citizen science approach. More specifically, teachers were involved in 1) finetuning the research question, 2) co-design of the study (e.g., materials), 3) data collection using online software (after a training) and 4) dissemination of results. This avenue of research seems promising for both scientists and teachers. However, additional and challenging steps are still required to meet the full fletched citizen science approach.

SYMPOSIUM 34

INTERACTIONS OF EXISTING KNOWLEDGE AND MEMORY FOR NEW INFORMATION IN DEVELOPMENT AND AGING: WHAT SUPPORTS WHAT?

Organizers: Zoe Ngo[1], Nora Newcombe[2]; *[1]Max Planck Institute for Human Development, [2]Temple University*

Symposium Abstract: Memory preserves the specific instances of our lives, but also allows us to create generalizable knowledge based on regularities across related experiences. How do the capabilities that support the different kinds of memories evolve across the human lifespan? The five papers in this symposium present new data using behavioral and fMRI techniques, spanning 3 years of age to old age. The first paper examines the contingency between specific memories and novel categorical generalizations in children from 3 to 7 years. The second paper uses three different generalization paradigms to test how generalization differs by age, whether these indices cohere, and how each is related to memory specificity from age 4 to 8. The third paper uses a task battery that measures multiple memory processes as latent constructs in 4–6-year-old children. The forth paper asks how semantically congruency differentially impacts memory consolidation across delays and across age from childhood to young adulthood. The fifth paper characterizes when prior knowledge helps or hinders memories in older adults. Collectively, our symposium provides new insights into the complex interplay between general knowledge and specific memories along the human ontogeny.

CONTINGENCY BETWEEN SPECIFIC MEMORIES AND NOVEL CATEGORY LEARNING IN EARLY DEVELOPMENT

Nora Newcombe[1], Sabrina Karjack[2], Zoe Ngo[3], Kara Storjohann[1]; *[1]Temple University, [2]University of California Davis, [3]Max Planck Institute for Human Development, Berlin*

Semantic knowledge guides adaptive behaviors through generalization; episodic memories preserve individual experiences. Contemporary models propose that generalization occurs via linking individual yet related episodes (Kumaran, 2012). If so, generalization should be contingent on memory for specific instances, as observed in adults. However, in development, semantic memory surfaces years before episodic memory, and initial findings show that generalization is untethered to episodic memory in young children (Ngo et al., 2021). This study aims to further characterize the contingency. Children of 3-8 years watched cartoon animals find homes in distinctive environments. These events had a coarse-level regularity, a specific regularity, and an episodic memory component. We tested children's novel inferences about unstudied animal-place associations and episodic memory of the animal-place associations. Preliminary results show age is a significant predictor of generalization accuracy at all levels. We will test whether episodic memory shows a similar age-related change, and whether generalization at each level is contingent on episodic memory. This design characterizes the generalization-episodic memory interdependence in childhood.

DEVELOPMENT OF MEMORY GENERALIZATION IN CHILDHOOD

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Memory allows us to make generalization based on the regularities across related experiences, while preserving the specific instances of our past. Neurocomputational models of memory suggest that the hippocampus contributes to both memory generalization and specificity. In three paradigms (statistical learning, associative

inference, and transitive inference), we tested how generalization differed by age and how it related to memory for individual associations from age 4 to 8. First, we found that 4-year-olds performed worse than older children in all tasks. Second, 8-year-olds outperformed younger children in the associative inference and transitive inference. Interestingly, inferential accuracy is more tightly coupled with memories of individual associations in older compared to younger children, suggesting that the link between generalization and specific associations is stronger with age. Surprisingly, despite conceptualized as generalization tasks, the inter-task correlations were far from consistent. They are generally related in the 6-year-olds, but are uncorrelated in the 4-year-olds. These findings underscore the importance of employing a multi-task design to capture the different aspects of generalization development.

CONSTRUCTING A TASK BATTERY TO ASSESS HIPPOCAMPAL NEURAL COMPUTATIONS SUPPORTING MEMORY IN EARLY DEVELOPMENT

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Hippocampal neural computations support various memory functions. Pattern completion contributes to constructing representations based on partial input and previously stored neural patterns, supporting the completion of memories from partial cues, and extraction of structures from experience. Pattern separation contributes to recoding similar memory representations into distinguishable activity profiles, supporting the discrimination and detailedness of memories. Behavioral and neuroimaging evidence suggest that these computations develop along different maturational trajectories. However, testing this assumption is challenging because behavioral manifestations of these computations cut across extant descriptive dichotomies of memory, and there are no process pure tasks to measure them. We address this challenge by assessing each computation as a latent construct capturing the common variance in performance on tasks that rely on the same computation. Here, we present preliminary data from a proof-of-concept study testing a task battery designed to measure pattern separation and completion as latent constructs in 4–6-year-old children. Combined with neuroimaging, this battery can help assess development of hippocampal computations.

MEMORY CONSOLIDATION OF CONGRUENT AND INCONGRUENT EVENTS: COMPARING CHILDREN AND ADULTS

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Events that are congruent or incongruent with prior knowledge may benefit memory in different ways. Congruent events improve memory accuracy due to more efficient encoding, while incongruent events may benefit memory precision due to enhanced encoding of event details. However, it is unclear to what extent different types of encoding (e.g., adaptive vs. intentional vs. incidental) may modulate memory consolidation of congruent/incongruent events over time, and how these processes may differ in children in comparison to adults. In Study 1, with an adaptive, learning-to-criterion procedure, we examined how short-delay (one night after learning) and long-delay (two weeks after learning) retention of events that are either congruent or incongruent events evolves in 6-7-year-old children, 9-10-year-old children and young adults. While with short-delay we found better memory for congruent events in both children and adults, incongruent information was retained better over long-delay in children, compared to young adults. In Study 2, we plan to change the learning procedure to incidental or intentional learning. We expect beneficial effects of congruent information in both short- and long-delay memory in children and young adults.

TRUE AND FALSE MEMORIES IN AGING CAUSED BY AN EMPHASIS ON PRE-EXISTING SEMANTIC KNOWLEDGE AT ENCODING? FMRI STUDIES WITH MULTIVOXEL PATTERN ANALYSES

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Pre-existing semantic knowledge is often considered a “double-edged sword” for older adults. It sometimes promotes true memories, but can also be detrimental causing false memories. In particular, according to the semantic categorization account, older adults' overreliance on pre-existing semantic knowledge at encoding causes false recognition by reducing the quality of visual representations. Alternatively, the impaired perceptual encoding hypothesis suggests that older adults demonstrate reduced encoding of visual details that would allow successful discrimination of similar lures, irrespective of the co-presence of semantic

information. The current fMRI studies investigate age-related differences in the neural mechanisms and the brain regions engaged in true and false memories. Results of study 1 revealed that older adults' overreliance on semantic processing at encoding boosted later memory, eliminating age-related differences through compensation. In study 2, we tested whether increased false recognition in aging is due to their emphasis on pre-existing semantic knowledge at encoding. The results potentially suggest that while semantic cognition in aging can enhance true memories, it can also increase false memories.

SYMPOSIUM 35

DEFYING THE STANDARDS OF COGNITION: WHAT ABOUT EVOLUTION? [TAKE 2]

Organizers: Sara B. Félix[1], Josefa N. S. Pandeirada[1]; *[1]William James Center for Research, Department of Education and Psychology, University of Aveiro, Aveiro, Portugal*

Symposium Abstract: This will be the second symposium reporting work inspired by evolutionary considerations and aligns with the ESCoP's aim of highlighting emerging ideas. Indeed, evolutionary arguments have been mostly ignored in Cognitive Psychology. The 23rd ESCoP conference affords a remarkable opportunity to discuss them and to share this alternative way of exploring cognition. A diverse group of researchers, at different stages of their careers, from various European Universities, will provide some more examples on how new cognitive phenomena can be uncovered and investigated under this approach. Patrick Bonin will present recent work relating different survival-related dimensions and psycholinguistic variables with memory performance. Edgar Erdfelder and Magda Saraiva will report on two different proximate mechanisms that potentially underlie the survival processing effect in memory. Raoul Bell will tackle a similar issue but with respect to the animacy effect. Finally, Natália Fernandes will present the first data on the mnemonic tuning for contamination in prospective memory. We expect this second symposium on this topic will enlighten the potential of this approach to deepen our knowledge on cognitive operations.

NORMS OF SURVIVAL-RELATED DIMENSIONS FOR A SET OF FRENCH WORDS: RELATIONSHIPS WITH OTHER PSYCHOLINGUISTIC VARIABLES AND MEMORY PERFORMANCE

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We provide norms collected on a sample of French adults for a subset of 732 words selected from the Bonin, Méot et al. (2003) database. The words were rated using Likert scales (1-5) on three survival-related dimensions: "finding food and water", "avoiding predators", "avoiding contamination". Reliability measures were computed for the norms and descriptive statistical analyses and bivariate correlations were performed. The entire set of norms will be very useful to researchers investigating episodic memory. Three experiments were conducted using the norms to investigate whether the survival processing advantage in memory was moderated by the congruency between relevance ratings (high versus low relevance) and survival contexts ("predation" [Experiment 1], "contamination" [Experiment 2], "food and water" [Experiment 3]). Compared to a deep-processing control condition (pleasantness), we found that the survival processing advantage was larger when the words were preselected to be highly relevant to/congruent with the survival dimension. The findings suggest that congruency constrains the generality of the survival processing advantage.

IS SURVIVAL PROCESSING SPECIAL? INSIGHTS FROM PSYCHOLOGICAL REFRACTORY PERIOD EXPERIMENTS

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Words judged for survival relevance are remembered better than words judged for relevance in a non-survival context. This is known as the survival processing effect. According to the richness-of-encoding hypothesis, this memory advantage arises from a particularly rich and distinct form of encoding that is effortful and requires limited cognitive capacities. In two experiments, we used the psychological refractory period framework in conjunction with the effect propagation and the locus of slack logic to assess the role of central cognitive resources for the survival processing effect. In line with previous research, our data demonstrate that the survival memory advantage relies on the capacity-limited central stage of cognitive processing. Moreover, our results also clarify whether survival processing is special in the sense that it is automatically prioritized whenever several tasks compete for central attentional resources. Results are discussed with respect to their implications for theories of the survival processing effect.

THE ANIMACY EFFECT ON MEMORY IN MIXED AND PURE LISTS: A TEST OF THE ATTENTIONAL-PRIORITIZATION ACCOUNT

Raoul Bell[1], Gesa Fee Komar[1], Laura Mieth[1], Axel Buchner[1]; *[1]Department of Experimental Psychology, Heinrich Heine University Düsseldorf, Germany*

The animacy effect refers to the finding that animate words are better recalled than inanimate words. A potential explanation of the effect is that animate words attract attention at the cost of inanimate words. This attentional-prioritization account implies the animacy effect to be more pronounced in mixed in comparison to pure lists. Three large experiments were run to test this prediction. In Experiment 1, the animacy effect did not differ between mixed and pure lists of animate and inanimate words despite adequate statistical power to detect a difference if it existed. In Experiment 2, two words were presented simultaneously in mixed and pure pairs of animate and inanimate words. The animacy effect did not differ between mixed and pure pairs despite increased attentional competition. Experiment 3 replicated this finding with incidental encoding instructions. Together, the results provide evidence against the attentional-prioritization account of the animacy effect.

DOES ENCOUNTERING POTENTIALLY CONTAMINATED ITEMS IMPROVE MEMORY FOR FUTURE INTENTIONS? THE CONTAMINATION EFFECT IN PROSPECTIVE MEMORY

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Studies have reported that retrospective memory (i.e., remembering past events) is optimized to remember fitness-relevant information, such as sources of contamination (e.g., objects touched by sick people; Fernandes et al. 2017). No studies have, so far, explored if prospective memory (PM; i.e., the ability to remember to perform a certain action in the future) is more efficient when the cues indicating the need for future action involve potential contamination. From a fitness perspective, it would be adaptive for humans to remember particularly well to perform a future action (e.g., washing hands) when encountering previously encoded contaminated items. Thus, we predict that people will be more likely to fulfill a delayed-intended action in such condition. In this work we will present the results of the first studies exploring the influence of potential contamination in PM using nonfocal event-based tasks.

SYMPOSIUM 36

HOW INTERNAL SIGNALS INFORM COGNITION

Organizers: Simona Raimo[1], Gerardo Salvato[2], Louise Kirsch[3], Alice Teghil[4], Chiara Baiano[5]; *[1]Department of Medical and Surgical Sciences, "Magna Graecia" University of Catanzaro, Catanzaro, Italy, [2]Department of Brain and Behavioral Sciences, University of Pavia, Pavia, Italy; ASST "Grande Ospedale Metropolitano" Niguarda of Milan, Milan, Italy; NeuroMI, Milan Center for Neuroscience, Milan, Italy, [3]Integrative Neuroscience and Cognition Center, Université Paris Cité, CNRS, UMR 8002, Paris, [4]Department of Psychology, "Sapienza" University of Rome, Rome, Italy, [5] San Camillo Hospital, Venice, Italy*

Symposium Abstract: The explicit and implicit processing of signals coming from the inside of the body (e.g., temperature, heart rate) represents a pivotal source of information in higher-order mental processes. Despite the increasing interest in the topic, the neural bases and behavioural counterpart of the impact of these signals on cognition and behaviour is still opaque. The aim of the present symposium is to offer different perspectives on the topic by presenting new evidence and insights into the relationship between internal signals and cognition in healthy and pathological populations, from the construction of the bodily self (G. Salvato & S. Raimo) to the perception of time (A. Teghil) and space (L. Kirsch) and decision-making (C. Baiano). This symposium includes speakers from different Universities and career stages, and will shed an integrative perspective on the impact of explicit and implicit perception of signals coming from the inside of the body in higher-order cognitive processes.

THERMOREGULATION AND BODILY SELF-AWARENESS: IS THERE A LINK? EVIDENCE FROM PATHOLOGICAL POPULATIONS

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The sense of body ownership derives from the multisensory integration of external and internal information. In particular physiological signals, such as body temperature, may play a crucial role. I will present evidence from healthy individuals in which the temporary interference with the sense of body ownership through behavioural manipulation (i.e., Mirror Box Illusion) correlates with diminished limb temperature. This finding is corroborated by evidence from pathological models of body ownership. I will demonstrate how right-brain lesions inducing Disturbed Sensations of limb Ownership (DSO) more frequently provoke thermoregulatory alterations, that is, lower temperature in the affected body regions. Moreover, in the absence of a brain injury, the altered sense of body ownership leading to a desire to amputate a healthy limb (i.e., Body Integrity Dysphoria - BID) may be associated with specific thermoregulatory responses involving the affected body regions. The presented evidence supports the importance of thermoregulatory signals in maintaining a coherent sense of body ownership.

INTEROCEPTION AND PERSPECTIVE-TAKING: REVIEW AND BEHAVIOURAL EVIDENCE

Louise Kirsch[1], Chiara Baiano[2], Xavier Job[3], Malika Auvray[4]; *[1]Integrative Neuroscience and Cognition Center, Université Paris Cité, CNRS, UMR 8002, Paris, [2]San Camillo Hospital, Venice, Italy, [3]Department of Neuroscience, Karolinska Institute, Stockholm, Sweden, [4]Sorbonne Université, CNRS, Institut des Systèmes Intelligents et de Robotique, ISIR, F-75005 Paris, France*

To perceive the world, humans tend to use an egocentric viewpoint originating from their body, the point of intersection of all sensory inputs, including interoceptive ones. However, once in interaction with another person, it is necessary to temporarily adopt their point of view. This ability requires some flexibility. Although interoception and perspective-taking flexibility have been the subject of many studies, very few have investigated their interactions. In this talk, I will first present an overview of studies to date looking at these interactions, highlighting caveats and future directions. I will then present a recent study investigating the links between spatial perspective-taking and interoception. Using a new version of the tactile Graphesthesia task in 106 participants, we were able to assess spatial perspective-taking flexibility and interoceptive abilities (from accuracy to awareness), and show how switching between different spatial perspectives is affected by the degree of focusing on one's internal body states.

INTEROCEPTIVE PROCESSING AND TIME PERCEPTION IN THE SECOND RANGE: BEHAVIOURAL AND NEUROIMAGING EVIDENCE

Alice Teghil[1]; *[1]Department of Psychology, "Sapienza" University of Rome, Rome, Italy*

It has been proposed that time processing relies on the integration of bodily changes, involving the insula as the primary interoceptive cortex. We present recent evidence framing the significance of interoception for timing in a context-dependent perspective. Using a novel paradigm assessing time processing with regular or irregular cues, we show that interoceptive sensibility (IS) selectively predicts timing when external cues are not informative about elapsed time. Also, timing performance in this condition is specifically associated with individual variations in the intrinsic functional connectivity of a network involved in multimodal integration, and with variations in resting-state connectivity of the right insula within a network modulated by individual differences in IS. Finally, evidence from brain-damaged patients shows that timing performance in irregular contexts is selectively associated with right posterior insular lesions. These findings provide evidence that tracking time without the aid of external cues relies on the integration of bodily changes in the right insula and highlight the importance to further study how the interplay between the processing of internal and external signals affects time perception.

LINKING PERCEPTION OF BODILY STATES AND COGNITIVE CONTROL: THE ROLE OF INTEROCEPTION IN IMPULSIVE DECISION-MAKING

Chiara Baiano[1], Massimiliano Conson[2], Lucia Ricciardi[3], Francesca Morgante[3], Marianna Amboni[4], Carmine Vitale[4], Gabriella Santangelo[2]; *[1]San Camillo Hospital, Venice, Italy, [2]Department of Psychology, University of Campania "Luigi Vanvitelli", Caserta, Italy, [3]Neurosciences Research Centre, St George's University of London, London, UK, [4]Institute of Diagnosis and Care, Hermitage-Capodimonte, Naples, Italy*

The detection and representation of physiological signals from the body is crucial for effective decision-making. However, the role of interoceptive processing in dysfunctional (i.e. impulsive) decision-making is still debated. Understanding the role of interoception on impulsive behaviours could be fundamental for some clinical populations, such as Parkinson's disease (PD), often characterised by the presence of impulse control disorders triggered by dopaminergic therapy. Here we present recent evidence on neurotypical individuals and PD patients supporting the relationship between interoceptive dimensions and impulsivity. We showed that high interoceptive sensibility predicted higher impulsivity in neurotypicals, thus suggesting that a too high subjective perception of physical sensations can lead to risk-taking decisions. Moreover, interoceptive dimensions resulted to have a role on impulsive and compulsive behaviours in PD. These findings provide new insights about the genesis of impulsive behaviours in PD as the result of a dysfunctional activity of the interoceptive system, dependent on the insular cortex and on dopaminergic connections between the amygdala and the striatum.

ENHANCED CARDIAC INTEROCEPTION IN BLIND INDIVIDUALS: UNRAVELING CROSS-MODAL PLASTICITY AND EMOTIONAL PROCESSING

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Blind individuals exhibit heightened abilities in perceiving exteroceptive information due to visual deprivation-induced cross-modal plasticity. However, it is unknown whether neuroplasticity after visual loss also affects interoception, that is, the sensations arising from one's inner organs that convey information about the physiological state of the body. We examined the influence of

blindness on cardiac interoception by testing 36 blind and 36 age- and sex-matched sighted volunteers on the heartbeat counting task. Blind participants showed significantly superior heartbeat perception compared to sighted controls, indicating heightened perceptual sensitivity to cardiac interoceptive signals. In contrast, there were no significant differences between the groups in the metacognitive dimensions of cardiac interoception or the purely physiological measurement of heart rate, thereby underscoring that the improved accuracy likely reflects a superior perceptual sensitivity to cardiac interoceptive signals in blind individuals. These findings have implications for understanding cross-modal plasticity after visual loss, emotional processing in blind individuals, and the development of bodily self-awareness without visual experience.

Posters – All Days

Theme

AGING

WHEN RELYING ON KNOWLEDGE INCREASES INTERPRETATION BIAS: INSIGHTS FROM AGING

Dorit Segal[1], Gitit Kavé[1]; [1]*The Open University of Israel*

Our own knowledge often biases our ability to judge what other people know. The current study aimed to examine the effects of aging and language dominance on interpretation bias. We sampled 72 younger (aged 19-39), 82 middle-aged (aged 40-59), and 83 older (aged 60-80) Russian-Hebrew bilinguals. Participants read short and ambiguous text message correspondence between two people and judged whether the recipient would interpret the message as sincere or sarcastic. Half of the texts contained information that suggested that the message was sincere, and half the texts contained information that implied that the message was sarcastic. The information that implied sincerity or sarcasm was available to the reader but not to the described recipient. Half of the texts were in Hebrew and half were in Russian. In both languages, older adults judged the recipient's interpretation as more sincere or as more sarcastic than did younger adults, based on their own privileged knowledge. The findings suggest that younger adults are better than are older adults at inhibiting their own knowledge. Language did not moderate the age effect, most likely because participants were similarly proficient in both Russian and Hebrew.

EFFECTS OF COGNITIVE INTERVENTIONS ON QUALITY OF SLEEP: THE CASE OF THE ELDERLY WITH INSOMNIA

Prof. Orna Tzischinsky[1], Dr. Kineret Weissler[1], Kfir Asraf[1], Prof. Iris Haimov[1]; [1]*Emek Yezreel College*

Insomnia is the most common Sleep Disorder. Late-life insomnia is associated with mental illness, and cognitive decline. This study is a comparison between personalized computerized cognitive training (PCTI) and group cognitive training intervention (GCTI) on subjective and objective sleep quality. 67 participants were randomly allocated to one of three groups – PCTI, GCTI, and active control (AC). The PCTI and AC groups completed an eight-week, home-based computerized program; the GCTI held eight weekly meetings. Participants monitored sleep quality by the Pittsburgh Sleep Quality Index (PSQI), and actigraphic recording, 3 times: two weeks prior to the intervention, immediately after it, and 6 weeks later. Mixed-model analysis shows that PCTI significantly enhanced actigraphy-based sleep efficiency (SE) and significantly reduced actigraphy post-sleep onset waking, no changes in the AC group. 6 weeks post-training, only GCTI group continued to show improved SE and reduced WASO. No significant effects on actigraphy-based sleep duration, sleep latency, or total PSQI were detected in both study groups. Elderly with insomnia can use either technique to improve sleep maintenance, without pharmaceutics.

OPENNESS TO EXPERIENCE, A PERSONALITY TRAIT THAT REDUCES SUSCEPTIBILITY TO MEMORY AGE-BASED STEREOTYPE THREAT

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Age-based stereotype threat (ABST) decreases episodic memory performance, while being high on the openness personality trait is positively associated to memory performance. This study aimed at examining how ABST and openness personality trait might interact on older adults' episodic memory performance. Seventy-five older adults were randomly assigned to the ABST condition or the control condition before taking a memory task. They learned word-lists with either a repetition strategy or a mental imagery strategy. Openness was measured with the Big-5 personality questionnaire. Results showed that the threatened group recalled fewer words, that the use of imagery strategy increased recall and that ABST disrupted more the recall of words learned with the imagery strategy. Additionally, openness was positively associated with recall performance and benefited only to the recall of words learned with imagery strategy in the threatened group. These results indicated that individual characteristics such as a high level in openness may disrupt the negative effect of ABST by improving the capacity of threatened people to execute the more resource demanding but also the more efficient memory strategy.

EPISODIC MEMORY REPRESENTATIONAL SIMILARITY ANALYSES: AGE SPECIFIC NEURAL SIMILARITY ACTIVITY EFFECT AT DISTINCT LEVELS

Zoltán Apa[1], Florence Requier[1], Mohamed A. Bahri[1], Christophe Phillips[1], Fabienne Collette[1] ; *1Université de Liège*

Relevant aging fMRI studies are investigating neuronal activity patterns across voxels within younger and older adults. Further, Representational Similarity Analysis (RSA) is an outstanding tool to assess voxel pattern similarity over experimental conditions. We assessed if lower performance in older is related to less similar neuronal traces between information encoding and retrieval. 53 younger and 63 healthy older subjects underwent an fMRI episodic memory task, with incidental encoding and yes-no recognition procedure. Using RSA we assessed pattern similarities between age groups and encoding/recognition conditions. Encoding-Retrieval Similarity maps were computed for each participant at the item level (comparison of encoding and retrieval for a given item) and set level (comparison of each item to the average of all remaining items). At brain level, larger encoding-retrieval similarity at the item level is observed in occipital areas bilaterally and left fusiform gyrus for the younger group by comparison to the older one. Since the item level measures the specific reactivation of individual pictures, these results can be interpreted as less specific episodic memory traces for visual characteristics of objects in healthy aging.

THE IMPACT OF AGE, SEX AND GENERAL COGNITIVE SKILLS ON THEORY OF MIND ACROSS THE LIFESPAN

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We tested age-related changes in Theory of Mind (ToM) using the Social Attribution Task (SAT-MC-II) across the lifespan in 321 participants between the ages of 8-92, controlling for the contribution of executive functioning (EF), memory, language and processing speed (PS), which may affect this developmental trajectory. We observed an inverted U-shaped developmental curve for ToM, peaking in young adulthood. Differences in EF and PS had an impact on SAT-MC-II score, but the predictive effect of age on ToM remained significant after controlling for these factors. The developmental trajectory of ToM showed sex differences, with a more robust improvement in females in adolescence, and with a more gradual improvement in males, even though performance levels in childhood and young adulthood were at the same level in both sexes. While visual PS contributed to SAT-MC-II score in both sexes, the EF affected performance only in women. Our results confirmed previous studies in the inverted U-shaped developmental trajectory of ToM, with sex differences in slopes. Changes and sex differences were affected, but not entirely accounted for by age differences in EF and PS. Further studies are needed to clarify the factors behind these differences.

EFFECT OF PHYSICAL AND COGNITIVE STIMULATION IN A SOCIALLY ENRICHED ENVIRONMENT ON OLDER PEOPLE'S COGNITIVE ABILITIES

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The simultaneous performance of physical exercises and cognitive activities (i.e. combined training) attenuates cognitive decline in aging and is more beneficial in a social context. In this study, we hypothesize that combined training program in a group setting will be even the more beneficial to older people's cognitive abilities when performed in a socially enriched environment, where social relationships and wellbeing are promoted. Fifty-three participants were assigned to one of three practice environments: individual practice at home (n=9), group practice in a gymnasium (n=19), and group practice in an enriched environment (n=25). All participants completed 12-week combined training and were assessed three times: before (T0), during (T1), and after the intervention (T2). The main analyses consisted of intra and inter-group mean comparison. The results showed a significant improvement in the episodic memory score (p<.01) and in the processing speed score (p<.01) after the program in enriched environment group, but no significant changes for the two other groups (p>.05). The results seem to show the benefits of combined training realized in socially enriched environment on older people's cognitive abilities.

PHYSICAL FITNESS DIFFERENTLY AFFECTS COGNITIVE FUNCTIONS ACROSS THE ADULT LIFESPAN

Patrick D. Gajewski[1], Klaus Golka[1], Jan G. Hengstler[1], Thura Kadhum[2], Jan Digutsch[1], Erhan Genç[1], Edmund Wascher[1], Stephan Getzmann[1]; *[1]Leibniz Research Centre for Working Environment and Human Factors at the Technical University Dortmund (IfADO), Germany, [2]Clinic for Psychosomatic Rehabilitation, Mittelrhein-Klinik, Boppard - Bad Salzig, Germany*

One of the most important lifestyle factors affecting cognitive functioning is physical fitness (PF). However, the specificity of cognitive functions affected by PF across the adult lifespan is less understood. The present study aims to clarify whether PF is associated with better performance in the same or different cognitive functions at different ages. To this aim, a sample of 490

participants (20-70 years) was split half into younger (20-45 years; n = 254) and older adults (46-70 years; n = 236). Cognitive performance was evaluated by standardized neuropsychological test batteries. Apart from cognitive status (MMSE) and cognitive failures in daily living (CFQ), no other association between PF and specific cognitive functions was found in the younger group. In contrast, several positive associations were observed in the older group: selective attention, verbal memory, working memory, logical reasoning, and interference processing. For all participants, PF level was associated with general intelligence (g-factor) and its subcomponents extracted using structural equation modeling (SEM). This association was most pronounced in the older group, suggesting that older adults benefit more from PF than younger adults.

SPEECH ACT RECOGNITION IN YOUNGER AND OLDER JAPANESE ADULTS

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Recognizing the speech act of an utterance, which directly or indirectly reveals the speaker's intention, is crucial for effective daily communication. Holtgraves (2008) found automatic speech act recognition for younger native English speakers, but it is unclear whether this holds true for older adults. This study examines the effect of aging on indirect speech act recognition by utilizing a recognition probe task (Holtgraves, 2008) where participants judged whether the probe word had appeared in the utterance shown before. In the indirect speech act condition, the probe words were speech acts of the utterances but did not appear. We predicted that recognizing the speech acts of the utterances in this condition would lead to false memory and thus inhibit judgment. Although accuracy did not show a significant difference, the results of reaction time indicated that older adults were slower at making judgments in the speech act condition, while younger adults did not exhibit this effect. The subsequent cognitive tests indicated that communication and imagination influenced the results of older adults suggesting that preserved social cognition may help older adults to recognize speech acts and lead to a strong effect of false memory.

SYNTACTIC ABILITY: DOES IT REALLY DECLINE DURING HEALTHY AGING? AN FMRI STUDY

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The aging process is associated with a reduction in both specificity and efficiency of language networks. An age-related decline in semantic processing has been widely reported. However, it remains unclear whether syntactic processing declines or not during aging. Thus, we aimed at investigating whether healthy young (N =33) and old (N =30) adults processed differently subject- vs. object-relative sentences during the fMRI scanning. Differences between conditions were investigated within and between groups.Measures of executive functioning were also collected. Behavioral data showed that elderly people had more difficulties in processing object-relative sentences than young people.For old adults, the object-relative>filler contrast determined widespread activations in a bilateral network, comprising th IFG, the FusG, the right SMA and caudate.Our results suggest that syntax networks in old adults might be organized in a stronger inter- hemispheric pattern which, in turns, affects their syntactic performance.These data shed light on age-related changes between young and old adults in the organization of syntactic networks. These results are critical for developing more efficient strategies to prevent age-related cognitive decline.

THE ROLE OF ATTENTIONAL RESOURCES IN WORKING MEMORY IN AGE-BASED STEREOTYPE THREAT

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Numerous studies have demonstrated that negative age-based stereotypes impair cognitive performance in older adults, an effect called age-based stereotype threat (ABST). Some studies have shown that the ABST effect reduces attentional resources measured via a typical working memory (WM) task, the complex span task (CS), but other studies failed to replicate this effect. In these early studies, the ABST effect was only examined on the memory component of CS tasks. However, these tasks are dual and also have a processing component that requires attention to perform correctly. The present study aimed to re-examine the role of WM in ABST by assessing its effect on both components of a CS task. Young (18-30) and older (60-77) adults performed a CS task designed to either elicit or reduce ABST. The attentional demand of the CS task was tailored to each individual's abilities and varied so that 1/3 of the trials were low-, 1/3 medium- and 1/3 high-attentional demanding. Older adults' concurrent task performance was

significantly reduced by stereotype threat in the high demanding condition only. These findings suggest that ABST draw on attentional resources and impairs performance in high demanding tasks.

HOW COGNITIVE RESERVE AFFECTS NEUROPSYCHOLOGICAL FUNCTIONS

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Cognitive reserve (CR) is defined as the ability to flexibly use available brain resources when brain changes due to aging or damages occur. The adaptability of cognitive processes allows the individual to preserve daily functioning and is associated to better clinical outcomes; thus, CR could explain individual differences in coping with neural changes. Our aim was to assess differences in cognitive functioning in a sample of 243 adults (age: 60.4±7.4; 50-88) and divided in high-CR (CR>130) and medium-CR (CR=70-130). Participants underwent a neuropsychological assessment; CR was measured with the Cognitive Reserve Index questionnaire (CRIq). As we expected, a series of ANOVAs showed significant differences in tasks assessing global cognitive functioning, visuospatial abilities, executive functions, language, and memory. Results revealed that high scores in CR are associated with better cognitive functioning and executive control. According to Stern, our findings suggest that brain actively attempts to compensate for pathology in order to maintain an efficient functioning in daily mental activities. Further studies could better investigate the influence of each CR domain on cognitive functioning in healthy and pathological aging.

Theme

ATTENTION

FROM EMOTION TO ACTION TENDENCY: TIME COURSE OF ATTENTIONAL EFFECTS OF AGONISTIC AND ANTAGONISTIC OVERLAY OF INTRINSIC AND GOAL RELEVANCES

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Research on emotional attention has shown that attention is captured by both the pleasantness (i.e., intrinsic relevance) and the goal conduciveness (i.e., goal relevance) of stimuli. Recently, it has been shown that the overlay of intrinsic and goal relevance increases the attentional bias. However, this result was only tested in the case of agonistic overlay, i.e., when both relevances generate approach tendency because stimuli are pleasant and goal conducive. The problem arises when the overlay is antagonistic, e.g., when a stimulus generates both approach and avoidance by being both goal conducive and unpleasant. In the present study, we tested whether antagonistic and agonistic overlay of relevances would equally increase the attentional bias. To this end, 120 participants performed an induction task, aimed at inducing different types of relevance to stimuli. At the same time, they performed a dot-probe task in which the stimuli competed to allow us to measure attentional biases. Our results revealed that agonistic and antagonistic overlay of intrinsic and goal relevance equally increased the attentional bias. These findings provide insight into how intrinsic relevance and goal relevance combine to impact attention.

EXPLORING THE INFLUENCE OF BREATHING PHASES ON VISUO-SPATIAL ATTENTION

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Emerging embodied cognition theories suggest that both external and internal bodily signals impact human cognition. In this study we investigated the influence of respiratory signals on attention allocation processes, following our prior research on the effect of breathing phase manipulations on numerical cognition and visuo-spatial attention (Belli et al., 2021). 26 healthy participants completed the Posner cueing task (both endogenous and exogenous paradigms) while detecting visual target stimuli (with 3 SOAs) at the peak of inhalation and exhalation. A strong interaction between target stimuli location and breathing phase was revealed through reaction times analyses. Responses were faster to the right during inhalation and to the left during exhalation, indicating a cost/benefit effect associated with each respiratory phase and its corresponding directional attentional shift. Specifically, inhalation facilitated rightward attentional shifts, while exhalation facilitated leftward shifts. These findings reinforce our prior research and suggest new interpretations of human visuo-spatial abilities. Potential explanations for this breathing-related cognitive bias will be discussed, which involve bottom-up and top-down mediations.

WE CARE A LOT! INDIVIDUAL ATTITUDES AND VALUE-BASED ATTENTIONAL CAPTURE

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Research suggests that previously rewarded stimuli capture attention even when they no longer predict a reward (attentional learning). Attentional learning has been observed with symbolic

rewards, such as monetary or social, which value is recognized by most individuals. However, other rewards have a symbolic meaning whose value is not recognized by everyone, and rather varies considerably between individuals. Here, we investigated whether one such value, namely ecological sustainability, can influence attentional learning. Individual attitudes towards the environment were assessed via a questionnaire. During a training flanker task, for each accurate trial participants could receive a feedback indicating that they were supporting an association fighting pollution (rewarded condition) or no feedback (unrewarded condition); the presence and size of the reward was signaled by letter color. In the test phase, the prior colors served as distractors in a singleton task. In the singleton task, only participants with high pro-environmental attitudes showed attentional capture by previously rewarded, compared with unrewarded, distractors. These findings suggest that individual attitudes play a role in how learned value shapes attention.

A VALENCE BASED SNARC-LIKE EFFECT ENGAGE BUT NOT DISENGAGE ATTENTION: EVIDENCE FROM A MODIFIED POSNER CUEING TASK

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The Posner cueing task is a potent tool for the understanding of the orienting of attention in the absence of eye movement. Cue-to-target spatial correspondence is beneficial under conditions of short asynchrony between an external cue (lighting up in a specific location out from fixation) and a target shape. How such a benefit is modulated by target qualia, like faces expressing either positive (happy faces) or negative (angry faces) emotions, is an unsolved question. Here we addressed such an issue investigating whether the spatial mental representation of valence affects motor reactivity in a way consistent with a SNARC-like effect, beyond the capture of attention by an external cue. Results are consistent with such an expectation. Beyond a global facilitation of cue validity (valid faster than neutral | neutral faster than invalid) and target's side (left targets faster than right) the spatial correspondence between the target side and the mental spatial representation of valence (left angry face | right happy face) capture attention producing a distracting effect on the engagement, but not the disengagement, component of attention: the first evidence of a valence based SNARC-like effect modulating exogenous attention.

SELECTION WITHIN WORKING MEMORY IMPAIRS PERCEPTUAL DETECTION

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There is a consensus that Working Memory (WM) and attention have influence on each other. Top-down mechanisms help coping with environmental or internal demands, enabling the selection of an item within the contents of WM to be prioritized for access. It has been observed that maintaining an item in this privileged state does not necessarily rely on sustained visual attention. However, it remains unclear whether selection within WM depends on perceptual attention. To investigate this, we recorded electrophysiological neural activity while parcipants performed a retro-cue task while also performing a detection task during the delay period following retro-cue presentation. The display of the detection stimuli was unpredictable and sustained perceptual attention was necessary to perform the detection task from the retro-cue onset. We observed a decrease in visual detection when a WM representation was retro-cued. The neural data showed that alpha oscillatory activity was consistent with a spatial shift of attention towards the retro-cued representation. Our finding suggest that selection within WM could be achieved through a perceptual attentional mechanism, as indicated by the convergence of neural oscillations and behavioral data.

EFFECTS OF RELATIONAL MEMORY AND REPETITION ON EYE MOVEMENT CONTROL IN NATURALISTIC SCENES – OPERATIONALIZATION MATTERS

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Eye movements proved to distinguish between memory for the mere repetition of a scene and memory for relations (for a review, Pollmann & Schneider, 2022). When amnesic patients view a scene repeatedly versus for the first time, they were shown to make fewer fixations and sample fewer regions. However, they–in contrast to neurotypicals–do not make relatively more fixations to, dwell longer on, and make more transitions in and out of the area of an altered object. The current study adapted a paradigm by Ryan et al. (2000) to explore these effects in a neurotypical sample (N = 25) with high resolution eye tracking. Subjects viewed a set of naturalistic scenes for a later memory test. Scenes were repeated, manipulated (object translation or addition/deletion), or novel. Relational memory became visible for translations in all measures and for additions in most measures. Repetition memory was observed as a reduced number of regions sampled, but not as significantly fewer fixations in repeated vs. novel scenes. This suggests that memory's effect on eye movements rather influences spatial characteristics of the

scan path than mere fixation number and encourages a debate about precise measures for relational memory.

DECODING ATTENTIONAL BREADTH AND SELECTION FROM TARGET-EVOKED ACTIVITY

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Visual attention enables us to select and process high-priority information. Attentional selection is usually studied in the form of a spotlight, and much less research has been done on different ways in which attention can be distributed. Here, we focus on attentional breadth, which refers to the size of the attentional spotlight that grows or shrinks in the shape of an annulus, such that attention is either narrowly focused on central vision, or broadly distributed across central and peripheral vision. In the current study (N = 30), we investigated the neural underpinnings of attentional breadth during a detection task. Using neural-network decoding, we successfully decoded covert attention from target-evoked activity. Strikingly, decoding relied strongly on activity in the beta band (13-30 Hz), although it is currently unclear which aspects of beta-band activity underlie this. Overall, our study provides new insights into the neural mechanisms underlying attentional breadth, and highlights the importance of considering both alpha and beta-band activity in understanding attentional selection.

COGNITIVE LOAD MODULATES THE EFFECTS OF TDCS ON EXECUTIVE VIGILANCE: BENEFITS UNDER HIGH DEMANDS

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Our vigilance inevitably and quite commonly decreases with time, potentially entailing very serious consequences. Transcranial direct current stimulation (tDCS) has proven to be a valuable tool for both understanding vigilance and palliating its decrement across time on task. The present study explored whether/how cognitive load modulates the mitigatory effects of tDCS on the executive vigilance (EV) decrement. Participants (120; 30 per group) underwent a modified ANTI-Vea task (single or dual load), whilst receiving sham or anodal tDCS over the right posterior parietal cortex. This data was further compared with another 122 participants (from prior studies), where participants underwent the standard ANTI-Vea task (triple load), combined with the same stimulation protocol. Both single and dual load conditions showed a significant EV decrement with time-on-task, which was not affected by tDCS. On the contrary, the triple (highest cognitive load) led to the greatest EV decrement (sham), but was the only condition where a mitigatory effect of active tDCS was observed. These results provide insight into the specific effects of tDCS on the EV, as it seems to benefit vigilance performance in the conditions where it is most needed.

HAZARD PREDICTION TEST REVEALS THAT ATTENTIONAL ORIENTING DEFICITS MAY AFFECT DRIVING AFTER SUFFERING A STROKE.

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Stroke may produce a visuospatial attention deficit in orienting. To explore the attentional orienting effect (Posner, 1980) in natural settings, we administered the Hazard Prediction (HPr) Test created by Muela et al (2020) which consisted of 39 videos (13 Simple, 13 Valid, 13 Invalid) of naturalistic driving settings. The appearance of the hazard requires the driver to make an avoidance manoeuvre to prevent the crash. 53 experienced drivers took part in this experiment: A Healthy (*N*=28) and a Stroke group (*N*=25). After watching each video, participants answered the question: "What happens next when the video is cut?" We replicated the expected robust main effect of orientation in complex driving situations [$F(2,102)=57.33$, $p<.001$, $\eta^2p=.529$, $BF_{incl}=1.623e+14$]. A significant group effect was also found $F(1,51)=14.37$, $p<.001$, $\eta^2p=.22$, $BF_{incl}=90.884$]: Healthy experienced drivers' performance was better (X=79.53% HP accuracy) than that of experienced drivers with Stroke (X=69.46%). The decrement in performance for invalid trials was enhanced in the stroke group as compared to the healthy group ([$F(2,102)=2.98$, $p=.055$, $\eta^2p=.055$, $BF_{incl}=4.208$]). These attentional orienting deficits may affect driving after suffering a stroke.

WHY ARE SUSTAINED ATTENTION AND WORKING MEMORY RELATED? THE ROLE OF INDIVIDUAL DIFFERENCES IN STATE INTRINSIC MOTIVATION

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Working memory capacity (WMC) and sustained attention are related. Explanations for this association predominantly focus on resource depletion, assuming that overloading WMC leads to lapses of attention. This individual-differences study explored an alternative motivational explanation proposing that lower motivation reduces sustained attention. N = 257 participants completed a complex span task with varying task demands and a simple reaction time (RT) task to measure WMC and lapses of attention (% RTs >= 500 ms), respectively. After each block of the complex span task, participants self-reported their intrinsic motivation (enjoyment, effort, and perceived competence). Need for cognition was assessed to control for trait motivation. Preliminary analyses

confirmed that poorer WMC was associated with more lapses of attention. Moreover, lower motivation during the WMC task predicted poorer sustained attention, above and beyond the need for cognition. Thus, the results are consistent with a motivational explanation. Furthermore, significantly lower motivation during high WMC task demands, suggests that individual differences in intrinsic motivation may explain past findings of increased lapses of attention after resource depletion.

INHIBITION OF RETURN AND LEARNED VALUE

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Inhibition of return (IOR) has been shown to be a modulable phenomenon in response to variations in the salience of both the cue and target. However, it remains unclear whether arbitrary associations between an irrelevant dimension and varying degrees of reward can also modulate IOR. To address this question, we conducted two pre-registered experiments using a Posner-type task. In Experiment 1, we manipulated the amount of reward associated with an irrelevant feature of the target (color) and assessed whether this manipulation influenced the IOR effect when participants received feedback for their performance or when feedback was omitted. Our results showed that the learned value of a target can indeed modulate the IOR effect, but only when feedback is omitted. In Experiment 2, we nominally replicated the findings of Experiment 1, but not statistically. A pooled analysis of both experiments (total N = 100) revealed a consistent modulation of the IOR effect by reward. Overall, our findings suggest that the learned value of a target can modulate the IOR effect, specifically when the rewarded dimension is fully task-irrelevant.

DYNAMICS OF FUNCTIONAL CONNECTIVITY WHILE ATTENDING TO TO-BE-DISCRIMINATED OR TO-BE-DETECTED VISUAL STIMULI

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The tasks of discriminating a visual stimulus to select a manual response vs. detecting a stimulus to respond with a predefined response are assumed to put more emphasis on either perception or action. This study aimed to demonstrate that these different task demands may be reflected in different oscillatory functional connectivity patterns while attending to the expected stimulus location. The electroencephalogram (EEG) was recorded while participants completed visual detection and visual discrimination tasks. In both tasks, the likely target location was indicated by a symbolic cue. In the detection task, we observed increased beta phase-connectivity between midfrontal, motor, and visual areas while anticipating the visual stimulus. In contrast, in the discrimination task stronger alpha connectivity was observed between parietal and occipital areas. These results support the view that more emphasis on either perception- or action-related processes are reflected in changed dynamics of inter-areal connectivity.

EFFECTS OF RHYTHM AND PRENATAL RHYTHMIC STIMULATION ON NEWBORNS' ATTENTIONAL DISENGAGEMENT

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Rhythm, defined as the repetition of regular temporal patterns that facilitate the development of expectations, entrains attention and facilitates perceptual performance in adults. There is no evidence of whether the same phenomenon occurs across development, and, considering how ubiquitous rhythms are in the infants' perinatal environment, the question is compelling. Accordingly, we investigated the effects of prenatal multisensory rhythmic stimulation delivered during the last trimester of gestation on newborns' visual spatial attention. Starting from the 29th week of gestation, two groups of pregnant women followed a rhythmic enrichment protocol (enriched group) or a relaxing protocol (control group). Their infants' visual attentional skills were tested at birth and at 2 months in a gap-overlap task under three experimental conditions differing for the temporal structure of the central cues: static, rhythmic, random. Saccadic latencies of their saccadic movements toward a peripheral target were measured. Preliminary results suggest that that rhythm affects attentional performance already at birth and constrains the efficiency of visual attentional disengagement differently for the infants in the enriched and control groups.

THE EFFICIENCY OF ATTENTIONAL NETWORKS IN TAKOSTUBO SYNDROME

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The role of cardiovascular risk factors in the occurrence and progression of cognitive impairment has been the subject of many studies. Attention is one of the processes less studied in heart-failure-related cognitive impairment, and previous attempts indicate an impact of cardiometabolic alterations due to heart failure (HF) in this cognitive domain. However, attention is not a unitary process but a set of independent systems (Alerting, Orienting, and Executive), which interact to ensure maximum behavioral efficiency. Here we explore the attentive networks, their modulation, and interactions in patients with Takostubo syndrome (TTS). Twenty participants with TTS compared to twenty healthy participants without HF performed a variant of the Attention Network Task for Interaction, a test that allows assessing orienting, executive control and alerting networks and their interactions. Patients with TTS showed an abnormal orienting effect as compared to controls. Moreover, there was an interaction between orienting and alerting only in healthy participants. These findings confirmed the relevance of brain-heart interaction in determining attentional impairment that could be a prodrome of more severe cognitive impairment in TTS.

PROCESSING EMOTIONAL FACES AT HIGH PERCEPTUAL LOAD

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Perceptual load (PL) theory proposes that processing of distractor stimuli is determined by the level of PL. He and Chen (2010) conducted a study with names as targets (task: gender categorization), faces as distractors, and varied PL with a varying number of pseudo names in the display. In line with PL theory, they observed gender congruency effects (CE) of faces at low but not high PL. However, familiar faces interfered even at higher levels of PL. We hypothesized that emotional expression might play a similar role as familiarity. In Exp. 1, we replicated He and Chen's result for unfamiliar faces: the CE was present for the lower levels of PL (2, 4 names/pseudo-names), but it disappeared for higher PL (6, 8). In Exp. 2, we additionally manipulated facial expression (happy vs. neutral), expecting neutral trials to have the same pattern of results as in Exp. 1 and the happy faces to capture attention regardless of load. We found a partial confirmation of our hypothesis: at level 2, both neutral and happy faces produced a CE, at level 4, however, only happy faces showed the effect. At levels 6 and 8, CEs were almost vanished. We discuss the results with regard to PL and slippage theory, where the latter better fits the results.

ATTENTIONAL ORIENTING TO SOCIAL CUES HELD IN WORKING MEMORY: A PARADIGM OF INTERNAL SOCIAL ATTENTION?

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The ability to shift attention based on the observed gaze direction on another person represents the basis of social attention. Recent evidence shows that there exists also a form of internal social attention by which social stimuli held in working memory can shift attention. Here we investigated this phenomenon by asking 41 university students to perform a two-phase gaze cueing task, in which a neutral face-cue gazing left or right preceded the target (Gabor patch), which appeared left or right. In the first phase of the task, participants were instructed to respond to the target (passive viewing). In the second phase participants were instructed to remember the face for later recognition (working memory). We used a SOA of 900 msec to avoid confusing the cueing effect of the face with working memory effects. Findings from the face recognition task showed that participants retained the face-cue in working memory but that it did not affect the gaze cueing effect. The present findings are discussed with reference to the extant literature on the timing of attentional shifts based on observed gaze.

PERIPHERAL CUEING AND ALERTNESS MODULATION OVER SPATIAL INTERFERENCE: SHARED AND SPECIFIC ATTENTIONAL MECHANISMS TRIGGERED BY GAZE AND ARROWS

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Recent studies using the spatial interference paradigm have found that arrow targets elicit the standard congruency effect (SCE), while gaze targets elicit a reversed congruency effect (RCE), indicating qualitative differences between the two. It has been proposed that gaze targets would produce both, the SCE and an additional opposite social component. This study aimed to examine whether the presence of a pre-cueing and an alerting signal, known to respectively reduce and increase the SCE, also modulate the RCE

equivalently. We divided the experiment into two blocks, a cueing block with a peripheral non-predictive cue, and an alerting block with a 2000-Hz tone present in 50% of the trials. Results showed the expected SCE and RCE in the un-cued location and absent-tone trials. However, when the tone was present, we observed an increment of the congruency effect for arrows, and a more negative effect with gaze. In the cueing block, the expected reduction of the SCE on cued trials was observed with arrows, whereas the gaze targets elicited a decreased RCE. These results suggests that while some manipulations have shared effects, others have differential effects on the spatial interference component produced by gaze and arrows.

CUE-TARGET UNCERTAINTY MODULATES ATTENTION CONTROL: EXAMINING THE ROLE OF CURIOSITY

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A common assumption in lab-based tasks is that any behaviour not in alignment with the stated goal indicates a failure of top-down control. For instance, peripheral cueing effects with non-predictive cues are considered a hallmark of stimulus-driven attention because the cues capture attention inspite of being irrelevant. But, what if people attend to such cues out of curiosity - a concurrent motivation in most humans? We examined this in a study with 60 participants. Peripheral cues and targets were presented either on the left or right of the fixation cross. The task was to identify if the target letter was E or H. There were three conditions: cue location constant for a block of trials and the target location allowed to vary (cue fixed), both cue and target locations constant for a block of trials (cue-target fixed) and the standard condition with variable cue and target locations. Cueing effects were seen only for the cue fixed and standard conditions. The absence of uncertainty (and curiosity) in the cue-target fixed condition made participants less sensitive to the information from the cues. We tentatively conclude that curiosity induced by stimulus uncertainty makes people susceptible to seemingly irrelevant information.

VIGILANCE IN PLAY: HOW ACTION VIDEOGAME EXPERIENCE IMPROVES PERIPHERAL DETECTION IN EMOTIONAL SETTINGS

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Several studies have suggested that action videogame (AVG) experience improves attentional tasks but there is no consensus on the impact of AVG in emotional perception. This study aimed to investigate whether AVG enhances vigilance performance in the presence of emotional stimuli. A total of 65 participants were assigned to each group based on self-reported gaming experience. Participants completed a dual task that included a central task (discrimination of emotions) and a peripheral task (signal if a Gabor changed size). Points were awarded for correct responses in the central task and deducted for missed detections in the peripheral task. Preliminary results show no significant differences between AVG and non-AVG players regarding reaction times, number of misses, and number of hits for the central task. However, AVG players performed significantly better than non-AVG players in the peripheral task, detecting more changes. These findings suggest that AVG players were able to broaden their attentional focus without sacrificing central task performance, remaining vigilant to peripheral threats. Data is still being collected and eye-tracker data will be analyzed to provide insights into attentional allocation.

INFLUENCE OF EMOTION-ASSOCIATED SALIENT FEATURES ON VISUAL ATTENTION CAPTURE

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Emotional information processing is automatic, preattentive and interferes with early attentional processes even when irrelevant. Our research examines the influence of emotion–associated saliency and emotional information processing on visual attention capture with two studies(n=180); linking emotional associations to valence (Study1) & arousal (Study2) in a categorization task using IAPS images masked with specific colors. Exp1 & Exp2 represented non-emotional and emotional categorization tasks; indicating implicit and explicit emotion processing. The interference was studied using the same colors as distractors in Additional Singleton Task. Significant effects of emotion were seen in all studies, with only Study1-Exp2 showing a display and emotion interaction effect. Positive associations had the highest mean response time in the explicit condition, contrasting implicit condition showing negative associations with most interference. Arousal levels showed no significant contrast. We infer that the interference levels differ depending on the nature of information processing. The valence of the context seems to drive the interference, particularly the positive valence when emotional context is explicitly processed.

IS THE VIGILANCE DECREMENT MITIGATED BY TASK LOAD AND PERCEPTUAL SALIENCE? AN ONLINE AND WITHIN-PARTICIPANTS STUDY

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Resources overload theory anticipates that the vigilance decrement should be hindered when task demands are increased. However, while some studies have observed detrimental effects of task load or perceptual salience on vigilance, other studies have failed to observe such effects. To jointly investigate the effects of task load and perceptual salience on vigilance, 45 participants (*n* = 24 from Spain and *n* = 21 from Argentina) completed an online vigilance task (i.e., ANTI-Vea) of ~33 min in nine repeated sessions. Critically, the vigilance task was manipulated in each session as a function of two orthogonal factors: task load (single, dual, or triple task) and target's perceptual salience (low, medium, or high). The vigilance decrement was observed as a progressive drop in hits across blocks. Main effects of task load (single > dual > triple) and perceptual salience (high > medium > single) were observed for overall hits. However, neither task load nor perceptual salience did modulate the drop in hits across time-on-task. We discuss the limitations of resources overload theory to account for the vigilance decrement when measuring vigilance under different task conditions but the same temporal and other stimuli parameters.

DOES PREPARATION REDUCE THE EFFECTS OF FEATURE BINDING WHEN SWITCHING AUDITORY ATTENTION?

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Auditory attention research shows consistent performance costs when switching between voices - similarly to "switch costs" in task switching research. When switching between tasks, switch costs can be reduced with longer preparation time before stimuli onset. Switch costs can also be modulated by the binding of task-relevant and task-irrelevant features, such that switching the irrelevant feature reduces the benefit of repeating the relevant feature. Our research investigates whether these findings can be extended to situations where only auditory attention is switched and whether preparation can modulate feature binding in this setting. We used an attention switching paradigm (N = 59), where target voice was visually cued by either gender or ear and the other (i.e. irrelevant) dimension could vary orthogonally. We found evidence of feature binding: switches in the irrelevant dimension reduced the repetition benefit. Importantly, preparation did not reduce the interaction of the nontarget dimension with the target dimension - on the contrary, this binding effect was larger at longer preparation intervals, suggesting that binding influences the representations that top-down preparation operates on.

EVIDENCE THAT ANXIETY INDUCES AN ENGAGEMENT BIAS TOWARDS NEGATIVE INFORMATION.

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Information processing biases play a vital role in the aetiology, maintenance, and management of anxiety disorders. These biases include preferential processing of affective information, especially negatively valenced information. The current study aimed to investigate how engagement and disengagement attentional biases would interact with measures of attentional control and on different dimensions of anxiety. 69 participants aged between 18-30 years participated in a modified dot-probe task to measure attentional bias and completed psychological measures to assess comorbidity, dimensions of anxiety, attentional control. Our findings showed that participants having high cognitive & somatic anxiety display a significant engagement bias towards affective, but especially negative information. In addition, we found that cognitive dimension of trait anxiety, focus and shift significantly explained attentional bias. Also, attentional focus was found to be negatively correlated with cognitive and somatic anxiety. These findings have implications for understanding the disruptions in cognitive processing caused by severe anxiety and other comorbidities.

INFLUENCE OF RHYTHMIC CONTEXTS ON PERCEIVED EVENT DURATION

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Rhythmic contexts are ubiquitous in our lives. The Dynamic Attending Theory (DAT) states that attention can be entrained to external rhythms, enhancing our behavior in terms of preparation (e.g., faster responses) and/or perception (e.g., better discrimination). Notwithstanding the influence of the DAT, several studies failed to observe entrainment effects. The present study aims to further explore this issue by replicating a seminal work by McAuley and Fromboluti (2014), which confirmed the predictions of the DAT within an oddball auditory paradigm. Our results showed a general foreperiod effect, with faster and more accurate responses in rhythmic blocks as compared to arrhythmic blocks, but no benefits for targets occurring on-time as compared to out-of-time as the DAT would predict. Using psychometric analyses to measure accuracy in the oddball task, our results were partly in line with the

original study as little distortion in perceived duration was observed for oddballs occurring at the expected time with respect to the entrained rhythm. In ongoing analyses, we are also incorporating measures from pupillometry, musical skills and spontaneous motor tempo to assess the role of individual differences in the entrainment effects.

EXPLORING THE ROLE OF MIND WANDERING AND EXECUTIVE CONTROL IN THE VIGILANCE DECREMENT: A STUDY USING THE ANTI-VEA TASK

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The resource-control theory suggests that the decrease in executive control (EC) over time leads to the allocation of attentional resources to task-irrelevant thoughts, resulting in decreased vigilance. To investigate the relationship between mind wandering (MW), EC, and vigilance decrement, we utilized the ANTI-Vea task with thought probes (TP) to measure MW. A total of 270 individuals participated in the study, divided into 3 groups with a different number of TP per block to identify the most appropriate rate of TP: 4 (N=90), 8 (N=90), or 12 (N=90); 90 participants completed the task in the lab, while 180 performed it online. Standard analyses were conducted for the ANTI-Vea task, and the change in MW was analyzed across blocks using a continuous scale ranging from completely on-task to completely off-task. We found that (a) the usual vigilance decrement and decrease in EC across time on task are still observed when TP are embedded in the ANTI-Vea, (b) TP embedded in the ANTI-Vea was observed to be useful given that MW estimation increases across time-on-task, and (c) the inclusion of TP does not significantly affect the main effects of the ANTI-Vea task. We discuss our results in light of the resource control theory.

THE ANTI-VEA-UGR: A NEW PUBLIC TOOL FOR THE ONLINE ASSESSMENT OF THE ATTENTIONAL NETWORKS AND VIGILANCE

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We present here the ANTI-Vea platform (ANTI-Vea-UGR; https://anti-vea.ugr.es/index.php). It is a free public website that our team has developed for online collecting and analyzing data obtained with the Attentional Network Test for Interactions and Vigilance – executive and arousal components (ANTI-Vea), and its different subversions. Using this tool, the independence, and interactions of the three attentional networks (alerting, orienting, and executive control), and the two main components of vigilance (Executive Vigilance and Arousal Vigilance) can be assessed, all psychometrically validated. The task is available in six different languages and allows customization of task parameters to suit different research goals and sample types. Importantly, the analysis can be easily done with a Shiny app and thus obtain the core indexes of attentional functioning (8 for the attentional networks, and 10 for vigilance). The versatility of a tool such as ANTI-Vea-UGR can be useful for improving research in the field of human attention. Therefore, we encourage researchers to use it and take advantage of the ease and low cost of online data collection and analysis it provides.

INTERFERENCE VS DISTRACTION: QUALITATIVELY DIFFERENT ATTENTIONAL CAPTURE EFFECTS DEPENDING ON DISTRACTOR RELEVANCE

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Based on our previous study (Manini et al. 2021), in which we investigated the effect of relevant vs. irrelevant distractors as a function of task demands, we propose that attentional capture caused by a distractor could be qualitatively different depending on its relevance to the task. We used the perceptual load procedure of Forster and Lavie (2016), which uses a distractor defined as fully irrelevant, that it does not share space nor feature with the target (i.e. cartoon character outside of the search array), and added some blocks with a potentially relevant distractor (i.e. a red letter within the search array) that did share both features and space with the target. In a series of experiments, we observed a systematic dissociation between both captures: a decrement in distraction produced by the irrelevant distractor, and larger interference produced by the potentially relevant distractors in high compared to low demands. The current data suggest the presence of a qualitative difference between the effect produced by fully irrelevant vs. potentially relevant distractors, which we interpret as leading to theoretically different phenomena: distraction and interference, respectively.

Theme

BILINGUALISM

LINGUISTIC TYPOLOGY, METACOGNITION, AND DECISION-MAKING

Leona Polyanskaya[1], Mikhail Ordin[2]; *[1]Universidade de Coimbra, [2]Coimbra Institute for Biomedical Imaging*

We found that bilinguals are better than monolinguals in detecting the decision, on which the likelihood of an error is high, and assign lower confidence ratings on such decisions than monolinguals. This is known as bilingual advantage in metacognitive efficiency. It has only been observed on language tasks, suggesting a limited transfer across domain. In the current study, we showed that the magnitude of effect is further modulated by typological difference between bilinguals' languages. Bilinguals whose languages are typologically different enjoy a natural training of metacognition due to the need to monitor efficiency of multiple cognitive strategies for processing typologically different language structures and incompatible sets of language cues. Therefore, they outperform those bilinguals whose languages are typologically similar. The metacognitive enhancement effect might not be transferred to non-language domains, but it influences decision-making strategies in non-language domains, including risk aversion degree, the degree of using prototypes in reasoning, and exploration/exploitation trade-off.

DOES STUDYING IN A SECOND LANGUAGE HINDER LEARNING MONITORING?

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English as a second language (L2) has become the medium of instruction in different contexts, even when people do not master it to the same degree as their native tongue. Previous studies suggest that L2 processing might overload the cognitive system. Therefore, acquiring new information in L2 could compromise the metamemory processes and cognitive resources needed for learning. In four studies, we investigated whether the interplay between monitoring and control (metamemory processes) changed as a function of the language of instruction. We explored how font type (Exp. 1), concreteness (Exp. 2), relatedness (Exp. 3) and text cohesion (Exp. 4) affected judgments of learning (JOLs, monitoring measure) and memory performance in L1 and L2 materials. Overall, results showed that people were able to monitor their learning both in L1 and L2, despite judging L2 learning as more difficult than L1. Interestingly, self-perceived difficulty did not hinder learning and people recognized L2 as well or better than L1 materials. We suggest that this might be an example of a desirable difficulty for memory and discuss L2 proficiency as a key factor.

MAY YOUR DECISIONS REFLECT YOUR LANGUAGE? HOW SPEAKING A FOREIGN LANGUAGE CAN AFFECT CHOICES IN A WORLD OF UNCERTAINTY

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Decision-making in a foreign language (FL) may result in choices that are different from those taken in the native language (NL). Specifically, some evidence has shown that presenting information in a FL may be less conducive to cognitive biases and costly mistakes. This phenomenon is known as Foreign Language Effect (FLE). Crucially, while the FLE literature has mainly dealt with decision-making in contexts of calculated risk, the effect of a FL on decision-making under uncertainty (where not all alternatives, consequences, and probabilities are knowable) remains unexplored. The present study aimed to bridge this gap by manipulating uncertainty in two moral problems - presented either in a calculated risk or in an uncertain version – and two exploration-exploitation dilemmas. The decision problems were administered to a sample of 300 Italian-English bilinguals either in their NL or in the FL. Bilinguals' language background was quantified by means of both subjective and objective measures. Measures related to individual attitude to risk and reasoning were also collected. Our results will be discussed in light of current dual-process theories of the FLE, extending their assumptions to uncertain scenarios.

IS INTERPRETER ADVANTAGE A GIFT OR AN EFFECT OF TRAINING: THE RELATIONSHIP BETWEEN EXECUTIVE FUNCTION AND TASK PERFORMANCE IN INTERPRETING TRAINING

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Simultaneous Interpreting (SI) is a multi-tasking activity that recruits concurrent auditory processing in one language and vocal production in another, requiring coordination among linguistic and cognitive control mechanisms. It is evidenced that cognitive abilities developed by interpreters are associated with enhancement in domain-generic executive functions (EFs). But it remains unknown whether such cognitive alternation is a result of skill acquisition, or it reflects a selection bias that only cognitively capable people are recruited and trained to be interpreters. We report the results of EFs and task performance in an intensive (two-week) interpreting training programme, which engages novice trainees (N = 26, M_{age} = 23.73, SD_{age} = 2.01) in a combination of sight translation (STR, a preparatory task to SI) and SI training. It is found that 1) the three EF subcomponents: inhibition, shifting, and working memory were enhanced by training, together with STR and SI performance; 2) only shifting subserved enhanced SI task performance, and no EF subcomponents subserved that of STR. Our findings suggest that

trainees benefit from a pre-existing advantage in shifting, and EF as a whole is enhanced due to the intensive training.

INDIVIDUAL DIFFERENCES IN THE IFOF EXPLAIN BILINGUALS' ABILITY TO REVISE AN UNEXPECTED INTERPRETATION DURING TEXT COMPREHENSION: A MRI STUDY

Ana I. Pérez[1], Elisa Martín-Arévalo[1], Teresa Bajo[1]; *[1]University of Granada*

Despite controversy about whether bilinguals outperform monolinguals in non-linguistic cognitive tasks, several studies have reported a bilingual advantage in linguistic tasks requiring executive functions such as monitoring (e.g., Ordin et al., 2020) or inhibitory control (e.g., Tiv et al., 2020). The ability to solve a mistaken interpretation demands these two executive functions (e.g., Pérez et al., 2015). In the present study, 30 monolinguals and 30 bilinguals young adults were assessed while revising no longer valid interpretations during native text comprehension, by means of behavioural measures and event related potentials. In addition, Diffusion-Weighted Imaging (DWI) from the inferior fronto-occipital fasciculus (IFOF) was extracted to explain individual differences in prior measures. Higher white matter integrity in the right IFOF was associated with a stronger N400 effect in bilinguals; in contrast, the same was not significant in monolingual younger adults. Our results suggest that brain changes apparently caused by the acquisition of a second language, may translate into a bilingual advantage in the first language, by means of the detection of semantic violations when an unexpected interpretation occurs.

PROJECT ENGRI: REDISCOVERING ENGLISH LOANWORDS THROUGH COMPUTATIONAL LINGUISTIC, PSYCHOLINGUISTIC AND NEUROSCIENTIFIC APPROACH

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Unadapted English loanwords are interesting from the perspective of bilingual lexical processing because they occur in L1 and L2, and all proficiency groups use them. Experimental research has been hindered by the lack of computational linguistics and psycholinguistic data. This project is aimed at developing the necessary resources, and using them to explore the cognitive processing of unadapted English loanwords. A classification algorithm was used to extract English loanwords from a newly created web corpus. The final dataset includes a list of 2,982 English loanwords, their frequencies, and Croatian equivalents. A translation study revealed that the interpretation of English loanwords can depend on whether they are presented in or out of context. A study into affective and lexico-semantic norms showed that English loanwords are more arousing and less emotional than their Croatian equivalents. Two priming experiments revealed that English loanwords are processed faster than non-loanwords, which indicates that they differ from other English words. Future plans are directed towards neurocognitive research, with the aim of getting closer to answering a very interesting question: Are unadapted loanwords processed as L1 or L2 words?

THE TIME COURSE OF MORAL DECISION MAKING IN A NATIVE AND A FOREIGN LANGUAGE

Susanne Brouwer[1]; *[1]Radboud University*

Previous research has shown that people make more utilitarian decisions when listening to moral dilemmas in a foreign language than in their native language. The current aim was to examine listeners' offline and online decisions, and how they are linked, to reveal the time course of moral decision making in a native and a foreign language. In a visual-world eye-tracking experiment, 82 Dutch-English bilinguals listened to 20 moral dilemmas (e.g., would you kill one person to save five?) in their native or foreign language, while looking at two pictures containing key people involved in the dilemmas. These pictures illustrated (1) the person/people that may be sacrificed and (2) the person/people that may be saved, depending on the participants' offline decision which was measured with yes/no-questions. The offline results replicated the *Foreign-Language effect* (p<.001). The online results showed that in the native language, listeners looked more at the people/person who they saved, whereas in the foreign language, they looked more at the people/person who they sacrificed (p<.01). This suggests that listeners may be more emotionally involved in the native than the foreign language as they implicitly look away from the victim(s).

DO FOREIGN SPEAKERS AFFECT MORAL DECISION-MAKING?

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Prior research has shown that people respond more utilitarian when a moral dilemma is produced by a native than a foreign-accented speaker. This study examined whether the influence of stereotypes on the categorization of speakers into other social groups based on their accents affects moral decision-making. In two experiments, Dutch and Spanish participants were presented with six moral dilemmas by a native speaker (Dutch/Spanish), and two foreign-accented speakers, one with negative stereotyping (Moroccan), and another with positive stereotyping (English). We used a written design to avoid processing disfluency. Speakers were introduced in

a bio before the participants read the dilemmas and described as having a strong accent (Exp. 1, N=109), or a mild or a strong accent (Exp. 2, N=115, ongoing data collection). The results of Exp. 1 showed that both groups together made more utilitarian decisions for the foreign speakers than for the native speaker, but no differences were found between the foreign speakers with a positive or a negative stereotype. Preliminary results of Exp. 2 showed that moral decision-making was modulated by the foreign speaker with a positive stereotype and by accent strength for the Dutch group only.

WITHIN- AND BETWEEN-LANGUAGE SEMANTIC PRIMING IN CLASSIFIER-NOUN PHRASES

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Previous studies have typically investigated semantic priming by presenting a pair of semantically related vs. unrelated stimuli (e.g., written nouns). In this study, we used auditory classifiers (e.g., a bowl of) as primes and participants were asked to name a visually presented object as probe. To explore within- and between-language priming effects, classifier language and naming language could be same or different for Chinese-English bilinguals. While both classifier and naming language varied unpredictably in Experiment 1 (n = 40), classifier language was kept constant for one block (but was manipulated across blocks) in Experiment 2 (n = 40). In both experiments, better performance was observed in semantically related conditions (a bowl of noodles) than in semantically unrelated conditions (a bowl of students). Yet, this semantic classifier priming effect was found only when classifier and naming language were the same but not different. Thus, classifier as semantic primes only worked within-language but not between-language. This might imply that, at least when using classifier as semantic primes, semantic activation is language specific.

INVESTIGATION INTO THE PROCESSING OF ENGLISH LOANWORDS IN CROATIAN USING CROSS-LINGUISTIC TRANSLATION AND SEMANTIC PRIMING PARADIGMS

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Within the research on bilingual lexical processing, very little attention has been given to unadapted English loanwords. They are interesting because they occur in many languages, they are used in L1 and L2 in the same form by all proficiency groups. This study aims at investigating cross-language priming effect in Croatian-English speakers. Translation and semantic priming experiments were conducted to explore the effects of proficiency, language direction and word type (loanword vs. non-loanword English words). English loanwords were selected based on their frequency in Croatian corpora, the availability of Croatian equivalents, and concreteness. A total of 76 university students participated in the experiments. Priming effect was found in both experiments and it was equally strong in both language directions. English loanwords were processed faster than non-loanwords, while no main effect of proficiency was found. The magnitude of priming effect did not differ between loanword and non-loanword English words. The results generally support recent models of bilingual lexical access, but also show that loanword processing follows different patterns compared to other L2 words.

MOVIES IN THE MAGNET: INVESTIGATING EMOTIONAL LANGUAGE PROCESSING IN BILINGUALS WITH A NATURALISTIC VIEWING PARADIGM

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According to psychological constructivism, emotions are formed by various factors including conceptual knowledge, which is supported by language. Languages that encode different emotional terms might lead to different emotional responses. Behavioral, psychophysiological, and neuroimaging studies showed automaticity of emotional processing in the first language (L1), while others found no differences between L1 and the second language (L2). This study aimed at examining bilingual emotional processing via a naturalistic paradigm, which is a more ecological approach than static stimuli (e.g., single words and faces). A sample of 54 proficient bilinguals underwent an fMRI scanning session while watching 36 1-min long videoclips – each categorized as either sad, funny, or neutral - in both L1 and L2. We treated bilingualism on a continuum by collecting objective and subjective data on the bilingual language background. We found a main effect of L1 over L2, and a significant interaction between language and emotional category with greater activation in areas involved in semantic (e.g., STG) and emotional processing (e.g., Amygdala). Results will be discussed extending psychological constructivism assumptions to more ecological paradigms.

COGNITIVE AND ENVIRONMENTAL FACTORS UNDERLYING LEXICAL RESTRUCTURING IN A FOREIGN LANGUAGE

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Vocabulary development may be delayed in sequential bilinguals compared to their native language peers. Delayed vocabulary development, in turn, may impede phonological development, via delayed lexical restructuring. The current study investigated the contributions of the bilingual home literacy environment, socioeconomic status, and cognitive predictors to lexical restructuring, as measured by development in EFL phonological specificity, in Dutch children enrolled in bilingual primary education. The data were collected from two schools that provide bilingual (i.e., Dutch and English) primary education in the Netherlands. We measured 60 children's Dutch and English phonological specificity and Dutch and English vocabulary size (T1 and T2), Dutch and EFL home literacy environment and socioeconomic status (T1), and their nonverbal working memory (T1) and English phonological awareness (T2). Most importantly, our findings revealed that children with larger EFL vocabularies at T1 had more enhanced phonological specificity at T2, and children's L1/L2 home literacy environment predicts growth in phonological specificity between T1 and T2. Implications of these findings for current models of reading development will be discussed.

EFFECTS OF BOTH AGEING AND BILINGUALISM ON ATTENTION AND EXECUTIVE FUNCTIONS

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Both ageing and bilingualism can have positive and adverse effects on cognition. We investigated their combined impact on attention/executive functions in the Attention Network Task (ANT). We examined the impact of bilingual individual differences using objective measures of language proficiency (L2 vocabulary) and language switching (L1 and L2 switch costs). Group comparisons (young & older mono- & bilinguals, N=40 each) revealed: age decreases *alerting* ($p<.001$) and increases *executive (inhibitory) control* performance ($p<.001$), for mono-and bilinguals alike (interactions: $p>.1$). For *orienting*, bilingual young adults perform better than monolingual young adults ($p<.06$), but, bilingual older adults perform worse than monolingual older adults ($p<.02$). There are limited effects of individual difference measures (N=177): *proficiency* improves orienting performance for young and older bilinguals alike; no relationships with *switching* performance were found. We show clear adverse (alerting) and protective (executive control) effects of aging which are in line with the literature (e.g. Veríssimo et al. 2022 Nature Human Behaviour), while the bilingualism effects for attention/executive functions are less clear.

BRAIN POTENTIALS SHOW REDUCED SENSITIVITY TO NEGATIVE CONTENT DURING SECOND LANGUAGE PRODUCTION

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Prior EEG studies showed reduced sensitivity to negative second language (L2) content (Wu and Thierry 2012, Jończyk et al. 2019). We recently extended this effect to language production: N400 amplitudes reduced for negative L2 words in comprehension; LPP amplitudes increased for negative words that were to be translated from L2-to-L1 (i.e., production in L1; Jończyk et al., in preparation). Here, we further investigate the production of negative and neutral words presented in a *spoken* modality. Polish (L1) – English (L2) bilinguals listened to negative and neutral words in L1 and L2. Spoken words were preceded by a neutral or sad emoji, signaling the emotional valence of a subsequent word. Emojis were either white or black, indicating whether participants should repeat aloud or translate the word. Languages were blocked; block order and cue color were counterbalanced. Data collection is ongoing. Results from 21 participants (target $n = 35$) show smaller N400 amplitudes for negative than neutral L2 words and increased LPP amplitudes when negative L2 words were to be translated into L1. Our results provide novel insight into emotional word production in bilinguals in a paradigm mimicking natural communication.

TOWARDS A QUANTIFIABLE MEASURE OF ORTHOGRAPHIC CONGRUENCY BETWEEN 2 LANGUAGES

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Whereas the advantage of having orthographic information available during vocabulary acquisition has been consistently observed in a L1 learning context, studies are inconclusive about whether this benefit extends to the acquisition of L2 vocabulary. A discrepancy that is mainly due to the language specific nature of grapheme-to-phoneme correspondences (GPC). Indeed, studies suggest that if GPCs are incongruent between L1 and L2, the resulting interference hinders the integration of novel L2 words. The dominant approach for determining congruency consists in a subjective evaluation, i.e. non-native L2 word pronunciations are

being deemed native-like or not by L2 proficient examiners. Although this method has yielded results, the lack of an alternative procedure underlines the necessity for a quantifiable measure of congruency.
Through the use of infralexical statistics, we have established a metric framework for calculating the degree of L1/L2 GPC congruency; permitting for the placement of any given L2 word on a percentage based continuum of congruency. The further inclusion of behavioral data allows us to account for both theory and praxis in order to thoroughly measure the degree of orthographic congruency between two languages.

TEMPORAL DYNAMICS OF THE FOREIGN LANGUAGE EFFECT IN MORAL DECISIONS: A MOUSE TRACKING STUDY

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The Foreign Language Effect (FLE) shows that individuals are more likely to make utilitarian choices in sacrificial dilemmas. Although this pattern has been replicated across laboratories and languages, no study has explored the temporal dynamics of such an effect. By employing mouse tracking, forty-two participants made dichotomous decisions for a validated set of 60 moral dilemmas, which differ in type (incidental vs. instrumental) and involvement (self vs. other), in either their native or foreign language. We recorded decision, response times, and response dynamics via participants' computer mouse trajectories. In instrumental dilemmas, we observed more utilitarian choices in the foreign than in the native language, and their trajectories are characterized by larger deviation towards the alternative choice and more flips on the x-axis in the foreign language than in the native language. Additionally, the overall patterns observed in mouse trajectories reveal a more direct path in foreign language compared to native language, suggesting language plays a significant role in conflict resolution. Our findings provide unique insights into the decision's temporal dynamics in moral dilemmas in native and foreign language.

EXAMINING EFFECTS OF BILINGUALISM FOR SUSTAINED ATTENTION AND INHIBITION WITH ROBUST TASKS

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Evidence for bilingualism's effects on executive functions (EF) is mixed. Bialystok & Craik, 2022 propose that findings are better explained through attentional control rather than inhibition. Most studies use Simon, Flanker or Stroop tasks, where RT and difference scores are contaminated with speed-accuracy tradeoffs (Draheim, 2021). We check if bilingualism variables are good predictors of EF (with a Bayesian approach) and test if reliance on RT-based measures is the source of conflicting results. We also test whether bilingual advantages appear on tasks measuring sustained attention rather than inhibition. We found that the null model was the best model (highest posterior probability) for all tasks. Bayes Factor = 4.31,7.1,3.7,4.2 for Sustained-Attention-to-Cue, Psychomotor Vigilance, Flanker and Adaptive Flanker tasks, respectively. Bilingualism-related characteristics failed to show a reliable influence on both sustained attention tasks. For improved measures less susceptible to methodological flaws related to RT impurity and processing confounds, the best model was the null model. We conclude that the null effects are not due to the" inadequate" choice of inhibition as a mechanism but that bilingualism does not modulate EF.

THE EFFECT OF L1-L2 SIMILARITY IN L2 PREDICTION: EVIDENCE FROM VISUAL-WORLD EYE-TRACKING STUDY

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There is debate whether predictive processing in the second language (L2) of bilinguals is similar as in the first language (L1). Here we ask whether any such differences in predictive processes depend on the similarity of the L1 and L2.
In a visual-world eye-tracking study, we compared both L1 and L2 prediction of Chinese-English (N=32) and Dutch-English (N=32) bilinguals. Dutch and English are typologically close (both belong to Western Germanic languages) whereas Chinese and English are typologically distant (Chinese is a Sino-Tibetan language). Each participant listened to highly constraining sentences like "Mary will read the book" or neutral sentences like "Mary will share the book" both in their L1 (Chinese or Dutch) and L2 (English) across blocks, while their eye movements were being recorded.
Preliminary data analyses showed that L1 and L2 prediction did occur in both Dutch-English and Chinese-English bilinguals, and more crucially, both groups of bilinguals showed similar patterns of predictive processing in their L2 English. Hence, similarity with L1 seems to play a minimal role in L2 predictive processing (at least at the lexico-semantic level).

IS L2 MORPHOLOGICAL PROCESSING MODULATED BY INDIVIDUAL VARIABLES? A MASKED PRIMING STUDY

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The role of morphology during second language (L2) derived words' recognition is still under debate. A recent meta-analysis on bilingual masked priming lexical decision studies has concluded that there

are differences in L1 and L2 morphological processing: significant morphological priming effects for transparent (e.g., sailor-SAIL) and pseudo-derived (e.g., belly-BELL) conditions (with no significant priming effect for the orthographic [e.g., needle-NEED] condition) were present in L1, whereas in L2, no differences across conditions were observed. Moreover, studies on the processing of L2 derived words show a scarce control of individual variables which have been seen to modulate lexical access. Considering this, the present study aimed to examine such variables' contribution to the recognition of L2 derived words. To do that, Portuguese-English bilinguals with different degrees of L2 proficiency and an English native speaker control group performed a masked priming lexical decision task in English. Results showed that only in L1 a significant relatedness effect was modulated by morphological priming. This seems to indicate that the underlying mechanisms of morphological processing of derived words are not the same in L1 and L2.

LEXICAL ALIGNMENT DOES MAKE SPEAKING EASIER FOR BILINGUALS EVEN IN THE FACE OF INTERFERENCE

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Lexical alignment is speakers' tendency to reuse the words of their interlocutor and is assumed to facilitate language production (Pickering & Garrod, 2004). We hypothesized, however, that alignment may actually hinder production when the word produced by the interlocutor creates competition with the speaker's favored word. Spanish-English bilinguals named and matched pictures with a confederate in Spanish. On critical trials, participants named objects which were previously named by the confederate with one of two possible names. Participants were fastest when they aligned with the confederate to their own favored name (established in a preliminary individual picture-naming session). Crucially, participants were also faster when they aligned to a name they disfavored than when they did not align and used instead the name they favored. These results are against our hypothesis, and suggest that alignment facilitates language production even in the face of interference produced by lexical competition. In addition, participants with lower Spanish proficiency showed numerically greater alignment, implying that alignment may also mitigate the production difficulties associated with lower proficiency.

FOREIGN LANGUAGE EFFECT ON THE JUDGMENT OF BULLSHIT

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The present study investigates the cognitive processing of nonsense, namely bullshit statements, in the context of the foreign language effect (FLE). We aimed to investigate if there is an FLE on the profundity assessment (PA) of bullshit statements and whether it could be attributed to emotional valence (EV)? Two pilot studies were conducted to create the necessary materials for the experiment. In the first study, we created a database of words in English and Serbian and collected lexical norms to control and manipulate the statement properties. Using the word database and the custom-made software, we created 480 bullshit and everyday statements, which were then evaluated by EV and imageability in the second study. The English statements were rated as more imaginable than their Serbian equivalents ($F(1, 71) = 59.111$, $p<.01$, $\eta2 = .055$). In the main studies (N1=96; N2=95), participants rated the statements by profundity. Results suggest that there is no FLE on the PA of bullshit when the evaluators are highly proficient in their L2, but in the less proficient participants, a FLE was found ($F(1, 94) = 4.917$, $p<.05$, $\eta2 = .004$). The FLE on the PA of bullshit was affected by EV ($F(2, 94) = 3.462$, $p<.05$, $\eta2 = .002$).

BILINGUALISM AND BIASES: BILINGUAL LANGUAGE EXPERIENCE AS A MODERATOR IN THE ASSOCIATION BETWEEN INTERNAL MOTIVATION AND EXPLICIT BIASES

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Research indicates that bilinguals (vs. monolinguals) show reduced social biases. However, it is unclear which dimensions of the bilingual experience are responsible for this reduction. We reanalysed data from a previous study that contained the responses of 389 bilinguals to a battery of questionnaires on bilingual and multicultural experiences, explicit biases, internal and external motivation to respond without prejudice, and executive control (EC). We reduced the multidimensionality of the data and explored which dimensions of the bilingual experience predicted explicit bias, considering individual differences in motivation, EC, and sociodemographic characteristics. Internal motivation was the strongest predictor of reduced explicit bias, but its effects were qualified by bilingual experiences. Language-use diversity (i.e., greater language-use balance, less language dominance, frequent switching and mixing, frequent multicultural experiences) and language-learning diversity (i.e., diverse proficiency and age of

acquisition across languages) were associated with reduced explicit bias among bilinguals with lower internal motivation. This study presents novel evidence on the relevance of bilingual experiences in bias reduction.

Theme

CHILD DEVELOPMENT

BIOLOGICAL MATURITY DISSOCIATES VERBAL AND NONVERBAL COGNITION IN ADOLESCENCE

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Cognitive abilities undergo large-scale development in adolescence, with different abilities manifesting different trajectories. These changes are driven not solely by chronological age, but also by biological maturation. We assessed the biological maturity of female adolescents (N=117) with 'bone age' (the level of skeletal maturity): an indicator of hormonal maturation, obtained with a non-invasive, ultrasonic measurement of the wrist. Cognitive ability was assessed with 11 subtests of the WISC IV. Using linear regressions we found that biological maturity has an independent effect on Working Memory and Processing Speed, while chronological age has an independent effect on Verbal Comprehension. Full Scale performance is affected by both chronological age and biological maturation, independently. Our results demonstrate that biological maturity provides another means to fractionate specific cognitive abilities. Additionally, individual differences in cognitive abilities in general, and Working Memory and Processing Speed in particular, might reflect variation in the onset and pace of biological maturation.

EFFECTS OF DEAFNESS CHARACTERISTICS AND PRINT EXPOSURE ON LITERACY SKILLS IN ORALLY EDUCATED DEAF CHILDREN

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Objective: Our research intends to study the effects of: 1 / different factors that can improve speech perception (age of Cochlear Implant (CI) and age of exposure to Cued Speech (CS, support system for the perception of oral language)), 2 / levels of perception in lip reading with or without CS and intelligibility of speech; and 3 / the level of print exposure, on the low literacy skills of young deaf people. *Method*: The effects of these different variables are examined using correlation and regression analyzes in both experiments carried out respectively with deaf children in Grades 2 and 3 (N = 33) and deaf adolescents in Grades 7 and 8 (N = 31). *Results*: No contribution of the variables age of CI and exposure to CS was observed in both experiments. However, results revealed a significant contribution of print exposure to literacy skills (decoding and comprehension in reading, spelling, and vocabulary) in all experiments and in addition, other contributions of speech perception with CS and intelligibility of speech production in experiment 2. *Conclusion*: The predictive aspect of these three variables in the explanatory model of literacy will be discussed, as will the consequences for educational and pedagogical practices.

WHAT MAKES PEOPLE HAPPY: PEOPLE

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Positive emotions are a key aspect of a successful development, but studies usually test only few competing predictors of emotions, thus failing to consider the complexity of the inter-relationships between all these factors. This makes it difficult to understand which are the real antecedents of children's positive emotions. To overcome these issues, we applied an exploratory network analysis to 46 variables (from psychological problems, to extracurricular activities, and cognitive tasks) to identify the main psychological domains of children (N = 10.904) and use these to longitudinally predict children's positive affect at six different time points and up to 36 months later. Among the five domains found (impulsive behaviour, cognitive functioning, psychological problems, supportive social environment, and extracurricular activities), only the supportive social environment resulted as consistently predicting positive emotions. To conclude, being more intelligent, having less psychological problems, doing extracurricular activities, or behaving in a less impulsive way is not as important as having a strong supportive social environment for children's happiness.

IMPROVING SACCADIC EYE MOVEMENTS IN YOUNG AND POOR READERS

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The initial saccade (ILP) of experienced readers lands preferentially halfway between the beginning and the middle of words, at the position originally called the Preferred Viewing Location (PVL). Our study examined whether a simple physical manipulation, namely the saliency (brightness) of the character located at the PVL, exerts a positive influence on the saccadic computation system. An eye-movement study was conducted with adults and 8-year-old children performing a lateralized lexical decision task. We found that this manipulation had no effect on the location of the ILPs for proficient readers (characterised by ILPs most of the time at the PVL), demonstrating the irrelevance of enhanced PVL saliency for readers having developed automatized routines for saccade computation. But it did act to move the peak of the landing site distribution towards the PVL for the cluster of participants with immature saccade targeting strategy (characterised by ILPs near the words' beginning and lowest reading level scores) or increased oculomotor instability (characterised by flattened and diffuse LP-curves and visual-processing deficits). These results suggest that attracting the eye towards the PVL could represent a new way to help reading.

IMPROVING READING THROUGH VISUAL SALIENCY: A REMEDIAL TOOL FOR NEURODEVELOPMENTAL DISORDERS

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An expert oculomotor behaviour is classically reflected in a narrower spread of Initial Landing Positions (ILPs), around the Preferred Viewing Location (PVL), as observed in proficient readers with efficient lexical processing. In contrast, shorter and/or increased variability in the ILPs have been reported in poor, dyslexic, and novice readers (relying on a letter-by-letter decoding strategy). The aim of our study was to examine the usefulness of a tool enhancing the PVL saliency. Our hypothesis was that a brighter/coloured letter in a word could act as a salient signal for launching the saccade and modify the location of the ILPs. A lateralized lexical decision task was conducted with 18 children with dyslexia, 15 children with neurofibromatosis type 1 (7 with co-morbid reading deficits, RD) and 42 reading-level and chronological-age controls in three conditions of PVL saliency (colour, bright or neutral). The data revealed better performance for children with RD (independently of the disorder) with a salient letter at the PVL. This suggests that this manipulation can improve saccade targeting strategy for RD children, and encourage the systematic use of the lexical route, thus providing promising insights for therapists.

THE INFLUENCE OF WRITING TECHNOLOGY AND GESTURE MODALITY ON THE DEVELOPMENT OF EARLY LITERACY

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Writing is a cornerstone in education. As digitalization increasingly replaces analogue writing media, its efficiency must be likewise scrutinized. Similarly, along with this trend, gesture modality, specifically handwriting usage is decreasing. Do these changes have an impact on early literacy development? Hardly any study has systematically manipulated writing medium and gesture modality across an ecologically valid intervention to teach kindergarteners cursive letters. In the current study, we address this research gap. We aimed to test which writing media and gesture modalities may work best to foster literacy skills in children. In a planned intervention of six weeks, we manipulated writing medium [paper vs tablet] and gesture modality [handwriting vs tapping]. Therefore, we studied four experimental groups (n = 89) and compared them to a non-intervention control group (n = 34). The results show that digital or analogue writing media had a similar impact on kindergarteners' letter learning. Regarding gesture modality, younger kindergartners profited more from tapping, whereas the older ones benefited more from handwriting. The study delivers concrete findings in this area and analog and digital working materials for school use.

VARIABILITY IN EXECUTIVE FUNCTIONING DEVELOPMENT: ASSOCIATION WITH HOME AND PEERS' SES

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The development of Executive Functions (EF), a set of high-level processes necessary to adjust behavior to goals is sensitive to life experiences. A robust body of evidence links SES to EF performance, however, several factors modulate the association. Consequently, it is also accepted that the developmental trajectories of EF are highly heterogeneous. Recent evidence points to a possible contribution of classroom peers' SES over the home SES. The aim of the current study was to assess the contribution of home and peers' SES on EF performance in a sample of 136 kindergarteners. By means of multilevel analysis, we found that the contributions of home and peers' SES varies among the processes considered. Home SES is associated with inhibitory control, cognitive flexibility, reasoning, and planning performance. Peers' SES explains further variance in inhibitory control and cognitive

flexibility. Surprisingly, we did not find an association between working memory and home SES, however, an interaction between age and SES emerged. Implications of the findings are discussed in terms of recent proposals that suggest that cognition adapts to the harsh contexts associated with poverty, and possible implications for classroom conformation.

UNIQUE AND SHARED CONTRIBUTION OF WORKING MEMORY AND SPATIAL ABILITY TO CHILDREN'S MATH PERFORMANCE

Chloe Oi Ying Leung[1], Prof. Christine Espin[1], Dr. Marian Hickendorff[1], Dr. Dietsje Jolles[1]; *[1]Institute of Education and Child Studies, Leiden University*

There is an abundance of research showing a relation between spatial ability and mathematics. Yet, the underlying mechanisms contributing to this relationship are still not clear. One factor that might play a role is working memory. The current study examined the unique and shared contributions of working memory and spatial ability to children's math performance. A sample of 278 fourth to sixth-graders in the Netherlands were tested on their verbal working memory, visuospatial working memory, spatial abilities (as measured by four spatial tasks) and math abilities (as measured by three math components). The findings show that, after controlling for verbal intelligence, working memory significantly predicted children's math performance in all age groups, while spatial ability significantly predicted children's math performance in fifth and sixth grade only. Moreover, we found that working memory uniquely contributed to math performance in fifth grade, but spatial ability did not. Interestingly, the opposite was true in sixth grade. Taken together, besides the shared contribution of working memory and spatial ability to math, both factors also have unique explanatory power, which changes across the upper elementary school grades.

THE IMPACT OF THE VIRTUAL CONTEXT ON THE THEORY OF MIND ABILITY OF PRE-SCHOOLERS

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The conquest of virtual space draws attention to how we understand our peers in this context. The capacity for theory of mind undergoes a significant development till 4-5 years of age, yet, we do not know how children process the mental states of others when they are present in an online space and when they leave the interaction happening on the virtual channel. In the present study, we investigated how 4-year-old children think about the knowledge of others when that person is or is not present virtually during the location change of an object. After introducing a partner to the child online or in person, the experimenter hid a toy in one box, and while the partner remained in the virtual or live space (true belief test) or left it (false belief test), moved it to the other box. Children were then asked what their partner might know about the current location of the object. We hypothesized that children acknowledge the limited access to information in the Virtual condition, and that this affects their cognitive inferences. Indeed, our results revealed no difference between the two conditions, supporting the idea that already pre-schoolers navigate reliably well in interactions happening in virtual space.

WITH YOU OR AGAINST YOU: SOCIAL COORDINATION STRATEGIES IN YOUNG ADOLESCENTS

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During adolescence, social skills continue to develop markedly. However, little is known about when and how they differentiate between cooperative and competitive scenarios. 189 young adolescents (age 11-13) completed 3 economic games, with the objective of maximizing "gold coins". Games involved a series of choices between two options: a low paying but sure option (e.g., 7 coins), and a potentially higher paying but uncertain one (15 coins or 0). In a cooperative game, coins were maximized if two anonymous counterparts both chose the uncertain option. In the competitive game, if both selected the uncertain option, both earned 0. In a control lottery condition, the outcome of the uncertain option depended on a random draw from a real-life urn. Individual difference measures involved perspective-taking and theory of mind, matrix reasoning and sociometric peer nominations. Adolescents displayed: a) affinity towards uncertainty and heightened payoff in cooperation, relative to competition and a random lottery and b) increased decision times and variance in competition than in the other environments. Individual differences analyses are ongoing. Adolescents strategically adapt their decisions to competitive vs. cooperative scenarios.

Theme

COGNITIVE CONTROL

PERFORMANCE-CONTINGENT REWARD INCREASES THE USE OF CONGRUENT DISTRACTING INFORMATION

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In the Simon task, participants respond to a relevant target dimension while ignoring distracting spatial information. Target and distracting information are congruent or incongruent, causing a

congruency effect. This effect is larger in mostly congruent blocks or following congruent trials (proportion congruency and congruency sequence effect, respectively), presumably because incongruent trials trigger increased focus on the target and inhibition of the distracting information. In two experiments, we tested how reward modulates these phenomena. Performance-contingent (but not non-contingent) reward increased the usage of the distracting information in mostly congruent blocks or following congruent trials, while the adaptation to incongruency was the same in all conditions. Diffusion model analyses found that the reward effect was captured by the drift rate parameter. These results suggest an increased focus on the target information by incongruent trials independent from reward, but the adaptation to (mostly) congruent trials is motivationally boosted: performance-contingent reward increased the use of congruent distracting information beyond a mere relaxation of the increased target-focus following (mostly) congruent trials.

EFFECTS OF DUAL-TASK PRACTICE ON TASK-ORDER COORDINATION AND ITS ADAPTATION

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Performing two tasks simultaneously involves the coordination of their processing. This coordination is particularly required in dual-task situations with varying orders of the presentation of the task stimuli. When task order switches between subsequent trials, task-order coordination leads to order switch costs in comparison to task order repetitions. Recent studies have shown the adaptive characteristics of order coordination processes in response to changes in task demands; the switch costs have been reduced after experiencing order switches in a previous trial in comparison to previous order repetitions. However, it is an open question whether task-order coordination processes and processes that adapt this coordination underly the same or different mechanisms. On way to investigate this issue is to test whether both sets of processes benefit from simultaneous practice under dual-task conditions to the same degree or not. Preliminary findings demonstrate improved task-order coordination after practice while the adaptive processes are largely immune to practice, pointing to different mechanisms underlying these sets of processes. These findings are discussed in the context of dual-task and cognitive control theories.

THETA BAND ACTIVITY AS A MEASURE OF COGNITIVE CONTROL IN THE LIST-WIDE PROPORTION CONGRUENCY EFFECT

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The list-wide proportion congruency (LWPC) effect describes the phenomenon that the size of the congruency effect depends on the frequency of incongruent trials within a given list. In a list of mostly congruent (MC) items, the congruency effect is larger (in terms of RT and error rates) than in a list with mostly incongruent (MI) items. The contribution of cognitive control and item-specific learning to this effect is still debated. In the present study, we therefore compared the contribution of cognitive control, measured by theta activity (3-8 Hz) in the EEG frequency band, between MC and MI blocks of confound minimized Stroop trials. Proactive control was measured by sustained prefrontal theta activity. At the trial level, we expected to find increased theta activity in incongruent trials in MC blocks, indicating the flexible upregulation of control. Preliminary analyses revealed the typical LWPC effect in error and RT data. Whereas no evidence was found for increased proactive control in MI blocks, results show that theta activity was specifically increased on the rare incongruent trials in MC blocks, indicating reactive control. Possible implications are discussed.

WHAT TRIGGERS TASK CONFLICT? EVIDENCE FROM THE STROOP TASK

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When performing the color-word Stroop task, two main types of conflicts are activated: information conflict, which is the conflict between the incongruent word and font color (measured by the difference in reaction time for incongruent and neutral word conditions); and task conflict, which is the conflict between the contextually relevant color-naming task and the irrelevant, but automatic, word reading task (measured by the difference in reaction time for word and non-word conditions). In the present work, we focused on the conditions in which task conflict is triggered. Specifically, we tested whether and to what extent non-word conditions trigger task conflict (Experiment 1), and in which context task conflict is most strongly triggered (Experiment 2). Additionally, we examined how the saliency of the irrelevant task of reading increases task conflict (Experiments 3 and 4), and the role of response type (manual vs vocal response) in triggering it (Experiment 5). Our results provide evidence for the behavioral manifestation of task conflict and demonstrate the technical and theoretical properties of this mechanism, which is typically neglected in the Stroop task.

THE SPLIT-HALF RELIABILITY IN THE AX-CPT IS AS QUESTIONABLE AS IN OTHER TASKS USED TO ASSESS ATTENTIONAL CONTROL

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Attentional control refers to the ability to maintain a goal and goal-relevant information despite distraction. One task used to assess this ability is the AX-CPT. In this task, a target response is required when the letter A is followed by the letter X. In all other trials, a non-target response is required. Different indices are used: d' context, d' reactive, proactive behavioral index (PBI), BX probe interference, and A-cue bias. While issues in the reliability of the attentional-control measures have been recently emphasized, only a few studies have reported the reliability of the AX-CPT indices. Moreover, the focus was on some indices from the AX-CPT variant with letters as material. Here, we investigated the split-half reliabilities of all indices in five AX-CPT variants with different material types (letter, dot, matrix, picture, word). In a large sample of young adults (N = 279), we estimated the Spearman-Brown adjusted split-half reliability using a permutation-based approach. Preliminary results showed reliability estimates ranging from .53 to .70 for d' context, d' reactive, and PBI (based on reaction times). For all other indices, the estimates were lower. Together, this questions the reliability of the AX-CPT indices.

EFFECTS OF A DYNAMICALLY CHANGING RESPONSE SET OVERLAP ON N – 2 REPETITION COSTS

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N – 2 repetition costs are a marker for inhibition processes during task switching that are supposed to reduce interference from currently irrelevant information. The present study aimed at elucidating effects of response set overlap on n – 2 repetition costs while keeping stimulus set overlap constant. For this purpose, each task was associated with two different response sets. The relevant response set was visually cued in every trial. N – 2 repetition costs were present when the response set overlapped from trial n – 2 to trial n – 1. In contrast, they were abolished when the response set switched. This result is interpreted in terms of stronger interference for overlapping response sets that need to be inhibited to a high degree, resulting in large n – 2 repetition costs. Furthermore, the present results support the notion that two means for interference reduction, task inhibition and task shielding, are deployed in a flexible way depending on environmental demands.

TESTING THE SPECIFICITY OF CONTROL ADAPTATIONS: EVIDENCE FOR A CONFLICT-SPECIFIC CONTROL PREPARATION

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People can rely on expectations to strategically adjust cognitive control in preparation to conflict. However, it is still unclear whether this "control preparation" consists of a proactive strategy that selectively activates goal representation to manage conflict specifically, or, alternatively, it consists of a general increase in the allocation of attentional resources, geared toward the resolution of any potential challenging situation. To investigate this, we used congruency cues (i.e., cues that predict the conflict level of the following stimulus) across two experiments, manipulating the presence or absence of conflict (flanker and Simon tasks) and the difficulty of the task (more or less degraded letter in a letter discrimination task). In Experiment 1, we showed that people can use cues to prepare exerting control and that this control preparation is generalizable across different conflict tasks. In Experiment 2 we found that, surprisingly, control preparation is useless when followed by a variation in task difficulty and, instead, leads to slower responses. These results seem to support the idea that people can specifically prepare for conflict and that this preparation slows down the processing of non-conflict events.

A SET OF SHARED NEURAL DYNAMICS SUPPORT ATTENTIONAL SWITCHES AND MEMORY UPDATING AS TWO KEY ASPECTS OF FLEXIBLE BEHAVIOUR

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Flexible changes in behaviour can involve changes in the processing of external information (e.g., shifting attention) or internal information (e.g., updating memory). However, it is unknown if different types of flexible change rely on the same or different cognitive mechanisms. In our EEG study, forty participants performed a task switching exercise where we independently manipulated the need to switch attention between two types of stimuli, as well as the need to switch between two sets of task rules stored in memory. Both attentional and rule switches increased error rates and reaction times. Both types of switches were associated with parietal decreases in oscillatory alpha power. Attentional switches and rule switches led to a subadditive interaction effect on both participants' performance and their alpha power reactivity. Thus, implementing both changes at the same time was more efficient than implementing individual changes separately. Independent of the type of change, higher frontal theta

power and lower posterior alpha power predicted faster responses. Our study suggests that flexibility relies on a domain-general pattern of neural dynamics which enable efficient adjustments independent of the type of change needed.

EFFECTS OF INTERRUPTION FREQUENCY ON THE PERFORMANCE IN A VISUAL SEARCH TASK

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In the present study, we investigated an effect of interruption frequency in a simulated medical visual search task. Three groups of participants (50 subjects each) performed the visual search task (primary task) during which they were interrupted by a number-classification task. Each group was interrupted at a different interruption frequency, i.e., in 25%, 50% and 75% of all trials (between-subject factor). Target presence (present vs. absent) and interruption presence (uninterrupted vs. interrupted) were varied within subjects. Participants were instructed to resume the interrupted trial of the primary task after an interruption as quickly and accuratelly as possible. As expected, interruptions led to slower response times in the interrupted trials of the primary task compared to the uninterrupted trials. This effect was independent of interruption frequency. However, the performance in the uninterrupted trials (Trails 2-4) that followed the interrupted one was significantly and consistently faster in the high frequency compared to the low frequency condition. The results suggest that increased interruption frequency might have a positive effect on the performance in the primary task in terms of an overall speed of execution.

THE STRUCTURE OF BINDINGS FOR ACTION SLIPS

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Even if actions go awry, they can prepare adaptive short-cuts for upcoming actions: Acted-upon stimuli are bound to actual but not executed correct responses, whereas executed erroneous responses enter bindings with effects that they produce. The repetition of stimuli or effects then triggers the retrieval of previously bound responses, thus facilitating their execution. As such, binding and retrieval steer agents toward successful actions and leverage potential action-effect contingencies. Bindings of erroneous action episodes might be organized independently, i.e., for the stimulus and the correct response for one and for the erroneous response and its effect for another. Alternatively, all features might be integrated in one event file. We examined performance depending on transitions in relevant stimuli, responses and effects between successive actions to elucidate the structure of bindings for action slips. Surprisingly, the results point to an integration of features of the stimulus, the correct response and the effect in correct and erroneous actions. The current study therefore revises our knowledge about the structure of bindings but also suggests boundary conditions for bindings of erroneous responses and their effects.

THE IMPACT OF PREFRONTAL HIGH-DEFINITION TRANSCRANIAL DIRECT CURRENT STIMULATION (HD-TDCS) ON CONFLICT RESOLUTION AND ITS PHENOMENOLOGICAL DYNAMICS

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The effects of applying non-invasive brain stimulation techniques on conflict resolution performance is still an open question. Here we will address this issue by assessing the cognitive and physiological effects of applying anodal and cathodal HD-tDCS over DLPFC on conflict resolution by using a 30' flanker task. Moreover, the effects of the stimulation on phenomenological dynamics over the course of the task will be addressed. In a pre-registered, randomized, sham-controlled, parallel study, we will assign participants to one of the 3 groups of stimulation: anodal, cathodal, sham. A pre-post resting state EEG and the task-related oscillatory activity during the first and last 6' temporal blocks of the task will be measured. Stimulation will be applied online from the second to the fourth block of trials (18'). Right after, participants will be asked to report their temporal experience tracing. Behavioral data will be analyzed by applying a drift diffusion modelling. This novel approach will allow us to get a more thorough understanding of cognitive processes and electrophysiological mechanisms underlying the effects of stimulation on conflict resolution. As far as we know, this will be the most comprehensive work on this topic

STOPPING IN ANTICIPATION: THE TWO-SIDED EFFECT OF ANTICIPATION ON RESPONSE INHIBITION

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People are able to stop actions before they are executed, and proactively slow down the speed of responding in line with their expectations of needing to stop. Such slowing generally increases the probability that stopping will be successful. Surprisingly though, no study has clearly demonstrated that the speed of stopping (measured as the stop-signal reaction time, SSRT) simultaneously profits from such proactive adjustments. Here, we tested in two well-powered and well-controlled experiments whether the SSRT is affected when stopping is anticipated. In each experiment, we used a Stop-Signal Task in which the stop-trial frequency was either high (50%) or low (20%). Our results robustly show that the SSRT was shorter when stop signals were more anticipated (i.e., in the high-frequent condition), thereby showing a clear proactive benefit on (the speed of) stopping when it can be anticipated. Ultimately, this finding reinforces the idea that people balance the demands of going and stopping and that this balance is adjusted proactively by both modulating the speed of going (i.e., by slowing it down) and the speed of stopping (by speeding it up).

ABSTRACT, INTERNALISED CONTEXT MODULATES STIMULUS-RESPONSE BINDING

Anna Render[1], Malte Möller[1], Susanne Mayr[1]; **[1]University of Passau**

Previous research has shown that the additional repetition of an irrelevant context sound modulates the after-effects of repeating so-called stimulus-response bindings. In an auditory negative priming paradigm, responding to a stimulus that was a distractor in the previous presentation results in a higher likelihood of falsely repeating the previously executed response, known as the prr effect. Importantly, this so-called prr effect is larger when a context (e.g., a sine tone) repeats. However, it is uncertain whether this modulation of the prr effect is only occurs with context stimuli such as sine tones or can be applied to more abstract, internalized contexts. To test this hypothesis, we used task set as an internalized context in the negative priming paradigm in three experiments. Task set was either repeated or switched between prime and probe presentations. In all three experiments, results revealed larger prr effects when the task was repeated, as opposed to when the task changed. This suggests that task sets can serve as a context similarly to sine tones, but the findings also indicated that the physical task cue presentation accounted to some degree for the effect.

INDEPENDENT REPRESENTATIONAL CONTENTS IN INHIBITORY CONTROL SUBPROCESSES

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Inhibitory control (IC) mechanisms are well-established in cognitive science, but modulation during response inhibition is not well understood. To investigate brain dynamics of response inhibition, we conducted two studies. First study examined functional neurophysiological bases of perception-action integration in IC, which discovered that specific brain areas are involved in processing various aspects relevant to perception-action integration using EEG signal decomposition and source localization techniques. The complexity of perception-action integration modulates some regions. Similar method was used in the second study to examine brain dynamics of IC processes. The study found that they are modulated by response execution mode and that stimulus-related information and rules of how to relate this information to the appropriate motor program are simultaneously encoded in neurophysiological signal. It also discovered a hierarchy in importance of brain areas involved during IC when focus is on perception-action integration. IC mechanisms involve encoding both stimulus-related information and motor execution rules simultaneously. Response execution mode modifies IC mechanisms and provides insight into the underlying brain systems.

EFFECTS OF DISTRACTOR MODALITY ON THE TIME COURSE OF SPATIAL CONFLICT RESOLUTION: INSIGHTS FROM MOUSE MOVEMENT TRAJECTORIES IN AN ACCESSORY SIMON TASK

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Lateralized responses to central targets are slowed-down when a distractor is presented contralaterally as compared with ipsilaterally to the response side. This so-called *Accessory Simon Effect* (ASE) decreases and even reverses with increasing distractor-to-target intervals, indicating that irrelevant spatial codes are suppressed. Moreover, inhibition is presumably stronger when distractors are presented in the target modality. In the present study, participants responded to the shape of a central stimulus by moving the mouse cursor from a central location to the upper left or right corner of the screen. A lateralized visual (Exp. 1) or auditory (Exp. 2) distractor occurred prior to or simultaneously with the visual target. The ASE decreased with increasing distractor-to-target intervals, but only reversed in Experiment 1. Likewise, mouse movements generally

veered towards the distractor location with short intervals but veered away from the distractor location with longer intervals. Again, this was only observed in Experiment 1. The results indicate that spatial distractors (1) affect parameters of target-directed movements and (2) are more strongly inhibited when presented in the target modality.

THE RETRIEVAL OF STIMULUS-RESPONSE (S-R) EPISODES IS INFLUENCED BY CONTEXTUAL DISCRIMINABILITY

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External context functions as a segmentation cue that indicates the start and end of events. Similarly, external context has been shown to influence the integration of S-R episodes. This study is concerned with the structuring role of context beyond the level of single S-R episodes. We tested whether context can structure sequences of S-R episodes in memory, influencing the likelihood of successful retrieval. In an auditory negative priming task pre-prime, prime, and probe presentations appeared successively. Participants identified target sounds while ignoring distractors. A context tone either repeated (low discriminability) or changed (high discriminability) between pre-prime and prime presentations. No context appeared in the probe. If context structures sequences of S-R episodes, successful retrieval of a prime episode should be impaired when multiple episodes in memory share the same context (i.e., in the low-discriminability condition). Erroneous probe responses with the former prime response were analyzed as indicator of S-R binding and retrieval. S-R binding and retrieval was weaker in the low- than in the high-discriminability condition, suggesting that external context can indeed segment S-R episode sequences in memory.

TEMPORAL COURSE OF TASK INHIBITION DURING TASK SWITCHING

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Flexible switching between cognitive tasks is thought to be supported by inhibition of recently abandoned task. This persisting inhibition resulted in slower performance when switching back to a recently performed task compared to a less recent task (ABA vs CBA task sequence; n-2 task repetition cost). In these experiments we investigated the time course of task inhibition by manipulating the temporal distance (lag) from the last execution of the task. In a cued task switching paradigm, this interval was either filled with the execution of other tasks (Exp1), or it was left empty, with no intervening tasks (Exp 2). Beside the task distance, the task difficulty was also manipulated (Exp 3) to assess potential change of inhibition related to the relative strength of the competing tasks. Finally, the same task distance manipulation was used in a voluntary rule shifting paradigm (Exp 4) to assess the hypothesis that inhibition also affects rule selection and not only the speed of task execution. Results suggest that task inhibition decays very slowly, that the time course of this decay also depends on the relative task difficulty and that task inhibition generalizes to mechanisms of voluntary rule selection.

EXECUTIVE FUNCTIONS INVOLVED IN THOUGHT SUPPRESSION: AN ATTEMPT TO INTEGRATE RESEARCH IN TWO PARADIGMS

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There are two main strands of thought suppression research: one concentrated around the white bear (WB) paradigm and the other related to the think/no-think (TNT) paradigm. While in WB research thought suppression is counterproductive, in TNT studies it is effective. We tested the hypothesis that these two tasks involve distinct executive functions: TNT procedure engages prepotent response inhibition and WB procedure – resistance to proactive interference. Concurrently, we replicated Friedman and Miyake's (2004) inhibitory function model. Participants went through WB and TNT procedures. Next, they performed a group of prepotent response inhibition and resistance to proactive interference tasks. Effects of thought suppression in WB and TNT procedures were unrelated. Intrusion frequency during suppression in both tasks correlated. Executive functions did not explain thought suppression results. Friedman and Miyake's (2004) model was replicated but with a strong correlation between inhibitory functions. TNT and WB procedures measure different effects of thought control, however their thought suppression phases are related. The role of executive functions in thought suppression is discussed.

INCONGRUENCE EFFECTS DEPEND ON SOA BETWEEN IRRELEVANT FLANKER PRIME AND TARGET AS INDEXED BY N2 AND LRPS

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Interference between relevant and irrelevant stimuli depends on the extend to which irrelevant stimuli are processed. Hence, large interference costs are expected when irrelevant incongruent stimuli (partially) initiate an incorrect motor response. Here, we focus on the temporal dynamics of incompatible response activation and (un)successful response inhibition. EEG was recorded while 55 young adults completed a task in which irrelevant flanker stimuli

were presented before (SOA of 100 ms, 67 ms or 34 ms) or along with the target stimulus (SOA 0 ms). As predicted, behavioral interference costs (RTs / error rates) varied as a function of SOA and reached a plateau at 67 ms. N2 latency in correct trials was only modulated by congruency, whereas N2 amplitudes were higher for error compared to correct trials except for the longest SOA. By contrast, LRP latency was higher for incongruent trials and increased as a function of SOA. More negative LRP amplitudes were observed for incongruent flankers preceding the target. Together, these results illustrate the temporal dynamics of (partially) activated incompatible responses even in correct trials, particularly when irrelevant stimuli precede target information by less than 100 ms.

CHANGES IN BRAIN SIGNAL VARIABILITY PREDICT TASK SWITCHING SPECIFIC BEHAVIORAL PERFORMANCE BENEFITS

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Behavioral variability is necessary for successful day-to-day functioning. This is most prominently the case, when changes in the environment signal the need for behavioral adjustments. A growing body of research indicates that neural variability is key for understanding brain-behavior relationships across individuals. Here, we present the results of a multi-level approach for estimating different brain signal variability measures (e.g., 1/f spectral components, entropy), showing their theoretical and empirical commonalities. Results revealed that stimuli that indicate the need for behavioral adjustments induce changes in brain signal variability across different areas of the scalp. Furthermore, the magnitude of these changes significantly accounted for individual differences in behavioural performance, highlighting the functional significance of variability in neural processing. However, the induced change pattern was different for different signal variability measures. We discuss their potential functional overlap and separability.

Theme
COGNITIVE MODELING

COMPARING SEQUENTIAL EFFECTS ACROSS PARADIGMS USING A MODELLING APPROACH

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The observation that responses are faster and more accurate in repetition trials compared to alternation trials, also known as sequential effects, occurs across many different paradigms. However, the mechanisms responsible for these effects are mostly investigated only within specific paradigms based on changes in mean reaction times. Therefore, in the present study we aimed to compare sequential effects across a pop-out search task, a colour-categorization task, a flanker-like interference task, and a dual-task paradigm to examine whether sequential effects in different paradigms also show the same patterns at the level of full reaction time distributions. We collected data from 56 participants per paradigm and analysed the obtained reaction time distributions using a multi-method approach, considering the Ex-Gauss distribution, the EZ-diffusion model, the four-parameter diffusion model, and the seven-parameter diffusion model. Overall, the results show that there are commonalities and differences among distribution-level sequential effects not only between paradigms but also within them, based on condition difficulty.

NO SINGLE MEASUREMENT MODEL OF VISUAL WORKING MEMORY CAN EXPLAIN TRAINING-INDUCED CHANGE

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Computational visual working memory (VWM) models are typically fitted to single-occasion data to investigate the theoretical structure and functions of VWM. However, individuals' VWM performance can change substantially after several training sessions. The current study investigated which of four popular VWM models can best account for these changes observed throughout training. We fitted the Standard Mixture Model (SMM; Zhang & Luck, 2008), Swap Model (SM; Bays et al., 2009), Target Confusability Competition Model (TCC; Schurgin et al., 2020) and Signal Discrimination Model (SDM; Oberauer et al., 2021) to the data of 46 participants who completed an orientation reproduction task for six sessions (pretest, four training sessions, and posttest). Preliminary results showed that, across all six sessions, the SMM and TCC fitted best to the data of 31% and 34% of participants, respectively. However, the best fitting model changed over the course of training for 93% of participants, indicating functional training induced changes that are not captured by current measurement models of VWM. Taken together, the findings suggest that none of the current measurement models can fully account for dynamic, training-induced changes.

A NEW MULTINOMIAL MODEL OF EVENT-BASED PROSPECTIVE MEMORY: DISENTANGLING THE PROSPECTIVE AND BOTH RETROSPECTIVE COMPONENTS

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Event-based prospective memory involves remembering to perform intended actions when specific events occur in the future. It consists of a prospective component (remembering *that* something must be done) and two retrospective components (remembering the target events, and remembering the actions to be performed). The established multinomial model of event-based prospective memory (Smith & Bayen, 2004) disentangles the prospective component and the retrospective component of remembering target events. However, this model does not measure retrospective memory for the actions to be performed. Therefore, we extended the original model by introducing a new set of parameters and response categories so that all three components can be measured simultaneously and independently. To determine the identifiability of the model, we examined the rank of the Jacobian matrix and performed simulations with 100,000 repetitions for a set of plausible parameter restrictions. Based on the rank of the Jacobian matrix at least three parameter restrictions are necessary for identifiability. Simulations showed that identifiability is given with all plausible combinations of parameter restrictions.

USING NETWORK SCIENCE TO PREDICT HUMAN ESTIMATES OF EVENT-BASED CENTRALITY AND STANDARDNESS

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In event cognition, measures of centrality and standardness have been used to investigate the importance of activities within events, such as “peel apples” for the event “baking an apple pie.” We used network science to construct temporally-structured graphs of events, based on people's production and ordering of event activities. We computed six network measures of activity centrality from the graphs. We tested whether these measures of centrality map onto human assessments of centrality and standardness. In Study 1, participants ranked activities with respect to centrality and standardness, and in Study 2, participants rated them. We correlated human rankings and ratings with the six network centrality measures, and conducted stepwise regressions. CheiRank, a measure of the influence of an activity within an event, was highly correlated with, and the strongest predictor of, human rankings and ratings of centrality and standardness. Results were most prominent for the rankings. Thus, network science measures of centrality capture human estimates of centrality and standardness. In particular, psychological centrality is related to the degree to which an activity temporally leads directly to other influential activities.

Theme

CONSCIOUSNESS

THE ROLE OF MUSIC IN MALADAPTIVE DAYDREAMING

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Maladaptive daydreaming (MD) is defined as an extensive and compulsive daydreaming activity. Individuals with MD can be completely absorbed in highly structured fantasies interfering with academic, interpersonal and vocational functioning. Although an increasing scientific interest in MD, its underlying mechanisms remain almost unexplored. Music is anecdotally described as the most common stimulus accompanying MD episodes. Nevertheless, its role in triggering and maintaining MD is not well understood. We conducted an online survey in order to investigate the specific role of music in MD. Preliminary results on 72 MD individuals show that music is more efficient than other media (e.g., movies or books) in triggering and maintaining MD states. Music seems to facilitate imagination and emotional processes, especially when it is associated to increased pleasure and arousal levels. Furthermore, the severity of MD positively correlates to individual sensitivity in musical absorption. Overall, this suggests that music constitutes a strong evocative and emotional stimulus crucial for the induction and modulation of immersive daydreaming episodes.

EXPLORING CAPACITY LIMITS IN UNCONSCIOUS VISUAL WORKING MEMORY

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Multiple investigations of unconscious visual working memory (VWM) have indicated that masked stimuli can be stored for seconds and then purposefully utilized, much like conscious items (Soto et al., 2011; Bergström & Eriksson, 2015; Trübutschek et al., 2019b). Nonetheless, the idea that unconscious items compete in a unitary VWM store remains controversial. To elucidate capacity limits for unconscious VWM, we conducted an experiment in which some memory items (1 or 4 white rectangular bars of differing orientations) were visible while others (0, 1, 2, 3, or 4 grey bars) were simultaneously suppressed from conscious sight using continuous flash suppression (CFS). After an 800 ms delay, a test probe was presented where either a visible or masked item had been. Participants reported whether the probe changed orientation and awareness of any masked items presented during the trial

(Perceptual Awareness Scale; Soto et al., 2011). Results indicated change detection for visible items was impaired as more masked items were presented, suggesting that masked items displaced or reduced precision of visible items in VWM. Change detection for masked items was at chance, indicating they were not stored or available for conscious retrieval.

Theme

DECISION MAKING

INVESTIGATING THE DECISION-MAKING PROCESSES FOR NON-FUNGIBLE TOKENS BASED ON THE CONSTRUAL LEVEL THEORY

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We examined how the decision-making processes for purchasing non-fungible tokens (NFTs) differed from those for purchasing physical products. According to the construal level theory, people focus on the desirability aspect (how much is the long-term benefit) of a product when the psychological distance is long, and the feasibility aspect (how easy to purchase the product) when the psychological distance is short. Given NFTs are virtual products that presumably trigger greater psychological distances, consumers should prioritize more on the desirability domain than the feasibility domain when they make a purchase decision regarding NFTs as opposed to physical products. The data in Experiment 1 supported this hypothesis. In Experiment 2, the eye movement data from the anti-saccade task suggested that participants exhibited higher levels of self-control when they made decision about NFTs than physical products, which was also supported by the construal level theory. The present study demonstrated how people use different decision-making modes for purchasing products from the physical versus the virtual worlds, and the findings should provide insights into how to develop effective strategies for promoting virtual products.

DECOMPOSING DECISION AND MOTOR PROCESSES DRIVING RESPONSE BIAS: A MODEL-BASED ELECTROMYOGRAPHIC STUDY

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The ability to use prior knowledge to inform decision-making is an essential component of adaptive behavior, particularly in conditions of perceptual uncertainty. Failures to integrate prior information to inform perceptual decisions, such as those recently observed in Parkinson's disease, appear to underlie various cognitive and motor problems. Yet, the precise impact of prior knowledge on motor processes remains controversial. To shed light on this issue, we recorded the electromyographic (EMG) activity of response-relevant muscles while subjects performed a random dot motion task with manipulations of response bias and perceptual discriminability. EMG results showed two striking and counter-intuitive phenomena. First, motor execution was slightly slower for the expected compared to the unexpected response. Second, response bias strongly modulated the number of subliminal muscular activations during deliberation. We further show that these results are consistent with predictions from a recent computational theory connecting decision and motor processes.

CREATIVE THINKING DOES NOT PROMOTE DISHONESTY

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We assessed the relation of creativity and unethical behavior by manipulating the thinking style of participants (N = 450 adults) and measuring the impact of this manipulation on dishonest behavior. Participants performed one of three inducer tasks: the alternative uses task to promote divergent thinking, the remote associates task to promote convergent thinking, or a simple classification task for rule-based thinking. Before and after this manipulation, participants conducted the mind game as a straightforward measure of dishonesty. Dishonest behavior increased from before to after the intervention, but this increase occurred independently of the induced mindset. Exploratory analyses, moreover, did not support any relation of trait creativity and dishonesty. We conclude that the influence of creative thinking on unethical behavior seems to be more ambiguous than assumed in earlier research or might be restricted to specific samples or contexts.

COGNITIVE, EMOTIONAL AND MOTIVATIONAL DETERMINANTS OF DECISION TO VOLUNTEER AGAIN. A STUDY OF VOLUNTEERS WORKING FOR RUSSO-UKRAINIAN WAR REFUGEES

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The aim of the study was to find out whether the cognitive response to participation in a volunteer activity for Russo-Ukrainian war refugees, stress, depression, anxiety, and the nature of the

motivation determine the decision to participate again in volunteering. The sample consisted of 720 Polish and Ukrainian volunteers. The cognitive aspects of their reaction were measured. Intrusion, avoidance, and hyperarousal were examined using the IES-R scale. Additionally, respondents were asked open-ended questions about the cognitive difficulties they experienced. Depression, anxiety, and stress were measured using DASS-21, and motivation by VFI. The results of multivariate linear regression indicate the importance of intrusion, expressed in recurring images, dreams, thoughts, and perceptual impressions related to the experience of helping refugees. Avoidance, manifested by efforts to get rid of images and forget, is also connected with the decision to participate in helping refugees in the future. Significantly related to the decision are motivational factors and depression. The Polish volunteers significantly differ in terms of their willingness to participate in volunteering for war refugees in the future from the Ukrainian ones.

CHANGE OF MIND IN THE MORAL EVALUATION OF REAL-WORLD IMAGES

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Change of mind occurs in the process of decision-making under the influence of various variables, such as response framing or perceptual factors. To investigate how perceptual factors affect the changeability of moral evaluation when judging real-world images, we have proposed an experimental "mind-change" paradigm. We asked participants to rate a set of real-world images of various moral levels (based on the Social Moral Image Database) on a continuous scale from "very immoral" to "very moral." Participants were required to rate the same images in two separate blocks. In our earlier study, we presented the images either partially occluded or without occlusion. Changes of mind in the moral evaluation were more likely to occur with additional perceptual information. Here, we extend the paradigm by adding population cues in the second block (data on the evaluation, presented together with the real-world images). We found that population cues have a stronger effect on partially occluded images than on fully presented images. As in our earlier study, subjects responded faster in the second evaluation. The results consolidate the findings of our previous study and further show the viability of this "change of mind" paradigm.

MONEY TALKS: THE ROLE OF FINANCIAL INCENTIVES IN FAIRNESS-BASED BEHAVIOR

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In this registered report, we investigated the impact of financial incentives on fairness-based decisions using a behavioral economics paradigm and hierarchical drift-diffusion modeling (DDM). Four groups of participants divided points between themselves and either a fairness norm violator or the disadvantaged person, inciting fairness-based punishment and fairness-based compensation behavior, respectively. Each group received financial incentives that were either aligned or in conflict with the respective fairness behavior. The results show that financial incentives reduce the frequency of fairness-congruent decisions for fairness-based punishment as well as compensation. Specifying the underlying mechanism, DDM results indicated that conflicting incentives render the fairness-congruent decision process less efficient (captured by a decrease in v-parameter). Hence, incentives can undermine fairness-based punishment and compensation, an insight informing incentive-based policies to foster cooperation.

TRUST, TRUSTWORTHINESS, AND APPROPRIATE RELIANCE IN THE CONTEXT OF AI. WHAT ARE WE ACTUALLY TALKING ABOUT?

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With increasing presence and relevance of AI, the scientific and public interest in transparent, fair, and interpretable AI - *trustworthy AI* - has grown. Overall, trustworthy AI aims to ensure that users, stakeholders or those affected can confidently rely on an AI and its results. Yet, as even contemporary best-performing AI remains fallible, it is also necessary to enable humans to critically review, to *distrust*, an AI when warranted. A prominent way towards trustworthy AI is the development of *explainable AI* (XAI), which explains its decisions comprehensibly. XAI research often assumes that explanations facilitate appropriate trust. Insights from psychological research on trust are often incorporated in such approaches. Yet, some cases only draw superficially from them or rely on an everyday understanding of trust. Furthermore, important insights on distrust are often overlooked. Thereby, terminology, concepts and empirical evaluation of trust in AI vary and carry undesirable ambiguity. This talk aims to conceptually clarify trust, trustworthiness, reliance and distrust for the AI context by summarizing current work on XAI and its relation to trust in automation and combining it with psychological research on trust and distrust.

COGNITIVE CORRELATES OF ACTION VIDEO GAMING: A CROSS-SECTIONAL STUDY OF COUNTER-STRIKE PLAYERS

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Past research has suggested that action video gaming is associated with enhanced executive control, but these relationships may be driven by differences in general processing speed. In this online cross-sectional study, we examined how expertise in the first-person shooter Counter-Strike (CS) is related to processing speed, task mixing, and task switching. Using a k-means cluster analysis of questionnaire responses, 235 players were classified as belonging to 1 of 4 CS expertise groups: Casual (n = 78), Experienced (n = 101), Aspiring (n = 22), and Semi/Professional (n = 34). Processing speed, task mixing, and task switching performance were measured with a colour-shape switching task. There was a main effect of Expertise, with faster responses in the Semi/Professional group relative to the other groups for single-task and repetition trials, but not for switch trials. No differences were observed for mixing or switching costs. Fitting drift-diffusion models to the data showed higher drift rates and shorter non-decision times in players with higher CS expertise. These results suggest that action video game players are more efficient in evidence accumulation and non-decisional processes, rather than in executive control itself.

IF I WERE YOU: MINORITIES ARE BETTER THAN MAJORITIES AT IMAGINING THE OTHERS' PERSPECTIVE

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Intergroup relations are susceptible to cognitive biases that may have profound effects on society. With increasing global migration flows in the 21st century, studying these biases is crucial. Human societies tend to organize into hierarchies, creating asymmetrical relations between groups. Focusing on Israeli-Arab relations in Israel, we explored whether Jews (majority) and Arabs (minority) share the same ability of imagining the other's perspective. In two experiments, Arab and Jewish students imagined themselves in 120 situations that framed Jewish and Arabic identities in Israel. We measured emotional intensity, relevancy, imaginability and the feasibility of such situations using self-report. Arab students rated Jewish themes as more feasible and relevant to their lives compared to Jewish students' ratings of Arabic themes. Notably, we found stronger correlation between relevancy levels for Jews and Arabs when analyzing ratings for Jewish themes compared to Arab-related themes, in both groups. These findings indicate that minorities compared to majorities may have higher readiness to generate possible states of affairs related to the outgroup and propose that imaginative abilities may be at the heart of intergroup conflict.

THE BAKER'S ADVICE MATTERS! MULTIPLE ANCHORING IN JUDICIAL DECISION-MAKING.

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The anchoring effect corresponds to the assimilation of a numeric estimate toward a previously considered value: the anchor (Tversky & Kahneman, 1974). Although the available anchors may be multiple, studies on the influence of multiple anchors reveal conflicting results and none of these studies looked at the influence of several anchors of different relevance. If anchoring results from a rational use of cognitive resources, as assumed by Lieder et al. (2021), it seems likely that participants will anchor on the most relevant anchor, regardless of its position. To test this hypothesis, we conducted two experiments using a text describing a trial in which two anchors (one relevant given by a prosecutor, the other irrelevant by a baker) appeared successively. Our results show an anchoring effect when there is oneanchor, but this effect disappears or diminishes in the presence of a second anchor, regardless of its relevance.

USING A FOREIGN LANGUAGE INCREASES RISK TOLERANCE, BUT NOT DUE TO ATTENUATED EMOTIONAL RESPONSES OR GREATER ACCESSIBILITY OF RISK-INCREASING THOUGHTS

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Using a foreign language can affect decision-making differently from using one's native language. This effect might be due to the context of learning of the languages, as people are in a less emotional and more formal context when they learn a foreign language than their native tongue. This might result in different representations of past experiences and weaker emotional connotations. To study whether the foreign language effect reduces risk aversion and its mechanisms, we conducted three experiments (total N=544). We explored two mechanisms: (1) the effect is due to reduced anticipated regret or (2) due to greater accessibility of risk-increasing thoughts. Participants in native and foreign language conditions were presented with two prenatal test variants with different sensitivities and informed that the less sensitive test has zero risk of miscarriage. Their task was to provide the maximum risk of miscarriage they would accept for the more sensitive test while still selecting it. Although all three studies consistently showed greater risk-taking in the foreign language condition, our findings do

not consistently support the proposed emotional mechanisms of the foreign language effect.

WHEN "LESS IS BETTER" CONFLICTS WITH "MORE IS BETTER": THE IMPACT OF MINDSET SWITCHING ON CROSS-DOMAIN SHOPPING

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Less fat, less salt, less sugar—healthy eating often associates with a 'the less, the better' logic, which is the opposite to "the more, the better" tendency observed in shopping when we try to make the most of expenditure. Switching between these mindsets requires cognitive effort and may lead to suboptimal decision-making in cross-domain shopping (i.e., involving food and non-food items). Two experiments (N=140 & 147) including single-domain (i.e., food only or non-food only scenarios, e.g., choosing among the healthiest sandwich, the most economical sandwich, and the worst sandwich that is neither healthy nor economical, or choosing among the most, the secondary, and the least economical sponge) and cross-domain trials. The results suggest that individuals are less likely to choose the healthiest food in the cross (vs. single) domain shopping scenario, particularly among those who are health conscious. Meanwhile, for those who aim to seek the best deals, they consistently choose the most economical options in both scenarios. This implies that health conscious individuals' health-oriented decision-making can be hindered when they perform cross-domain shopping tasks.

AVOIDANCE AFTER INTERPERSONAL BETRAYAL

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Betrayal is a form of interpersonal threats where one's sense of trust in another person is at risk. Emotion regulation constitutes a critical component of adaptive behaviour in response to threats. Combining vignettes, autobiographical accounts, questionnaires, and behavioural experiments, this series of studies investigated how people respond to betrayal, and how emotion regulation plays a role in people's subsequent selection of behaviour. In Study 1, participants read hypothetical scenarios involving betrayal, before indicating how likely they would avoid and approach the betrayer. Study 2 asked participants to recall a personal experience of interpersonal betrayal before indicating how they later interacted with the person who betrayed them. Study 3 used betrayal-related vignettes modelled after the autobiographical accounts of Study 2. Across all three studies, we found that there is a positive correlation between maladaptive emotion regulation and avoidance. People who use more maladaptive emotion regulation tend to reduce contact to a greater extent with the person who betrayed them. In contrast, using a reaction time task, the automatic avoidance towards social threat appears to be unrelated to the response to betrayal.

UNCERTAINTY AND CHANGE-POINT DETECTION DURING DECISIONS UNDER UNCERTAINTY MODULATE PUPIL-LINKED AROUSAL DIFFERENTLY IN YOUNG AND OLDER ADULTS

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Recruitment of the arousal system, during evidence accumulation in changing environments, is associated with periods of high uncertainty and change-point detection, resulting in enhanced sensory processing. This study investigates if impaired evidence accumulation in older people suggested in previous studies is associated with abnormal recruitment of the arousal system. We tested young and older adults (N = 32/36; mean age = 24/60 years) with an inference task where participants had to make decisions about which of two possible sources was generating noisy sensory evidence. Notably, the source changed unpredictably throughout the task, modulating uncertainty. We measured pupil-linked arousal and its relationship with uncertainty and change-point detection estimated from a normative model. Periods of high uncertainty and detection of change-points were associated with increases in pupil-linked arousal, albeit differently across age groups. Participants with lower levels of task performance and older people showed less sustained effects of uncertainty on the pupil, suggesting that older people respond differently to uncertainty and that this change may be associated with impaired decision-making in changing environments.

TMS STUDY OF THE ROLE OF THE DORSOLATERAL AND DORSOMEDIAL PREFRONTAL CORTICES IN THE SPREADING OF ALTERNATIVES DURING DECISION-MAKING

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Choosing between equally attractive options may lead to the spreading of alternatives (SoA) when people increase preferences for the chosen alternative and decrease for the rejected one to justify the choice. The revealed SoA neural correlates include the dorsomedial prefrontal cortex (dmPFC), associated with choice-induced cognitive conflict identification, and the dorsolateral prefrontal cortex (dlPFC) involved in cognitive control. We hypothesized that interfering with dmPFC and dlPFC activity during the repeated presentation of similar options after the choice might interrupt the SoA which could lead to an improved understanding of the role of the target brain areas. Firstly we tested 2 experimental paradigms and chose the modified free-choice paradigm with reminders about the previous choice as the most optimal one since it showed a significant stable effect. The online repetitive transcranial magnetic stimulation (rTMS) protocol led to suppressing preference change in the dlPFC block, however, the SoA effect was not significantly reduced while inhibiting dmPFC activity. The study highlighted the role of dlPFC in preference change due to a complex choice, while future studies will further explore dmPFC engagement in the SoA.

PEOPLE WITH HIGH FLUID INTELLIGENCE SHOW GREATER RESPONSE BIAS IN FAVOR OF THEIR PRIOR IDEAS DURING THE EVALUATION OF POLARIZED INFORMATION

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In democratic societies, an accurate evaluation of information is required for optimal belief formation. However, previous research on fake news suggests that this process is usually flawed and there has been controversy on whether cognitive abilities help or hinder subjects' performance. Based on recent advances in dual process theories of rationality, this study investigated the effect of fluid intelligence, in opposition to cognitive reflection, in sensitivity and response bias during the evaluation of news headlines veracity and their interaction with prior beliefs in a Signal Detection Theory framework. 418 participants were presented with both true and false real news headlines that were for, against, or neutral about a polarized subject, immigration, and were asked to classify them as true or false. Afterwards, their cognitive abilities and ideology were measured. Our results show that, although ideological congruency was used as the main cue to determine whether a headline was true or false, fluid intelligence modulates this effect. The higher the score in fluid intelligence, the greater the tendency to believe congruent headlines and reject incongruent headlines. This finding challenges the dual process theory approach.

FRAME AND TREATMENT DECISIONS: IMPACT OF COVID?

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The world recently experienced a global health pandemic that disrupted everyday life. How the Covid-19 pandemic imacts health decision-making may not be understood for decades. This study aims to examine the relationship between cognitive processes and frame on risk in treatment decision in a pre- and post-Covid sample. Frame, or the way in which information is presented, is related to decision making in a variety of domains. The dual processing model of cognition states that individuals process information by either a preconscious experiential system or a conscious rational system. Research indicates that participants who score low on the Rational Experiential Inventory (REI) are more prone to the framing effect compared to participants who scored higher; therefore, higher scoring participants are less susceptible to the effects of frame. 164 pre-Covid and 448 post-Covid participants were presented with the classic Asian Disease Problem to assess the framing effect. Participants provided information on Meaning in Life, Death Anxiety, Self-Rated Health, and Prospective Time to Death. Results indicated that frame significantly predicted risk level in decisions in both pre-and post Covid samples. Additional results will be discussed.

HUMANS AS INTUITIVE CLASSIFIERS

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Mainstream decision research rests on two implicit working assumptions, inspired by subjective expected utility theory. The first assumes that the underlying processes can be separated into judgment and decision-making stages without affecting their outcomes. The second assumes that in properly run experiments, the presentation of a complete description of the incentive structure replaces the judgment stage. While these working assumptions seem reasonable and harmless, the current paper suggests that they impair the derivation of useful predictions. The negative effect of the separation assumption is clarified by the predicted impact of rare events. Studies that separate judgment from decision making document oversensitivity to rare events, but without the separation people exhibit the opposite bias. The negative effects of the assumed impact of description include masking the large and predictable effect of past experiences on the way people use descriptions. We propose that the cognitive processes that underlie decision making are more similar to machine learning classification algorithms than to a two-stage probability judgment and utility weighting process.

Theme

EMOTION

THE VALIDATION OF THE EMOTIONAL CLIMATE CHANGE STORIES (ECCS) DATABASE

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Emotional response to climate change is rarely studied experimentally, and emotional stimuli are often created ad-hoc for each study. There is insufficient focus on the clarity and coherence of appraisals underlying the elicitation of emotions. The Emotional Climate Change Stories (ECCS) database is a collection of 180 short stories describing either climate change or neutral situations. Stimuli were selected to represent 6 distinct categories (anger, anxiety, compassion, guilt, hope, and neutral state). Stories in ECCS are based on real experiences of emotions, shared by the participants from two samples: people particularly concerned about climate change (N=40) and the general population (N=523). The database was tested in a large opportunity sample in Poland (N=603) and validated in purposive samples in Poland (N=304) and Norway (N=300). Stimuli from ECCS effectively evoke specific emotions, allowing for improved experimental control in environmental psychology research. ECCS is available in English, Polish and Norwegian. This database can be useful for researchers studying the impact of different emotions on attitudes towards the environment, actions taken to address climate change, as well as mental health and well-being.

USUALLY I DON'T RUMINATE, ONLY FROM TIME TO TIME: THE PREDICTIVE VALUE OF TRAIT AND STATE MEASURES OF RUMINATION FOR THE INTENSITY OF AFFECTIVE STATES

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Emotion regulation ability varies over time within individuals. Increased state, but not trait rumination is associated with higher emotional reactivity in the laboratory. However, the temporal, within-person examination of rumination may predict emotional reactivity more accurately. We investigated the predictive value of rumination measures (trait, mean state, and state) for emotional reactivity in 247 individuals over 28 days, with short questionnaires sent 8 times daily. We used linear mixed-effects models on the 14265 observations obtained. All rumination predictors had independent but overlapping predictive values for emotional reactivity. But for negative affect regardless of stress, mean state rumination was the strongest predictor, possibly combining the advantages of both state and trait measures. We found only a moderate positive correlation between trait and state measures. Psychometric and contextual differences in the self-report techniques could explain this. Our findings provide insight into within-individual dynamics of emotion regulation and their relationship with affect, overcoming limitations of the trait approach. They corroborate the need to re-evaluate the traditional measurement of psychological constructs.

THE EFFECT OF AROUSAL CHANGES ON VISUAL SPEED OF PROCESSING

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The ability to process visual information quickly is advantageous, particularly in negative situations. Indeed, emotional arousal and valence influence our style of processing information.
In this study, we examined mood's effect on processing speed by comparing affective states that vary in arousal and valence. We combined music and Velten's statements to induce four moods (anxiety, calm, happiness, sadness). Participants performed a Two-Flash Fusion task before and after the induction. Affect Grid was used to assess affective changes. Also, we measured individuals' affective states and traits by means of self-report questionnaires.
Eighty participants took part in the study. Psychometric Weibull functions were fitted, and statistical comparisons of the thresholds were performed. Linear mixed models were tested to look at the effect of interindividual differences on perceptual changes. Preliminary results confirm the effectiveness of the induction procedure. A significant effect of anxiety on processing speed emerged, as driven by arousal level. Individuals' traits significantly predicted differences in thresholds.
This study confirms the powerful role of music in shaping mood that can influence our ability to process information.

THE RELATIONSHIP BETWEEN EMOTION REGULATION IN DAILY LIFE, MENTAL HEALTH, AND EXECUTIVE FUNCTIONS

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We conducted two studies investigating emotion-regulation (ER) strategy use in daily life. The aim of the first study was to investigate the role of variability in ER strategy use as predictor of depressive symptoms. We also examined the interplay of depressive symptoms, perceived ER effort and ER success. 392 participants (M= 28.80 years of age, SD= 14.03) reported their use of 10 specific ER strategies over 21 days via smartphone as well as their perceived ER effort and success. We found positive associations between within-strategy variability and depressive symptoms. Perceived ER effort positively predicted depressive symptoms, while perceived ER success was negatively associated with depressive symptoms, indicating that ER variability was a substantial predictor for mental health. However, optimal levels of ER variability may vary as a function of dynamic contextual factors, requiring executive control processes to support adaptive and flexible ER. Thus, our second (ongoing) study (current N=89, expected N =150) examines the association of daily ER variability, situational factors and executive functions (shifting, inhibition, and working memory). We hypothesize a differential role of executive functions for ER.

DOES THE PRESENCE OF EARLY PSYCHOTIC SYMPTOMS IMPACT FACIAL EMOTION RECOGNITION SKILLS IN 22Q11.2DS?

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Children and adults with 22q11.2DS often exhibit social impairment, and have elevated rates of psychosis. However, the relationship between social cognition and the presence of psychotic symptoms has not been studied in children with 22q11DS. 38 children with 22q11.2DS (13 with psychotic symptoms and 25 without) and 54 controls, completed one task of facial expression recognition, one task of contextual emotion recognition, and one task of vocal emotion recognition. All participants also completed an IQ test. The group*task interaction was significant, $F(3,147) = 3.27$, $p < .05$. Both had lower performance than controls in all tasks. This difference was even larger in the contextual task and even larger in the vocal recognition task. However, the two groups of patients did not differ from each other in any task. Finally, only 2% of these results can be explained by IQ. Difficulties in emotion recognition thus seem to be specific to the 22q11.2DS, independently of the presence of psychotic symptoms, and this is not due to lower IQ level in patients.

PROSOCIAL EFFECT OF MORAL ELEVATION OVER CAUSAL ATTRIBUTIONS OF OTHERS' ACTIONS

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Moral elevation is the emotional response resulting from witnessing acts of moral beauty. This emotion has been shown to promote prosocial behavior toward others. However, it is unclear whether it also affects the cognitive processes involved in social perception. The present research aims to study whether elevation affects the causal attributions people make about other's behavior. Using a video induction procedure to elicit elevation (and other control emotions), three studies (total N = 267 adults from Spain; 79.03% female) explore the relationship between elevation and Correspondence Bias: an attributional bias by which people tend to attribute others' behavior to internal causes to a greater extent than to external causes. The results show that a) elevation trait correlates with internal causal attributions about others' behavior, b) experimental manipulation of elevation affects causal attributions about others' behavior, and c) experimental manipulation of elevation can reduce Correspondence Bias. This is relevant because, within the social perception, there are some cognitive biases underlying asocial behavior, such as prejudice or ideological extremism. Those could be reduced, thanks to the prosocial influence of elevation.

THOUGHTS ABOUT WHAT COULD HAVE HAPPENED AMONG SURVIVORS AFTER TERRORISM – VIVIDNESS AND FREQUENCY OF COUNTERFACTUAL THINKING

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After a traumatic experience, counterfactual thinking (CFT), imagining alternative scenarios or outcomes of the event, is common. Previous studies have found a strong association between CFT and distress after trauma. The objectives for this study were to investigate whether; 1) vividness and frequency of CFT are positively associated with high levels of posttraumatic stress reactions (PTSR), and 2) if level of exposure during the traumatic episode and peri-traumatic reactions (fear, helplessness, horror, confusion, and peri-traumatic dissociation) are predicting vividness and frequency of CFT. The participants were 289

survivors after the terror attack at Utøya, Norway, in 2011. They were between the ages 21-65, with a mean age of 27.7 (SD = 4.6), and 51.2 % were females. CFT and PTSR were assessed 8.5-9 years post trauma. Multiple linear regression and ordinal logistic regression analysis were performed. Vividness and frequency of CFT were independently and positive related to PTSR. There was no significant relationship between exposure or peri-traumatic reactions for vividness and frequency of CFT. The results imply that vividness and frequency of CFT can have important clinical implications for trauma exposed individuals.

CONTENT ANALYSIS OF HUMAN-ROBOT DAILY INTERACTIONS AND THE ROLE OF ROBOT PERSONALITY

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"*Harmony*", a human female-form companionship robot developed by *Realbotix™*, exhibits a personality choice application. This is intended to support interaction quality. Does it? Demographic profiles of 2,616 males owning the *"Harmony"* personality app and their initial personality choices were collected. Factor analysis evaluated these choices and content analysis classified ensuing human-robot verbal conversations. We also correlated selected robot personalities and interaction patterns. Robot owners were mostly from USA and Germany (mean age 39 years, range 18-70). We found a 4-factor personality preference: positive (e.g., cheerful, funny), negative (e.g., jealous, moody), loving (e.g., sensual, affectionate) and informative (e.g., intellectual, helpful). "Loving" and "positive" personality settings correlated positively with the "companionship" dimension of the interaction. This is the first systematic analysis of real-life daily interactions between humans and humanoid companionship robots. These initial findings inform the use of companionship robots in therapeutic or intimate contexts.

INHIBITING MIMICRY DISRUPTS EMOTIONAL AUTHENTICITY PERCEPTION IN LAUGHS AND CRIES

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Seeing a facial expression often triggers activity in the same facial muscles and brain systems involved in producing that expression. In the visual modality, such sensorimotor mechanisms are thought to facilitate emotional understanding and affiliation. Here, we examined the role of sensorimotor mechanisms in the auditory modality. In a pre-registered study, participants listened to authentic and posed laughs and cries in two conditions: while their facial responses were inhibited by holding a pen in the mouth (n = 75), or while responding freely to the vocalizations (n = 75). Inhibiting facial responses decreased participants' ability to discriminate authentic from posed vocalizations, similarly for laughter and for crying. It did not affect how much participants felt the heard emotions, however: they reported stronger contagion responses for laughter compared to crying, and for authentic compared to posed expressions, but similarly in the inhibited and non-inhibited conditions. These results point to a role of sensorimotor mechanisms in auditory emotional processing and indicate that this role generalizes across sensory modalities. They also highlight a dissociation between mimicry and self-reported emotional contagion.

THE AMBIGUITY OF WORDS (ON THE EMOTIONAL SPACES OF VALENCE, ORIGIN, AND ACTIVATION) IN THE N-BACK TASK: BEHAVIORAL AND EYE TRACKING MEASUREMENTS

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In everyday life we need to deal with ambiguity, mixed signals and different emotion which might influence our cognitive functioning. Furthermore, we would like to argue that this influence may be dependent on the kind of ambiguity in emotions: whether it is uncertainty about valence (positivity, negativity), origin (automaticity, reflectiveness) or activation (arousal, subjective significance). In two experiments (behavioral and webcam-based eye tracking) we checked whether the mixed emotional load in words may change the reaction times and the accuracy in completing the N-back task in a 3-back version. We asked our participants (Exp. 1: N=60; Exp. 2: N=48) to complete the task while distracted by the emotional word (of different ambiguity characteristics) presented on a screen. Our results show that words of valence and origin ambiguity caused significantly longer reaction times and higher accuracy than words of no ambiguity and of activation ambiguity; furthermore, in the eye tracking measurement the fixations on emotional word were significantly longer for those groups of words. It seems that the kind of ambiguity present in the emotional load of a word may significantly influence the cognitive processes characteristics.

MOTIVATIONAL INFLUENCE ON TIME PERCEPTION OF EMOTIONAL STIMULI

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The effect of emotions on time perception has been debated in the literature, with evidence indicating that negative and arousing

stimuli tend to be overestimated. However, it remains unclear whether this effect is influenced by emotional valence and/or arousal. This study aimed to investigate the role of motivation in temporal distortions, specifically exploring two aspects of emotion: approach/avoidance and motivational intensity. To achieve this, we used a modified Approach-Avoidance task that included a temporal bisection task to examine how motivation modulates the estimation of the duration of fear, sadness, and neutral pictures. The study hypothesized that avoidance-related stimuli, particularly fearful images, would be perceived as lasting longer, while approach-related stimuli, especially sad images, would be perceived as lasting shorter. Additionally, the study expected that motivational intensity would amplify these effects. Our results indicate that avoidance-related stimuli were overestimated, while approach-related stimuli were underestimated, and that motivational intensity played a role in the perception of fear-related stimuli. Overall, this study suggests that motivation has a unique effect on time perception.

AFFECTIVE ATTITUDES TOWARD SUSTAINABILITY: THE ROLE OF MINDFULNESS, HEARTFULNESS, CONNECTEDNESS TO NATURE AND PROSOCIALNESS

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Our study investigates the role of mindfulness in the explicit and implicit affective attitudes toward sustainability. We focused on the indirect effects of mindfulness and its emotional quality heartfulness through prosocialness and connectedness to nature. 458 subjects answered various questionnaires and completed an explicit affective evaluation task and an affective priming task. They explicitly evaluated sustainable concepts more positively than non-sustainable ones. Structural equation modeling revealed the mindfulness facets inner awareness and insight as predictors for prosocialness, and prosocialness as predictor for the explicit attitudes toward sustainability. Exploratory analyses showed a relation between self-compassion and explicit attitudes toward sustainable concepts and an overall relation between gratitude, prosocialness, and explicit attitudes toward sustainable concepts. None of the relations with the implicit attitudes was significant. Our findings suggest prosocialness as a relevant mediator for the relation of explicit attitudes toward sustainability and mindfulness. However, this connection might be more complex, and the differentiation between inner and outer awareness seems insightful for future research.

INFLUENCE OF EXPRESSIVE WRITING ON HEART-RATE VARIABILITY AND EMOTIONAL REGULATION

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Expressive writing is a form of writing in which individuals describe their most traumatic life event. When people remember, they tend to use the pronoun "I" - a self-immersed perspective. However, writing using she/he – a self-distanced perspective - might also be beneficial as it helps to disclose from an outsider's point of view. Two hundred and one participants were randomly assigned to four groups: Expressive groups, writing either in the 1st person (self-immersed; n = 49) or the 3rd person (self-distanced; n = 51) and two control groups, writing about their daily routine (self-immersed; n = 51 and self-distanced; n = 50). Emotion regulation strategies were measured before and after writing and ECG was recorded throughout the experiment. We found that the self-distanced expressive group increased cognitive reappraisal a month after writing, in comparison to all other three groups. For the ECG results, heart-rate was higher in the self-distanced expressive group in comparison to the self-immersed expressive group, and high-frequency HRV was higher in the self-immersed expressive writing group, in comparison to the self-distanced group. Overall, these results help to clarify the role of emotion regulation in expressive writing.

RESTRICTING MOVEMENTS OF LOWER FACE LEAVES RECOGNITION OF EMOTIONAL VOCALIZATIONS INTACT BUT INTRODUCES A VALENCE POSITIVITY BIAS

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Blocking facial mimicry can disrupt recognition of emotion stimuli. Previous studies focused on facial expressions, and it remains unclear whether this generalizes to other types of emotional expressions. By emphasizing categorical recognition judgments, previous studies neglected the role of mimicry in other processing stages, e.g. dimensional evaluations. Here we addressed both issues by asking participants (N = 60) to listen to brief non-verbal sounds of 4 emotion categories (anger, disgust, fear, happiness) and neutral ones under 2 conditions. 1st condition included blocking facial mimicry by creating constant tension on the lower face muscles, in 2nd, facial muscles remained relaxed. After each stimulus, participants evaluated sounds' category, valence, and arousal. While blocking manipulation did not influence emotion recognition, it led to higher valence ratings in a non-category specific manner, including neutral sounds. Our findings suggest that bodily feedback play a role in the evaluation of affect vocalizations, introducing a directional bias. Distinction between stimulus

recognition, categorization, and evaluation is important for understanding what cognitive and emotional processing stages involve bodily processes.

LISTENING TO MUSIC WITH A FRIEND MODULATES REWARD RESPONSES AND MEMORY

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Music and social interaction are intrinsically related and highly pleasant activities engaging the mesolimbic dopaminergic reward system. Sharing an experience with a friend, as well as the closeness of the relationship, are associated with higher perceived emotional intensity and increased activation of the reward circuitry, which has been shown to promote memory formation and consolidation. Here, we investigated whether shared music listening could modulate both pleasurable responses and musical memory. 36 pairs of friends provided pleasure ratings for their favorite and experimenter-selected music under two conditions: listening to music together or alone. Pairs' closeness was measured by the "Inclusion of Other in the Self" (IOS) scale. Memory performance was tested with a recognition/recollection paradigm 24 hours later. Results revealed higher pleasure ratings when listening together to the friend's favorite music (vs alone), particularly for higher IOS scores. Results further revealed that the more the pleasure, the better the memory, especially when having listened together, and depending on the IOS score. Sharing music with a friend modulates therefore reward responses and reward-dependent memory performance.

ABSTRACTNESS OF PAINTING STYLE AFFECTS AFFECTIVE PRIMING ON AESTHETIC PREFERENCE

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Art painting can affect our emotions. Previous studies have reported the phenomenon of affective priming, whereby viewers' aesthetic preferences for paintings can be influenced by their emotional state prior to viewing the paintings. Some studies have focused on the characteristics of target stimuli as factors that determine how affective priming occurs (positive or negative priming). In such studies, the abstractness of the target stimuli was focused as the characteristics of the target stimuli. However, the abstractness has not been fully controlled. In the current study, we prepared art paintings for two types of painting style (abstract vs impressionist) and compared the preference for abstract and impressionist paintings after the presentation of emotional primer. Participants viewed the affective picture to induce positive or negative emotional state. Then, they answered their preferences for two types of paintings. The results showed that the affective pictures influenced the preference only for the impressionist paintings, and suggested that the abstractness of the target stimulus was one of the key factors in determining the emotion priming effect.

MOTOR CORTICOSPINAL EXCITABILITY DURING THE OBSERVATION OF FACES VARYING IN TRUSTWORTHINESS

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People automatically and spontaneously evaluate others' faces on the trustworthiness dimension, which dominates the formation of first impressions and guides our behavior. Face trustworthiness judgment is considered an extension of emotions recognition: in absence of relevant emotional cues, trustworthiness may be used to infer behavioral intentions signaling approach/avoidance behaviors. It has long been acknowledged that emotions prime the human body for action; indeed, observing facial and body emotional (vs. neutral) expressions systematically modulates motor corticospinal excitability (CSE) measured by means of motor-evoked potentials (MEPs) elicited delivering single-pulse transcranial magnetic stimulation (TMS) on the motor cortex. In the current study, we used TMS to investigate whether, similarly to emotion, trustworthiness primes the human body for action. We assessed motor corticospinal excitability in response to the passive observation of faces varying in trustworthiness. Preliminary results indicate no clear pattern of MEPs amplitude modulation as a function of face trustworthiness, suggesting that trustworthiness does not prime the body for action, at least when the participants passively viewed the faces.

THE EFFECT OF FRUSTRATION ON INHIBITORY FUNCTION AND WORKING MEMORY OF PEOPLE WITH ANXIOUS TRAITS

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In this project, we were interested in observing how people with anxiety traits might be affected by frustration in memory tasks and executive function. The sample was comprised of 90 participants, of which 45 participants had high levels of anxiety traits and 45 participants had low anxiety and depression traits. There were two experimental sessions, one where frustration was induced, and one where it wasn't. The memory tasks consisted of a verbal working-memory task and spatial working-memory task. The inhibitory function was evaluated in a Go/No-go task. The levels of emotional activation were measured throughout the experiment through heart rate and galvanic response monitoring. Results revealed that the frustration-inducing task was effective at altering the physiological state of the participants. Differences were found between the two groups in both the frustration and the no-frustration session. The anxious traits group responded more strongly to the frustration-inducing task. This group also showed significant differences between sessions. These results indicate that undergoing frustrating tasks may have a lasting detrimental cognitive effect on people predisposed to anxiety.

CAN A NEGATIVE EMOTIONAL STATE INFLUENCE OUR VISUAL PERSPECTIVE-TAKING LEVEL 2 ABILITY?

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Visual perspective-taking (VPT) is a ToM component that involves representing and making judgments about another point-of-view. Its first level (L-1)corresponds to the understanding of different perspectives and level 2 (L-2) relates to comprehending another's viewpoint. While recent research has shown that emotional states can affect VPT L-1, their impact on VPT L-2 has not been investigated yet. To explore this question, we randomly induced (via short videos) negative or neutral emotional states to 35 participants (M = 20.7; SD = 2.3; data collection still ongoing). Subsequently, they were asked to perform a VPT L-2 task in which the perspective to be taken and the congruence between perspectives were manipulated. Our first results shown an egocentric tendency as reported in previous experiments. Participants perform better when responding from their own perspective (92.6%) compared to other's (74.2%; $p < .05$). Interestingly, when exposed to a negative induction, participants tended to commit more errors (respectively, 18.8% vs. 14.1%; $p < .05$). These preliminary results suggest that emotional states might not only influence L-1 but also L-2, extending our knowledge on the link between emotions and perspective-taking skills.

AFFECTIVE LANGUAGE PROCESSING IN HEALTH PROVIDERS: EEG EVIDENCE OF EMOTIONAL, ATTENTIONAL, AND SEMANTIC OPERATIONS

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Healthcare providers play a critical role in conveying sensitive and stressful information to patients, a task that engages emotional, attentional, and semantic operations. However, the neurobiological basis of such processes in daily clinical tasks remains unclear. To bridge this gap, we recruited 40 nursing students and asked them to read identical paragraphs to perform either a procedural decision task or a communicative decision task. Online EEG recordings were obtained to examine event-related potentials indexing emotional salience (EPN), attentional engagement (LPP), and semantic integration (N400) efforts. Relative to the procedural decision task, the communicative decision task involved smaller EPN amplitudes (indicating pre-attentive categorization of emotional stimuli), larger LPP modulations (related to attentional engagement), and no differences in N400 effects (indicating semantic integration). Our results show the potential for the type of clinical task to influence the processing of emotional stimuli, revealing that healthcare professionals engage in active top-down processing of emotional stimuli, depending on the task requirements.

DOES BLINDNESS AFFECTS EMOTIONAL AUTHENTICITY PERCEPTION? BEHAVIORAL AND ERP INSIGHTS

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The ability to distinguish authentic from posed emotional expressions is a crucial social skill. To perceive emotional authenticity, blind individuals must mainly rely on vocal cues. However, the behavioral and neural mechanisms underpinning emotional authenticity perception in the blind are currently unknown. In the current study, we used behavioral and event-related potentials (ERP) measures to study whether and how blindness affects the perception of emotional authenticity in vocalizations. Fifty-one individuals with different visual conditions (17 early blind, 17 late blind, 17 sighted controls) completed two tasks (authenticity and emotion discrimination) while electrophysiological data was recorded. In these tasks, participants heard laughs and cries varying in authenticity (spontaneous vs. volitional) and emotional quality (sadness vs. amusement). Behaviorally, the late blind group was generally less accurate at detecting the authenticity of vocalizations than the sighted group, which did not significantly differ from the early blind group. Our ERP findings indicated that early blindness modulates the temporal course of emotional authenticity perception, particularly at early sensory (N1) and late processing (LPP) stages.

Theme

EXECUTIVE FUNCTIONS

ADAPTATION AND VALIDATION OF THE HAYLING TEST FOR FRENCH CHILDREN AGED 6 TO 11 YEARS

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The ability to inhibit develops rapidly during childhood and plays an important role in learning. Moreover, inhibition appears to be deficient in many neurodevelopmental disorders (e.g., attention-deficit/hyperactivity disorder, autism spectrum disorders). It is therefore essential to provide relevant tools to assess inhibition in children. The Hayling Test is dedicated to assess inhibition of the dominant response. In this test, participants hear sentences in which the last word is missing. In an automatic condition, participants are asked to produce the word strongly cued by the beginning of the sentence. In the inhibition condition, subjects are asked to refrain the cueing word and to complete the sentence with an unrelated word. The aim of our study was to adapt, to validate and to standardize the Hayling Test into a French-speaking pediatric population. We developed the Child-Hayling Test and evaluated both the test-retest reliability and the convergent validity of this test in a sample of 136 children aged 6 to 11 years. The Child-Hayling Test was then administrated to 310 typically developing 6- to 11-year-old children in order to produce normative data. At the moment, statistical analyses are ongoing.

THE DICE TRAIL TEST: A NONVERBAL VERSION OF THE TRAIL MAKING TEST FOR INDIVIDUALS WITH DOWN SYNDROME

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The Trail Making Test (TMT) assesses cognitive flexibility but requires reading ability, which limits its applicability in intellectual disability (ID). We examine feasibility and validity of the new Dice Trail Test (DTT) in Down Syndrome (DS). We included 66 DS participants aged 8-57 years (mild to moderate ID) and age-matched controls. Participants connect dice according to the numbers (DDT-A) or alternate between numbers and colors (DTT-B). Convergent validity was assessed with TMT and category switching and divergent validity with the Boston Naming Test (BNT). For mild ID, odds of task completion (88%) were higher than for moderate ID (61%, *OR* = 4.31, $p < .05$). There was an interaction on completion time ($p < .01$, = .25) between DTT-condition and group: Prolonged completion time in DTT-B compared to DTT-A was observed, but the increase was greater for DS than for controls. DTT flexibility (difference between DTT-B and DTT-A) correlated moderately with category switching ($r = .43$) and TMT (r = .33), but not with BNT. In DS, older adults showed higher flexibility in DTT compared to younger children ($p < .05$). Although limited in its applicability for moderate ID, DTT is a valid tool to assess cognitive flexibility in DS.

RELATIONS OF EXECUTIVE CONTROL FUNCTIONS, SELF-REGULATION, AND AFFECT: A MACHINE LEARNING AND NETWORK MODELLING APPROACH

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Executive control functions (EF) and self-regulation (SR) are wide-ranging psychological constructs supporting the regulation of cognition and affect (e.g., Bridget et al., 2013). Despite their theoretical overlap, behavioral tasks and self-report measures of EF and SR are often unrelated (e.g., Eisenberg et al., 2019). N = 315 participants (14-80 years) completed self-reported measures and behavioral tasks that evaluated EF, SR, and positive and negative affect on two measurement occasions (one-month apart). Using k-means and deep learning algorithms, we distinguished two groups with differential EF performance as well as SR and affective experiences. Grouping was predicted with logistic regression by age and personality (conscientiousness and neuroticism). We further applied network model analysis to investigate the connections between EF, SR, and affect in the two groups and identified well-connected key variables. SR variables like behavioral inhibition as well as positive affect demonstrated the highest centrality in both groups. The results of the first measurement occasion were predominantly robust and also found at the second occasion. The findings contribute to our understanding of individual differences in EF and SR.

THE FACTORIAL STRUCTURE OF EXECUTIVE FUNCTIONS IN PRESCHOOL AND ELEMENTARY SCHOOL CHILDREN

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Research on cognitive development has provided mixed evidence regarding the structure of executive functions (EF) in childhood. While most studies with young children suggest a unitary structure of EF, research with older children indicates an increasing differentiation of cognitive abilities over the course of childhood. In an ongoing study, a preliminary sample of preschool children (n = 114, M_{Age} = 5.84, SD_{Age}= 0.36, % female: 47.52) and elementary school children (n = 84, M_{Age} = 9.89, SD_{Age}= 0.58, % female: 59.74) completed measures of working memory, inhibition, and flexibility. Confirmatory factor analyses revealed that a single-factor model best represented performance on EF tasks in preschool children ($\chi^2(df = 8) = 3.87$, p = .87, CFI = 1.0, RMSEA < .01, SRMR = .05). In elementary school children, a three-factor solution of EF demonstrated the best fit to the data ($\chi^2(df = 9) = 5.37$, p = .801, CFI = 1.0, RMSEA < .01, SRMR = .04). Our results add to the debate on the structure of EF at different developmental stages and indicate a successive differentiation of cognitive abilities during childhood.

EXECUTIVE FUNCTIONS AND PROBLEM-SOLVING: THE IMPACT OF INHIBITION, FLEXIBILITY, AND WORKING MEMORY ON TECHNICAL PROBLEM-SOLVING IN PRIMARY SCHOOL AGE

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Executive functions and problem-solving skills develop significantly in elementary school age, and are both closely associated with action control and goal-directed behavior. However, only few studies have focused on the question how problem-solving success is supported by executive functions. In this study, we aimed to investigate whether executive functions predicted technical problem-solving abilities in elementary school age. 477 children (6-8 years, M=7.43 years, SD=0.65, 229 female) completed a set of three problem-solving tasks on gear and block constructing and tasks measuring executive functions (inhibition, flexibility, working memory). Confirmatory factor analysis revealed that the three dimensions of executive control significantly contributed to problem-solving performance. The strongest predictor was flexibility (r = .64), followed by working memory (r = .51) and inhibition (r = .30). We conclude that particularly working memory and flexibility support controlled goal-directed technical problem-solving behavior in elementary school children.

PERCEPTUAL ORIENTATION AND LEGITIMACY OF INTERPERSONAL CUES TO ENDANGERMENT (P.O.L.I.C.E.)

Harry Piper[1], Dr. Paloma Mari-Beffa[1]; *[1]Bangor University*

The ability to detect interpersonal threat is a cognitive mechanism critical for survival and social relations. This research offers a new tool to test individual differences in the perception of interpersonal threat. Naturalistic video footage of randomly selected scenes resulting in an aggression 50% of the times were used (although any violence was removed). Participants reported the level of subjective threat (Threat Perception Index, TPI). Separately, participants observed which of 18 visual cues were present in each video and, if present, how threatening they were (Johnson and Aaron, 2013). Convergent validity between the presence of cues and the TPI was high (r=.89), as well as the TPI internal consistency (Cronbach's alpha =.93) and split half reliability (r=.61). In addition, the K-means cluster analysis of the 18 cues revealed three main groups of cues responsible for the perception of threat: head, torso and interpersonal space. Finally, the analysis of individual differences revealed a reduction in the perception of threat with age, but an increase with experience. Our results provide support for the use of this test to evaluate threat perception in multiple domains such as education, health or security.

SENSORIMOTOR CONTEXT INFLUENCES ORIGINALITY AND EXECUTIVE FUNCTIONS

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To what extent executive functions are related to sensorimotor processing? Empirical studies demonstrating that using gestures enhances executive functions in mathematics give some support to the existence of such a link. We investigate the relation between sensorimotricity and executive function in a creative task since creativity is intertwined with working memory and inhibition. This research was thus aimed at evaluating whether different sensorimotor context of action (paper vs. digital tablet) could modulate performance in creative and executive tasks. Sixty children from 1st to 8th grades performed the Corsi Block (working memory) and Sky Search (inhibition) tests. Creative task consisted in producing drawings of a man who exists and a man who doesn't exist. Each task was performed using finger on tablet and pen on paper. Although executive functions did not predict originality scores, results revealed higher scores in originality, inhibition, and

working memory tasks when they were performed using finger on tablet compared to pen on paper. Altogether, these results suggest that varying the sensorimotor context of task execution modulate the performance in the creative task as well as in executive tasks.

YOU GET A GAIN, YOU GET A GAIN, EVERYBODY GETS A GAIN!?: ACCOUNTING FOR INDIVIDUAL DIFFERENCES IN EXECUTIVE FUNCTION TRAINING GAINS

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Findings on executive function (EF) training gains are quite inconsistent. Individual differences are seen as a potential source of variation in reported effects, with some participants benefiting from the training and others not improving their performance. In this study we investigated age, baseline cognitive abilities, and personality traits as potential predictors of EF training gains. Healthy middle-aged adults (*N*=100, 49-65 years old) were randomly assigned into either one of the three training groups (updating, inhibition, shifting) or an active control group (communication skills training). The training included twenty 20-min sessions distributed over ten weeks. Mixed effects model analyses indicated that individual differences in fluid reasoning were significantly associated with training performance and gains, while age and personality were not significant predictors. Our results highlight the need for personalized and tailored approaches in designing training interventions, especially with regard to age and fluid reasoning.

HEART RATE VARIABILITY AS A MARKER OF COGNITIVE FUNCTIONING

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The intimate connection between brain and heart via the vagus nerve has been well established. Vagally mediated heart rate variability (vmHRV) is thought to index top–down control processes in cognition and emotion regulation. This study examined the relationship between cardiac vagal tone indexed by mHRV and cognition. One hundred and forty-three healthy young adults took part in the study. All participants completed a comprehensive neuropsychological battery. According to previous evidence, a close relationship between resting vm-HRV and cognitive functions was found. In particular, the association between vm-HRV and executive functions was supported. Better cognitive performance was evidenced in participants with higher resting vm-HRV than in participants with lower resting vm-HRV. Accordingly, vmHRV can be considered a marker of memory, attention, and executive functioning. To our knowledge, this is the first study to adopt a complete neuropsychological battery (i.e., an assessment of different cognitive domains). The current research provided new evidence regarding interactions between cognitive and autonomic systems, proving further evidence of the body-brain interactions.

EMOTIONAL QUALITY AND PERCEPTUAL AMBIGUITY MODULATE BEHAVIORAL INHIBITION IN AN AUDITORY GO/NO-GO TASK

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Behavioral inhibition is modulated by the emotional quality and perceptual ambiguity of visual stimuli in Go/No-Go tasks. However, it is not clear whether these variables also modulate inhibition in the auditory domain. In the current study, sixty-six college students completed an auditory Go/No-Go task with emotionally ambiguous and non-ambiguous stimuli. Behavioral and EEG data were recorded. Stimulus type (Go, non-ambiguous No-Go, and ambiguous No-Go) and emotional quality (angry, neutral) were manipulated. Participants completed two blocks and the emotional quality of Go and non-ambiguous No-Go stimuli was counterbalanced. Commission errors, and the N2 and P3 ERP mean amplitudes were analyzed.

Ambiguous No-Go elicited more commission errors and did not differ from Go stimuli regarding the N2 mean amplitudes. No-Go stimuli elicited increased P3 mean amplitudes, specifically for No-Go stimuli paired with neutral Go stimuli.

These findings indicate that at earlier and later stages of processing, the allocation of resources needed for inhibitory control is not solely guided by emotion. How efficiently we inhibit a response also depends on perceptual ambiguity, as ambiguous emotional information may hinder these processes.

CLUSTERING & SWITCHING IN TYPICALLY DEVELOPING CHILDREN (5-17 YEARS): THEIR RELATIONSHIP WITH SEMANTIC VERBAL FLUENCY, LANGUAGE AND EXECUTIVE FUNCTION

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Performance in semantic verbal fluency (SVF) tasks, mainly measured by the number of correctly retrieved words (NW) of a particular semantic category, is a widely accepted measure of executive function (EF). Two strategic processes observed during retrieval, semantic clustering and cluster switching (C/S), have been proposed to explain the NW-EF link. However, very few studies

have examined the relationship of C/S strategies with EF measures in typically developing children. This study investigated the associations between NW, C/S, EF, and lexical competence in a wide age range of typically developing children. The sample consisted of 450 greek-speaking children aged 5 to 17 years. Participants were individually tested with the following tasks: SVF (animals), day/night & animal Stroop, Corsi-block, nonword serial recall, sentence repetition, and a lexical task. Results confirmed the NW-C/S link and showed a significant association of NW and number of switches (but not cluster size) with EF. Finally, C/S and lexical knowledge jointly predicted 81% of the variance in NW. Results are discussed for their theoretical implications concerning the cognitive processes underlying SVF. *The research project was supported by the Hellenic Foundation for Research and Innovation (H.F.R.I. Project Number: FM17-13).

INABILITY TO DISSOCIATE ALCOHOL OR DRUG CONSUMPTION FROM DRIVING. EFFECT OF DRIVING EXPERIENCE AND RELATIONSHIP WITH VIOLATIONS, ERRORS AND LAPSES

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Alcohol and drugs affect perceptions, attention, coordination, reaction time, and other cognitive processes, and can interfere with the driver's ability to drive safely. This research aims to explore the dissociation of alcohol and substance consumption from driving of non-offender drivers and its relationship with their self-reported Violations, Aggressive Violations, Errors and Lapses (Driver Behaviour Questionnaire, DBQ). 362 drivers: 119 inexperienced (<2 years), 68 novice (2-5 years) and 173 experienced drivers (>5 years) answered these questionnaires: AUDIT (Alcohol Use Disorders Identification Test), DAST (Drug Abuse Screening Test) and DBQ. Those drivers who reported higher alcohol consumption and those unable to dissociate alcohol and drugs consumption from driving ("Drive a little after drinking more than 3 beers or glasses of wine") showed higher scores in all the DBQ factors. A higher percentage of inexperienced drivers showed the ability to dissociate alcohol consumption ("1 or 2 more glasses of beer or wine") from driving than novice and experienced drivers. In addition, inexperienced drivers showed higher Lapses than experienced drivers but lower Violations and Aggressive Violations than experienced drivers.

CUE-BASED BIASING WHEN SWITCHING BETWEEN REVERSED STIMULUS-RESPONSE MAPPINGS

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The notion of a prepared reflex assumes that stimulus-response (S-R) links of an impending task are established prior to presentation of the imperative stimulus. This was investigated in conditions of switching between reversed S-R mappings for an otherwise identical two-choice task (i.e., in Experiment 1, parity judgment for a stimulus digit with "odd → left key/even → right key" vs. "even → left key/odd → right key"). On each trial, the relevant S-R mapping was indicated by an advance cue (SOA = 800 ms). Response congruency effects in an occasionally presented additional (probe) task, executed with the same response keys, demonstrated better performance when probe task and cued mapping required the same response for the current stimulus but were unaffected by the S-R mapping of the preceding trial. Combining S-R mappings of unequal strength (i.e., digit magnitude judgment with SNARC-compatible vs SNARC-incompatible mapping, Experiment 2) yielded a response congruency effect in probe task trials only when the stronger mapping was cued (i.e., a SNARC effect). This SNARC effect was eliminated but not reversed when the weaker mapping was cued. The results demonstrate cue-based biasing when switching between reversed S-R mappings.

THE DOMAIN-SPECIFIC VS. DOMAIN-GENERAL NATURE OF RESISTANCE TO INTERFERENCE ? AN AGING STUDY

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The question of the domain-specificity/generality of resistance-to-interference (RI) remains a highly debated empirical and theoretical issue. The present study investigated the effect of aging on RI capacity across three domains (phonological, semantic, and visual) and for two different tasks. Using a high vs. low interference judgment task and a high vs. low interference WM task in young and elderly adult participants (N>130 per group), we obtained strong evidence (BF_{10}=1.814+30) for a domain by group interaction, with the elderly group showing stronger RI effects in the semantic domain relative to the young group. Additional correlational analyses showed evidence for an absence of association of RI scores between domains, particularly in the young adult group. Overall, these results support a domain-specific view of RI processes.

Theme

HIGHER COGNITIVE FUNCTIONS

TOOLS UNDER THE ELECTROENCEPHALOSCOPE: TOWARDS A UNIFIED PICTURE OF THE NEURAL TIME COURSE OF VISUAL TOOL PROCESSING

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Brain location for visual tools has been widely studied, but little is known about the temporal resolution at which the underlying brain processes unfold. Electroencephalography (EEG) provides time-resolved information, and, although there are many EEG studies about tool processing, these have not yet been comprehensively analysed. This integrative review addressed this knowledge fragmentation. EEG responses specific to tools were shown at different temporal stages that may be related to different cognitive processes. Mu event-related desynchronization (ERD), known to index motor processing in action execution and recognition, was also induced by visual exposure to tools (from 140ms). Importantly, mu ERD appeared consistently enhanced by experimental manipulation involving potentially more motor interaction (e.g., tool looking usable, from 100-200ms, tool within reach, from 300ms; tool showing same grasp-to-move and grasp-to-use gestures). This literature review constitutes a significant step for moving forward from the typical static spatial descriptions to the real-time temporal dynamics of the neural processing of tools, and provides an integrative look on the time course of key cognitive processes involved in tool processing.

INFLUENCES FROM FORCED EFFORT ON SEMANTIC INFERENCE DURING CROSS-SENTENCE PROCESSING

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To create meaning across sentences, readers make semantic inferences through the process of elaboration, supplying missing or implicit information. In a preliminary study with random pairs of sentences, offering the strongest challenge for semantic inference, we found positive correlations between volitional effort, semantic inference, and liking during cross-sentence processing. In the present study, we investigated the impact of forced effort in a similar paradigm. Participants were asked to process random sentence pairs, and rate how sensible the sentences were, how interesting, and how appealing. The paradigm included an opt-in procedure where participants can choose to think aloud while elaborating on the meaning of the sentence pairs. The participants were occasionally forced to elaborate even if they chose to opt out. The ratings for sensibility and appeal were higher in opt-in trials than in the other trials. While the ratings for sensibility were higher in forced-in trials than in opt-out trials, the levels of interest and appeal were similar in these trials. The findings suggest that forced effort leads to more understanding but not more liking, indicating a distinct role for intrinsic motivation in preference formation.

GAIN-LOSS FRAMING EFFECTS OF RISK-AVERSE OR RISK-SEEKING CHOICES ARE ELIMINATED BY A HUMAN EXPERT BUT NOT AN ARTIFICIAL INTELLIGENCE'S RECOMMENDATION

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Two experiments (n=709) examined how recommendations from a human expert or Artificial Intelligence (AI) system affect choices. Participants exhibit a framing effect in choices of programs to combat a disease expected to kill 600; framed as gains, most choose a certain option (saving 200 people), not a risky one (a 1/3rd probability of saving everyone and a 2/3rd probability of saving no-one); framed as losses, most do not choose the certain option (400 people dying), but the risky one (Tversky & Kahneman, 1981). Experiment 1 showed a human expert's recommendations led participants to be less risk-averse with gains and less risk-seeking with losses. When the expert's recommendations were opposite the typical choices (risky option for gains, certain option for losses) the framing effect was eliminated, as choices of the certain option for gains and the risky one for losses were reduced. Experiment 2 showed an AI system's recommendations had no effect on participants' risk-aversion with gains, but led to less risk-seeking with losses. When the AI's recommendations were opposite the typical choices, the framing effect still occurred, most chose the certain option for gains, but choices of the risky option for losses were reduced.

CHARACTERIZATION OF EXECUTIVE AND EMOTIONAL SKILLS IN A RARE GENETIC SYNDROME (PRADER WILLI SYNDROME) AND PRESENTATION OF INNOVATIVE TREATMENTS

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PRACOM (PRAder Willi COMmunication) is a large project aimed at better understanding the consequences of a rare genetic disease, the Prader Willi Syndrome (PWS), on everyday life of patients and their caregivers by characterizing the cognitive, emotional and

behavioural dimensions of this syndrome, and by proposing new innovative therapeutic avenues. Assessments of emotional (emotional regulation, lability, reactivity, irritability, depression), cognitive (lexical decision task and inhibition, sustained attention, working memory experimental tasks) and behavioural dimensions (temper tantrums) were conducted in 31 adults with PWS and 30 neurotypical adults. Twenty family caregivers were also interviewed on the consequences of temper tantrums on quality of life and burden. Moreover, two therapeutic programs were proposed to patients with behavioural disorders: 1) emotional regulation psycho-education, 2) transcranial stimulation. We present the results of these cognitive and emotional assessments and the feasibility and tolerance for these two new therapies applied to PWS. This work provides an interesting experimental framework allowing the investigation of the interactions between cognitive, emotional and behavioural components.

TAKE YOUR TIME: SLOW BRAIN RHYTHMS PREDICT FLUID INTELLIGENCE

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Evidence whether fluid intelligence is associated with either increased or decreased brain activity, the latter indicating neural efficiency, is mixed and limited primarily to the alpha and beta bands (7-30 Hz), while the delta and theta bands (1-7 Hz) are rarely examined. To clarify the relationships between fluid intelligence and brain activity in all these four bands, EEG data were recorded in 160 healthy adults solving the Raven's Advanced Progressive Matrices. The fluid intelligence and the working memory (WM) factors were based on multiple test scores. The delta band power positively correlated with fluid intelligence, oppositely to the neural efficiency hypothesis. High fluid intelligence, but not capacious WM, was specifically accompanied by the brain activity at relatively low frequency (2-3 Hz), but only in males. By contrast, the negative relationships between the alpha and low-beta activity and fluid intelligence, after the activity associated with idle intervals was filtered out, corroborated the neural efficiency hypothesis, but it pertained also to WM. The theta band power was unrelated to fluid intelligence. Overall, the brain activity in the delta, alpha, and beta bands explained 26% of fluid intelligence variance.

DO DIFFERENCES IN SOCIAL STATUS MODULATE RETRIEVAL OF OBSERVATIONALLY ACQUIRED STIMULUS-RESPONSE BINDINGS?

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People orient their behavior towards others they perceive to be of higher social status than themselves, which implies that they are considered more relevant than others of lower status. In previous studies, this social relevance was already shown to be necessary for observationally acquired stimulus-response binding and retrieval (SRBR) to occur, albeit resulting from different sources like task demands or the relationship between the interaction partners (Giesen et al., 2014; 2018). Thus, in the present study we expected to find observationally acquired SRBR effects only if the observed person had a higher social status than the participant but not if their social status was lower. To manipulate social status, participants were either assigned the role of the leader or the follower. Leaders were able to give the follower feedback on their performance and decided how an extra reward would be split between them. Then they performed an online interactive color classification task to assess observationally acquired SRBR effects. Results will be presented and discussed.

A MNEMONIC ADVANTAGE FOR BEAUTY: IS IT SELF-REFERENCE OR EMOTIONAL PROCESSING?

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Recent models propose a multi-process account of aesthetic judgement (AJ) integrating a subjective evaluation component based on self-referential processing. Accordingly, in a previous study, we showed that AJ produce a mnemonic advantage comparable with self-reference (SR). Yet, it is not clear whether this effect is linked to AJ *per se*, or to an underlying emotional evaluation (EE) process. In two studies, using the artworks used in our last study, we tried to disentangle the effects of AJ and EE. In the first, we asked 45 participants to encode paintings in an AJ, a SR and a control condition (judgement of color). Retrospectively, participants had to judge their emotional reaction to each painting. In the second, we used the same procedure but replaced the SR with an EE encoding condition. We replicated a mnemonic advantage for AJ. Yet, we showed that extreme emotional ratings of paintings better predicted recognition performances in the AJ than SR condition (Study 1), and that paintings encoded in the EE condition were as well recognized as those in the AJ condition (Study 2). This suggests that AJ might involve both self-referential and emotional components.

HOW WELL DO THE THREE EMBEDDED COMPONENTS OF WORKING MEMORY ACCOUNT FOR THE REASONING AND WORKING MEMORY RELATIONSHIP? A LATENT-VARIABLE ANALYSIS

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The Three-Embedded Components Model of working memory (WM) consists of the *Focus of Attention* (FA), which holds a single representation in current thought, the *Region of Direct Access* (RDA), which selects memoranda bound to the current context, and the *Activated Part of Long-term Memory* (aLTM), which consists of activated memoranda not bound to the current context. It is not well understood how individual differences arise in these components and how they relate to fluid intelligence (Gf) and WM capacity. The present study used confirmatory factor analysis to address these questions. Participants (N = 198) completed four tasks to assess WM capacity, four tasks for each of the three embedded components, and the Berlin Intelligence-Structure test. Preliminary analysis revealed latent variables for RDA and aLTM but not FA. RDA and aLTM shared significant variance with WM capacity and Gf. Further analysis of the model components and their relationships with cognitive abilities will be completed utilizing drift diffusion modelling (DDM). DDM accounts for reaction time and accuracy, so latent variable analysis using DDM may reveal all three embedded components and further elucidate the association of WM and Gf individual differences.

SPONTANEOUS TRACKING OF OTHER AGENTS' LOGICAL INFERENCES GUIDES BELIEF ATTRIBUTION

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Representing what others may infer from the available information may play an important role in predicting their behaviour. Whether we track these inferences spontaneously is currently unknown. To address this issue, we ran four online experiments. Adults saw pictures displaying an agent and three boxes where animals could hide. After two boxes opened, they could infer the identity or the location of a hidden animal via disjunctive, or in two experiments, disjunctive and conditional reasoning. The agent's conclusion either matched or differed from their own: depending on the number of events she witnessed (Exp. 1-3) or her prior beliefs (Exp. 4) she could represent one or two alternatives. Participants had to rate the likelihood of an animal hiding at a certain location, either from their own or the agent's perspective. In three out of four studies we found higher ratings of the alternative participants could eliminate but the agent considered 'possible' compared to the alternative both of them considered impossible, even when tracking the agent's beliefs was unnecessary. Results indicate that adults spontaneously track others' logical inferences, as long as the task is cognitively not too taxing.

PRIMACY EFFECTS IN EXTERNAL STRATEGY CHOICE – INITIAL SPEED BENEFITS OUTWEIGH LATER SPEED BENEFITS

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Human performers often rely on external assistance to acquire or process information, such as relying on smartphone apps or search engines. To make informed choices about strategies that provide such external assistance, it is clear that performers need to monitor the performance of different strategies. In the present study, we investigated whether participants monitor an external strategy's performance—here: speed—more closely during initial as compared to later encounters. In three experiments with 737 participants, we show that performers are sensitive to subtle speed differences and select strategies—here: two competing algorithms that can solve trivia questions—accordingly. Most remarkably, even when both strategies performed identical across *all* encounters, the strategy with superior speed in the *initial* encounters was preferred. Worded differently, participants exhibited a technology-use primacy effect. Contrarily, evidence for a recency effect was weak at best. These results suggest that great care is required when performers are first acquainted with novel ways to acquire or process information.

SOCIAL INSTRUCTIONS: THE FORMATION OF SHARED TASK SETS IN A COLLABORATIVE CONTEXT

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Through language, humans have the capacity to instruct others to perform parts of a collaborative task. The intention to implement instructions on upcoming tasks has been shown to activate a corresponding task set, and this can affect the execution of ongoing task behavior ("instruction-based reflexivity"). Here we investigate whether such preparatory task sets are also formed when giving verbal instructions to a task partner. In a series of three experiments, we adapted the instruction-based reflexivity paradigm to investigate whether instructing another person leads to the intention to implement the instruction content and thus forming a corresponding task set on behalf of the task partner (Experiment 1,2 N=48). In addition, we tested if the formation of such shared task sets is induced by the collaborative task (i.e., the act of instructing the task partner), or if this is also present in a non-social context (Experiment 3, N=48). Lastly, we ran a pooled analysis. We found evidence for the formation of task sets in response to instructing a task partner. These effects, however, are rather small and seem to

be, at least in part, elicited by lower-level characteristics associated with the act of verbalizing instructions.

HOW MUCH DOES IT TAKE TO RELATE? EXPLORING THE IMPACT OF REDUCED SPEAKER VISIBILITY ON EMPATHY, THEORY OF MIND, AND PROSOCIAL BEHAVIOR

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The importance of visual cues for social understanding has been prominently highlighted by heated debates on face masks during the COVID-19 pandemic. Despite apprehensions about the detrimental effects of reduced face visibility on emotion recognition, it is still unclear whether such concerns hold true in typical naturalistic settings. Our study addressed this question by using dynamic stimuli to investigate how reduced visibility of the eyes, mouth, and face impact empathy, Theory of Mind, and prosocial behavior. We modified a well-established paradigm (EmpaToM) to include various levels of visual input, which were compared in different combinations throughout four experiments (total n = 156): Participants viewed short videos of a person recounting a brief autobiographical episode, with their face fully visible, partially visible (mouth or eyes covered), or not visible at all (audio only). The results consistently indicated that reduced visibility did not affect participants' empathetic response, Theory of Mind performance, or willingness to help in any way. This pattern emphasizes that individuals have the ability to compensate for missing visual information in a naturalistically complex and dynamic environment.

WORKING MEMORY MODALITY AND LOAD EFFECTS ON DRIVING SPEED: A STUDY IN A DRIVING SIMULATOR

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Driving is a complex cognitive task requiring coordination between limited resources for perception, attention, working memory (WM) and motor processes (Groeger, 2002; Mikula et al., 2020). The current study investigated the effects of manipulating WM load across modalities during a concurrent driving task (Lane – Changing Task). Participants were asked to hold information in their working memory across three modalities (visual, auditory, and both) and with increasing working memory load (0-back, 1-back, and 2-back) while performing the LCT in a driving simulator. Both task based and driving based dependent measures were obtained. The data analysed using generalized linear mixed models (GLMM), revealed that contrary to the prevailing view (Wilde, 1981) participants' increased their speed of driving as the working memory load increased across modalities. Also, participants were most vulnerable when load increased in the visual modality compared to the auditory and dual modalities. These results point to the differential effects of increasing task demands across different modalities and in designing in-vehicle information systems to assist driving in modern vehicles.

Theme

INDIVIDUAL DIFFERENCES

OCDTWIN STUDY – IDENTIFYING NEUROCOGNITIVE RISK FACTORS FOR OCD

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Obsessive- compulsive disorder (OCD) is a chronic impairing impairing psychiatric disorder strongly interfering with many aspects of life. The causes of OCD are unknown, and understanding its etiology holds promise for improved treatment and strategies to prevent its often chronic course and long-term medical and socio-economic consequences. Twin studies suggest that OCD is a partially genetic disorder, but also that unique environmental factors are at least as important. Recruiting monozygotic (MZ) twins discordant for OCD provides a unique opportunity to identify biological or neurocognitive changes due to unique environmental conditions only the affected but not the unaffected sibling has experienced. Within-pair comparisons allow to identify neurocognitive signs of unique environmental risk exposures contributing to the development of OCD. Here, The OCDTWIN study design and rationale will be presented. In Hamburg, we have started to examine MZ pairs with OCD on two full days of assessments and experiments. Preliminary results will be provided for neurocognitive examinations, which include cognitive conflict tasks (EEG), evaluation of facial expressions (fMRI), as well as instrumental and pavlovian learning mechanisms.

BASELINE PUPIL SIZE SEEMS UNRELATED TO FLUID INTELLIGENCE, WORKING MEMORY CAPACITY, AND ATTENTIONAL CONTROL

Veera Ruuskanen[1], Thomas Hagen[2], Thomas Espeseth[2], Sebastiaan Mathôt[1]; *[1]University of Groningen, [2]University of Oslo*

In recent years, several studies have investigated the relationship between resting-state pupil size (and variability) and cognitive abilities (fluid intelligence, working memory capacity, and attentional control). Results have been mixed, and it is therefore still unclear whether resting-state pupil size is related to cognitive abilities. Here we replicated and extended studies that previously found a

relationship. In two experiments (224 participants), we measured resting-state pupil size in the absence of a task, and subsequently estimated fluid intelligence with a matrix task. For a subset of the participants (102) we also estimated working-memory capacity (Letter-Number-Sequencing task) and attentional control (attentional-capture task). In addition, we controlled for several personal and demographic variables known to influence pupil size (e.g. age, nicotine consumption, etc.). We did not find evidence for a relationship between resting-state pupil size and any of the measured constructs, neither before or after controlling for confounding variables.Thus, our results suggest that the relationship between resting-state pupil size (or variability) and cognitive abilities is either weak or non-existent.

IS SCHIZOTYPY RELATED TO ENHANCED DIVERGENT AND OVERINCLUSIVE THINKING?

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It has been suggested that people who are highly schizotypal are more creative, but empirical support for this thesis is limited. In existing studies conclusions were drawn based on comparing high and low schizotypal individuals after excluding average scores on the schizotypy scale. However, treating schizotypy as a continuous variable seems to be a better approach as it corresponds with schizotypy seen as a spectrum ranging from normal experiences to extreme states of mind related to psychosis and schizophrenia. We applied tasks measuring creativity markers, specifically divergent thinking and overinclusive thinking, as well as a schizotypy questionnaire (O-LIFE) to 36 healthy participants and 33 schizophrenia patients to assess the relationship between these measures after controlling for fluid intelligence. We did not find a significant correlation between schizotypy and divergent thinking or overinclusive thinking (r=.011, p=.931; r=.083, p=.502, respectively). Our data do not support the putative relationship between schizotypy and creativity.

THE ROLE OF HOLISTIC PROCESSING AND EYE MOVEMENT STRATEGIES ON INDIVIDUAL DIFFERENCES IN FACE RECOGNITION ABILITY

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We aimed to investigate the relationship between face processing patterns and individual differences in face recognition ability via tasks that impair holistic face processing. Face recognition performance related to holistic face processing strategies was measured from 206(ages between 18-63; 26 super-recognisers and 17 developmental-prosopagnosics) participants during the inversion, composite, part-whole tasks and while eye movement patterns were recorded alongside behavioral performance. Participants' holistic face processing indexes were calculated using subtraction and regression methods for each of these tasks. Face recognition performance was evaluated using CFMT+, EGEFACE (a new test using dynamic faces), and KFMT. We observed that as face processing ability increased, reliance on holistic processing measured via residual scores of part-whole, composite and inversion tasks increased. Yet, this association was weaker or nonsignificant when subtraction scores were used. Eye movements data are discussed in terms of face processing strategies, duration and preferred location of fixations on the face, their relation to holistic face processing index and face recognition ability from a variety of face memory and perception tests.

DO PEOPLE WITH CONSPIRACY BELIEFS PREFER COMPLEXITY?

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Conspiracy theories are often very complex compared with official accounts. One possibility is that this complexity underlies their appeal. Thus, we investigate whether people with conspiracy beliefs have a domain-general preference for complex explanations over simpler ones, using a curve-fitting task (Johnson et al., 2014). We present participants with scatterplot data. Next, participants are given four curves of varying polynomial complexity (linear, quadratic, cubic, quartic) and asked to choose which curve best represents the data. In some trials, participants chose between best-fitting curves, whereby the more complex curves had higher model fit. In other trials, the scatterplot data were randomly perturbed such that the complex curves no longer offered the highest model fit. When choosing between best-fit curves, participants generally preferred complex curves, regardless of conspiracy belief. When choosing between non-best-fit curves, however, increased belief in implausible conspiracy theories was associated with a tendency to choose more complex curves. Thus, people with stronger conspiracy beliefs consistently preferred complex curves, suggesting that they may have domain-general preferences for complexity.

THE LINK BETWEEN PROCRASTINATION, EMOTION REGULATION AND VIGILANCE

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Procrastination is the irrational delay of task completion. Previous studies have shown that students who frequently procrastinate present poor emotion regulation skills and difficulties with maintaining attention during task completion. However, none of these studies have investigated the role of emotion regulation in the relationship between a tendency to delay tasks and attention within the framework of attentional network and resource-control theories. The present study aimed to fill this gap by investigating whether the relationship between procrastination and attention can be mediated by emotion regulation skills. To achieve these goals we recruited 206 students, who completed questionnaires measuring procrastination and difficulties in emotion regulation along with the Attentional Networks Test for Interactions and Vigilance—executive and arousal components. The results showed that procrastination is inversely related to executive and arousal vigilance, and that the ability to regulate emotions fully mediates these relationships. Obtained findings suggest that implementing strategies of regulating one's emotional states may reduce procrastination-related attentional deficits.

Theme

LANGUAGE

PHONOLOGICAL PROCESSES IN WILLIAMS SYNDROME: STRENGTHS OR WEAKNESSES? A SYSTEMATIC REVIEW.

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Williams syndrome (WS) is a rare genetic neurodevelopmental disorder characterized by an atypical language profile, which is thought to be a strength in the cognitive profile despite the individuals' mild to moderate intellectual developmental disorder (Bellugi et al., 2000). However, the literature has no consensus on this claim (Thomas & Karmiloff-Smith, 2003). Consequently, there is a need for a state-of-the-art review of the phonological processes involved in the development of language skills in individuals with SW (Brock, 2007; Mervis, 2006). We conducted a systematic review using the PRISMA method and four databases (ScienceDirect, PubMed, EbscoHost and Web of Science). Several phonological processes were explored (e.g. phonotactic representations, phonological awareness). The results reveal the heterogeneity of the test groups, control groups and tasks used. This disparity makes it complex to compare findings across studies and may explain SW's heterogeneity and generalization difficulties. The implications of this work for research on WS are discussed in order to propose new research methodologies, based on a developmental perspective rather than a deterministic approach of a unique cognitive profile specific to WS.

HUNGARIAN SPEAKERS CONVERGE TO CONJUGATION PATTERNS IN NONCE VERBS

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We report on an online experiment in which participants play a word-matching game with a co-player. The game consists of variable verbal conjugations in Hungarian. Based on the co-player's previous picks, players have to anticipate its subsequent picks. Previous research shows that this type of morphological convergence works in English (Rácz et al 2020): if players see the co-player picking "wove" as the past tense conjugation of "weave", they can anticipate that the co-player will pick "hove" as the past tense of similar-looking "heave". Our results show that this works in Hungarian, a morphologically more complex language. Apart from replicating the English result, this points at the mediating role of the productivity, saliency, and transparency of morphological patterns in convergence and sheds further light on the role of lexical representations in language processing and production (Bybee 1988). References: Bybee, Joan L. "Morphology as lexical organisation." Theoretical morphology (1988): 119-141. Rácz, Péter, Clay Beckner, Jennifer B. Hay, and Janet B. Pierrehumbert. "Morphological convergence as on-line lexical analogy." Language 96, no. 4 (2020): 735-770.

THE IMPACT OF WORKING MEMORY LOAD ON THE SEMANTIC STROOP EFFECT

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During visual word recognition, semantic representations are dynamically processed via control mechanisms that match semantic information with task-relevant goals. Previous research analyzed the semantic Stroop task as a function of response speed (delta-plot analyses) and reported that the semantic Stroop effect was absent in the fastest responses and mainly occurred in the slowest ones. Here we investigated whether this pattern might reflect reduced efficiency in proactively maintaining the task goal in the slowest responses, with the subsequent emergence of semantic Stroop interference. Participants completed 2 semantic Stroop tasks: a classic semantic Stroop task and a semantic Stroop task combined with an n-back task. By taxing the executive control system, the n-back task should hinder proactive control. Delta-plot analyses of the semantic Stroop task replicated the enhanced effect

in the slowest responses. When the semantic Stroop and the n-back tasks were combined, the semantic Stroop effect did not interact with response speed, suggesting that, when few executive resources are available, interference has less chance to emerge. Results are discussed in terms of the balance between proactive and reactive control.

TRANSPOSED-CHARACTER EFFECTS THROUGHOUT READING ACQUISITION : WHEN DO LETTER AND NON-LETTER STRINGS PROCESSING BECOME DIFFERENT?

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Efficient reading requires the association of different letter identities with their positions in the written word, leading to the development of a specialized mechanism for encoding location-invariant letter position. In this study, we investigated the emergence and development of this location-invariant letter position mechanism, but also whether this mechanism is a consequence of the orthographic code or inherent to generic visual object recognition. To do so, we used the same-different matching task with children from Grade 1 to 5. Reference and target stimuli were composed of 4-characters strings (consonants, digits, geometrical forms) and could be identical or different by transposing or substituting two internal characters. Analyses of RTs and error rates revealed a generalized transposed-character effect, regardless of the type of characters in Grades 1 and 2, whereas transposed-character effects were greater for letter strings than for non-letter strings arising in Grade 3 and lasting up to Grade 5. These results suggest a letter-specific position coding mechanism that is a consequence of the orthographic code, which emerges once a certain reading experience is attained.

READING ABILITIES IN DEAF: INFLUENCE OF THE LANGUAGE SYSTEM ON THE CROWDING EFFECT

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There is evidence that deaf individuals present enhanced attention allocation to the periphery in low-level visual perception tasks. However, studies examining the impact of this redistribution of attention on the deaf reading skills are still scarce. The present study aims to explore how deaf and hearing adult readers identify letters and symbols in the periphery. To do so, we examined the crowding effect, the difficulty to identify a target object when surrounded by flankers, in a 2-alternative forced choice task. Letter and symbol characters were presented briefly in the right or in the left visual field, either in isolation or surrounded by two flanking characters. Two distinct language systems (English vs. Kannada) were moreover compared. While English is an alphabetic language with a linear visuo-spatial structure, Kannada is an Indian alphasyllabry language involving complex visuo-spatial assembly. Indeed, crowding manifested in both groups and in both languages. No periphery advantages were shown in the deaf group. However, deaf participants presented higher accuracy with Kannada letters while the hearing group performed better with English letters.

RAPID AUDITORY PROCESSING TRAINING IMPROVES LINGUISTIC AND NON-LINGUISTIC FUNCTIONS IN INDIVIDUALS WITH APHASIA

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Patients with aphasia (PWA) often present deficits in non-linguistic functions, such as executive functions, working memory, and Rapid Auditory Processing (RAP), which intensify the speech difficulties. Therefore, training of those functions may be useful in the treatment of aphasia. The present study compared the effects of the novel RAP-based Dr. Neuronowski® training method (experimental training) with the linguistic training (control training). Thirty-four PWA underwent linguistic and non-linguistic assessments: before and after the training. Patients were randomly assigned to either experimental or control groups.
The experimental training improved both non-linguistic functions (RAP, short-term and working memory) and linguistic functions: phoneme discrimination, sentence comprehension, grammar comprehension, verbal fluency, and naming. In contrast, the control training improved only grammar comprehension and naming. Thus, RAP training appears to have broader benefits for linguistic and non-linguistic functions than does linguistic training. This provides evidence that Dr. Neuronowski® is a powerful tool with promising clinical application. Supported by National Science Centre, Poland, grant number: 2016/21/B/HS6/03775.

THE COUPLING BETWEEN EYE ACTIVITY AND AFFECTIVE SPEECH

Sümeyye Şen Alpay[1], Christian Keitel[1], Anne Keitel[1]; *[1]University of Dundee*

Speech tracking refers to the coupling between an internal rhythm and temporal regularities of speech acoustics. While speech tracking has often been studied in relation to brain activity, recent findings suggest that listeners' eye activity can also been attuned to tracking these regularities. Importantly, ocular speech tracking has been shown to be more robust for attended speech, suggesting that the process is modulated by attentional mechanisms. Here, we analysed simultaneously recorded eye tracking and electrooculogram (EOG) data to investigate eye responses during listening to affective naturalistic speech. Mutual information (MI) analysis reveals that the acoustic speech signal is tracked by eye movements in different frequency bands. When linking the strength of ocular speech tracking to arousal and valance ratings of speech material, we show that MI values were modulated by higher arousal ratings. This finding is consistent with previous studies suggesting that affectively salient stimuli are prioritised in attention and perception. Taken together, our results highlight the role of eye activity for auditory speech processing and reveal differential ocular speech tracking patterns in response to affective speech.

INVESTIGATING METHODOLOGIES AND OUTCOMES OF VOCABULARY RESEARCH FOR YOUNG DEAF POPULATIONS

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Development of vocabulary size in deaf/hard-of-hearing (DHH) children and adolescents can be delayed compared to their peers due to lack of access to early language input. We reviewed the effectiveness of complementary vocabulary instructions in previous research conducted with experimental methods for vocabulary improvement of this population. We searched five databases for peer-reviewed journal articles in English published between 2000-2022 (inclusive), reporting vocabulary interventions for two- to 18-year-old DHH children and adolescents without comorbidities. We followed Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines. Our protocol was pre-registered in PROSPERO with ID CRD42021243479. We conducted three meta-analyses on receptive, expressive oral vocabulary and signed vocabulary and assessed methodological quality. Our results showed that 25 included studies revealed risk of bias ranging from some concerns to high risk. We found that vocabulary instructions helped improvement in receptive, expressive oral vocabulary and signed vocabulary in experimental groups. Methodological quality should be considered while interpreting these results and in designing future vocabulary research.

NON-BINARY MORPHOLOGICAL FORM IN TWO SPANISH-SPEAKING POPULATIONS: A PSYCHOLINGUISTIC STUDY

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The use of gender-inclusive language has spread considerably across different communities with diverse strength. In Spanish, one of the most widespread proposals is the use of the non-binary morphological variant [-e]. We developed a reading task to evaluate the processing of this variant in two different Spanish-speaking communities. With a 2x2x2 design, we presented sentences with stereotypically masculine (i.e. blacksmiths) and stereotypically feminine (i.e. nurses) role names to participants from Chile and Argentina. We considered three experimental hypotheses: a) the role names' stereotypicality will influence the processing; b) women will present shorter reading times (based on previous evidence that women tend to use non-binary forms more frequently); c) participants from Argentina will have shorter reading times (based on the greater diffusion of the non-binary variant in Argentina). The analysis of reading times did not show an effect of stereotypicality, nor of participants' gender identity, or nationality. However, we did find an interaction between stereotypicality and gender identity among Argentinian participants, but not among Chilean participants. This could be linked to different sociolinguistic patterns of use.

CONTRASTIVE LEXICALITY EFFECTS WHEN REPORTING LETTER REPETITIONS COMPARED TO LETTER SUBSTITUTIONS ACROSS ORTHOGRAPHIC STRINGS

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Though detecting stimulus repetitions or substitutions might seem antithetical descriptions of the same task, they involve different cognitive processes. Repetition detection is slow-serial, and substitution detection efficient-parallel. However, this task asymmetry has been demonstrated when comparing arbitrary stimulus sets involving detection of physical similarity/difference (sets of colours or consonant strings in matched case; see Hyun et al., 2009). It is unclear whether the asymmetry persists when, e.g., comparing orthographic stimuli in unmatched case, or meaningful stimuli. To test this, 4-letter string pairs were presented. Participants (n =32) were split into two groups: One detecting presence/absence of letter repetitions across the strings, the other, presence/absence of letter substitutions. Compared strings were either words, pseudowords or nonwords. Responses were modelled using Bayesian-DDM. Overall, substitution detection was more efficient but also showed greater sensibility to the lexicality manipulation than repetition detection. Results are discussed in terms of implications for visual word processing and the generality of stimulus comparison processes.

LINKING L1 PHONEME CATEGORIZATION TO NON-NATIVE PHONETIC LEARNING: THE ROLE OF GRADIENCY

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Listeners differ in how they categorize L1 speech sounds: some exhibit higher sensitivity to subphonemic differences (i.e., gradiency) than others. Here we examine the links between L1 gradiency and non-native phonetic learning using a pretest-posttest design. We trained native Spanish speakers on a novel phonetic contrast. We first collected behavioral measures of gradiency in an L1 contrast (Spanish /b/-/p/). Then, we assessed the (baseline) discriminability of a novel phonetic contrast (English /b/-/p/) using the mismatch negativity (MMN) EEG component. Participants were then trained on the novel contrast over a period of two days. Finally, we collected a second (posttest) discriminability measure using the MMN. We wish to see if L1 gradiency enhances non-native phonetic learning, and whether higher L1 gradiency is linked to higher non-native gradiency. Preliminary results suggest that even though gradient versus categorical listeners exhibit different discriminability patterns, these differences do not predict success in learning the novel contrast. If this pattern holds, it would indicate that higher gradiency may affect how listeners learn non-native phonetic contrasts, but this may not necessarily lead to better learning.

DOES A MISMATCH ON ACCENTUAL CUES AFFECT THE MAGNITUDE OF THE SHORT-TERM REPETITION PRIMING EFFECT? AN ERP INVESTIGATION IN FRENCH

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Primes that mismatch the targets on a phoneme (/deb**a**/-/deb**y**/) should produce responses intermediate between repeated primes (/deby/-/deby/) and unrelated primes (/kotɔ̃/-/deby/). But what about for primes and targets that mismatch on accentual cues (/de**by**/*unaccented* - /de**'by**/*2nd accented syllable*)? We recorded ERPs while participants performed a go/no-go semantic categorization task. 50 ms ISI separated the primes and targets. A repetition priming effect was observed on the N400 component with repeated primes eliciting less negativity than unrelated primes. As expected, a partial repetition priming effect was observed when the primes and targets mismatched on a phoneme. Phonemic-mismatch primes elicited less negativity than unrelated primes, and more negativity than repeated primes. In contrast, no difference was observed between the repeated and the accentual-mismatch primes. Hence, although a mismatch on phonemic cues has a detrimental impact on the short-term repetition priming effect, a mismatch on accentual cues has no consequence. This finding reinforces the view of an abstract lexicon in which acoustic details irrelevant for identification are stripped away before making contact with lexical representations.

EFFECTS OF EARLY FOREIGN LANGUAGE EXPOSURE PROGRAMS ON CHILDREN'S COGNITIVE DEVELOPMENT: A SYSTEMATIC REVIEW

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Despite the studies conducted during the 20s-50s claiming that exposing children to a foreign language produced several cognitive disadvantages, the neuroscientific research accumulated in the last decades challenged this view. A considerable amount of evidence suggests that being exposed to two or more languages from early infancy conveys benefits to cognition that extend beyond the language domain. Thus, it is not surprising that a growing interest in exposing young children to foreign language programs has emerged. Nevertheless, studies exploring the benefits of such programs are scarce and present controversial results. This review aims to identify: (1) what programs already exist; (2) cognitive measures that have been used; (3) effects of such programs in cognition. Results indicate that children enrolled in this type of programs obtain considerable improvements regarding foreign language development, without compromising native language development. Moreover, gains in terms of executive functioning have also been reported. Yet, more research with convergent methodologies ought to be conducted, considering the effects of possible confounding variables (e.g., age of acquisition, proficiency levels, socioeconomic status, etc.).

LANGUAGE USE INFLUENCES IMMANENT JUSTICE THINKING

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Imagine reading a news article about a person who had an extramarital affair and was later involved in a freak car accident. Would you think that the person's extramarital affair caused the accident? Although it is irrational to assume that a person's bad deeds cause them to experience misfortunes, people often make such causal connections. This is known as immanent justice thinking and is thought to be rooted in the intuition that people get what they deserve. Based on previous research showing that reading information in a proficient foreign language instead of a

native language sways intuitive thinking, we predicted that language choice could affect immanent justice attribution. In three pre-registered studies involving native Italian and native German speakers (N = 863), we found that presenting scenarios in foreign English increased immanent justice attribution compared to presenting them in the native language. Furthermore, we found that this language effect was more pronounced in participants who rated themselves as more religious. Our results demonstrate that language choice can affect the way we process information and can alter our judgments.

INVARIANT REPRESENTATIONS IN GROUNDED COGNITION THEORIES: THEORY AND EVIDENCE

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We review and test theories of grounded cognition (GC) and their predictions about invariant representations (e.g., representations of momentum, gravity, friction), hypothesizing that abstract concepts can be grounded in these. Invariant representations form an integral part of object representations like other attributes such as an object's weight or position. E.g., a flying ball is not represented just as heavy and left, but also as having momentum. GC approaches examine how abstract concepts gain meaning, positing that abstract concepts consist of experiential representations (e.g., of sensorimotor states). This view would therefore predict that invariant representations, similarly experiential, should also ground concepts. Yet, GC theories and experiments consistently neglect invariant representations. We discuss this gap, forming an outlook for future research. Furthermore, we test this hypothesis using a surreptitious measure of two objects' perceived momentum, one successful, another non-successful. Indeed, the object described as successful is perceived as having more momentum. This suggests that the abstract concept of success is grounded in the invariant momentum.

STATISTICAL LEARNING IN ACQUIRING THE ALPHABETIC CODE: A STUDY IN CHILDREN AT RISK FOR READING DISABILITY

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Statistical learning (SL), i.e., the ability to extract regularities from the environment, is assumed to be involved in reading acquisition. Vazeux et al. (2020) found that SL might occur in learning letters-to-syllable association to facilitate the acquisition of the alphabetic code. Guo et al. (in preparation) showed that a small set of letters-to-syllable associations with more information regarding grapheme-phoneme-correspondence (GPC) regularities (a "rich" orthographic environment) led to better phonemic awareness in prereaders than a set of associations with less information (a "poor" orthographic environment). In this study, prereaders with low socio-economic backgrounds who are at risk for reading disability were assigned into two groups and taught respectively two sets of syllabic associations designed and used by Guo et al. (in preparation). Tests were administered to assess children's letter knowledge, syllable reading, and phonemic awareness before and after training. From a pedagogical perspective, we examine whether training in a rich orthographic environment would help children at risk for reading disability extract GPC regularities and facilitate access to the alphabetic code.

THE STATISTICAL READER: A STATISTICAL LEARNING THEORY OF READING PROFICIENCY ACROSS WRITING SYSTEMS

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A statistical learning theory of proficient reading assumes that reading experience leads to a deep assimilation of the statistical structure of a writing system, enabling effective predictions on-the-fly, thus facilitating eye-movement behavior. By this view the expert reader is not just an efficient decoder but also an efficient *predictor* of what orthographically is expected next. We examined whether uncertainty regarding words across different landing positions determines ocular movements in English, Spanish, and Hebrew. For each landing position from first to last letter, we calculated the expected uncertainty about what the word is, assuming neurobiological constraints of the visual system. Our findings demonstrate that the three writing systems systematically differ in the amount of uncertainty they impose on their readers in general, and in different landing positions in particular. Importantly, our results show that readers through statistical learning modulate their ocular movements given how uncertainty unfolds within words in their language, and that this explains substantial variance in reading behavior. The implication for a theory of reading proficiency will be discussed.

HOW DO PEOPLE DISCRIMINATE CONVERSATIONS GENERATED BY HUMANS AND ARTIFICIAL INTELLIGENCE? THE ROLE OF INDIVIDUAL VARIABILITY ON PEOPLE'S JUDGMENT

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Artificial intelligence (AI) has greatly improved, leading to models that produce realistic texts hard to distinguish from human text. This study aimed to explore how well people can distinguish text generated by humans or AIs and which features they use to do so. Participants completed an online experiment assessing conversations generated by humans or AIs. We used two different humans and two AIs (GPT-3 and Mitsuku) and assessed the effect of the agent on participants' ratings and accuracy in discriminating humans and AIs. A significant effect of agent on both ratings and accuracy emerged. Ratings were significantly higher for conversations produced by humans than AIs. Accuracy was 70% for humans, 49% for Mitsuku and 40% for GPT-3, indicating that participants often mistook this AI for a human. 72% participants deemed deciding between human and AI difficult; 66% used a rule to decide. Interestingly, the same feature prompted some people to decide for a human and others for an AI, although other aspects were distinctive for one or the other. High variability among participants in the features used to discriminate humans and AIs emerged. This should be considered when developing chatbots and robots designed to interact with humans.

ADAPTIVE PROCESSING IN WORD PRODUCTION: REPEATED NAMING REDUCES SEMANTIC COMPETITION

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Adaptive models of word production hold that lexical processing is shaped by recent production episodes so that competitor words which are semantically related to a selected target word (e.g., "cherry" or "grape" for target "apple") become less accessible for future retrieval. We put this assumption to a novel test in two picture-word interference experiments which looked at semantic interference (longer picture naming latencies with a semantically related distractor word than an unrelated distractor word) and its development over repeated naming. Across two times of measurement, semantically related distractor words were either identical (fixed target-distractor mapping, e.g., either "cherry" or "grape" for target "apple" on both times of measurement) or different (variable target-distractor mapping, e.g., "cherry" on first time of measurement and "grape" on second time of measurement). Semantic interference was reduced at the second time of measurement for both fixed and variable target-distractor mapping. This generalization to new target-distractor combinations provides strong novel support for the notion of production dependent changes in lexical accessibility as captured by adaptive models of word production.

NOVEL VISUAL WORD LEARNING TRACKED WITH FPVS-EEG

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Recently frequency tagging with EEG recordings proved efficient to measure the neural basis of visual word recognition. Here we investigate the emergence of neural representations for novel words acquired with orthographic and semantic learning methods. We used fast periodic visual stimulation (FPVS) displaying pseudowords at 10 Hz with deviant words every 5 stimuli, to test 32 adults before and after a learning task of 32 rare unknown French words (16 with each method). EEG results show a significant learning effect, with larger word-selective responses over the left occipital-temporal cortex at post-test with both methods. Moreover, behavioral lexical decision data reveal significant increases in reaction times for novel words' lexical neighbors and for 1-letter close pseudo-words, suggesting competition effects arising with new lexicalizations. However contrary to our expectations, those effects seem stronger for the orthographic method. This might indicate that the semantic method, implemented here by simultaneous image and word presentation during learning, drags the participant's attention away from the orthographic form. Our findings open new perspectives to track novel word learning using EEG.

NEUROPHYSIOLOICAL EVDENCE OF ZERO MORPHEME PROCESSING: AN MEG STUDY

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So-called zero morphemes are a theoretical construct which implies morphological elements with an abstract syntactic function but no overt phonological or orthographic representation. Whilst it is useful in purely linguistic frameworks, its neurocognitive reality remains uncertain. To address this, we conducted an MEG experiment recording passive auditory brain responses to Russian pronoun-verb phrases. The phrasal stimuli included correct/incorrect gender agreements that incorporated both zero (Ø) and overt verbal affixes (e.g., "on kupil-Ø / he boughtMASC" vs. "ona kupil-a / she boughtFEM" vs. "*on kupil-a / *he boughtFEM") and single verbforms with preceded filled hesitation pause as a control ("kupil-

Ø / boughtMASC"). Brain responses to zero morpheme agreement violations were stronger than those to correct phrases (p = .002), indicating morpheme pre-activation by the early automatic morphosyntactic priming mechanism (Shtyrov et al., 2003). This effect had a left-frontal distribution and was expressed from ~200 ms after the verbal gender affix onset. It can be attributed to the ELAN component, known to reflect early automatic syntactic processing, thereby confirming the neurocognitive reality of zero morpheme representation.

CHALLENGES IN EARLY DETECTION OF CHILDREN AT RISK FOR ORAL LANGUAGE DISORDERS: THE POTENTIAL OF SPEECH PROCESSING TECHNOLOGIES

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To address the challenges of early detection, past research has attempted to identify early predictors of adverse language trajectories and to improve early screening tools for at risk children. In addition, the crucial role of early home language environment in leveraging subsequent language development has been increasingly acknowledged. Automatic speech processing technologies have recently allowed researchers to collect daylong naturalistic recordings and obtain various ecological measures on a child's language development and environment. The objective of this meta-analytic review was to assess whether these technologies, such as the most widely used Language ENvironment Analysis, might be promising tools to enhance early identification of children at risk for oral language disorders. A systematic search for records reporting on associations between automatic measures of language environment and language skills in children younger than 6 years old was performed. Results on the strength of this association across different language domains will be presented. Possible implications will be discussed in an attempt to define whether a recorder is the solution to address the current challenges of early detection.

EXPLORING THE ROLE OF INTERLOCUTOR IDENTITY ON SOCIAL ATTENTION

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Eye-gaze stimuli can elicit orienting of attention in an observer (gaze-cueing -GC- of attention). Increasing evidence has shown that social-factors modulate this phenomenon. At the same time, language has recently been considered a critical cue for social categorization. Here, we explored the role of linguistic-identity in the GC effect. Italian-native participants were familiarized with Caucasian faces together with auditory sentences. Half of the faces were associated with Italian (native) and the other half with an unknown language (Albanian-Exp1-N=48; Basque-Exp2-N=48). Participants then performed a GC task using the faces as cueing-stimuli. The auditory sentences were then presented again, and participants decided which face uttered each sentence. Results showed that participants categorized faces according to the language they spoke, replicating the role of language in social categorization. Further, results revealed a greater GC effect for 'Italian' vs. 'Albanian' identity (Exp.1), while similar GC effects were observed between 'Italian' and 'Basque' identities (Exp.2). Results will be discussed also considering: a complementary attentional mechanism (holding) and another social-factor: the trustfulness of the speaker.

TO ADD OR REMOVE? INVESTIGATING THE EFFECTS OF DIACRITICAL MARKS ON VISUAL-WORD RECOGNITION IN GERMAN AND FINNISH

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This study examined the role of diacritical marks during word recognition in two transparent orthographies (German and Finnish), where diacritical marks differentiate vowel sounds. Our aim was to test whether the addition of a diacritic (e.g., Kätze vs. Katze [cat]) would result in a larger cost relative to the intact words than the removal of a diacritic (Kröte [toad] vs. Krote) in semantic categorization experiments. Perceptual accounts predict an asymmetric pattern: removing a diacritical mark incurs a lower cost than its addition, as occurs in masked priming experiments (e.g., Katze-KATZE < Kätze- KATZE; Krote-KROTE = Kröte-KRÖTE). In contrast, abstractionist accounts predict a comparable cost in both cases. To test these hypotheses, participants were presented with intact words and misspelled words (either with an added or omitted diacritic). Results showed a reading cost for both misspellings in both languages. Importantly, the magnitude of the cost was roughly the same for the two types of misspellings. Thus, the initial perceptual asymmetries in word processing that may occur in masked priming do not persist in later lexico-semantic stages, where abstract codes dominate.

COMPARING PHONEME CATEGORIES BETWEEN PRODUCTION AND PERCEPTION IN WORD PRODUCTION WITH FMRI

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Phonological processing in word perception vs. production is the focus of this study. Two groups of models make distinct predictions on the brain regions involved across the language modalities: (1) Partial Separation Models (PSM) assume both frontal and temporal regions are recruited in production, but only temporal regions – in perception; (2) Integration Models (IM) assume the same fronto-temporal network to be recruited across modalities. In the current fMRI study we are contrasting these models by comparing minimal phonological pairs (e.g., bilabial: "ballon" vs. alveolar: "talon") within the same participants performing picture naming and passive listening tasks. We've performed a region of Interest (ROI) analysis in the motor and auditory cortex to assess the presence (PSM) or absence (IM) of an interaction between phoneme and modality. Bilabial-initial words, both in production and perception, elicited more activation in the lip-associated ROI compared to the tongue-associated one, and vice versa for the alveolar-initial words. This result may indicate that phonological networks are shared across the language modalities.

HILEX – A QUICK TEST TO MEASURE LEXICAL PROFICIENCY IN HINDI

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Research indicates that assessment of language proficiency through objective measures correlates better with their performance in experimental tasks as compared to self-report measures (Khare, et al., 2013). We present HiLex, a tool for quick and objective assessment of lexical knowledge of Hindi. In a self-paced lexical decision task, 280 participants (187 L1, 93 L2; 183 M; 93 F; 4 X) were presented with 180 items (120 words, 60 pseudowords) on the centre of the screen and were asked to indicate if an item is an existing word in Hindi. The words were drawn from a distributed range of frequencies from the Shabd corpus (Verma et al., 2022). The suitability of each stimulus was assessed by using Item Response Theory (IRT) analysis and their point-biserial correlation with overall accuracy. Finally, 40 words and 20 pseudowords were selected and included in a list of 60 items. Scores on HiLex were obtained by accounting for accuracies on an unequal proportion of words and non-words. In further investigations, we find that HiLex scores were highly correlated with participants' age, the number of years of experience with Hindi, their education level and also their self-rated proficiency in Hindi.

EYE MOVEMENTS IN FRENCH DYSLEXIC ADULTS DURING READING ALOUD TEXTS OF DIFFERENT DECODING DIFFICULTY

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Dyslexia is a learning disability of debated etiology, which includes both visual and phonological deficiencies. In this study, we simultaneously recorded eye movements and voice utterances from both dyslexic and non-dyslexic university students during the reading of a meaningful and a meaningless text, both used as screening tools for dyslexia in France. Preliminary data showed that dyslexic participants made more reading errors, had longer reading time and made more fixations and more saccades of larger amplitude compared to the control group with both texts. However, their fixation time was longer only when reading the meaningless text. These results may indicate that atypical eye movements become more pronounced in dyslexics when reading depends on grapheme to phoneme decoding, i.e., in the case of the meaningless text, even if we are dealing with university students. These findings may indicate that both visual and phonological impairments may be implicated in dyslexia.

THE CONTRIBUTION OF PHONOLOGICAL AS OPPOSED TO SERIAL ORDER SHORT-TERM MEMORY TO SECOND LANGUAGE NEW WORD LEARNING

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The role of short-term memory (STM) in new word learning remains unclear. This study investigates whether the importance of STM for phonological information relative to STM for serial order information in second language (L2) word learning varies as a function of first language (L1)-L2 phonological overlap. A total of 140 Grade 3 primary school Arabic-English bilingual children with a mean age of 8.59 years old participated in this study. A series of tasks were provided to test children's L1 and L2 phonological perception and STM, serial order STM, and L2 novel word learning ability. The results of hierarchic regression show that STM for L2 phonology and for serial order made a unique contribution to L2 novel word learning. L1 phonological STM predicted the learning of L2 novel words with non-overlapping phonemes in L1 even when serial order STM was controlled. The effect of serial order STM on the learning of L2 novel words did not vary as a function of L1-L2 phonological

overlap; whereas the effects of phonological perception and STM on the learning of L2 words with non-overlapping L1 phonemes were more than twice as large as on the learning of L1-L2 phonological overlapping words. The implications for L2 learning are discussed.

PERCEPTUAL STRENGTH NORMS FOR 5,500 SPANISH WORDS

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Many current theoretical approaches in cognitive psychology emphasize the importance of sensorimotor information in cognitive processes. This idea has led to the development of research into variables related to the sensorimotor properties of concepts. This has facilitated the study of their semantic representation and, in general, has aided the design of experiments. In the present study, perceptual strength ratings were collected for a total of 5,500 Spanish words from a sample of more than 600 participants, who had to rate the degree to which they experienced a concept through each sensory modality (sight, hearing, smell, taste, and touch). Comprehensive descriptive analyses of this large dataset of modality-specific norms are provided. In addition, to further study the implications of these variables for conceptual processing, correlational and regression analyses were run, including intercorrelations among the five modalities, as well as their relations with other well-known psycholinguistic, affective, and sensorimotor variables. The present norms constitute a potentially useful tool for cognitive science researchers, especially for those interested in studying the role of sensorimotor information in human cognition.

PHONEMIC PERCEPTION IN MULTILINGUALS: AN ERP STUDY

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Previous ERP studies focused on pre-attentive phonemic perception observed reduced discrimination mechanisms in the L2 when compared with the L1 (Jakoby, Goldstein & Faust, 2011; Liang & Chen, 2022; Song & Iverson, 2018). What remains unexplored is a wider picture on how multiple languages interact in the same speaker, with possible differences between the first foreign language (L2) and next one (L*n*). The aim of the current ERP study was to investigate phonemic perception mechanisms in multilingual participants, whose L1 was Polish, L2 was English, and L*n* was Norwegian. They were exposed to selected vowel contrasts in their L1, L2 and Ln presented within the oddball paradigm. For all three languages, we observed the Mismatch Negativity (MMN) as a reaction to deviant stimuli (Näätänen et al., 1997). We hypothesized that the response to the change would be deficient for non-native languages when compared to L1, and this hypothesis was confirmed. In addition, have observed differences between L2 English and L*n* Norwegian, which suggests that foreign language status as L2 or L*n* modulates auditory language processing.

IS FOREIGN-ACCENTED SPEECH LESS CREDIBLE? EVIDENCE FROM THE ILLUSORY TRUTH EFFECT

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Foreign-accented (FA) statements are judged as less credible than native-accented (NA) statements. At the same time, the repetition of a statement makes it sound more truthful (Illusory-truth effect). Here, we explore the interaction between these two phenomena in a between-participant design. 10 native-Italian (Exp.1) and 10 foreign-Italian (Exp.2) speakers uttering 80 statements were recorded. Speakers' voices were rated by 109 participants on several social dimensions (e.g. status, desirability). In the main experiment, 60 Italian-speakers (30 per experiment) listened 40 unknown-sentences. After few minutes, the same set-of-sentences (Old-condition) were presented together with a new set of 40 sentences (New-condition) and participants assessed the truthfulness of the statements on a 6-point-scale. Higher truthfulness rates for Old compared to New sentences were observed, replicating the illusory-truth effect. There was no interaction between the experiments, suggesting a similar amount of illusory-truth effect for FA and NA statements. No modulations of the social dimensions of the speaker's voices were observed. Overall, our results challenge previous results on lower truthfulness rates for foreign-accented speech.

THE EFFECTS OF LOCAL AND GLOBAL ALPHABET CONTEXT ON CODE SWITCHING IN WORD RECOGNITION

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It is often observed that switching between languages induces a processing cost. We investigated whether switching between two alphabets engenders an analogous cost. We used Serbian as the. testbed language as it can be written in two alphabets – Cyrillic and Roman. We presented 271 participants with a mixed-alphabet visual lexical decision task (VLD). All letter stings could be pronounced in two ways (bivalent). Half were interpretable as words in Roman (*PETAK* /petak/ meaning *Friday*, but meaningless in Cyrillic /retak/), and half were interpretable as words in Cyrillic (*CAJAM* /sajam/ meaning *fair* but meaningless in Roman/tsajam/). Prior to the mixed alphabet VLD, participants encountered an

alphabet induction phase with instructions printed in either Roman or Cyrillic alphabet and a single-alphabet VLD. The (global) phonological ambiguity effect (Feldman & Turvey, 1983), i.e. the processing disadvantage for phonologically bivalent stimuli was observed for both words and pseudowords. In addition, for words, we observed a significant effect of local alphabet context and it was marginally modulated by the global alphabet context. We conclude by drawing parallels between code switching in bilingualism and bialphabetism.

WORD ORDER PRIMING WITH GERMAN DATIVE EXPERIENCER VERBS

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The locus of structural priming is often considered to be an abstract constituent structure, but there is growing evidence that priming at other levels, such as information structure, also plays a role. Here, we tested structural priming in German, using sentences with dative experiencer verbs. These sentences alternate between the order of their constituents (i.e., Dat-V-Nom vs. Nom-V-Dat), such as *das Buch gefällt dem Mann– dem Mann gefällt das Buch.* These alternants differ in the order of their thematic roles, but not in their syntactic structure. We conducted an online written priming experiment, where a dative verb and two bare nouns were shown in a triangle (balanced for position). In the prime sentence, one noun was colored blue. The participants (n=48) were instructed to form a grammatical German sentence using these three words, and when a word was blue to start with that word. There was always one animate and one inanimate noun to disambiguate the dative experiencer. There was a preference for Dat-Nom order, which can be explained by animacy. Importantly, there was a significant priming effect of 8%. These findings suggest information structure (possibly emphasis on thematic roles) as a locus of structural priming.

DOES SEMANTIC DISTANCE AFFECT READING? AN EYE-TRACKING STUDY ON SPANISH

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Sentence constructions differ in the range of lexical items they occur with, i.e., in syntactic productivity. The Spanish inchoative construction, which expresses the onset of an event (e.g., *romper a llorar*, lit. 'break to cry'), is very productive: many verbs can fill both the inchoative verb and the infinitive slots. But how extensible are constructions? Here we ask whether reading is hindered when the infinitive slot is filled by verbs that usually do *not* occur with the inchoative, and whether this effect depends on their semantic closeness to typical infinitives. We recorded eye movements of 66 native Spanish speakers as they read sentences (45 critical, 185 filler items). In the baseline condition, inchoatives and infinitives co-occurred frequently in a corpus. The close and the distant condition had low co-occurrence frequency but differed in the semantic distance of the infinitive. Low frequency yielded longer total reading times in the close than in the baseline condition. We also observed longer regression-path durations in the distant but not in the close condition compared to the baseline. In conclusion, data suggest that semantic closeness reduced the frequency effect, thus enhancing the construction's extensibility.

INVESTIGATING SOCIAL GROUNDING OF ABSTRACT WORDS

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Semantic representation of abstract words is a subject of debate in embodied cognition framework as they are more detached from the sensory world than concrete ones. Several theories have proposed the involvement of emotional, linguistic, and social experience in representation of abstract words (Borghi et al., 2018). In our work we focus on a latter variable, since little to no empirical research has been dedicated to exploring whether (some) abstract words are indeed associated with richer social experience. To this end, we conducted two semantic categorization tasks (explicit and implicit) in two languages (English and French). Our goal was to observe the effect of socialness on word categorization and its interaction with concreteness. Our results show that in contrast to high concreteness that produces strong facilitation effect in both tasks, high socialness impacts the recognition of neither abstract nor concrete words. Based on these results we conclude that we find no evidence that socialness may be a variable along which abstract words are grounded. However, to reach a solid conclusion, we are running two similar experiments manipulating emotional valence — a variable known to influence processing of abstract words.

WORD DIFFICULTY, BUT NOT SENTENCE BOUNDARIES DETERMINE THE ACCURACY OF REGRESSIVE SACCADES IN READING

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We report research examining effects of lexical word difficulty and sentence boundaries on the control of long-range regressive saccades during reading. Participants were asked to read single-line sentences in German for comprehension. The re-inspection of target words was triggered using a secondary task of checking for a spelling error that was inserted when the eyes had reached the end of the line. When words were more difficult in terms of

orthographic irregularity and lower frequency, this dramatically increased the efficiency of regressing back to these words in terms of fewer saccades needed and less time spent. In contrast, the presence of sentence boundary (two short sentences vs. the clauses connected by and), altered eye movements during initial reading, but made no difference for long range regressions. The data suggest that the reading of difficult words may be related to establishing a more stable representation in visuo-spatial memory that can help to move back more successfully when required to maintain comprehension.

UNRAVELLING WORD RECOGNITION IN SPANISH: A LARGE LEXICAL DECISION MEGA-STUDY CONSIDERING PSYCHOLINGUISTIC VARIABLES AND INDIVIDUAL DIFFERENCES

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We present a large-scale lexical decision mega-study to examine word recognition in Spanish. With 7,500 words and 970 participants, this is the most extensive speeded lexical decision study in Spanish to date. Words were characterized by multiple lexical, semantic, and emotional psycholinguistic variables (e.g., concreteness, emotional valence, age of acquisition, frequency, neighborhood density). Furthermore, individual differences such as age, gender, language background and personality factors were considered. All these variables were included in the analyses as predictors of lexical decision response times and errors. The data were analysed using mixed linear models and Bayesian factors, revealing robust effects of word and participant variables, as well as interactions within and between them. Altogether, the results of the present study advance our understanding of the role of psycholinguistic variables in word recognition in Spanish and highlight the importance of considering individual differences in word recognition research. In addition, the present study supports the validity of the mega-study approach for psycholinguistic research and may help to resolve inconsistencies found in previous studies.

THE INFLUENCE OF COGNITIVE ABILITIES ON SECOND LANGUAGE LEARNING

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The role of cognitive abilities in second language learning remains unclear, especially concerning children and young adolescents. Whereas some studies report a relationship between cognitive skills, such as working memory and phonological awareness, and L2 learning, others argue against this association. Here we present a systematic review and a meta-analysis of studies that explore the influence of cognitive abilities on children's second language learning in the formal educational system. Twenty-two studies provided information regarding which cognitive skills appear to have an impact when monolingual children and young adolescents learn a second language explicitly in school. Overall, in the preliminary results, we observed that the factor that seems significantly to impact learning a second language is working memory and its subsystems, namely visual-spatial memory, short-term memory and short verbal memory. Likewise, the results indicate higher correlations between phonological awareness, word decoding and specific language proficiency skills, such as reading or writing. In conclusion, it appears to be a correlation between cognitive abilities and L2 learning in children and young adolescents.

MULTIMODAL INFORMATION CONTRIBUTION TO LANGUAGE COMPREHENSION IN NATURALISTIC SETTINGS: EEG EVIDENCE

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Daily communication contains rich multimodal cues. For instance, prosodic stress in auditory modality highlights a word and facilitates its comprehension. Gesture in visual modality can convey meaning, emphasis or pragmatic information. This EEG study investigates the contribution of multimodal cues in the comprehension of fully naturalistic dyadic interactions, using N400 to index processing difficulty. Words in each passage were quantified for linguistic predictability, prosodic stress and gestures. Results showed that less predictable words elicited larger N400, indicating more difficult processing. While meaningful gestures and prosodic stress (without gestures) reduced N400, emphatic (beat) gestures enlarged N400. Further, gestures enhanced predictability effect, enlarging the N400 effect, potentially by increasing attention to speech. Our study demonstrates multimodal information's role in naturalistic language comprehension, highlighting complex interactions between linguistic, prosodic, and gestural information.

EMBODIED PRACTICE AND VOCABULARY ACQUISITION IN FRENCH KINDERGARTEN CHILDREN

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According to embodied cognition, using co-speech iconic gestures (IG) supports L2 vocabulary learning in adults and children. The present study addressed this question in L1 with French kindergarten. Children had to learn 30 new words, 15 verbs and 15 nouns separated in 3 lists, through 3 conditions: using pictures (P) and using IG either by visualizing (V-IG) or by visualizing and reproducing IG (VR-IG). Words were presented through videos and training took place with groups of 3-4 children to reproduce the group dynamics of classroom. Participants were tested individually with word production (recall and denomination), word comprehension (recognition) and word meaning (definition) tasks immediately and 7 and 21 days after the end of the training. Results indicated that more words were significantly recalled and recognized in VR-IG than in P and V-IG conditions. This effect was also observed on the long-term measures. No beneficial effects of VR-IG over P and V-IG emerged for denomination task. Interestingly, for word meaning skills, we observed an interaction effect between conditions and vocabulary level of children assessed at the beginning of the study : IG were more effective for children who had a higher vocabulary level.

GRAMMATICAL GENDER AND PARTICIPANT SEX INTERACTION IN LEXICAL ACCESS AND EMBODIED PERSPECTIVE TAKING

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Although the processing of grammatical gender has been studied extensively, research has largely overlooked the effects of participant sex. We review findings from three experimental paradigms where a gender-sex interaction emerged, first for visually presented nouns reflecting a bias toward one's own grammatical gender "counterpart" (especially for women) in a cued shadowing task and a gender monitoring task. Second, we found response latencies' sensitivity to gender-sex congruence in the auditory processing of verbs and adjectives concerning speaker voice sex in addition to effects of participant sex on accuracy and latencies. Third, gender-sex congruence affected the embodied processing of first-person sentences and images with an internal or external perspective in a picture-sentence verification task. Whereas internal and external perspectives were not differentiated in the gender-sex congruent condition, in the gender-sex incongruent condition internal perspective incurred large processing costs. These findings are discussed in terms of embodiment specificity accounts, individual differences and the experiential basis of grammatical information processing.

REGULARITY IN EYE MOVEMENT DATA PREDICTS COMPREHENSION DURING TEXT READING

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The hypothesis of Reading Time Regularity (RTR; Wallot, 2016) states that regularity contained in measures of the reading process is informative about higher-cognitive processes. We tested this very assumption by investigating eye movements and comprehension during text reading. To this end, 37 participants read three short stories at a comfortable pace, as fast as possible, and as accurately as possible while their eye movements were recorded. Each story was followed by a comprehension assessment consisting of wh-questions and yes-/no-statements. Fixations and gaze steps were extracted. Time series were then subjected to recurrence quantification analysis. Recurrence measures predicted participants' text comprehension scores, thus, yielding evidence in support of RTR. However, while reading instruction affected yes-/no-statements, it did not improve model fit for wh-questions which opens up a discussion about the adequacy of the different item types regularly used in reading research. Furthermore, the number of fixations predicted comprehension scores replicating findings by Southwell and colleagues (2020). More research is needed to map out potential advantages of RTR compared to such aggregated measures of the reading process.

A PROPOSED UNIFICATION OF GOOD-ENOUGH AND NOISY CHANNEL LANGUAGE PROCESSING APPROACHES

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Good-Enough Processing (GE; Ferreira et al., 2002) and Noisy Channel Processing (NC; Gibson et al., 2013; Levy, 2008) are two recent approaches to language processing. Both seek to explain how language comprehenders sometimes arrive at interpretations of input that are systematically inconsistent with the actual content of that input. Sometimes the inconsistency results in an incorrect yet plausible interpretation of morphosyntactically licit input (1-2), and sometimes it results in undisturbed processing and interpretation of illicit input (3-4) as if that input were in fact licit. 1) While Anna dressed the baby played in the crib. (Interp. *Anna dressed the baby*); 2) The dog was bitten by the man. (Interp. *The dog bit the man*); 3) The key to the cabinets are rusty. 4) More people have been to Ghent than I have. GE and NC explain these phenomena differently (probabilistic heuristics vs. rational Bayesian inference); however, both approaches make many of the same predictions about their processing. We propose a unification of GE and NC, with NC being a mechanism within the broader GE heuristic toolbox. We support this proposal with considerations of five major types of sentences often examined in psycholinguistic research.

NEURAL SIGNATURES OF LEXICAL ALIGNMENT IN NATIVE AND NON-NATIVE VERBAL INTERACTIONS

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In two EEG experiments, we evaluated the behavioral and neural signatures of lexical alignment in native-native and native-nonnative verbal interactions. In a joint picture naming task, participants were asked to take turns with a native or a non-native "confederate". We manipulated whether the confederate named the picture (e.g., COLOGNE) with a favored name (name agreement of 60-70%) or with a disfavored name (name agreement of 30-40%). Behavioral and EEG alignment responses were obtained when speakers interacted with native and non-native partners. Participants aligned to their partners by using disfavored names rarely used otherwise. Lexical alignment was modulated by the interlocutor's accent, with participants aligning more with individuals of the same accent than those speaking with a foreign accent. ERP responses also revealed differences between pictures whose corresponding names were previously named with a disfavored than those pictures named with a favored name (P200). Our results suggest lexical alignment as an important feature of language in interaction, modulated by non-goal directed (priming of lexical representations) and goal-directed mechanisms (i.e., beliefs about the communicative competence of interlocutors).

GENDER-DIVERSE EXPERIENCES AT THE INTERFACE BETWEEN EXTEROCEPTION AND INTEROCEPTION. AN INVESTIGATION ON VOICE PERCEPTION

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Gender-diverse individuals face everyday discrimination and misgendering. Voice is one of the most stereotyped aspects of gender-diverse identities, and it represents a bridge between internal experiences and socialization. However, the impact of interoceptive representation of language (i.e., voice self-perception) and its relation with gender remains still underexplored. We investigated this asking gender-diverse and cisgender participants to read gender-stereotyped and neutral texts in three different conditions (inner reading, loud reading, and listening to their recorded voice) and to complete a vocal congruence task. Also, we ask them to rate gendered and non-gendered words on five semantic dimensions. Preliminary results show that gender-diverse participants perceive less vocal congruence in all conditions. They also rate gender-related words as more emotional and related to the body and social aspects than cisgender participants. This evidence is two-folded: it highlights the role of stereotypes on gender-diverse identities in the perception of congruence between internal and external bodily cues. Moreover, it confirms the importance of emotional, bodily, and social aspects related to gender for conceptual representation.

THE EFFECT OF MORPHOLOGY ON SPELLING ACCURACY AND SPELLING CONSISTENCY: A STUDY ON GREEK CHILDREN WITH SPELLING DIFFICULTIES

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The present study examined the accuracy and consistency of Greek-speaking children's spelling difficulties with morphologically complex words. A spelling-level match design was used. Participants were selected for inclusion in three groups: a spelling difficulties group (SpD, n=21 sixth graders) and two control groups, a chronological age-matched group (CAM, n=21 sixth graders) and a spelling age-matched group (SpAM, n=24 fourth graders). They completed a spelling dictation task designed to test the spelling of lexical, derivational, and inflectional morphemes. Participants' performance was evaluated as for: spelling accuracy, spelling consistency and spelling consistency in accurate spelling. In all measures, the SpD group performed lower than the CAM group but similar to the SpAM group. Regarding the morpheme type, all groups had lower performance in spelling derivational morphemes than lexical and inflectional morphemes, underlining the crucial role of morpheme's linguistic characteristics in spelling for all children, with or without spelling difficulties.
Results are discussed for their implications for spelling research as well as their educational implications, especially for children with spelling difficulties.

NEIGHBORS (AND OTHER FACTORS) -- BUT NOT COHORTS -- PREDICT SPOKEN WORD RECOGNITION PERFORMANCE IN DECISION TASKS

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Spoken word recognition (SWR) theories agree that words with more phonological competitors should be recognized more slowly. Theories differ in how they define phonological similarity. The Cohort Model posits that competitors are determined by onset overlap, while the Neighborhood Activation Model assumes high global similarity (at any position) is crucial. We compare similarity metrics using mixed effects regressions (numbers of cohorts, neighbors, and 'nohorts' - items that are both cohorts and neighbors). We also include concreteness (semantic variables are relatively rarely examined in SWR), depth of processing (lexical vs. semantic decision), phoneme length, and syllables [mono- vs. bisyllabic words]). We present new data for 1000 nouns, and compare our lexical decision data with a recent megastudy (the Auditory English Lexicon Project). Our results suggest that frequency, word length, neighborhood, and concreteness are robust predictors across tasks, but onset competitors that are not also neighbors have no detectable impact when these other dimensions are considered simultaneously in regressions. We discuss contradictory findings from timecourse (e.g., eye tracking) studies and implications for theories and models of SWR.

UNCONSCIOUS CATEGORISATION OF L2 CONCEPTS MAY BE BASED ON THE NATIVE SEMANTIC NETWORK

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Is a bilingual's perception of the world grounded in their native language experience, or does learning a second language involve establishing alternative conceptualisations of the world? The present study tests this in a visual-word ERP study. Native Mandarin speakers of L2 English (N=28) were presented with primes and targets that were unrelated in English, but shared a nominal classifier in Mandarin (e.g., towel – snake, classifier: tiáo/条). Mandarin sentences generally necessitate insertion of a classifier between an article/quantifier and noun (e.g., *yī* (one) + **tiáo** (classifier) + *shé* (snake)), with the classifier indicating semantic features such as animacy, shape, or function. By pairing targets with primes that shared or differed in classifier, we thus manipulated semantic relationships between stimuli that were present in the L1, but absent in the L2. Relative to unrelated controls, targets primed by words from the same classifier category elicited a smaller N400 (p= < .001) in the bilingual group, but not in a monolingual English control group (N=28; p= < .668). These findings suggest that second language concepts are unconsciously categorised based on the native semantic network.

SIMILARITY OF SENSORIMOTOR EXPERIENCE AS A MEASURE OF THE RELATEDNESS AMONG THE MEANINGS OF AMBIGUOUS WORDS

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PDP models of lexical ambiguity (Rodd, 2018) see the word meaning as distributed in the pattern of activation of basic units, the patterns being more similar in the case of related senses of the polysemous words (paper), than in the case of unrelated meanings of homonyms (bank). In parallel, embodied cognition models (Barsalou, 1999) see prior sensorimotor (SM) experience as the basis of representation. We combined the two model groups to test the hypothesis that SM information could serve as basic units. Participants rated the possibility of SM experience for individual senses/meanings of ambiguous words and the semantic similarity of sense/meaning pairs. We observed both higher semantic similarity ratings and higher similarity of SM experience ratings in the case of polysemous words. However, the estimated similarity of SM ratings was not predictive of visual lexical decision task latencies, suggesting the need for more refined measures. Our results are the first to show that semantic similarity of senses/meanings of ambiguous words is reflected in the similarity of SM experience with objects denoted by them, suggesting that traces of SM experiences could serve as the basic units hypothesised by PDP models.

LONGITUDINAL ANALYSIS OF LETTER AND SPEECH SOUND ASSOCIATION

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The first and critical step for reading development is learning letter-speech sound (LS) association. LS integration was extensively studied in adults and children using cross-sectional designs, with a consensus that the left superior temporal cortex is the integration site (Blau et al. 2009). In the longitudinal fMRI study (N = 67), we found significant changes in the pattern of brain activation during the first two years of formal education. While the brain activity in sensory areas decreased in response to unimodally presented speech sounds and letters, it increased when children processed multimodal LS pairs. Namely, sub-additive effects reverse into super-additive effects in superior temporal areas. We did not observe changes in time for the congruency effect.Thirty children

returned for an additional scan in the 8th grade of primary school (third-time point). I will present the pattern of brain activation in children who have already automatized LS integration and higher levels of LS integration.

Theme
LEARNING

BEYOND SELF-REPORTS: USING PHYSIOLOGICAL SYNCHRONY AS AN OBJECTIVE MEASURE OF EFFECTIVE COLLABORATION IN EDUCATIONAL BOARD GAMES

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Well designed games are known to enhance learning (Shute & Ke, 2012). In this study, we measured collaboration objectively through physiological synchrony (PS) during cooperative board game play. Performing collaborative tasks often leads to similar physiological responses among collaborators (Strang et al., 2014; Wallot et al., 2016). For example, PS of skin conductance is correlated with self-reported negative affect (Mønster et al., 2016). In our study, skin conductance response and self-reports about cooperation and emotions were used to explore the relationship between perceived quality of cooperation and PS. We created false pairs (randomly assigned pairs) and compared the results obtained from true dyads (those who did the experiment together). The results of the 14 pairs confirmed that people synchronize more with true dyads than with false pairs. There was also a positive correlation between PS and self-reported beliefs in the positive aspects of cooperation, and a negative correlation with positive deactivating emotions (e.g., calmness). These results suggest the possibility of using PS as an objective measure to understand effective forms of collaboration in educational contexts.

STIMULUS-RESPONSE BINDINGS AS A SOURCE OF CONTINGENCY LEARNING; CONTINGENCY AWARENESS AS A SOURCE OF EVALUATIVE CONDITIONING

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In the valence contingency learning (VCL) task, participants evaluative target words, which are preceded by nonwords. Each set of nonwords is predictive for positive/negative evaluations. This produces robust VCL effects (better performance for trials that conform with vs. contradict the contingencies). In turn, evidence for evaluative conditioning (EC) effects on valence ratings for nonwords are mixed. In a highly powered (N=129) preregistered study, we investigated both effects and assessed whether they are a consequence of incidental stimulus-response (SR) bindings vs. contingency awareness. Participants were explicitly informed about contingencies (instructed group) or not (incidental group). Both groups then worked through the VCL, an explicit rating task, and a contingency awareness test. Both groups showed VCL and EC effects for nonwords. Multilevel analyses showed that VCL effects were fully explained by episodic retrieval of SR bindings only in the incidental learning group, but not in the instructed learning group. EC effects were fully explained by nonword-specific contingency awareness. These findings have implications for theories about the processes underlying contingency learning and evaluative conditioning.

PATTERNS OF VISUAL ATTENTION IN MASSED AND INTERLEAVED LEARNING: EFFECTS ON CATEGORY LEARNING AND RECOGNITION MEMORY

Ezgi Melisa Yuksel[1], Melina Knabe[1], Benjamin R Barmore[1], Haley Vlach[1]; *[1]University of Wisconsin-Madison*

Interleaving information, as opposed to blocking, improves the learning of categories, such as artists' painting styles (Kornell & Bjork, 2008). We aimed to assess whether blocked and interleaved schedules result in different patterns of visual attention during learning. For this purpose, 116 participants (M_{age}: 19.98) studied paintings from 12 different artists on either a blocked or interleaved schedule and identified the artists for a series of new paintings. The results replicated prior research: Participants were significantly better at learning the painting styles for artists whose paintings were presented on an interleaved schedule. Furthermore, the distribution of visual attention to the stimuli differed between the two presentation schedules: Participants looked at the artist's name more on interleaved presentations, whereas they looked at the paintings more on blocked presentations. However, in a follow-up study, the recognition memory performance for paintings of 45 participants (M_{age}: 20.08) did not show any significant differences between the blocked and interleaved schedules. Ongoing studies are investigating the underlying mechanisms and the impact of individual differences in working memory, and prior knowledge.

MODALITY-BASED DIFFERENCES IN DISTRIBUTIONAL STATISTICAL LEARNING: CATEGORIZATION AND PRODUCTION OF SIGNALS ACROSS MODALITIES

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Statistical learning (SL) was found to enable learning of various types of sequential patterns across sensory modalities. However, few studies have focused on **distributional SL** (DSL, learning the

frequency distribution of individual exemplars) or examined DSL across modalities using comparable tasks. The current study investigated **DSL's modality- and stimulus-specificity** using a **within-subject design** to compare individuals' performance in auditory and visual modalities (N = 118 adults). Two stimulus types were used for each modality: linguistic vs. non-linguistic auditory stimuli and temporal vs. spatial visual stimuli. Stimuli varied in their lengths as they were distributed into two categories (short vs. long). DSL was assessed using a passive categorization task and an **active production task**. Results showed that learners' performance was correlated only for tasks in the same sensory modality or with the same type of stimuli, supporting the modality- and stimulus-sensitivity of DSL. Considering both production and categorization results, we suggest that SL, if a unitary mechanism, faces constraints at multiple levels while learning and processing distributional patterns.

THE LINK BETWEEN STATISTICAL LEARNING AND LANGUAGE: A META-ANALYSIS

Sam Boeve[1], Haoyu Zhou[1], Louisa Bogaert[1]; *[1]Ghent University*

Statistical learning (SL) is a cognitive mechanism underpinning several cognitive skills ranging from perception to memory. The proposed link between SL and language is one of the most illustrative examples of the significance of SL. But what evidence is there to support this claim? In this meta-analysis, we review the studies that tested this link empirically by correlating an individuals' SL performance with a measure of language ability. We review the evidence available for different types of SL tasks (i.e., using artificial, natural, or intermediate stimuli) and types of language measures (i.e., acquisition or processing). Preliminary results show an excessive use of artificial stimuli with regularities that consist mostly of transitional probabilities between neighbouring elements. Given the weak correlations between language ability and tasks that measure SL skills, we stress the importance of task reliability and propose a shift towards approaches that recognize the multi-componential nature of both SL and language. Doing so will broaden our understanding of SL, language, and their interaction.

WHAT DRIVES THE NEURAL ENTRAINMENT EFFECT IN VISUAL STATISTICAL LEARNING?

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Statistical learning (SL) refers to the ability to extract regularities from the sensory environment, which typically occurs without explicit awareness. Behavioural research has long acknowledged the importance of SL in a wide range of cognitive domains such as language and visual perception. More recently, an EEG-based measure of SL has been introduced that quantifies the amount of neural entrainment (or phase locking) to the temporal structure created by patterns embedded in the sensory input relative to the presentation rate of the individual stimuli: an increase at the pattern rate and a decrease at the individual rate indicates pattern learning. Whereas it provides a promising online and implicit way of measuring SL, it is still unknown what exactly is reflected in this measure. Does it merely reflect differentiation in the neural response to predictable and unpredictable stimuli, or is there more to it? In this EEG study, our aims are (1) to replicate the neural entrainment effect in a visual SL task and (2) to better understand what underlies this effect by combining spectral analysis with ERP analysis, neural decoding and simulations. I will present the study design, simulations and initial empirical results.

COMPARING L2 WORD LEARNING USING ORTHOGRAPHY VERSUS VISUAL REFERENTS

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Vocabulary acquisition is one of the most critical aspects of second language (L2) learning. Thus, pinpointing the training conditions that lead to better and faster L2 word learning can have wide theoretical and practical implications. This study examines how late, L2 learners acquire new lexico-semantic information when using orthography versus visual referents. To this end, by the time of the conference, we will have tested 60 adults, native speakers of Polish. During Session I (behavioral learning), participants are taught a series of 40, L2 words from an artificial language along with their meanings using a four-alternative forced-choice (4AFC) task. Half of the words are learned using orthography to present their meanings (i.e., Polish translations) and the other half using images. In Session II, 24 hours later, participants perform a translation priming task, while EEG signal is recorded. To assess participants' learning performance, we will examine the N400 event-related potentials (ERPs) for words presented congruently and incongruently (orthography vs. imagery) to how they were originally learnt. Our results will allow us to evaluate the efficacy of using imagery, as compared to orthography, in L2 word learning.

INTACT PREDICTIVE PROCESSING IN AUTISTIC ADULTS – A STATISTICAL LEARNING STUDY

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One of the popular frameworks that aim to explain autistic traits is the predictive processing framework. It claims that atypical behaviour in Autism Spectrum Disorder (ASD) occurs as a result of impaired ability to predict future events based on prior knowledge and incoming sensory stimuli. However, some empirical evidence contradicts this framework. The reason for this inconsistency might lie in the variety of tasks used to test predictive processing, which might involve distinct neurocognitive mechanisms. In our study, we aimed to extend the scope of predictive processing research on the acquisition of probability-based regularity without feedback or reward, that is, on statistical learning. We tested 20 autistic and 22 neurotypical adults on a 40-minute-long probabilistic statistical learning task. We found comparable performance in ASD and neurotypicals, and the learning dynamics showed a similar pattern as well – both were underpinned by Bayesian analyses. Thus, our study provides evidence for intact statistical learning in autistic adults. We discuss potential mechanisms behind this result, noting that even if predictive processing is atypical, it might not always mean a deficit in performance.

IT'S TIME TO GET ON MY FEET: DECISION TO TERMINATE SOCIAL LEARNING IN AN INFORMATION FORAGING TASK

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Arbitrating individual learning (IL) and social learning (SL) is one of the key cognitive features of humans. Yet, it has not been empirically evaluated how much time humans would spend on learning from preceding generations and acting on their own. Here, we investigated the relationship between the type of social information available from a preceding individual (namely, an experimental parent), the strategies of switching from SL to IL, and the task performance. We conducted an online behavioral experiment with three conditions of available social information (i.e., choice history, reward amount, or both), in which 185 participants worked on a 30-armed bandit task. We found that participants who could only observe reward amount engaged in social learning for the longest term. In addition, participants who could only observe choice history performed worse than their experimental parent due to over-exploration of the search space. Analysis with computational models revealed that participants tended to fail to adjust their initial expectation of the possible rewards according to social information. These results suggest that humans typically underuse social information, which may hinder successful cumulative cultural evolution.

SPECIFIC LEARNING DISORDER IN MATHEMATICS IN A MULTILINGUAL EDUCATION CONTEXT: TOWARDS A MORE TAILORED DIAGNOSIS

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Language is an important factor when assessing math skills and when diagnosing specific learning disorder in mathematics. This is challenging in linguistically heterogeneous contexts (e.g., Luxembourg) as one needs to differentiate if problems arise from low language skills or result from an underlying learning disorder. As diagnostic tools generally do not consider linguistic heterogeneity, we have developed a test battery for third-grade children, tailored to a multilingual education context. Following diagnostic guidelines and neurocognitive models of number processing, we devised a series of tasks with reduced language load in the instructions and within the items. To evaluate how language background affects performances, we compared results of the pilot study (N = 116) with scores of the same children in the Luxembourgish school monitoring program. A significant interaction between test and language profile showed that performance differences based on children's linguistic backgrounds were less pronounced in the test battery than in the monitoring tasks. This provides first evidence that the new tool is suitable for a multilingual context. The poster will address the test framework and language profile-related results.

IMPROVED KNOWLEDGE IN STEM AND NON-STEM FIELDS WHEN USING COMICS COMPARED TO NON-COMICS LEARNING MATERIAL

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The past decades have seen a growing use of comics education material in STEM and non-STEM related fields. However, there are inconsistent reports regarding the effectiveness of learning when using comics—the use of visual language and writing in sequential

images that convey education material—compared to non-comics. In this study, we conducted a meta-analysis to quantify the overall effect of comics vs non-comics material that have been used in empirical studies that targeted learning for STEM and non-STEM fields. Results showed an overall moderate effect in favour of comics compared to non-comics in STEM and non-STEM learning, indicating increased knowledge due to the use of comics. Findings not only contribute to the Visual Language Theory and Spatial Cognition, but also shed light on the conditions in which comics can foster learning.

HOW DOES THE MODULATION OF DORSOLATERAL PREFRONTAL CORTEX BY NON-INVASIVE BRAIN STIMULATION AFFECT THE RETRIEVAL OF PROBABILISTIC SEQUENCE KNOWLEDGE

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The ability to acquire probabilistic sequences promotes the development of skills and predictive processing. Recent research has demonstrated that sequence learning can be enhanced by inhibitory repetitive transcranial magnetic stimulation (rTMS) over the dorsolateral prefrontal cortex (DLPFC). Previous studies typically modulated the encoding phase of sequence learning by rTMS that exerted its beneficial effects after a certain period of consolidation. Here, we tackled whether the retrieval of a well-established sequence knowledge can still be modulated by inhibitory rTMS of the DLPFC. Healthy human participants practiced an implicit probabilistic sequence learning task (Alternating Serial Reaction Time task) for 25 min. After a 24-h offline period, participants received 1 Hz rTMS or sham stimulation for 10 minutes over the left, right or bilateral DLPFC. The sequence knowledge of the participants was tested immediately after the rTMS administration. The DLPFC groups showed similar access to probabilistic sequence knowledge to the sham group. Our findings demonstrate the robustness of implicit probabilistic sequence learning as well as the fact that DLPFC plays a different role in the encoding and retrieval processes.

THE INFLUENCE OF CONTEXTUAL VARIABILITY ON THE LEARNING AND RETENTION OF NOVEL WORDS: DOES THE TYPE OF VARIABILITY MATTER?

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Adults predominantly learn new vocabulary from reading, and contextual variability benefits such learning. We used web-based experiments to examine what features of variability facilitate learning of novel object words in narrative contexts. We manipulated variability in non-definitional object features (e.g. color) and variability in situational contexts in which new objects were experienced (e.g. characters). 285 participants encountered 8 novel words in three short fictional narratives each, and subsequently provided written word definitions. Several scores were computed per definition including the number of core/definitional features and the number of non-core features provided. Definition scores indicated significantly better learning of core features in the conditions with situational variability, including the condition with highest variability, i.e. in both object and situational features. Fewer non-core features were mentioned in the condition with highest variability. Although performance dropped at follow-up up 1 day later, performance remained higher in the conditions with situational variability. Our results suggest that situational variability support identification and retention of core semantic features of words.

EXECUTIVE CONTROL AND THE REWIRING OF PROBABILISTIC REPRESENTATIONS

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Modifying habits can be a challenge, particularly when it comes to changing unwanted behaviors. Cogntive researchers have focused on understanding the mechanisms behind habit formation and how they can be rewired. One mechanism for forming new habits is probabilistic learning, which allows the implicit extraction of probabilistic regularities in our environment. However, the relationship between executive control functions (EF) and the rewiring of probabilistic representations is still poorly understood. To explore this relationship, we conducted a three-day experiment in which participants completed an implicit probabilistic sequence learning task on the first two days, followed by a battery of executive function tests on the third day. On the second day, some of the probabilistic elements of the sequence were changed, allowing us to observe how participants adapted to the altered environment. We measured five aspects of EF: attentional control, inhibition, working memory, flexibility, and verbal fluency, using a variety of tasks. Our results revealed a positive correlation between rewiring and inhibition. These findings suggest that cognitive inhibition plays a critical role in the rewiring of implicit probabilistic knowledge.

THE EFFECT OF WORD FAMILIARITY ON SPACED LEARNING ACROSS TIME

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Spacing out information promotes retention more than massing information – a robust finding in psychological science. Research on the *spacing effect* has primarily manipulated aspects of the learning schedule (e.g., item repetitions, retention interval). Limited work has considered how familiarity with the to-be-learned information impacts the spacing effect. The current study addressed this gap by examining how word frequency/familiarity affects retention on a massed or spaced schedule. Adults were presented with 24 high familiarity (e.g., apple), low familiarity (e.g., vestige), or nonsense (e.g., blicket) words on a massed and spaced schedule. Retrieval was tested after a 5-minute (N = 100) and 24-hour (N = 337) delay, revealing a significant spacing effect regardless of word familiarity. Furthermore, overall performance was significantly greater for highly familiar items. These results suggest that spacing is effective regardless of general word familiarity. Ongoing studies are assessing the effect of word familiarity on spacing after a 1-week delay and how learners' prior knowledge of test items – as measured by a vocabulary test – impacts the spacing effect.

IMPROVED BROAD MATH LEARNING WHEN TRAINING SPATIAL SKILLS VIA THE ONLINE LEARNING PLATFORM RIF3.0

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Past research has indicated that training specific spatial skills, such as spatial visualization, transfer to math performance. However, it is still unknown if training a combination of spatial skills, beyond spatial visualization, can show transfer to improved broad math skills. In this study, following a pre-post quasi-experimental design, we asked 11-13-year-old students to participate to 8 spatial training sessions. Students in the experimental class completed spatial training tasks via the new online platform RIF3.0, while students in the control class did their regular math class. We measured the spatial skills, with the Spatial Reasoning Instrument (SRI), and the math skills, with a battery of mathematical tasks designed to test math competencies in areas suggested by the guidelines of the Austrian Ministry of Education to measure mathematical gains. Preliminary results revealed that spatial training only led to far transfer, with students in the intervention classes significantly improving their math accuracy in the post-test; while students in the control classes performed slightly worse. Findings suggest that the online learning platform has the potential to be utilized by math teachers to enhance students' math learning.

NULL DISFLUENCY EFFECT IN LEARNING: EVIDENCE FROM TWO EXPERIMENTS

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Disfluent fonts have been suggested to improve memory and comprehension. However, research shows inconclusive results regarding the mechanisms of the effect. We conducted two experiments to test the moderators of the effect in ecologically valid conditions. Exp. 1 tested the effect in a sample of 203 schoolchildren. Exp. 2 tested the effect in L2 in a sample of 454 university students. Learning materials were presented in a disfluent, fluent, or in mixed fonts. We measured learners' immediate and delayed memory and their self-perceived performance within-participants (Exp. 1) and between-participants (Exp. 2). In addition, participants' characteristics were included as moderators. Both studies indicated no main effect of Font and no Font interaction with other variables in the models. Disfluent font and font mixing did not lead to improved retention. Further, in Study 1 we found significant correlations between objective and self-assessed memory in the mixed font group ($r = .44\text{-}52$, $p < .05$) and in the disfluent font group ($r = .61\text{-}70$, $p < .001$), but not in the fluent font group. Thus, disfluent font improves metacognitive estimates of performance, but not retention.

INTERVENTION TO SUPPORT HEALTHCARE PROFESSIONALS IN REFUTING ANTI-VACCINATION ARGUMENTS: THE EMPATHETIC REFUTATIONAL TECHNIQUE

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Anti-vaccination arguments can be rooted in misinformation and ungrounded cognitions, which makes them difficult for healthcare professionals (HCPs) to rebut. Empathetic and refutational techniques (ERTs) have been shown to be effective at countering vaccine misinformation. In two experiments (n_1 = 201 HCPs from the UK; n_2 = 120 medical students from Finland), we investigated whether presenting texts that demonstrate ERTs to HCPs would improve their metacognitive confidence in discussing vaccines with patients compared to texts without ERTs. Moreover, we investigated whether just reading these texts would help the HCPs integrate ERTs into their own approach when they described how they would respond to different anti-vaccination arguments. The results showed that while the ERT texts did not increase HCPs' confidence in their refutational abilities, they were more likely to describe an empathetic approach to respond to hypothetical

patients than the HCPs in the control group. Taken together, these findings suggest that more comprehensive training may be required to help HCPs with refutational approaches to anti-vaccination arguments and to increase their metacognitive confidence in discussing vaccines.

DISSECTING TEMPORAL PREPARATION: NEUROPHYSIOLOGICAL AND COMPUTATIONAL EVIDENCE FOR ITS UNDERLYING COGNITIVE STEPS

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Prominent models of temporal preparation characterize it as a unitary, probability-based mechanism that relates event probability to 'anticipation', which speeds up reaction times. In contrast, the multiple trace theory of temporal preparation (MTP) is a neurocognitive *process model* where preparation results from a set of steps that unfold on each trial. In the model, memory traces are formed through associative learning between a neural representation of duration, and inhibiting and activating motor processes. The automatic retrieval of this inhibition and activation on subsequent trials is what affects response times. In this presentation, we will first review key differences between MTP and other models. We will present findings in preparation which show an interplay of inhibition and activation, associative learning and retrieval, and gradual forgetting: mechanisms that are central and unique to MTP. Then, we will review a series of findings from electrophysiology, and pupillometry, which show how the characteristics of MTP are reflected in neurophysiological signals. Together, these results reveal the cognitive building blocks that underlie preparation for action.

DISENTANGLING THE EFFECTS OF LINEUP SIZE ON THE COGNITIVE PROCESSES UNDERLYING EYEWITNESS IDENTIFICATION DECISIONS USING MULTINOMIAL MODELING

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Larger lineups diminish the risk to innocent suspects by reducing the sampling probability of randomly selecting the suspect among the lineup members. However, variations in the number of lineup members may also affect cognitive processing. In two experiments, the two-high threshold eyewitness identification model was applied to disentangle the effects of lineup size on detection and guessing processes underlying identification decisions. Participants were shown simultaneous or sequential lineups consisting of either three or six (Experiment 1) or two or five (Experiment 2) lineup members. Results obtained in both experiments convergently showed that culprit-presence detection was more likely and guessing-based selection was less likely in smaller than in larger lineups. However, guessing-based selection in smaller lineups did not decrease to a level sufficient to compensate for the benefit of increased protection of innocent suspects in larger lineups due to the lower sampling probability of randomly selecting the suspect. Consequently, the rate of innocent-suspect identifications increased with decreasing lineup size, albeit to a lesser degree than the rate of culprit identifications.

Theme

MEMORY

COGNITIVE CAPACITY LIMITATIONS UNDER ALCOHOL WHEN PROCESSING MULTIPLE VISUAL OBJECTS

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Alcohol is assumed to deplete general cognitive resources yet intoxicated participants show selective deficits across a range of cognitive tasks and stimuli. Given fMRI evidence that high-level visual stimulus categories (e.g., faces and scenes) are represented in specialized cortical regions, we tested the notion that alcohol depletes modular resources selectively, disrupting the processing of some stimulus categories more than others. In an old/new, face/scene recognition task, intoxicated and placebo-controlled participants were presented with pure-category trials displaying either four faces or four scenes, and mixed-category trials showing a combination of two faces and two scenes. In line with previous findings, recognition was poorer for pure than mixed trials, consistent with the view that simultaneous processing of four same-category items demands more domain-specific resources than processing only two items from that category (Cohen et al, 2014). Crucially, however, alcohol intoxication impaired recognition performance to the same degree regardless of visual category and trial type. Our findings are therefore consistent with the view that alcohol depletes cognitive resources generally rather than selectively.

FACE THE MUSIC: ARE MUSICIANS LESS SUSCEPTIBLE THAN LAYPEOPLE TO MISINFORMATION ABOUT A MELODY?

Joanna Ulatowska[1], Magdalena Frass[1]; *[1]Nicolaus Copernicus University*

This study aimed at testing the misinformation effect in groups of trained musicians (with at least six years of music training) and musical laypeople. Both groups listened to a piece of melody and

after that were presented with a written description of the piece that either correctly described it or that falsely suggested that there was an additional instrument present. The memory for the original melody was then tested with a 2FC test in which participants were asked to choose the fragments they thought belonged to the melody they listened to at the beginning of the study. The results revealed that the misinformation worked only in the group of musical laypeople, that is they were more likely to choose the misinformation-consistent alternatives in the experimental condition than in the control one. No such differences were observed in the musicians' group, who were also significantly less susceptible to misinformation. Furthermore, the misinformation effect was negatively correlated with the musical sophistication index, but only in the group of experts. The current study is one of the few to show that musical training helps resist misinformation for auditory information.

SEQUENTIAL VERSUS SIMULTANEOUS PRESENTATION OF MEMORANDA IN VERBAL WORKING MEMORY: (HOW) DOES IT MATTER?

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To-be-memorized information in verbal working memory (WM) can be presented sequentially, like in oral language, and simultaneously, like in written language. While sequential presentation may favor discrete, temporal encoding processes, simultaneous presentation may favor spatial encoding processes. We compared immediate serial recall tasks for sequential versus simultaneous word list presentation with a specific focus on serial position curves of recall performance, transposition gradients, and the nature of serial order errors. First, we observed higher recall performance in the simultaneous compared to the sequential conditions, with a particularly large effect at end-of-list items. Moreover, results showed more transposition errors between non-adjacent items for the sequential condition, as well as more omission errors especially for start-of-list items. This observation can be explained in terms of differences in refreshing opportunities for start-of-list items during encoding between conditions. This study shows that the presentation mode of sequential material can have a significant impact on verbal WM performance, with an advantage for simultaneous encoding of sequence information.

RECOGNISING FACES 20 YEARS LATER: A COMPARISON OF TYPICAL AND SUPERIOR RECOGNISERS

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The present research examined the ability to recognise familiar and unfamiliar faces across a 20-year age gap in typical and superior face recognisers (SRs). We recruited control and SR participants who either watched (familiar) or did not watch (unfamiliar) the popular UK TV show Big Brother, series 1-3, which aired in 2000-2002. Data was collected using an old/new recognition task. In a learning phase, participants were shown images of contestants taken between 2000-2002 when they were on the show. In the subsequent recognition phase, participants were asked to recognise the same individuals in recent images (e.g., images taken in 2019-2021). We compared performance of familiar and unfamiliar individuals. A third group of familiar participants completed the recognition phase only. There was an interaction between group (control, SR) and condition (unfamiliar, familiar with learning phase, familiar recognition phase only). SRs displayed higher accuracy than controls, but only in the two conditions in which they completed the learning phase. There was no difference between SRs and controls for the familiar recognition phase only. Our findings have implications for the nature of tests that are commonly used to categorise SRs.

GAZE AND VISUAL SHORT-TERM MEMORY FOR LOCALIZING IMAGE PARTS

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Our study investigated the impact of gaze allocation during encoding on short-term memory for scenes. The number of fixations made in a fixed viewing period have been found to be positvely correlated wtih scene recognition. But it is not clear why. To figure out what benefit fixations have on scene memory, we introduced an image-part localization task. On each trial, observers had 8 seconds to freely explore a scene—taken from a variety of indoor and outdoor categories—and, two seconds later, localise a randomly picked part from that scene within the scene footprint—i.e., the area the scene previously occupied.

We found that image-part localization is quite poor, unlike recognition memory for the whole scene, but that it correlates positively with the amount of time spent fixating the location of that part. Localization-performance with blurred scenes shows that this relationship is influenced by the level of detail in the scene, not only overt attention to the scene part. We suggest image detail plays a role in forming visual memories at each fixation, possibly by allowing a more elaborate description of the scene.

FLASHBULB AND EVENT MEMORIES: REMEMBERING THE 2016 EURO CUP FINAL

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On July 10, 2016 Portugal's national football team won for the first time the UEFA European Championship. Two years after the match, we examined what the Portuguese remember of this momentous occasion. We investigated if flashbulb memory (FBM; i.e., memory for the circumstances under which one has learned about the win) and event memory (EM; i.e., memory for the factual details of the match) were determined by distinct factors, and whether EM was a predictor of FBM. Participants (*n*=222) responded to an online questionnaire about their FBM, EM and set of predictors. Structural equation modeling revealed that FBM and EM were associated with different pathways. Interest in football predicted the importance attributed to the game, which triggered emotional intensity which predicted personal rehearsal (ensuing conversation), a direct determinant of FBM. On the other pathway, interest determined knowledge about football, the main predictor of EM. Importantly, EM was a causal determinant of FBM which shows that the memory trace for the original event enhances memory for the reception context. The findings suggests that even though flashbulb and event memories are determined by independent factors, they interact very closely.

CAN YOUNGER AND OLDER ADULTS ENGAGE IN PRIORITISATION WHEN FOLLOWING INSTRUCTIONS WITHIN A WORKING MEMORY PARADIGM?

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Evidence has shown that adults can prioritise valuable individual items in working memory. However, no study has examined prioritisation using a following instructions paradigm. In six online experiments, we investigated this in younger (N=120; 18-30 years) and older adults (N=119; 60-78 years). Participants listened to instruction sequences containing five action-object pairs (e.g., tap the star) for immediate serial recall. They completed two conditions: no-prioritisation, where all action-object pairs were worth equal points, and prioritisation, where one mid-sequence action-object pair was worth more points than the others (either the 2nd, 3rd, or 4th action-object pair). Participants were then asked about strategies they had used during encoding. Overall, both younger and older adults showed boosts, of equivalent size, to the more valuable pair in the prioritisation versus the no-prioritisation condition. There was a trend for older adults to perform less well overall, but this was not consistent across all studies. Prioritisation sometimes came at a cost to other, non-prioritised, action-object pairs for both age groups. These results have valuable implications for following instructions, working memory, and cognitive ageing.

THE JOINT EFFECT OF WORD FREQUENCY AND OUTPUT INTERFERENCE IN RECOGNITION MEMORY: TEST OF A MODEL PREDICTION

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Output interference (OI) and word frequency (WF) effects are two important effects in the recognition memory literature. Item and context noise models have separate explanations for these models. A joint investigation of these effects is important to test the model predictions. The current project simulates and tests the prediction of an item noise model of Retrieving Effectively from Memory Model (REM). The REM model is simulated, and WF and OI effects in recognition memory were tested with 104 participants. OI and WF effects were replicated and there was no interaction effect found. These results supported the predictions of the REM model. However, the strength of the OI effect was stronger than REM's predictions. To conclude, even though REM is lacking in predicting the strength of the OI effect, it can explain most of the variance in the data.

EFFECTS OF PRIOR-TASK SUCCESS AND FEEDBACK ON EPISODIC MEMORY PERFORMANCE AND ORGANIZATIONAL STRATEGY EFFECTIVENESS IN YOUNG AND OLDER ADULTS

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Successfully completing a cognitive task and/or receiving positive feedback before a memory task increases performance on that task. Our goals were to try to separate the effects of prior success from those of feedback on recall performance and on the semantic organizational strategy and to show that this strategy might be more effective after success and/or feedback, especially in older adults. Young and old adults divided into 3 experimental conditions: "control", "prior success" and "prior success with positive feedback" learned 20 organizable words, and were submitted to a recall test. The number of words was counted and an organization index was calculated (ARC). Results confirmed the classic age effect. Recall and ARC were higher in the "positive feedback" condition for participants in both age groups. The ARC index was more strongly associated with recall in this condition for older adults only, indicating greater effectiveness of the organization strategy. Giving positive feedback after completion of a cognitive task could alter some of the metacognitive processes on which performance on a memory task depends, particularly in aging. Further studies will clarify these processes.

SURVIVAL PROCESSING IN IMMERSIVE ENVIRONMENTS ENHANCES MEMORY PERFORMANCE

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Numerous studies have shown survival processing effect; memory for items encoded related to survival scenario is better compared to those encoded with other strategies such as self-association. Some studies insisted that this effect was explained by the evolution of memory system, so-called adaptive memory. Most of studies gave the survival context with verbal scenario or assessed the performance of a word memory task. If survival processing advantage could be explained by adaptive memory theory, this advantage should be observed even if the survival context and items to be encoded are perceptually presented in immersive environments. Here, this study aimed to assess whether the survival processing effect was found for visual objects related to survival context in immersive environments. At first, participants rated their survival relevance or self-relevance for each several object in survival and non-survival VR environments. Then, they engaged in a free recall task. As a result, the number of recalled items presented in the survival environments was higher than that presented in the non-survival environment. This result suggests that the survival effect advantage could be explained by adaptive memory.

THE EFFECT OF THE LOCI METHOD ON SHORT-TERM MEMORY

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An effective memory strategy known since ancient Greece is the “loci method”. It consists of using a known place (e.g., home, street, route), and breaking it down into many elements to be used as retrieval cues. This technique has been shown to be very effective for long-term memory, but less is known about its impact on short-term memory. The aim of this research was to evaluate the extent to which the loci method improves the immediate recall of six-word lists presented at a rate of 3s or 1s per word, compared to two other strategies: verbal rehearsal, already known to be efficient in short-term memory and the mental line which impact has yet to be confirmed. Because short-term memory usually benefits from information stored in long-term memory, we hypothesized that associating each word with a specific place should improve participants’ performance. However, we also assumed that mentally generating locations has a cost, therefore the benefit of the loci method over other strategies should be observed mainly at a rate of 3s. The first results suggest that indeed the loci method improves immediate recall, but only for words presented 3s. In addition, this benefit depends on the visual imagery abilities of the participants.

SUPPORTING CHILDREN WITH POOR WORKING MEMORY WITHIN THE CLASSROOM

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Working memory (WM) has been shown to predict academic attainment across the school curriculum. However, there is limited research on interventions to support WM in the classroom. The current study investigated how cognitive offloading, via the use of a topic-specific visual learning aid, could support children’s learning. 60 children (ages 9-10) across two school classes participated: one group (intervention) was given the visual aid during maths lessons on a specific topic, and the other was not (control). Children were tested on their topic knowledge at two time-points: T1, prior to teaching on the topic; and T2, after teaching on the topic had finished. This enabled comparison of the improvement in children’s test performance between the intervention and control groups. Children’s WM ability was also assessed. Results showed that WM ability was associated with performance on the tests, but both the intervention and control group showed the same improvement in test performance between T1 and T2. Follow-up qualitative work, using focus groups of 6-8 children, were implemented to assess children’s understanding of visual aids.

EXPLORING PRIORITISATION EFFECTS ACROSS DIFFERENT FORMS OF BINDING IN WORKING MEMORY

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In the limited capacity system of working memory (WM), attention can be directed to specific items for prioritisation, based on allocated ‘value’. Research shows that value-based prioritisation can improve recall for certain items within sequences of unitised coloured shape conjunctions. However, it is unclear how prioritisation affects WM for non-unitised forms of binding. The present study, reports a series of experiments examining how value-based prioritisation impacts WM for different forms of binding; unitised (coloured shapes), spatially separated (shapes and colours presented simultaneously in separate, vertically adjacent locations) and cross-modal (shapes presented visually in synchrony with auditory colour names). In each trial, participants were sequentially presented with four feature pairs and asked to recall the colour of one shape at the test. We found better overall performance in unitised than spatially separated and no difference between unitised and cross-modal binding. Regarding value-based prioritisation, while the priority boost for high-value items was clear for unitised and separated, it was not consistently observed in cross-modal

binding. Implications for WM, binding and attentional control are considered.

INVESTIGATING THE ROLE OF WORKING MEMORY IN THE OCCURRENCE OF INVOLUNTARY PAST AND FUTURE THOUGHTS

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Across two experiments, we tested the hypotheses that the frequency of IAMs (involuntary autobiographical memories) and IFTs (involuntary future thoughts) may be reduced due to (1) the limited working memory capacity that enables the processing of only a finite number of thoughts and/or (2) the reduced likelihood of noticing incidental, task-irrelevant cues that may potentially trigger IAMs and IFTs. To this end, participants completed a laboratory vigilance task with irrelevant cue-words to trigger IAMs and IFTs, and random thought-probes to measure their frequency. Study 1 (240 participants) manipulated the level of working memory load (none, low, high) while participants performed a letter version of the N-back. The presentation of working memory task-items and incidental cue-words in the vigilance task was also manipulated (simultaneous vs. sequential). Study 2 (240 participants) further manipulated the type of working memory load by using either verbal or visuo-spatial N-back task. In both studies, to further examine levels of incidental cue-noticing, participants also completed an unexpected cue-recognition task after completing the vigilance task.

THE USE OF COGNITIVE STRATEGIES IN TWO-PHASE WORKING MEMORY TRAINING

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Using a two-phase working memory training paradigm, we previously demonstrated both positive and negative cross-phase transfer effects. Backward digit span training transferred positively, whereas backward spatial span training transferred negatively to subsequent backward letter span training. In contrast, the transfer from backward letter span training to backward spatial span training was not correspondingly negative, but rather weakly positive. In the present study, we investigated the use of cognitive strategies in two phases to explore the mechanism of the negative transfer effects. The results of the strategy questionnaire indicated that (a) verbal backward recall promoted the rehearsal in the original forward order, but spatial backward recall did not, (b) verbal backward recall involved less visuospatial process than spatial backward recall, at least for mental imaging, (c) grouping strategy was not used spontaneously in the backward spatial training group in either phase, (d) peel-off strategy is not primarily used in backward serial recall. We speculate that the negative transfer was partly due to the strategies being carried over to the subsequent backward letter training phase, where they would no longer be optimal.

THE PROCESS-SENSITIVITY OF THE CHANGING-STATE EFFECT

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The finding that irrelevant sounds that change from one token to the next disrupt working memory more than steady-state sounds is well established as the changing-state effect (CSE). Two dominant accounts differ in whether they expect the CSE to be process-sensitive: The duplex mechanism account predicts that the CSE is restricted to tasks in which participants process order information, and according to an attentional capture account, it should occur independently of the role of order information. Therefore, we conducted two experiments to determine the role of processing order information for the CSE, in which we contrasted tasks that do and do not afford the processing of order information and recorded participants' strategy choices to assess whether they applied an order-based strategy irrespective of the task. We used Bayesian modelling to assess whether the CSE is indeed zero when no order information is processed. Surprisingly, there was only a small changing-state effect in one of the tasks in Experiment 1, which is predicted by neither account. In Experiment 2, we observed changing-state effects for both types of tasks and irrespective of the applied strategy. These findings support the attentional capture account.

PUPIL OLD-NEW EFFECT AND ITS MODULATION BY MEMORY RETRIEVAL

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Pupillometry has been used in the past to investigate memory retrieval. In recognition memory tasks, pupil dilation (PD) is more pronounced to previously studied items compared to novel distractors, termed as the pupil old-new effect. Precise nature of the effect is still unknown. In this study, we investigated PD in a recognition task with and without explicit memory retrieval. We presented words with the instructions to learn. After the learning phase, recognition confidence judgements were made on the previously presented old items. In the test phase we presented the

previously studied items intermixed with novel distractors. In one condition participants categorized old and new stimuli as animate or inanimate objects (semantic processing), whereas in the other condition an explicit old-new decision has to be made (retrieval mode). By only including high confidence old judgements, we found that the pupil old-new effect disappeared without retrieval mode. It seems that retrieval effort is an essential prerequisite for the effect to emerge.

CONTEXTUAL STABILITY, NOT PREDICTION ERRORS, UNDERLIES EVENT SEGMENTATION

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Although we perceive the world as a continuum, we remember the past as memory units, a phenomenon called event segmentation. The influential theory suggests that memories are segmented when prediction errors occur. A more recent theory claims that segments form due to the stability of a context. Here, we contrasted these accounts. Participants viewed images of real-life objects and evaluated them according to one of two aspects (like/dislike, natural/manmade). We also rewarded certain categories to further facilitate segmentation. To assess the degree of event segmentation, we used two standard measures; temporal distance and temporal order judgments. We observed segmentation when the rule and reward value (Exp.1), and object category (Exp.2) were same across 5-6 consecutive images (e.g., AAABBB). However, when the intervening task rule, reward value, and stimulus category were present for just one item and did not persist in further images (no contextual stability; e.g., AAABAAA), event segmentation was absent (Exp.3). Despite creating prediction errors, contextual changes did not result in event segmentation if the new context did not endure, suggesting that contextual stability, not prediction error, regulates event segmentation.

ENHANCING STORY MEMORIZATION IN CHILDREN WITH WEAK PHONOLOGICAL SKILLS: THE ROLE OF PICTORIAL SUPPORT AND MODE OF PRESENTATION (LISTENING OR READING)

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Children with weak phonological skills have difficulty recalling verbal material. Is it possible to help them better memorize a text? 178 children aged 8 to 12 with strong and weak phonological skills listened to or read a short story. The orally presented story was accompanied or not by 4 drawings illustrating it. The written story was accompanied or not by the 4 drawings, which were either integrated into the text or placed together below the text. Immediately after the presentation of the story, the children had to perform a cued recall of the story (T1). One week later (T2), a free and cued recall of the story was requested. No pictorial support helped children to better recall the orally presented or written story at both measurement times. However, at T2, no significant difference between children with strong and weak phonological skills was present in the condition of the heard story regarding their ability to recall the story, while children with weak phonological skills performed poorly at T1. A new experiment is underway to determine whether orally communicating (such as consolidation) the correct answers not provided by the children at T1 could have been beneficial to children with weak phonological skills at T2.

MEASURING EPISODIC MEMORY IN DAILY LIFE: AN APPROACH WITH DEEP LEARNING TECHNOLOGY FOR NATURAL LANGUAGE PROCESSING

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The recency effect, a well-established phenomenon in memory research, has rarely been investigated beyond laboratory settings. In this study, we sought to explore the recency effect in the context of daily events using a 15-day online diary survey. During the first 14 days of the survey, participants were instructed to record positive experiences from each day (i.e., encoding). On the 15th and final day, participants were asked to recall positive events that occurred on two randomly selected days during the survey period (i.e., retrieval). The degree of similarity between the descriptions of the encoded and remembered events served as a measure of memory accuracy. Similarity was evaluated using a fine-tuned RoBERTa model, a deep learning language model. Regression analysis revealed that participants exhibited more accurate recall of events that occurred more recently, such as those from the 14th day, thus supporting the occurrence of the recency effect beyond the laboratory setting.

DESTINATION AND SOURCE MEMORY REVISED: SAME SAME BUT DIFFERENT?!

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Source memory refers to remembering the origin (*source*) of information, whereas destination memory describes memory for the target (*destination*) of information. While a decision is typically involved when information is passed to a self-selected destination (e.g. person), such a decision component is usually lacking in source interactions (Marsh & Hicks, 2002). To test the assumption that this decision component leads to better destination than source memory, we manipulated both interaction type (destination vs. source) and decision component (present vs. absent) between

participants (4 groups, *n* = 32 per group). In a preregistered experiment, participants either decided to whom to give neutral objects or from whom to receive those. Alternatively, their decision was predetermined by the computer program. Using multinomial modeling for data analysis, we found better memory in the conditions with a present (vs. absent) decision across both memory types. Interestingly, across both decision conditions, participants remembered sources better than destinations. We suggest that a higher self-focus in destination versus source interactions might account for this result pattern.

SPONTANEOUS ADAPTATION OF MAINTENANCE STRATEGIES IN WORKING MEMORY

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Cognitive models suggest that several maintenance mechanisms could be used to struggle against information forgetting in working memory (WM), as elaboration. Although it is well-known that elaboration improve long-term memory (LTM), its effect on WM remains unclear. In the present study, we investigated whether elaborative strategies are spontaneously used to maintain information in WM. Seventy adults performed a complex span task, in which the distribution of free time periods varied. As elaborative strategies require time to be set up, we expected better memory performance in a condition with a few long free time periods than in a condition with many short free time periods. Besides, we evaluated the capacity of a computational model to simulate the behavioral outcomes, depending on the availability of the elaboration. In line with the computational modeling, the behavioral findings showed a positive effect of a few long free time periods compared to many short free time periods; on WM recall, but not on LTM recall. These findings provide evidence in support of the role of elaboration for the maintenance of information in WM. However, the unexpected absence of a similar effect on LTM recall requires further investigation.

FALSE MEMORY PRODUCTION INDICES FOR AD HOC CATEGORICAL AND ASSOCIATIVE LISTS

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The DRM paradigm is an experimental procedure used to induce false memories. It consists of presenting lists of words semantically related to a non-presented critical word, usually observing high levels of false recall and false recognition of the critical word. These results have been replicated by varying the type of relationships between the words presented and the critical word, but research with ad hoc categories is scarce. The ad hoc categories are built spontaneously to achieve a specific objective in a specific context and their elements come from different taxonomic categories (e.g.: things to lower a cat from a tree). In order to study false recall of ad hoc categorical and associative relationships using the DRM paradigm, 140 lists (70 ad hoc, 70 associative) were constructed based on 70 critical words. The study involved 272 participants who were presented with various lists for study, which they later had to remember, after each list. The results showed false memory differences between both types of lists, with the associative ones producing the highest levels. The study allows progress in important lines, such as those related to the nature of semantic representation or the understanding of memory distortions.

GRADED FORGETTING

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Forgetting is often considered counterproductive in everyday life. However, it may mainly be so when it is complete (all-encompassing and permanent) and not when it is graded (partial and fluctuating). I propose that forgetting is in fact mostly graded, and that this is a vital reason that it is often beneficial. I outline three ways in which forgetting may be graded. First, it may happen with respect to one, but not another, part of a memory (e.g., involve the declarative but not the non-declarative part of a memory). Second, it may happen in one context, but not in another (e.g., in a work environment, but not at home). Third, forgetting may appear at one point in time, but not at another (e.g., a currently forgotten memory may spontaneously reappear in the future). Also, I propose that five levels of forgetting are possible, based on whether an engram or a context is unavailable, silent, restricted, latent, or potent. Overall, I posit that forgetting is often beneficial because it can be flexible and tailored to the circumstances.

SPATIALIZATION TESTED VIA THE SPOARC EFFECT IS MODULATED BY THE NUMBER OF ITEMS TO BE MEMORIZED IN WORKING MEMORY

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The SPoARC (Spatial Positional Association of Response Codes) effect refers to a left-to-right (in Westerners) mental spatialization of ordinal information in working memory. In the present study, we investigated how spatialization can be modulated by the number of items to be maintained in working memory. The hypothesis was that spatialization should be sensitive to capacity limits because spatialization could help alleviate difficulty to hold information by

anchoring ordinal information onto space. In Experiment 1, 139 participants performed a spatialization task with sequences of either two, three, four or five items using a between-subjects design. Results only showed a significant spatialization effect for sequences of 4 items. In Experiment 2, 96 participants performed the same spatialization task for sequences of three, four and five items but using a within-subject design. Results again showed a single significant effect for sequences of four items. We also found that this effect was in part linked to the participants' span. Overall, our findings suggest a greater spatialization for sequences of four items and a possible modulation by working memory capacity as participants with the lowest spans tend to spatialize more.

ARE RECALL AND RECOGNITION CONDITIONALLY INDEPENDENT? TESTING THE RETRIEVAL INDEPENDENCE ASSUMPTION IN MULTINOMIAL MODELING

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Previous studies found that participants can correctly recall a word in a cued recall test after they fail to recognize this word as old. This recognition failure phenomenon is puzzling because recall relies more on retrieval than recognition. The retrieval independence assumption argues that this phenomenon may occur because recall and recognition are independent conditional on an item being stored in memory. We are interested in testing the boundaries of this assumption in a variant of the original paradigm where participants (N = 248) first receive a recall and then a recognition test. We manipulated recall cues (first-letter cue vs. no cue) and base rate ratios of the distractors relative to targets (half vs. equal) to create enough degrees of freedom to model recognition retrieval after successful and unsuccessful recall separately. Our multinomial model-based analyses show that the retrieval independence assumption does not hold in the present experiment, indicating that the internal and external cues necessary for free and cued recall are correlated with those involved in recognition. The results will be discussed with regard to the testing effect and possible influences of the retention interval length.

DIRECTED FORGETTING AND SURVIVAL: AN EXPLORATION OF THE INHIBITION PROCESS IN MATERIAL WITH AN INTRINSIC SURVIVAL VALUE

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The *survival effect* states that stimuli processed from a survival-related scenario are better remembered. This effect has been observed even in materials with intrinsic survival value. However, few studies have investigated the inhibition process with this type of information. To address this issue, two experiments were conducted using the directed forgetting paradigm. Experiment 1 used the item-method, while Experiment 2 used the list-method. In both experiments, participants studied a set of high and low value words in a survival-related dimension: avoiding death. Half of these words were associated with an instruction to learn (RRRR) and the other half to forget (FFFF). After presentation, participants completed a free recall task followed by a recognition task. The results showed that words marked to learn were better recalled than those marked to forget, with this difference disappearing in the recognition task only with the list method. The results are discussed in the context of the directed forgetting paradigm and the survival effect.

CAN SPATIAL ASSOCIATIONS BE TRANSFERRED FROM SHORT-TERM TO LONG-TERM MEMORY? INVESTIGATING THE SPOARC EFFECT USING REPEATED SEQUENCES

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Studies on the SPoARC effect have shown that serial information is spatially processed in working memory. However, it remains unknown whether these spatial-positional associations are durable or only temporary. This study aimed at investigating whether spatialization would persist when a sequence presented repeatedly is expected to be chunked. Thirty-seven participants performed a spatialization task inspired by the Hebb repetition paradigm. A sequence of four stimuli presented individually in the middle of a computer screen was repeated throughout the task. After each sequence, participants had to decide whether a probe belonged to the sequence using two lateralized response keys. While the SPoARC effect was detectable in a similar paradigm using non-repetitive sequences, no spatialization was observed in our results. However, further analysis revealed that the effect was detectable at the beginning of the task, suggesting that the more the sequence was repeated, the less participants spatialized information from left to right. These findings show that associations created in working memory between items and space are temporary: working memory progressively saves on spatialization once a sequence is chunked in long-term memory.

THE REASONS FOR WITNESSES SUCCUMBING TO MISINFORMATION HEARD FROM OTHER WITNESSES: VERIFYING THE MECHANISMS OF THE MEMORY CONFORMITY EFFECT

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The memory conformity effect involves the inclusion in memory accounts concerning a particular event of incorrect information (misinformation) that a witness has obtained as a result of another witness's account of the same event. The main aim of the present experiment was the verification of the assumption that this effect is caused through two types of mechanisms: (1) memory-related mechanisms, consisting in the fact that the misinformation causes a person to have mistaken memories concerning the event; and (2) non-memory related mechanisms, in which the person has correct memories of both the event and the misinformation, that is, the person is aware of the discrepancy between them but responds according to the misinformation. 160 participants were tested using the innovative MORI technique. It was shown that awareness of the discrepancy between the event and the misinformation reduced succumbing to misinformation. However, it was demonstrated that, despite being aware of discrepancies, 21.4% of participants still succumbed to the misinformation. It was also shown that the main reason for participants being misinformed despite being aware of the discrepancy was distrust of their own memory.

METAMEMORY BELIEF IN SCHEMA-BASED SOURCE MONITORING: REMEDIES OF THE METAMEMORY EXPECTANCY ILLUSION

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The authors investigated the contribution of belief to item-wise metamemory predictions in schema-based source monitoring. They tested whether belief correction remedies the *expectancy illusion* (i.e., people predict better source memory for expected sources, but show better source memory for unexpected sources, e.g., oven in a kitchen vs. razor in a kitchen; Schaper et al., 2019a). If the illusion is mainly based on a false belief, a correction should generalize to future learning. Two belief-correction procedures were tested as remedies of the expectancy illusion. Participants studied expected and unexpected source–item pairs and rendered item-wise predictions about source memory. Belief correction via instruction before study attenuated but did not fully remedy the expectancy illusion (Exp. 1). Further, test experience updated belief: Confidence judgments at test reflected actual source memory and predicted belief after test (Exp. 2). Belief after a first test predicted metamemory predictions during a second study cycle (Exp. 3). However, the expectancy illusion was again merely attenuated. Thus, the expectancy illusion partially persisted in all experiments, which may be due to deficient use of the corrected belief.

ACHIEVEMENT MOTIVATION AFFECTS MEMORY FOR UNFINISHED TASKS

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This study aimed to investigate whether achievement motivation affects memory for finished and unfinished tasks. We tested 1094 young adults, who were presented with 12 anagrams and given one minute to complete each of them. After a short delay, they had to recall as many anagrams as possible. The results showed that unsolved anagrams were more likely to be recalled than solved ones. Moreover, achievement motivation resulted in higher recall of unsolved anagrams. These findings provide support for the special status of unfinished tasks in memory and highlight the importance of achievement motivation for Zeigarnik-like phenomena.

MEMORY AND LISTENING EFFORT IN TWO-TALKER CONVERSATIONS: DOES FACE VISIBILITY HELP US REMEMBER?

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In face-to-face conversations, it is quite unusual that two talkers' audio signals come from the same spatial position and that the conversational partners cannot be seen at all - yet monaural-diotic sound presentation without any additional visual cues, such as faces, is often realized in cognitive-psychological experiments. The availability of such spatial and visual cues might facilitate listening and thus reduce listening effort while increasing memory for heard content. In the present study, participants performed a dual-task paradigm including a primary listening task, where a conversation between two spatially separated talkers (+/- 60°) with corresponding static faces was presented on computer screens. In parallel, a vibrotactile pattern recognition task was administered as a secondary task independently of both visual and auditory modalities. We assessed psychometric measures, like individual working memory capacity, to allow person-specific factors to be included as covariables in data analysis. We discuss our results regarding the role that spatial and visual cues play on short-term memory and listening effort in conversations, while also considering person-specific factors.

USING OBJECTIVE AND SUBJECTIVE MEASURES TO REVEAL QUALITATIVE DIFFERENCES BETWEEN MNEMONIC EFFECTS OF OVERT AND COVERT RETRIEVAL

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In two experiments, we tested for qualitative differences between mnemonic effects of initial covert retrieval (recollecting without reporting) and overt retrieval (recollecting and reporting). Earlier studies have shown a mixed pattern, with some failing to find any differential effects of overt and covert retrieval on subsequent memory performance and others showing differential effects. However, even when differential effects were found, it was unclear whether they reflected qualitative differences between overt and covert retrieval or merely reflected less invested effort when retrieval was covert. Here, we compared effects of overt and covert retrieval by examining both objective and subjective measures of memory following a 48-hr retention interval, as a function of initial retrieval mode and retrieval difficulty of small (Exp. 1) and large (Exp. 2) units of information. The results showed that whether (Exp. 2) or not (Exp. 1) a quantitative mnemonic advantage of overt over covert retrieval was found in terms of the magnitude of the testing effect, qualitative differences were found between them in terms of subjective phenomenological measures, reflecting more than differences in invested retrieval effort at initial testing.

THE EVOLUTION OF THE FLUENCY HEURISTIC IN AMNESIA

Willems Sylvie[1], Billet Maud[1]; *[1]ULiège*

The present study contains an analysis of fluency-based recognition in amnesia. Adopting an attributional model approach, we found that the fluency heuristic though present in both is distinct in an amnesic group (10 patients with different aetiologies) compared to age-, gender-, and education-matched control subjects. Experiment 1 showed that the naive (metamemorial) theories underlying the attribution of fluency to past experience are altered in amnesia. Experiment 2 showed that amnesic individuals globally used an appropriate global processing strategy that favoured the use of fluency. However, some patients showed better performance on a task where the instructions were modified to promote a global recognition strategy that favours familiarity-based processing, compared with the standard recognition judgement.These results suggest that processing fluency can constitute a cue for recognition decision in amnesia. However, this influence is not direct and is subject to metamemorial belief changes. Amnesic patients may gradually learn that fluency is not a reliable index of memory.

THE CUTE, THE BAD AND THE NEUTRAL: EMOTIONAL STIMULI CAN COMPENSATE FOR THE TASK-SWITCHING EFFECT ON SUBSEQUENT MEMORY PERFORMANCE

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The present study tested whether emotional stimuli can compensate for the detrimental memory effects of exhausted cognitive control. Toward this goal, we used a task-switching procedure in which we induced negatively or positively connoted emotional and neutral stimuli. The emotional stimuli were placed on switch trials and the neutral stimuli on repeat trials, or vice versa. In two experiments, the participants performed an animacy and an even/odd classification task on compound stimuli consisting of a picture and a number in the center. Afterwards, the participants completed a surprise recognition memory test for the pictures. The results indicated that emotional stimuli on switch trials can improve memory, but only when they are negatively connoted. In two further experiments with the same stimulus materials, participants had to switch between two different number tasks (even/odd, bigger/smaller than 5), the pictures were presented in the background. Again, the results showed that emotional stimuli can compensate for the detrimental effects of task switching on memory. Thus, emotions can boost memory in situations of exhausted cognitive control.

EFFECTS OF CONTEXT CHANGES ON MEMORY REACTIVATION

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Context has a well-studied relationship with LTM. However, how it affects the interplays between WM and LTM remains unclear. To study this interplay, we used a delayed match-to-sample task where each target object repeats for 6 consequent trials, which has been shown to result in its transfer from WM to LTM. During half of these repetitions, the context (i.e., the background color) will change. To measure the WM storage of the target, we will use the contralateral delay activity (CDA) in the electroencephalography (EEG). Our preliminary results show that repeated targets are stored with larger LTM involvement, as indexed by a decrease in the CDA amplitude. However, when there is a context change, the target item is reactivated in WM, as evident in an increase in the CDA when the background color changes. These results suggest that individuals reactivate LTMs in WM to adjust to new settings even when these settings are task irrelevant.

FACTORS RELATED TO CORRECT AND FALSE RECALL AND RECOGNITION OF A SET OF 55 LISTS OF 10 WORDS: A MEGA-STUDY

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The use of mega-study approaches to investigate intrinsic factors related to word memorability has become increasingly common. In contrast to factorial studies, mega-studies allow word properties vary more freely, thereby providing a better understanding of their influence on memory. We describe a mega-study in which 55 lists of 10 words were presented to 400 participants using the DRM procedure. The lists maintained a relatively constant amount of backward associative strength, allowing for the evaluation of the relative importance of a set of variables that was used to characterize the lists based on the lexical, associative, semantic, perceptual, sensorial, motor, and emotional properties of studied and critical words These variables were used as predictors of correct and false recall and recognition through a set of regression analyses. The pattern of results showed some differential effects of specific variables on memory performance, highlighting the importance of certain representational features related to accessibility, similarity, emotional valence, and measures of activation spreading. The results are discussed in the context of embodied-cognition and hub-and-spoke models.

INDIVIDUAL DIFFERENCES IN WORKING MEMORY REACTIVATION OF LONG-TERM MEMORIES PREDICT PROTECTION AGAINST ANTICIPATED INTERFERENCE

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How do humans prepare for anticipated interference? We tested the hypothesis that working memory (WM) is recruited to protect long-term memory (LTM) representations from perceptual interference. On each trial, participants saw a previously studied memory object followed by a retention interval. After retention, participants chose the memory object on a test display that contained an additional lure object. In half of the blocks, the retention interval contained perceptual interference. The contralateral delay activity (CDA), an index of WM storage, was used to track WM reactivation during retention. Interference decreased accuracy only for participants who prepared for interference with smaller CDA in the interference vs no-interference blocks (LTM preparers) but not those with larger CDA (WM preparers). This finding suggests that reactivating LTMs in WM is a better strategy when preparing for interference and highlights the individual differences in such preparation.

THE TEMPORAL COMPRESSION OF EXPERIENCE IN MEMORY: THE EFFECTS OF THE NUMBER AND DURATION OF EVENTS

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Remembering the unfolding of past episodes usually takes less time than their actual duration. In this study, we tested whether such temporal compression depends on the number and duration of remembered events. To address this question, we asked 72 healthy young adults to watch and mentally replay short movies depicting 1, 2, or 3 events (continuous actions performed without interruption), each lasting 3, 6, 9, or 12 seconds. For each trial, we computed the event remembering duration (ERD) by dividing participant's mental replay duration by the number of events composing the movie. When events were presented alone, ERD was close to the actual stimuli duration for short events (3 and 6 s), but smaller for longer ones (9 and 12 s). We also observed an effect of the number of events, showing that ERD was lower when multiple events had to be remembered. Taken together, these results suggest that both the number and duration of events have a specific influence on the temporal compression of experience in memory.

PROMOTING RESILIENCE: INVESTIGATING INDIVIDUAL DIFFERENCES IN THE ABILITY TO CONTROL INTRUSIVE MEMORIES

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Intentional suppression of unwanted memories enables us to downregulate intrusive thoughts and reduce the frequency of their occurrence, which subsequently leads us to forget. This mechanism acts as an adaptive emotion regulation strategy, allowing us to let go of thoughts of negative experiences that hinder our well-being. Recurrent intrusive thoughts of unwanted memories are apparent across numerous stress-related clinical disorders, including post-traumatic stress disorder (PTSD). To advance, we need to understand how the healthy brain promotes resilience by controlling unwanted memories and stopping the negative impact caused by intrusions. I will present findings from our recent projects that investigated whether neural and physiological measures (EEG, heart rate variability) recorded during voluntary retrieval of negative memories can act as markers for predicting whether these develop into involuntary intrusive memories in the lab and in daily life,

measured via Ecological Momentary Assessment (EMA). Furthermore, I will present findings from our recent registered report that reveals how enhancing mindfulness may act as an avenue improve the ability to control intrusive memories.

DO WORKING MEMORY LIMITS CONSTRAIN LONG-TERM RETENTION OF VERBAL INFORMATION

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Research has suggested that working memory (WM) capacity constrains the transfer and retention of visual information in long-term memory (LTM) and contributes to an encoding bottleneck. To investigate the generalisation of the visual bottleneck to verbal information, four experiments were carried out with separate samples of young-adult participants (N = 38 – 42). The likelihood that verbal items (words or nonwords) were actively held in WM was controlled by presenting items in sets of two, four and six with presentation time adjusted accordingly. In Experiments 1 and 2, items were presented simultaneously and in Experiments 3 and 4 presentation was sequential. Analysis of participants' performance on WM and subsequent LTM tasks found that WM was better for items presented in smaller set sizes in all experiments. An effect of set size on LTM retention was found when words were presented both simultaneously and sequentially, and for the simultaneous presentation of nonwords. This supports previous research and suggests that WM limits constrain LTM retention of verbal as well as visual information.

SEMANTIC AND PHONOLOGICAL ERRORS IN WORKING MEMORY TASKS IN CHILDREN AND ADULTS

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False memories refer to the remembering of events that have not been experienced but have semantic or surface (e.g., phonological) features similar to real experiences. Recent research has shown that semantic false memories can occur in working memory (WM) tasks that require holding a few items for a few seconds. These semantic errors emerge from the age of 4 and increase until adulthood. However, less is known about the development of phonological errors. The aim of the present study is twofold: to compare the developmental changes in semantic and phonological errors from childhood to adulthood and to examine the role of WM maintenance mechanisms on their occurrence. In a complex span paradigm, 8-year-olds and young adults memorized short lists of semantically or phonologically related words for later recall while performing a concurrent task that either prevented or did not the words from being held in WM. Data collection is ongoing. We expect that preventing WM maintenance will increase semantic errors in adults more than in children and conversely decrease phonological errors in adults more than in children. This study will provide a better understanding of the role of WM in the emergence of false memories of different nature.

WORKING MEMORY & SPATIAL STROOP HYBRID TASK: A TEST OF WORKING MEMORY'S EFFECT ON SIMPLE PROCESSING AND THE TRANSLATIONAL HYPOTHESIS

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The aim of this experiment was to examine whether the findings from Kiyonaga and Egner (2014) of a Stroop effect using temporally separate colour and word information could be replicated in a Spatial Stroop setting. Participants were shown either a letter or a location and asked to remember it for a short period. During this retention period, they had to make a very simple judgment about a stimulus of the opposite type (if remembering a letter, they judge a location and vice versa). They then had to decide if a probe item was the same as or different to the to-be-remembered item. The replication of the findings from the colour-word Stroop experiment was successful: when judging an item which was incongruent with the to-be-remembered item, participants were significantly slower to respond. This was the case whether they responded to letters or to locations. Participants were also significantly less accurate in recognising the memory probe in these cases, which further corroborates the previous findings with colour and word stimuli. Response method was additionally manipulated here to test the Translational Hypothesis of Stroop interference in this Working Memory-Stroop hybrid.

WHAT MECHANISM UNDERLIES THE IRRELEVANT SPEECH EFFECT: PHONOLOGICAL PROCESSING OR REHEARSAL?

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The Irrelevant Speech Effect (ISE) refers to the phenomenon that to-be-ignored background speech reliably impairs visual-verbal serial recall performance. The changing-state account (CSA) proposes that the ISE results from sound-induced impairments of the serial rehearsal process that participants use to maintain the item sequence. In a series of experiments, we explored role of rehearsal in the ISE by hindering rehearsal use through rapid visual presentation of the list items. In contrast to the CSA prediction, the ISE was not abolished in rapid when compared to standard

presentation rate. We found that rehearsal intensity correlated with ISE magnitude: the more rehearsal, the stronger the effect. We argue that ISE does not specifically affect serial rehearsal, but impairs phonological processing. In the current experiment, we investigated the ISE in a phonological processing task that did not require serial order retention and strongly discouraged a rehearsal strategy. Our data showed that the processing of phonological information was impaired by the presence of irrelevant speech. These findings are preliminary and invite further investigation and analysis. Implications for dominant accounts of the ISE are to be discussed.

REPETITION LEARNING: EQUAL OR SIMILAR FOR DECLARATIVE AND PROCEDURAL WORKING MEMORY REPRESENTATIONS?

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Working memory (WM) maintains information about the world around us and guides our behaviour. Oftentimes researchers distinguish between declarative WM representations, information about the world, and procedural WM representations, information guiding our actions. Yet, it is unknown how these compare due to methodological differences across studies. Declarative WM tasks often investigated accuracy of memory performance while to-be-memorized contents changed across trials. In contrast, procedural WM tasks focussed on the speed of performance as contents were held constant. To address these differences, we employed different versions of a Hebb repetition task with declarative and procedural representations. We measured accuracies and response times of memory performance for lists fully repeating, partially repeating, or not repeating their contents. Performance was most accurate and fastest for lists fully repeating their contents. Moreover, performance was least accurate and slowest for lists with partially repeating contents suggesting the build-up of proactive interference. These patterns were comparable between declarative and procedural tasks indicating similarities between declarative and procedural WM representations.

A SEMANTIC STRATEGY TRAINING INTERVENTION AIMED AT ENHANCING YOUNG AND OLDER ADULTS' VISUAL WORKING MEMORY CAPACITY

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More meaningful, 'high semantic' visual working memory tasks are more likely than low semantic tasks to activate non-visual codes, boosting participants' available resources and capacity. Actively combining strategies is also positively associated with task performance, and is most effective during more demanding, low semantic tasks. Data will be presented from two pre-registered experiments which assessed effects of a semantic strategy training intervention on performance of low and high semantic visual working memory ('matrix') tasks. Study 1, conducted remotely, focused on recognition performance of 44 young adults (18-35 yrs). Across both accuracy and response time data, effects of semantic availability, semantic training, and the interaction were not significant. However, the intervention group's accuracy was positively correlated with reported use of semantics, specifically within the more challenging low semantic task, as predicted. Study 2 is being conducted in the lab and addresses recall performance of both young and older (aged 60+) adults (target sample size = 128). We predict that, if semantic training is more beneficial for those with lower capacity, older adults will show a greater intervention effect.

INDIVIDUAL DIFFERENCES IN RETENTION OF NOVEL WORDFORMS LEARNED THROUGH AUDITORY STATISTICAL LEARNING

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Through statistical learning (SL) observers can discover the statistical regularities in the environment. Nearly all work on SL has focused on the ability to *detect* regularities, whereas the ability to *retain* knowledge about statistical regularities is less studied, and individual differences therein have to date not received any attention. We tested 81 participants on an auditory SL paradigm with embedded syllable patterns, assessing participants' pattern knowledge immediately after learning and then again after one week, without any additional exposure to the patterns. In addition, we quantified the stability of the retention measure at the individual level with a test-retest design. Results at group-level demonstrate that participants' pattern knowledge *improved* over one week. The test-retest reliability coefficient was close to zero and suggests that retention is not a stable characteristic of an individual, at least not in the way it was operationalised here. Our findings highlight the importance of investigating SL performance over an extended duration after exposure. Retention at the individual level requires more investigation to elucidate whether it is possible to reliably measure one's retention ability.

INDEPENDENT EFFECTS OF TOP-DOWN AND BOTTOM-UP ATTENTION IN A DUAL-TASK TEST OF WORKING MEMORY WITH SCENES

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Considering the relation between working memory and attention, it is widely accepted that top-down attention is the main driving force for allocating cognitive resources. However, whether bottom-up attention is also involved in this process is still controversial. Does top-down attention take precedence over bottom-up attention, or does bottom-up attention also affect working memory? We used the picture span test (PST), one of the complex span tests for visual working memory, with eye-tracking to investigate whether a top-down attentional process (judging semantic violation in a scene) can influence the effect of bottom-up attention (salient parts in the scene) on the memory performance and eye fixations. Our previous studies on PST have indicated that the stimulus-driven salience of the task-irrelevant part in the scene can induce memory errors. A current comprehensive reanalysis of our data showed that semantic violation in scenes attracted the gaze but did not affect the effect of saliency on memory performance. In the process of working memory for scenes, it is possible that bottom-up and top-down attention work independently.

NEUROPHYSIOLOGICAL MARKERS OF MUSICAL AND VERBAL SHORT-TERM MEMORY: A FUNCTIONAL NEAR-INFRARED SPECTROSCOPY (FNIRS) STUDY

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Musical and verbal short-term memory (STM) are key auditory processes that have been shown to be impaired in children with learning disorders. Neuroimaging studies have revealed the involvement of fronto-temporal networks in musical and verbal STM. To our knowledge, no study has explored a putative fronto-temporal impairment during musical and verbal STM in children with learning disorders. We used a fairly new technique, functional Near-Infrared Spectroscopy (fNIRS), ideal for investigating auditory cognition in special populations. We conducted two studies in a total of 40 healthy adults to assess frontal lobe involvement in auditory STM. In the first one, we observed the preferential recruitment of inferior frontal gyrus (IFG) and dorsolateral prefrontal cortex (dlPFC) during encoding and maintenance of musical and verbal sequences with a Delayed Matching-To-Sample Task, when compared to a low-level perception task. In the second study, we tested a specific involvement of the dlPFC for the maintenance of higher memory loads. These two studies pave the way for a final ongoing study in which we explore the impairment of the same structures in children with learning disorders and age-matched or reading-level-matched controls.

THE EFFECT OF EMOTIONAL VALENCE ON NONBELIEVED MEMORIES

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The phenomenon whereby people remember events that they know never happened is called “Nonbelieved memory” (NBM). Several studies have investigated the characteristics of NBMs by comparing them to typical (i.e., believed) memories (BMs). Although some phenomenological differences have been observed, NBMs are often experienced as "memory-like" despite the change in belief. The purpose of this study was to examine whether the characteristics of NBMs is influenced by the emotional valence of events, as is the case for BMs. Participants aged from 20 to 60 years (n = 220) were asked to describe an NBM, to explain the reason for belief change, and to rate its phenomenological characteristics. Whenever an NBM was retrieved, they also described an age-matched BM of the same valence so that the characteristics of both types of memories could be compared. The results showed that phenomenological ratings of NBMs and BMs are minimally influenced by their valence. Interestingly, an examination of emotional valence and intensity ratings at the time of the events and during retrieval revealed that the fading affect bias previously demonstrated for autobiographical memories was also apparent for NBMs.

HOW ARTISTIC EXPERTISE SHAPES INDIVIDUAL DIFFERENCES IN LOW-LEVEL SENSORY WORKING MEMORY

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How do our different day-to-day experiences shape our working memory abilities? To investigate extreme examples of individuals with different daily sensory experiences, we recruited participants from two unique groups - musicians and visual artists - for whom precise perception and reproduction of low-level sensory stimuli are essential. All subjects were graduates from Fine Art and Music Bachelor's programs with extensive training in their respective fields, either in drawing or in ear training. Participants performed two different working memory tasks in which they were asked to either memorize a visual (oriented grating) or an auditory (pure tones) stimulus and reproduce it as precisely as possible after a short delay. We found that both groups showed selective benefits for the sensory modality of their professional expertise. Artists recalled the orientation of a memorized grating in a less biased fashion, while musicians showed higher precision when recalling pure tones. These results suggest that daily experience can shape working

memory abilities in a modality-specific manner and allow us to ask what differential neural mechanism drive these differential abilities.

WHAT HELPS MEMORY RETENTION MORE, A BRIEF PERIOD OF WAKEFUL REST OR REPEATING THE INFORMATION?

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Studies have shown that a brief period of rest immediately after learning can improve the retention of new memories. An obvious question in this context is whether the retention of new memories is better supported by a rest period immediately after learning or by active repetition of the to-be-retained information. In a counterbalanced within-subjects design, participants learned three auditorily presented word lists. The learning of one word list was followed by either several minutes of wakeful resting (eyes closed, relaxed), active repetition, or performing a working memory task. Our results show that active repetition supports memory retention more than wakeful rest, and that wakeful rest supports memory retention more than performing a working memory task. The practical implications of our findings and their relevance in the context of existing wakeful resting studies are discussed.

ASSESSING MEMORY AND METAMEMORY FOR EVERYDAY VISUAL SETTINGS BY MEANS OF CAR BRAND LOGOS

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Previous research in incidental memory for everyday settings has shown that frequent exposure to stimuli does not guarantee an accurate representation of them in our memory. The main goal of the present study was to explore memory and metamemory for a simple and familiar type of visual stimuli that people repetitively interact with: car brand logos. In two experiments, we explored recall (drawing) and forced-choice recognition (Exp.1), as well as naming of car brand logos (Exp.2). Participants also provided confidence judgements about their performance in all tasks. Results showed that memory accuracy for logos was modest in recall and recognition tasks, nevertheless accuracy in naming the visually displayed car logos was almost perfect. Interestingly, participants showed an overconfidence in their ability to recall and recognize the car logos that contrasted with memory accuracy. This overconfidence was completely absent in the naming task. These results support a functional view of encoding, in which irrelevant details for the usual function of the stimuli do not need to be encoded, leading to a more efficient and adaptive memory system.

THE EFFECT OF EMOTION ON SPATIAL WORKING MEMORY CAPACITY

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Emotion enhances spatial working memory (WM) performance when emotional stimuli compete with neutral ones for access to WM. We hypothesized that if competition exists it should appear only when information to be encoded exceed WM capacity. An emotional object-relocation task with different memory load conditions (2, 4, 6, 8 rectangles to be relocated) was used to verify this hypothesis. In each condition pictures selected from IAPS incidentally appeared superimposed on each rectangle. Valence and arousal of the pictures were manipulated: in experiment 1 half of the pictures were negative with high-arousal and half neutral with low-arousal; in experiment 2 all pictures were negative, and arousal was manipulated (low vs. high); in experiment 3 all pictures were neutral, and arousal was manipulated; in experiment 4 valence was manipulated (negative vs. neutral) and arousal (low) was kept constant. Emotional pictures increased spatial WM performance only in the 8-rectangle condition, suggesting that competition occurs when stimuli to be encoded exceed WM capacity. Moreover, this competition effect only appeared when valence was manipulated, suggesting that rectangles associated with negative pictures are prioritized for access to WM.

COLLABORATION IN ELECTRONIC GROUPS: POSITIVE AND NEGATIVE EFFECTS ON MEMORY AND SUGGESTIBILITY

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Recent research has shown that collaboration has both positive and negative effects on memory and suggestibility in face-to-face settings. However, it is still unknown whether the same outcomes may be seen in a virtual environment context. The performance of 10 nominal triads and 10 collaborative triads in a fully online scenario was studied in the current study to shed further light on this issue. The Deese/Roediger-McDermott (DRM) task and the Gudjonsson Suggestibility Scale (GSS) were administered while participants interacted live via videoconference. Collaborative triads demonstrated the expected inhibition effect in both the immediate and delayed (after 24 hours) recall tasks for the GSS, and they were also less suggestible than nominal triads. These findings replicated the in-person pattern of results. In terms of the DRM, we likewise showed that cooperation reduced recall and recognition of both studied words (the typical collaborative inhibition effect) and critical lures (the error-pruning effect). We conclude that at least when

using a videoconference setting, remembering in a virtual context demonstrates the same general properties as its in-person equivalent.

DEFICITS IN INHIBITORY CONTROL OVER INTRUSIVE MEMORIES AND DEPRESSIVE RUMINATION

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Memory control is a crucial aspect of emotion regulation. Retrieval suppression of undesired memories, and their associated forgetting, is linked to the individual tendency to ruminate. High ruminators struggle to downregulate memory intrusions, resulting in decreased *suppression-induced forgetting (SIF)*, making them more vulnerable to depressive symptoms. Indeed, people with subthreshold depression also experience reduced *SIF*. In a retrieval suppression task, we compared healthy Low Ruminators (LR), High Ruminators with Dysphoria (HRD), and High Ruminators with no depressive symptomatology (HRnD). Contrary to LR, HRD and HRnD showed no *SIF*. Interestingly, phenomenological reports revealed that all three groups were equally able to reduce the frequency of memory intrusions along the task. However, a closer look at the strategies reported by participants revealed that HR used alternative thoughts to prevent intrusions more often than LR. These findings suggest that individuals with a tendency to ruminate are more likely to use non-inhibitory mechanisms to control their memories, which may reduce the downregulation of intruding thoughts in the long term, being less effective for emotion regulation.

PERSONAL LIKELIHOOD AND EVENT FAMILIARITY INFLUENCE THE SIMULATION OF FUTURE EVENTS

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Episodic future thinking (EFT) is the ability to project the self forward in time to pre-experience a potential future event. EFT combines at least two core processing components. One component activates the event's associated relevant knowledge, and the other places the event in a coherent autobiographical context. We studied these two components through a person's familiarity with an event, and their belief in the likelihood of that event's future occurrence in their life. We predicted that high event familiarity and likelihood would enhance simulations, making them clearer and more detailed, but both components would have distinctive roles. Using two norming studies, we developed participant-specific sets of events that participants then simulated and rated phenomenological aspects. We also analysed their event descriptions. We found that both components are relevant for EFT and play combined and distinctive roles during EFT. High levels of familiarity enhanced the perceptual information produced and perceived during the simulation of likely future events. Contextual spatial and temporal information felt more real in likely events. Finally, high levels of familiarity independently enhanced temporal information.

THE IMPACT OF TEST LANGUAGE ON SHORT-TERM MEMORY IN A MULTILINGUAL SETTING: DIGITS VS. NONWORDS

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Short-term memory (STM) is a crucial cognitive function in reasoning, learning and in everyday life activities. Therefore, it is included in most intelligence tests. Most widely used is the digit span task, where verbally presented numbers must be stored and retrieved. The task presentation requires language-processing, which needs to be considered especially in multilingual settings where participants' home language(s) differ from the test language. In this study we compared the performance of sixth graders with high, low or no test language exposure at home using two STM measures: digit-span (1 to 9) vs. nonwords (CVC monosyllables). Both conditions were administered as a group test in two different samples. Each test included 13 items with a span ranging from 3 to 7. In the digit-span condition (N = 4266), high exposure to the test language at home resulted in significantly better results than low- or no exposure. In contrast, the nonword condition (N = 4574) showed no significant differences. Conclusively, language proficiency has an impact on STM performance in tasks that rely on processing a specific language. This aspect should be considered in multilingual settings in which a more universal measure would be more appropriate.

THE INTERPLAY BETWEEN MULTISENSORY INTEGRATION AND ATTENTION: HOW ARE CROSS-MODAL OBJECTS MAINTAINED IN WORKING MEMORY?

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The current study explores how multisensory integration and attention interact in working memory (WM). Using an audio-visual WM task, participants are presented with one or two audio-visual memory items. In a block-wise manner, they maintain either visual, auditory, or both features (conjunction condition). After a delay,

participants judge if the probe matches one of the task-relevant memory features or objects. Behavioral data shows that the task-irrelevant feature of the probe reduces accuracy despite the instruction to focus on only the task-relevant feature. Further, with an increasing memory load, task-irrelevant feature interferes with the accuracy more strongly than with a lower memory load. An analysis of SAN amplitudes (a metric for auditory WM load) as a function of load shows further evidence of cross-modal interactions: we find clear SAN load effects in the conjunction condition, while in the auditory condition, only a marginal effect is present. Further, alpha power modulations are sensitive to task instructions such that a stronger desynchronization is evident when focusing on visual or audio-visual features versus auditory features only. In sum, the study sheds light on the neural basis of multisensory WM.

MODULATION OF RECOGNITION MEMORY BY ASSOCIATED RELEVANCE: TIME-RESOLVED EVIDENCE FROM EVENT-RELATED BRAIN POTENTIALS

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The N400 and the Late Positive Complex (LPC) of event-related brain potentials have been linked to the recognition memory processes of familiarity and recollection, respectively. Recognition memory has been demonstrated to be impacted by the emotional relevance of stimuli. In this study, we investigated 'old/new' effects reflected in N400 and LPC modulations following associative learning of symbolic stimuli (letter strings). In two experiments, we used an old/new recognition task, after participants had learned associations between monetary outcomes and either the characters or fonts of letter strings. We found significant interactions between novelty and associated relevance for LPC amplitudes. Interestingly, this effect was restricted to the group that had learned the character-outcome association. Our results confirm that LPC modulations reflect an integration of different high-level processes, including the evaluation of relevance and recognition memory processes. In contrast, the N400 was modulated by novelty but not by the associated relevance, suggesting that the underlying function of the N400 is the evaluation processes of anomalous semantic information independent of associated relevance.

THE SELF AS A MEMORY HOOK: AN UP-TO-DATE META-ANALYSIS ON THE SELF-REFERENCE EFFECT

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Self-representation is linked to memory processes, as shown by improved retrieval of self-referentially encoded material, compared to perceptual semantic or other-referential encoding. This self-reference effect (SRE) has been extensively studied in basic and translational research contexts. While self-reference tasks enjoy ongoing popularity and the body of research continues to grow, to our knowledge, no systematic integration of SRE studies has been reported since in almost three decades (Symons & Johnson, 1997). With our present meta-analysis, we aim to close this gap and update knowledge on the SRE, its size, moderators and hypothetical drivers. Following extensive search, we included results from Web of Science, PsycInfo, PsyArXiv and unpublished studies. We integrate previous and more recent findings on the SRE, taking into account learning task and experimental design characteristics, retrieval format and interindividual differences, such as age or psychopathology. In line with previous research, we confirmed the SRE as a robust phenomenon, with the largest effects observed when the baseline task involved "surface-level" features such as phonemes, while other-reference sometimes nearly matched self-referent.

EFFECTS OF GROUP DISCUSSION ON TRUE AND FALSE MEMORIES

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Schacter (2001) has summarized research showing when biases may distort memory in a variety of ways. The vast majority of research on memory has been done at the individual level. Yet memory is inherently social; we share our stories and experiences with each other, and others may fill in the gaps in our memories and/or distort our memory in various ways. This may simultaneously increase the number of details accurately recalled and/or exaggerate or attenuate any memory biases shown by each individual. The main goal of the proposed research was to test the effects of group discussion on true and false memories. We had 156 participants attempt to recall 7 lists of 15 words using the Deese/Roediger-McDermott (DRM) procedure to elicit false memories. Half of the participants recalled the lists individually, whereas the other half discussed their memories within groups of two or three. Participants discussing their memories recalled a higher proportion of the words that were on the lists (.59 vs. .45), $F(1,154) = 78.3$, $p<.001$, $\eta^2 = .34$, whereas group discussion did not affect the proportion of lures (i.e., false memories) reported (.43 vs. .49), $F(1,154) = 2.31$, $p = .13$, $\eta^{2=} = .015$.

WORKING MEMORY CAPACITY EFFECTS ON EYE MOVEMENTS: READING VS READING SPAN TASK

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There is ample evidence that eye movements in reading are responsive to the ongoing cognitive processing of stimuli. Therefore, reading is affected not only by lexical characteristics, but by basic cognitive functions such as WM (working memory). We investigated the role of WM capacity and lexical characteristics on eye movement parameters. The study includes two measures of WM capacity: visuospatial and verbal n-back tasks, and two sentence reading tasks (regular reading and Reading Span task) using Eyelink 1000+ eye tracker. Results showed that first and last words attract more reading time than those in the middle. As we expected, longer words do not attract more reading time than short words. Moreover, participants with higher WM capacity make fewer blinks in both single and dual reading tasks. They also skip words in the reading task, while lower WM capacity participants tend to skip words in the dual task. Both n-back tests results correlated with the new WM capacity results as provided by the Reading Span task. In conclusion, it is evident that WM capacity plays a significant role in eye movements and reading, but its nature should be discovered more closely in future research.

LIVING WITHOUT IMAGERY: STUDY OF EPISODIC ASSOCIATIVE MEMORY STRATEGIES IN APHANTASIA

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Unitization consists in encoding associations in episodic memory as one unique entity. It allows recognition to rely on familiarity (sense of knowing), instead of recollection (recollecting the encoding context) that would otherwise be required to recognize associations. Yet, little still is known about the mechanisms underlying unitization. Some authors proposed that unitization requires visual imagery to integrate the different pieces of information before their anchoring within semantic memory. This study aimed to test this hypothesis. We manipulated (1) the presence vs. absence of visual imagery by recruiting control and aphantasic participants, and (2) the possibility to anchor representations into semantic memory by using words vs. pseudowords, across three word-colour associative memory conditions encouraging or not unitization, while measuring the contribution of recollection and familiarity. Preliminary results show that aphantasics display globally worse performance than controls, with preserved familiarity but reduced recollection, especially for unitization using pseudowords, with increased guessing. This suggests that visual imagery is not necessary for unitization, as long as semantic information is available.

INTERFERENCE IN ACTIVE AND PASSIVE WORKING MEMORY STATES

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Working memory can hold items in an active, priority state, or a passive de-prioritized state. These functional states are hypothesized to rely on different neural mechanisms. Functionally active states are likely to be supported by persistent neural firing, while passive states utilize activity-silent mechanisms. Here, we tested the hypothesis that retention in such activity-silent states might be more robust to interference. We asked the participants in our experiments to memorize two items, which were probed at the end of each trial in a fixed priority order. During memory maintenance, we presented an interfering task that required an immediate response. The interference task was not relevant to the memory task as such, but there was either feature-based or location-based overlap with the memory items. We manipulated whether this overlap pertained to the item that was probed first (i.e., the active item), or second (the passive item). We observed a clear interference effect in both cases, but there was no reliable difference between the two priority states. Thus, we conclude that there seems to be no difference between functionally active and passive states when it comes to robustness against interference.

LOOKING-AT-NOTHING AND MEMORY STRENGTH IN WORKING MEMORY

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When retrieving information from long-term memory, people tend to gaze toward the location where this information appeared, a behavior known as "*looking-at-nothing*" (*LAN*). The current study examined whether LAN varies with the strength of the retrieved representation. Memory strength was manipulated through the frequency of color-shape bindings. Half of the memory shapes had a high chance of appearing with a specific color and a lower chance of appearing with other colors, the other half was randomly paired with the colors. Participants (N = 32) completed 120 trials, where four colored shapes appeared sequentially across four squares and then disappeared. Then, one shape's name was presented auditorily, and participants recalled aloud its color. Eye movements

were tracked with an *Eyelink 1000 Hz*. Task accuracy did not vary with binding frequency and at test, the gaze was less frequently directed to the location further from the probed; nonetheless, gaze was equally likely to land on the probed and its adjacent locations. In sum, participants did not make use of binding frequency to improve their working memory performance and LAN was not consistently observed in this working memory task. observed in this working memory task.

ENHANCING THE RETRIEVAL OF EPISODIC MEMORIES THROUGH ATTENTIONAL FOCUSING IN WORKING MEMORY: EVIDENCE BY EVENT-RELATED POTENTIALS IN THE EEG

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Attentional focusing during encoding has been shown to enhance explicit episodic memory performance. Recent evidence suggests that this might result from attentional modulations on the level of working memory (WM). To investigate this interplay, we used EEG to measure brain activity during a seemingly unrelated WM task nested in an episodic memory task. In an initial learning phase, participants were shown objects at certain locations and instructed to remember those associations. In the WM task, two-thirds of the objects reappeared at their associated locations, but only half of them were cued as task-relevant. During the episodic memory retrieval phase, participants retrieved the locations associated to each object. For objects cued during the WM task (compared to non-cued objects and those not presented during the WM task) location report was more accurate and faster. Preliminary findings on EEG level indicate an early positivity in the ERP during episodic memory retrieval for all objects presented in the WM task, while a later positivity in the P3 time window was shown only for cued objects. These findings demonstrate the importance of the focus of attention in WM for the formation and retrieval of episodic memories.

IMAGERY AND VERBAL STRATEGIES IN MEMORY RECALL OF SPATIAL DESCRIPTIONS

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Being able to represent and remember information about spatial environments from different perspectives is important for numerous daily activities. This study examined how frequently individuals spontaneously engage in visual mental imagery and verbal rehearsal strategies in memory of spatial descriptions, and whether using certain strategies is associated with better recall performance. Memory recall for route (person-centred) and survey (object-centred) spatial descriptions was examined in a sample of 105 individuals, who also reported to what extent they used route- and survey-based mental imagery and verbal rehearsal strategies in each description. Results showed that participants favoured route-based imagery to recall the route description and survey-based imagery to recall the survey description. Regression models further revealed that employing both imagery and verbal strategies was associated with higher recall for both route and survey descriptions. The present findings indicate that spontaneous use of both visual mental imagery and verbal rehearsal memory strategies is ubiquitous in free recall tasks of spatial descriptions and a core part of efficient memory functioning.

SEARCHING AMONG MEMBERS OF A SUPERORDINATE CATEGORY INCREASES HITS AND FALSE ALARMS DURING RECOGNITION TASK

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In this study, we examined how the "find the odd man out" task relates to memory. We conducted four experiments (N total = 122) that differed in the time that subjects had available to memorize the target object. In the first phase, participants searched for a target image to remember among five distracting images belonging to a different category. The categorical visual search was organized differently for two conditions: in the low categorical distinctiveness condition (LCD), the target image was surrounded by images from the same superordinate category (e.g., cat/dog); in the high categorical distinctiveness condition (HCD), it was surrounded by dissimilar objects from another superordinate category (e.g., cat/chairs). In the second phase, participants took a recognition test. We expected that the visual search would lead to memory distortion, shifting the memory trace toward the prototype: more hits and false alarms in the LCD condition compared to HCD condition. The hypothesis was confirmed.

"HOW ANIMATE IS 'LIVER'?": DIFFERENCES AND COMMONALITIES ON ANIMACY RATINGS AMONG PORTUGUESE, AMERICAN AND BRITISH PARTICIPANTS

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Animate/living stimuli, as compared to inanimate/nonliving objects, hold an advantage in many cognitive processes (e.g., memory, attention and language). For instance, animates are processed faster and are better recalled than inanimates. Despite the increased recognition of the importance of this variable, it is not yet

widely controlled for in research, partially due to the lack of animacy ratings available. Also, questions remain about the consistency of animacy ratings among different languages and the possibility of relying on ratings collected in another language. In this study, we present comparisons of animacy ratings provided by Portuguese, British and American participants. Comparisons among the three were made for a set of 173 words, while the latter two considered ratings of 500 words. Results revealed that ratings from all samples were highly correlated; however, mean rating comparisons revealed significant differences (Portuguese > British= American). These results suggest that animacy is similarly understood across languages, although with some differences. Possible reasons for such differences will be presented, as well as potential implications for research. The animacy ratings will be available via OSF: osf.io/w6jgr/

Theme

METACOGNITION

EFFECT OF WRITING SCRIPT ON METACOGNITION OF WORD LEARNING

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We explored how experience with different scripts modulates inferential word learning in visual vs. auditory modality and metacognitive monitoring in word learning. The experiment is run with Mandarin (Logographic script), Arabic (syllabic script), Portuguese (opaque alphabetic script) populations. Hypothesis: metacognition in the visual modality is influenced by the writing system stronger than metacognition in the auditory modality. The efficiency of metacognitive monitoring also influences memory encoding during word learning. We (1) compared metacognitive efficiency in the visual modality across populations, and (2) difference in metacognitive efficiency between auditory and visual modalities across populations. Metacognitive efficiency in the auditory modality is modulated by the size of the basic processing unit (word for logographic script, syllable for the syllabic script and phoneme for the alphabetic script). Hence, in the auditory modality metacognitive efficiency for logographic script is highest and for alphabetic script is lowest. These results have direct pedagogical implications on constructing vocabulary acquisition activities in foreign language teaching depending on the target language.

STUDY OF EARLY METACOGNITION AND ITS INFLUENCE ON THE USE OF THE MEMORABILITY HEURISTIC

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The early emergence of monitoring and control abilities have been recently established, raising the question of whether such basic metacognitive skills could predict the use of more complex memory strategies (e.g., the memorability heuristic involving the implementation of a more conservative response criterion for memorable than non-memorable events) later in development. Here, we documented the development of both monitoring and control processes between age 2.5 and 4.5 (n=63) while exploring their impact on children's later use of the memorability heuristic. First, control (cue request) and monitoring (confidence judgment) abilities were tested at three-time points (12-month interval). Then, at age 4.5, a story-recall task including memorable and non-memorable events followed by a true-false recognition test was used to assess the heuristic. An increase in both monitoring and control performance was found with age while 4.5-year-old children's use of the heuristic was shown to be predicted by metacognitive control 12 months earlier. Overall, our findings show an improvement in monitoring and control processes between age 2.5 and 4.5 and suggest the importance of early metacognitive abilities for later metacognitive functioning.

AGE-RELATED DIFFERENCES IN METACOGNITIVE CONTROL IN TODDLERHOOD: A PILOT STUDY

Marie Geurten[1], Marion Gardier[1]; *[1]University of Liege*

Over the past decade, evidence has been provided that metacognition – processes whereby people monitor and regulate their mental operations – emerges at an early stage of children's development. To date, however, few studies have examined age-related differences in these early skills. The aim of this pilot study was to document changes in metacognitive processes over the course of toddlerhood. To do so, 3 groups of 24-, 30-, and 36-month-old children were recruited (n=54) and presented with a forced-choice recognition task. After each memory decision, participants were presented with a cue to help them decide whether their response was correct. They had then the opportunity to change their recognition response. The ability to use the cue to switch response more often after an incorrect than a correct decision was used as a measure of metacognitive efficiency. Results revealed that children in all age groups were able to use the cue to strategically improve their memory performance and that such an ability increased with age. Such findings confirm the early emergence of strategic metacognitive skills in toddlerhood and contribute to our understanding of the nature of the metacognitive change occurring at such a young age.

EXPLICIT METACOGNITIVE MONITORING DIMINISHES PERFORMANCE IN A BASIC VISUAL TASK SIMILARLY TO AN ADDITIONAL PERCEPTUAL TASK

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This study aimed to determine whether intentional monitoring (assessing confidence in one's response) affects performance in perceptual and general knowledge tasks. Across two experiments, participants were either asked to indicate which one of two briefly presented fields contained more dots or to choose from two suggested answers to a general knowledge question. Two forced-choice responses – first and final – were given in each trial. Between both responses, participants, depending on group assignment, either rated confidence in their first response on a 4-point scale, indicated a larger digit on an analogous 4-point pseudo-scale, or observed a blank screen. We detected lower accuracy of final responses in conditions including confidence judgments and perceptual digit search as compared to the blank screen condition, but only in the dot perception experiment. This effect might have stemmed from a higher number of changes of mind in the blank screen condition, which were predominantly corrective and contributed to higher general performance. Our results suggest that metacognitive monitoring might hinder processing in simple visual tasks, either due to resource consumption or interference with lower-level visual processes.

METACOGNITIVE EFFECTS OF CONTEXT REINSTATEMENT ACROSS EPISODIC AND SEMANTIC MEMORY TASKS

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Episodic information in the form of familiarity often contributes to judgments concerning semantic memory. But do recollections of specific episodic events also affect such judgments? Here we compared the effects of reinstating the encoding context at the time of retrieval – a manipulation facilitating retrieval of specific episodes of previous study – on metacognitive judgments accompanying both episodic and semantic memory tasks. Participants studied verbal materials presented against contextual background photographs and were later asked either to recognize words that were studied or to recognize synonyms and antonyms of these studied words. In Experiment 1, prospective metacognition in the form of feeling of knowing judgments was examined. Experiment 2 examined retrospective metacognition in the form of confidence judgments. In both experiments, reinstating encoding context affected metacognitive judgments in the episodic memory tasks, but had no discernible effect on metacognitive judgments in the semantic memory tasks. Thus, while people may become confused by stimulus familiarity when retrieving information from semantic memory, they are capable of separating episodic recollection from the appraisal of semantic retrieval.

DYNAMICS OF CONFIDENCE IN IMPLICIT PROBABILISTIC LEARNING

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Metacognition is often studied in situations where task representations are already formed. Little is known about how metacognition develops in learning. This study addresses these questions by looking at online confidence in probabilistic learning. Participants performed the weather prediction task providing confidence ratings on each trial. Such an experimental setting allowed us to track the dynamics of metacognition in parallel with learning. Single and dual-process models of metacognition were considered for predicting possible results. Results showed that probability learning and metacognitive sensitivity both developed over time, but metacognitive sensitivity developed more gradually. Unlike accuracy, confidence was influenced by reward prediction errors in a previous trial. Participants felt more confident after surprising correct responses. To sum up, we observed the temporal development of both probability learning and metacognitive sensitivity in the probabilistic learning process. However, metacognitive sensitivity developed more gradually compared. Metacognition and probability learning also depended on different sources of information. The obtained results support the dual-process models of metacognition.

TITLE: WHERE THERE'S A WILL, THERE'S A WAY: THE STRUCTURE OF IMPLICIT THEORIES OF WILLPOWER

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Self-control allows people to align their behaviour with intention in the face of a motivational conflict. Implicit theories of willpower are associated with self-control in laboratory tasks and real life.[1] However, while research on implicit theories of other psychological attributes (e.g., intelligence, personality) studies the perceived malleability of these attributes[2], research on implicit theories of willpower has focused on whether willpower is seen as a limited resource. Using questionnaire data from UK participants (n=182, age=18–75), we conducted a principal component analysis, which suggested that the implicit theories of the limitedness and malleability of willpower were relatively independent of each other and distinct from self-esteem. Additional correlation tests showed

that only the limitedness dimension was associated with self-rated trait self-control: beliefs of limitedness were negatively correlated with trait self-control. Finally, in contrast to previous research[3], there were no age-related differences in implicit theories. The proposed two-dimensional measure can broaden our understanding of lay ideas of self-control, offering relevant insights for impactful self-control research and science communication.

Theme

MOTIVATION

THE BENEFICIAL ROLE OF CURIOSITY ON ROUTE MEMORY IN CHILDREN

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There has been a growing interest in the role of innate curiosity on facets of human cognition, such as spatial learning and memory. We assessed the influence of trait curiosity on route memory in forty-two 10-year-old children (22 Males; 20 Females), who actively explored virtual environments designed to elicit varying levels of uncertainty (i.e., state curiosity). We manipulated state curiosity (low, medium, and high) within each environment by increasing the level of uncertainty in correctly predicting the appearance of a cartoon character when exploring a path. As trait curiosity increased, so did memory performance in high uncertainty conditions, suggesting that children with high levels of curiosity can better recruit cognitive resources within such environments. Importantly, in environments with medium uncertainty, children with low trait curiosity were able to perform as well as those with high curiosity. Further, children with high compared to low curiosity also reported greater feelings of presence during the immersive experience. Results highlight how individual differences in trait curiosity influence route memory, and suggest these interact dynamically with state curiosity, invoked within different environments.

DO WE PUNISH WHAT IS MORALLY WRONG OR WHAT IS UNCOMMON? THE EFFECT OF A DESCRIPTIVE COOPERATION NORM ON PUNISHMENT

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To test the effects of descriptive norms on punishment, we used a Prisoner's Dilemma game with a costly punishment option and manipulated whether the participants' partners cooperated or defected in the majority of trials. Using a multinomial model, we measured the effects of this base-rate manipulation on cooperation and different types of punishment. In two experiments, high cooperation rates increased participants' cooperation, suggesting that they followed the descriptive cooperation norm. When participants' cooperation was not enforced through partner punishment, cooperation rates approximately corresponded to the manipulated base rates. Participants' inclination to morally punish defection increased when the base rate of cooperation was high in comparison to when it was low, suggesting that moral punishment is affected by descriptive norms. Nevertheless, moral punishment remained at a high level even in the low-base-rate group. Furthermore, if punishment only served to reinforce descriptive norms, high cooperation rates should decrease the inclination to antisocially punish cooperation. The opposite was the case, which corroborates that people do not simply punish what is uncommon.

EFFECT OF GENDER AND MOTIVATION ON ACTUAL AND PERCEIVED MENTAL ROTATION PERFORMANCE IN ADOLESCENTS

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Performance in the Mental Rotation Test (MRT) usually produces robust gender differences in favor of males, who also report higher confidence in their mental rotation performance. Moreover, different effects of performance and mastery goals on male and female adolescents' actual and perceived performance are assumed. Accordingly, the present study analyzed gender and motivational differences in actual and perceived mental rotation performance. Eighty-one adolescents (30 males, 51 females) between 10 and 16 years solved the MRT with 12 items and filled out a questionnaire about their perceived performance in the task and their mastery and performance goals. Male adolescents outperformed females in the MRT (d = .740) and reported higher perceived performance (d = .945), while females reported higher mastery goals (d = .564). Correlations between mastery goals and actual (r = -.424) and perceived (r = -.407) mental rotation performance were negative for male and non-significant for female adolescents. Results are discussed in terms of gendered motivational approaches to test situations.

BINDING OF APPROACH-AVOIDANCE GOALS TO STIMULI

Andreas B. Eder[1], Anand Krishna[1], Carina Giesen[2], Christian Frings[3]; *[1]JMU Würzburg, [2]University of Jena, [3]Trier University*

Appetitive and aversive stimuli are typically distinguished by their capacities to trigger approach- and avoidance-related action tendencies, respectively. The present study investigated whether approaching and avoiding stimuli creates an episodic memory trace that is automatically retrieved when the stimulus is encountered again. Using a sequential distractor-to-distractor repetition

paradigm, we hypothesized that distractor repetition from prime to probe trials will facilitate approach/avoidance to the probe target if the response is also repeated from prime to probe but will impede responding to the probe target if the response has changed. Results of four experiments (total *N* = 403) were in line with the hypothesized episodic binding and retrieval effect. A stimulus-cued retrieval of the previous approach and avoidance response was even obtained with different response sets and with perceptually different approach- and avoidance-related action effects in prime and probe trials. It is concluded that approach and avoidance action goals become linked to stimuli in an episodic memory trace and are automatically retrieved from memory when the stimulus is encountered again, which makes these stimuli 'appetitive' and 'aversive'.

Theme

MOTOR COGNITION

HUMANS ASSUME THAT ROBOT ACTIONS ARE GOAL-ORIENTED

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Humans infer intentions by making predictions about others' actions, an ability that develops at a young age and is even evident in nonhuman primates. However, it is unclear if this mechanism extends to artificial agents. We used a preferential looking-time experiment to examine if people would assume that robot actions are goal-oriented. Adult humans (n = 45) observed a humanoid robot conducting actions that were expected or unexpected, if one assumed that the actions are goal-oriented. Participants were either provided a context where unexpected actions were functional (n = 23), or not (n = 22). We hypothesized that if people assumed that the robot's actions are goal-oriented, they would fixate longer at the robots' face when it conducted unexpected actions. Results show longer fixations at the robot's face during unexpected actions when provided a functional context for unexpected actions, which replicates prior work in primates. Moreover, trial-by-trial analysis reveals that fixation differences between the conditions decreased as the experiment progressed. These results provide implicit evidence that humans assume that robots perform goal-oriented actions, but update assumptions as they gain experience with the robot.

DEGREE OF VOLUNTARINESS IN ACTION CONTROL AND SENSE OF AGENCY: EVIDENCE FROM MANIPULATING SACCADE AUTOMATICITY

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Sense of agency refers to the feeling that one is in control of one's actions and resulting effects. We examined the impact of different levels of action voluntariness on sense of agency by manipulating saccade automaticity. Participants performed saccades either towards a static stimulus following an endogeneous cue, or pro- vs. anti-saccades towards/away from suddenly appearing peripheral stimuli. By fixating those stimuli, participants changed the stimulus color. We hypothesized that anti-saccades would lead to the strongest sense of agency due to a high level of voluntary action control vs. relatively automatic pro-saccades. However, while agency ratings were comparably high over all operant conditions, we found that temporal effect binding (a supposedly implicit index of agency) was strongest for endogeneously cued saccades towards static stimuli. Pro-saccades, in contrast, led to attenuated effect binding, comparable with a non-operant baseline condition. Our results suggest that highly automatized actions imply a reduced implicit sense of agency, probably because subjects experience a weaker degree of intentionality and control.

AS EMBODIMENT COMES OF AGE: A PROCESSING ADVANTAGE FOR ACTION WORDS IS MODULATED BY AGING AND THE TASK

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Processing of action-related words (e.g., fork, throw) engages neurocognitive motor representations, consistent with embodied cognition principles. Yet, the impact of aging on action word processing is not well understood. In lexical tasks involving semantic access, such as picture naming, higher motor-relatedness generally yields better performance, especially in older adults, perhaps due to the relative sparing of motor semantic brain circuitry in aging. However, motor-relatedness was recently found to affect performance in younger but not older adults in lexical decision. We hypothesized this was due to shallower semantic access in this task in older adults. We tested effects of motor-relatedness on 2,174 words in younger and older adults in lexical decision and in reading aloud, a task that does not explicitly require semantic access. In lexical decision, younger adults were faster and more accurate at words with higher-motor relatedness, whereas older adults showed no motor-relatedness effects. In reading aloud, neither age group showed such effects. Overall, the evidence suggests that higher

motor-relatedness can yield better lexical performance, especially in older adults, but that such effects depend on the task.

THE NEURAL CORRELATES OF APRAXIA: AN ANATOMICAL LIKELIHOOD ESTIMATION META-ANALYSIS OF LESION-SYMPTOM MAPPING STUDIES

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Limb apraxia is a motor disorder frequently observed following a stroke. Patients present clinical deficits observable using three specific tasks: tool use, imitation, and pantomime. These tasks are supported by different cognitive processes, which are supported across a left-lateralized brain network including inferior frontal gyrus, inferior parietal lobe and lateral occipito-temporal cortex (LOTC). For the past twenty years, voxel-wise lesion symptom mapping (VLSM) has been used to obtain statistical brain maps of lesions associated with tasks assessing apraxia. For the first time, we proposed a meta-analysis of studies using VLSM on tool use, imitation, and pantomime to better understand the brain regions associated with a deficit in these tasks. We performed a literature review regrouping 2301 left brain-damaged patients from 37 papers. Data were processed with Anatomic Likelihood Estimation analyses. Our results questioned traditional neurocognitive models on apraxia and reinforce our understanding of cognitive processes involved in action production. Interestingly, lesions within the LOTC were more associated with imitation deficits than tool use or pantomime, confirming its important role in higher visual processing.

AGENCY AND SENSORIMOTRICITY: IS EVERYDAY LIFE SENSE OF AGENCY LINKED TO ACTION-EFFECT ANTICIPATION?

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According to the ideomotor theory, voluntary actions depends on the anticipation of their direct effects. The better the correspondence between an effect and its anticipation, the stronger the sense of agency (SoA) i.e. the feeling of being the initiator of our actions and causing their effects. But, does a strong SoA in daily life (dispositional SoA) improve Response-Effect (R-E) learning ? In a serial reaction time task, participants categorized letters using keypresses. The presentation of the stimuli followed a fixed serial order. Two 12-element sequences were distributed among 11 blocks with a sequence change in the ninth. Responses were followed by spatially compatible/incompatible tones. Situational and dispositional SoA were measured. We observed an overall effect of sequence learning. RTs decreased progressively in the training blocks and increased in block 9. RTs decreased faster in compatible condition than in incompatible condition. We also noted a positive correlation between situational and dispositional SoA. Finally, the difference between compatible and incompatible condition learning was marginally modulated by the level of dispositional SoA showing that dispositional SoA may be linked to R-E learning.

ENCODING OF ACTION'S SENSORY OUTCOME REVEALED IN PRE-MOTOR POTENTIALS AND MULTIVARIATE PATTERN ANALYSIS: AN EEG STUDY

Edward Ody[1], Yifei He[1], Benjamin Straube[1], Tilo Kircher[1]; *[1]University of Marburg*

Self-initiated movements are accompanied by an efference copy that contains a prediction of their sensory outcomes. This prediction may be represented in motor preparation potentials such as the lateralized/readiness potential (L/RP). This study examined how an action's sensory outcomes are encoded within motor preparation EEGs. We manipulated button press movements (self- or externally-initiated) that lead to either visual or auditory stimuli (100 ms delay), or no immediate contingency effects (control). There was an interaction between task and movement in the RP, with larger differences for the visual and auditory conditions than for control, suggesting an influence of action-outcome prediction. LRP conversely only showed a main effect of movement. We further used multivariate pattern analysis to decode self- vs. externally-initiated movements. Results revealed above-chance and increasing decoding performance for all conditions from -1000 ms onwards. More importantly, we observed lower decoding accuracies for the control condition, but visual and auditory conditions did not differ. To conclude, MVPA and RP (but not LRP) show that motor preparation encodes the action's contingency but not the modality of the action's outcome.

DOES TYPING-RELATED MOTOR EXPERIENCE INFLUENCE THE RETRIEVAL OF ORTHOGRAPHIC INFORMATION? EFFECT OF LETTER CONFIGURATION IN AN ANAGRAM SOLUTION TASK

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Embodied theories of language postulate that reading a word reactivates a set of sensory and motor experiences previously associated with the word's concept (Berndt et al., 2018). An experience associated to written linguistic material is writing. Nowadays, keyboard replaces pen, and typing is massively used to produce linguistic material on different devices. Recent work indicates that the time spent typing on a keyboard influence word recognition process (Cerni et al., 2016). In our study, we tested the hypothesis that the knowledge of the keyboard configuration associated to typing, facilitates the retrieval of the order of the sequence of letters composing a word. We ran an online experiment with 100 adults. Two tasks were designed: anagram resolution (main task) and intruder identification (control task). Two visual presentation conditions were possible: either congruent or incongruent with the way the word is written on the keyboard. Preliminary results indicate that anagrams were solved faster in the congruent than in the incongruent configuration, while the configuration had no effect in the intruder identification task. If confirmed, these results suggest that keyboard practice plays a role in retrieval of word information.

AGING AND THE CONTROL OF ACTION SEQUENCES

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Performance in many experimental tasks is influenced by the age of the participant. In research on action control, findings regarding the role of age are mixed, with some studies indicating differences between younger and older adults while others do not. We sought to investigate the influence of aging on the control of action sequences through binding between responses. It is assumed that multiple independently planned and executed responses can be integrated into a common representation of an action sequence. If one of the responses is subsequently repeated, it can retrieve the other responses, affecting performance of further actions and resulting in so-called response-response binding effects. Here, we compared the performance of young adults (< 30 years) and older adults (> 65 years) in a response-response binding task. While both age groups tend to differ in performance, with older adults generally showing longer response times, they do not differ in the magnitude of binding effects. Thus, the results support the idea that binding in action sequences may occur somewhat independently of age. The results are discussed in the context of action control and aging.

THE INFLUENCE OF ACTION-EFFECT COMPATIBILITY ON SEQUENCE PLANNING AND INTER-MANUAL TRANSFER

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We often perform complex sequences of movements (or actions) such as typing or playing an instrument in order to produce perceptual effects, such as words on a screen or a melody. When our actions generate predictable and compatible effects (e.g., when the spatial locations of actions and effects match), we may plan actions by anticipating those effects. It is not known whether action-effect compatibility helps us plan sequences of varying complexity or transfer control to different effectors (e.g., different hands). Participants (*N*=49) performed long (6-item) and short (3-item) action sequences from memory with their dominant hand (Experiment 1) and did so again but also switched to their non-dominant hand in a transfer phase (Experiment 2). In both experiments, each action generated predictable auditory effects (tones) that spatially matched or mismatched the actions (compatible versus incompatible effects). Compatible (compared to incompatible) effects *speeded* initiation of long sequences compared to short sequences, but switching hands *slowed* initiation of long sequences more when effects were compatible compared to incompatible. Compatible action effects may benefit complex sequence planning in an effector-specific manner.

LET'S PLAY TOGETHER: THE EFFECT OF MUSICAL PLEASANTNESS ON INTERPERSONAL SYNCHRONIZATION

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One of the key ways in which humans interact with their auditory environment is when they synchronize their movements to regular patterns of sound. While at the individual level, it has been suggested that the quality of the sound (i.e. whether it is pleasant or not) may affect auditory-motor synchronization and fine temporal prediction, no studies have ever investigated whether the degree of pleasantness has an effect on a joint action synchronization task. In this study, we investigated whether the quality of the shared goal during a joint synchronization task affects participants' ability to temporally coordinate their actions. Paired participants performed a dyadic synchronization–continuation task. The auditory feedback created by the dyad was experimentally manipulated to create chords with different levels of pleasantness. Preliminary results

showed a gradient in the synchronization accuracy as a function of the degree of consonance, with the more consonant chords leading to an overall better synchronization of the dyad, compared to the more dissonant ones. Together these results seem to suggest that the harmonic aspect of the musical structure significantly affects interpersonal synchronization.

MOVEMENT-INDUCED SELF-REFERENTIAL MEMORY ADVANTAGE WITH TEMPORARILY-ESTABLISHED SELF-RELEVANT STIMULI

Serge Onyper[1], Mark A. Oakes[1]; [1]*St. Lawrence University*

Self-referential stimuli are prioritized by the perceptual and memory systems. In prior work, we have shown quicker detection times of one's selfie compared to a selfie of another person or a photograph of a building. We've also shown that various stimuli are more memorable when associated with self-relevant stimuli via incidental movement of the stimulus toward or away from the referent. This advantage in attentional capture and memory is reduced, however, when the referent is a familiar other, such as a close friend or well-known celebrity. To rule out familiarity as the explanation for this facilitation, we trained participants to associate colorful shapes with the self, a celebrity or a close friend, and a stranger. These shapes served as referents for a task during which participants moved stimuli toward a particular referent. Responses were faster and in some instances more memorable for stimuli moved toward self-relevant shapes. We conclude that the movement-induced self-reference effect can occur with self-relevant stimuli that are not inherently familiar to participants.

ON THE ROLE OF THE RIGHT PREMOTOR CORTEX IN MUSICAL RHYTHM PERCEPTION: A DENSE-TRANSCRANIAL MAGNETIC STIMULATION (TMS) MAPPING APPROACH

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Humans have the unique ability to flexibly extract a regular beat from complex auditory patterns, such as music. Recent studies demonstrated that beat perception relies on interactions between the auditory and motor systems, specifically the premotor cortex (PMC) and the supplementary motor areas (SMA). However, how motor planning regions *actively* contribute to beat perception is still an open question. To fill this gap, transcranial magnetic stimulation (TMS) was applied over a grid of 4 spots covering the dorsal (dPMC) and medial part (SMA/pre-SMA) of the right PMC, while participants performed a Beat Alignment Test (BAT). 10 Hz triple-pulses TMS was applied immediately before participants try to detect misalignment between a metronome and a musical extract. Results indicated that TMS over the most caudal part of the dPMC significantly increases the probability of indicating that the metronome is synchronized with the beat compared to a sham control condition. Our results provide causal evidence that specific part within PMC houses key mechanisms for perceiving if an auditory stimulus is synchronized with respect to the regular beat, pointing to a pivotal role of the premotor cortex in temporal predictions about beat times.

TIMING ERROR IN EXECUTED MOTOR ACTION ALTERS VISUAL MOTION PERCEPTION IN PREDICTION-MOTION TASK

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Visual motion extrapolation refers to extracting spatiotemporal features of a visible moving object to estimate its motion when occluded. This estimation is influenced by action. We aimed to refine the influence of action time on visual motion prediction with data from previous experiments investigating action's effect on the point of subjective equality (PSE) in a prediction-motion task. 37 subjects performed ~300 trials in which they judged whether an occluded object had reappeared earlier/later than expected. During occlusion, subjects pressed a button when the object passed over a target.The time difference between participant-key-press time and the exact time object passed over the target defined action Constant Error (CE). Individual trials were divided in 2 distributions after sorting in ascending order the real or absolute value of the CE. For each sort, the significance of PSE difference between the 2 distributions was evaluated with permutation test. PSE difference was significantly increased only when trials were sorted according to real CE, i.e., PSE increases as time CE increases. Further investigations will aim to better define motor action characteristics that impacts visual motion extrapolation.

REPRESENTATION OF 'SELF AND 'OTHER' POSSIBLE MOVEMENT DIRECTIONS JOINT ACTION PLANNING: AN EEG STUDY

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We investigated whether people represent in advance their own as well as a co-actor's possible movement directions in joint reaching task. An EEG participant and a confederate of the experimenter were seated side by side viewing a computer monitor on which

visual stimuli were displayed. Three possible reaching targets were arranged on conceivable semi-circles at the side of each co-actor. An informative cue indicated one, two or three possible movement directions for each co-actor, followed by a go signal, which specified the targets to be reached and prompted the co-actors to initiate their actions in a coordinated manner. We hypothesized that action onsets as well amplitudes of movement planning ERPs will be modulated depending on the number of possible movement directions of the two co-actors. We are currently in the EEG data collection and processing stage. Confirming our predictions, behavioural analysis of the first 14 participants showed that the participants' action onsets were inversely related to their number of their own as well their co-actors' possible movement directions. These preliminary findings suggest that participants adjust their behaviour taking into a co-actor's possible movement directions.

MOTOR CONTAGION OF MULTIPLE AGENTS: A KINEMATIC ANALYSIS

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Observing other people's actions induces a motor contagion effect, visible in the kinematic unfolding of our own movements. Is this effect modulated by the number of agents performing the action? In the present study, we investigated this question by eliciting motor contagion within a Virtual Reality environment, where participants were asked to draw shapes in the air with their index finger, while observing two avatars performing either the same or different shapes compared to them. The movements of the participants were recorded through a motion capture system and analyzed to extract a measure of similarity between the performed and the observed kinematic profiles. Our results suggest that observing multiple agents performing the same action can elicit an enhanced contagion effect, compared to observing only one agent. Furthermore, initial evidence suggests that the observers' movements display kinematic aspects that are related to both observed actions, even when these two actions are different from each other. Our results further our understanding of the phenomenon of action influence in group contexts, allowing us to start to unfold whether and how group conformity effects are embedded in low-level motor processes.

IMPACT OF AFFORDANCE SIMILARITY AND THEMATIC RELATIONS ON MU RHYTHM DESYNCHRONIZATION DURING PERCEPTION OF 3D OBJECT PAIRS

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The perception of a manipulable object induces an evocation of motor representations associated to the visual object. This evocation results in a desynchronization of neural oscillations observed between 8-12hz in central regions (μ rhythm). However, a reduction of μ rhythm desynchronization has been reported when an object evoking several distinct motor representations is presented, reflecting a competition between the different motor representations evoked by a single object. We questioned whether this competition phenomenon would also occur in multi-object situations, when pairs of objects evoking distinct motor representations are presented. We also investigated the potential influence of thematic relations between objects (e.g., key-lock) on this competition. 30 Participants had to select a target object in 3D scenes displaying object pairs. Each object evoked a power/precision grasp so that the objects of a pair could evoke similar or dissimilar grasps. Objects could be thematically related or unrelated. Preliminary results indicate that μ rhythm desynchronization during object perception was sensitive to the similarity of motor representations evoked by the two objects. The relations between objects modulates the effect.

INFLUENCE OF COGNITIVE DEMAND PREDICTABILITY ON BALANCE CONTROL

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Recent studies investigating cognitive-motor interference developed an event-related methodology to measure postural sway and demonstrated that response conflict (i.e., congruency effect) reduces short-term variability of balance control. Here, we used this event-related methodology to measure postural sway while performing a cognitive dual-task. A visual short-term memory task requiring a deferred verbal response and an auditory-manual reaction time task were combined. We varied the stimulus-onset asynchrony (SOA) thus the timing of cognitive load created by the interference of manual response postponement and the maintenance of more than one task set (single task vs. dual task; task load). Additionally, we manipulated the predictability of task load per block. Performance differed in predictable vs. unpredictable blocks, but only for single task trials resulting in a mixing costs like pattern. Postural sway was decreased in single-task trials compared to dual-task trials but only in blocks with predictable task load where just one task-set had to be maintained. Maintaining more than one task set may briefly suppress intermittent control impulses which underly postural control processes and result in more postural sway.

Theme

NEURAL MEASURES

FREEDOM OF CHOICE INTENSIFIES THE NEURAL PROCESSING OF BOTH POSITIVE AND NEGATIVE FEEDBACK DURING REINFORCEMENT LEARNING

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Being able to freely decide about actions is assumed to influence our ability to learn from our environment. However, it is unclear whether freedom of choice (FoC) primarily intensifies the processing of negative or positive feedback during action regulation. We used EEG to study changes in affective feedback processing as a function of FoC. Thirty participants completed a reinforcement learning task during which they received positive or negative feedback following item choices made either by themselves (free choice) or by the computer (forced choice). Independent of choice context, midfrontal theta activity, an established measure of cognitive control, was more enhanced for negative than positive feedback. Throughout feedback presentation, we found increased midfrontal power in the delta and theta range for free, compared to forced choice trials. This indicates that FoC increases the neural impact of both positive and negative feedback during goal-directed actions. Our findings point towards a role of midfrontal low frequency oscillations in enhancing action regulation when individuals can proactively interact with their environment and indicate a potentially relevant mechanism underlying the benefits of experiential learning.

RELATIONSHIP BETWEEN HEART AND PULSE RATE VARIABILITY

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ECG is commonly used in sleep research to track sleep quality, including heart rate variability (HRV). However, home measurements typically only allow for pulse data using a mobile EEG headband. This study aims to investigate whether pulse data can reliably replace ECG measurements. A MATLAB-based pulse data processing program was developed for the study, which could support uniform methodology for further research. The presentation will cover HRV and its significance, applications, and its relation to pulse rate, along with the conditions for measuring each. It will discuss pulse rate variability (PRV) and how it was compared to HRV. The presentation will describe various pulse peak detection methods and their implementation in MATLAB, how HRV is influenced by neurological activity, respiration, and other factors, and how different metrics interpret and quantify these. The presentation will conclude with a comparison of PRV and HRV metrics, with results suggesting that pulse rate measured by a mobile EEG headband can be used to estimate HRV.

HEMISPHERIC BRAIN-RHYTHM ASYMMETRIES IN SPEECH-IN-NOISE COMPREHENSION

Tanja Atanasova[1], Anne Keitel[1]; *[1]University of Dundee*

Resting-state brain activity has the potential to index intrinsic features that might be related to behavioural performance. In this proof-of-concept study, we analysed intrinsic rhythmic region-specific brain activity in magnetoencephalography data and linked this to the performance of 20 participants in a speech-in-noise word comprehension task. All participants showed prominent theta and beta rhythms in left and right Heschl gyrus. Participants with higher theta amplitudes in the left Heschl gyrus tended to understand speech-in-noise better than those with lower theta amplitudes. This could be linked to theta's role as a temporal reference to segment from the syllable unit to the consonant and vowel unit. Conversely, participants with lower individual beta amplitudes in the right Heschl Gyrus also showed better speech comprehension. This effect could index how beta-band rhythms increase with task-related engagement. Both theta and beta effects were specific to the respective hemisphere. Our results suggest specific functional hemispheric asymmetries correlated to speech perception. Importantly, we show that individual differences in the rhythmic make-up of the brain are linked to differences in speech-in-noise comprehension.

LOOK ME IN THE EYE – HOW SOCIO-EMOTIONAL CUES INFLUENCE OUR DECISIONS

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Socio-emotional cues convey emotional and social information that is critical to accurately interpreting the emotions and intentions of others. Real-world interactions have typically been studied in standardized experimental protocols involving economic decision-making tasks. We have developed a transparent interaction platform that allows mutual observation of faces, gestures and non-verbal utterances. EEG, eye-tracking, heart rate and facial expressions are recorded while participants perform a dynamic dyadic task to investigate the effects of socio-emotional cues on neural processing and dynamic decision making. We time lock EEG epochs to one player's gaze fixations on the other player and identify events using automatically decoded emotional expressions to model the influence of perceived socio-emotional cues on partner decisions. Collection and analysis of psychophysiological data is ongoing. Preliminary results are consistent with the idea that human behavior often deviates from conventional economic assumptions of self-interest and leads to cooperation, even when this comes at an economic cost. Our study aims to clarify how socio-emotional cues contribute to prosocial tendencies and strategy changes within and across dyads.

Theme

NUMERICAL COGNITION

FREQUENCY-TAGGING EEG REVEALS INSTRUCTION-DRIVEN MAGNITUDE INTEGRATION USING THE NUMERICAL DISTANCE EFFECT

Cathy Marlair[1], Aliette Lochy[2], Virginie Crollen[1]; *[1]Université catholique de Louvain, [2]Université du Luxembourg*

While humans can readily access the common magnitude of various numerical codes, it is not yet clear whether this integration occurs spontaneously, or only when involved in explicit magnitude processing. We addressed this question by examining the neural distance effect, a robust marker of magnitude processing, with a frequency-tagging approach. By varying the instructions given to participants, we compared spontaneous processing of visually presented numerosities to explicitly oriented processing of magnitude or parity. EEG responses were recorded while participants were viewing rapid sequences of a base numerosity presented at 6 Hz in randomly mixed codes: digits, words, dots and fingers. A deviant numerosity either close or distant from the base was inserted every five items. We observed clear discrimination responses of the deviant numerosity despite its code variation. The distance effect (larger responses when base/deviant are distant than close) was present when participants were explicitly oriented to magnitude and parity, but not in simple viewing. Abstract magnitude integration thus requires sufficient cognitive resources engaged in numerical processing, but occurs whatever semantic aspect of numbers is activated.

THE SNARC EFFECT RELIES ON AN ALLOCENTRIC FRAME OF REFERENCE

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Participants react faster to small numbers on the left and to large numbers on the right (spatial-numerical association of response codes (SNARC) effect). Our study examined the reference frame the SNARC effect relies on. If it is body-centered (egocentric), then it will emerge regardless of the spatial relation between the participant's body and the numerical referents, whereas if it is world-centered (allocentric), it will be smaller if an individual's body is misaligned relative to those. Twenty-eight participants (M_{age} = 23 years, SD_{age} = 5) took part in the experiment. First, they put cards with numbers 1 to 9 on a pinboard, from left to right. Then they performed speeded parity judgments, i.e., decided whether the number on the screen was even or odd by pressing either the left or the right button on an iPad in two blocks: (1) facing the pinboard (direct); (2) with their backs to the pinboard (reverse). In the break in each block, they read the numbers from the pinboard out loud. In both blocks, we found a reliable SNARC effect. In the reverse block, the effect was smaller, which suggests that the SNARC effect has an allocentric frame of reference: SNARC was smaller because the external numerical referent was not salient.

INDEPENDENT SPATIAL NUMERICAL ASSOCIATIONS FOR SYMBOLIC AND NON-SYMBOLIC NUMERALS

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Evidence shows that both symbolic (digits) and non-symbolic (dots) numerals are spatially represented, with small (vs. large) numbers eliciting faster left (vs. right) key responses (Spatial Numerical Association or SNA). A format independent SNA has been used to support the existence of a common system for symbolic and non-symbolic numerical representations. This study aims at investigating whether symbolic and non-symbolic SNAs interact when both numerical formats are shown simultaneously. Participants were presented with dice-like patterns, with digits being displayed instead of dots. In the non-symbolic task, participants judged whether the digits on the screen were more or less than three, while in the symbolic task, participants judged whether the digits were numerically smaller or larger than three. In a second

experiment, a different group of participants replicated the study by evaluating parity rather than the magnitude. Overall, results show a consistent SNA in the symbolic task, while there is no evidence that the irrelevant numerical dimension modulated SNA. Our findings support the idea of independent representations and question some propositions of current theoretical accounts, such as the ANS and ATOM.

MATH ANXIETY IS RELATED TO ALTERED RESPONSE MONITORING IN AN ARITHMETIC TASK

Nuñez-Peña, M.I. & Campos-Rodríguez, C.[1]; *[1]Universitat de Barcelona*

In this study we examined response-locked event-related brain potentials (ERPs) in 22 highly (HMA) and 22 low math-anxious (LMA) individuals when performing a speeded arithmetic verification task. Specifically, two widely studied ERPs elicited during error processing that relate to behavioural adjustment following mistakes were examined: the error-related negativity (ERN) and the error positivity (PE). It has been suggested that the ERN reflects the evaluation of actions that require corrective action and the Pe reflects the conscious detection of errors. The correct-related negativity (CRN), another response-locked ERP elicited after a correct response, was also studied. It is suggested to reflect the uncertainty regarding response accuracy or coactivation of correct and incorrect responses. Our results showed that LMA and HMA groups did not differ in the ERN but in the CRN and Pe amplitude. Concretely, LMA individuals showed less negative CRN and more positive Pe amplitudes than their HMA peers, suggesting more uncertainty regarding response accuracy and worse adaptive behavioural adjustment after committing errors in arithmetical task in the latter.

CAN COGNITIVE CALCULATORS COMPUTE CORRECTLY? BUILT-IN BIAS IN MENTAL ARITHMETIC

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There is a recent debate about the origin of systematic estimation errors in mental arithmetic, such as overestimating addition and underestimating subtraction results (Operational Momentum or OM). Although calculation constitutes the core of mental arithmetic, most OM studies did not assess true calculation accuracy because they induced uncertainty during either operand encoding (with dot patterns) or reporting of results (with imprecise options). Our study ensured accurate encoding of arithmetic problems by presenting operands and operators either auditorily (N=30) or as symbols (N=30). We ensured exact reporting of arithmetic outcomes by allowing participants to verbally state results. Finally, we induced the uncertainty needed to obtain arithmetic errors, rather than learned fact retrieval, by presenting multi-digit operands and imposing time pressure. We obtained "reverse" OM in all mental arithmetic tests without peripheral uncertainty. Our findings support the arithmetic heuristics and biases model (AHAB; Mioni et al., 2021) that predicts "reverse" OM when participants experience uncertainty in the calculation stage, due to cognitive anchoring. More generally, "normal" OM might be an artefact of peripheral task uncertainty.

NEURAL SIGNATURE OF THE OPERATIONAL MOMENTUM EFFECT REVEALED BY INTERMODULATIONS IN FREQUENCY-TAGGED ELECTROENCEPHALOGRAM

Nicolas Masson[1], Christine Schiltz[2], Talia L. Retter[2]; *[1]Université catholique de Louvain, [2]Université du Luxembourg*

Recent behavioral studies have challenged the dominant theory that solutions to small additions are, like multiplications, retrieved from long-term memory. Instead, it was suggested that small additions are solved by fast counting procedures akin to shifts of attention along a mental number line. Because additions are also associated to an over-estimation bias termed operational momentum (OM), it was suggested that the shifts are going too far. Here, we used frequency tagging and electroencephalography (EEG) to identify a neural signature of OM while adult participants viewed simple additions and multiplications with correct or incorrect (+1 or -1) proposed solutions. The problem and the proposed solution flickered at distinct frequencies (F1 & F2) leading to contralateral occipitotemporal EEG responses. Importantly, correct trials elicited temporoparietal and frontocentral responses at intermodulation frequency terms (e.g., F1+F2), indicating an integration of the problem and its' solution. Incorrect conditions did not reveal intermodulation, with the exception of Addition +1, compatible with an OM effect. This supports the theory that single-digit additions and multiplications are solved by mechanisms of a distinct nature.

IS THE SNARC EFFECT ASSOCIATED WITH PRE-MATHEMATICAL AND SPATIAL ABILITIES IN PRESCHOOL?

Tânia Ramos[1], Carrie Georges[1], Christine Schiltz[1]; *[1]University of Luxembourg*

The SNARC, a cognitive phenomenon describing the mental association between numbers and space, has been extensively studied over the last 30 years. Yet the functionality of this association in mathematical and spatial abilities remains unclear. We investigated the possible triangular relationship between these concepts in preschool children (n=136, mean age=6.3 years). The SNARC was assessed using a magnitude classification task and

bootstrapping was used to measure individual SNARC consistency. 37% and 19% of the children revealed consistent number-space associations in a left-to-right and right-to-left direction respectively. 44% did not show consistent spatial-numerical mappings. Pre-mathematical and spatial abilities were measured using 7 numerical and 3 spatial tasks, respectively, reduced into two factors via two respective principal component analyses. A one-way ANOVA revealed no significant effect of SNARC consistency (left-to-right consistent, right-to-left consistent, inconsistent) on the numerical and spatial factors. Although some children show consistent spatial-numerical mappings at this developmental stage, it seems that they might not (yet) rely on these associations when performing numerical and spatial tasks.

PROFESSIONAL ARCHITECTS REVEAL A MORE PRECISE REPRESENTATION OF ANGLES THAN CONTROLS

Mateusz Hohol[1], Piotr Szymanek[1], Krzysztof Cipora[2]; *[1]Jagiellonian University, [2]Loughborough University*

Phenomena analogous to the distance effect and the SNARC also appear in the processing of non-numerical magnitudes. We aimed to investigate the distance effect and the SNARC-like effect in the angle processing in relation to geometric expertise. We compared the performance of 2 groups: architects and controls in 2 tasks. In the direct angle magnitude classification task, participants assessed whether an angle is greater/less than 90 deg. In the indirect task, they decided whether an angle is dashed/continuous. The indirect task allowed us to quantify the SNARC-like effect; the direct task: both distance and SNARC-like effects. We found a robust distance effect at the whole sample level and in each group separately. To our knowledge, this is the first evidence of the distance effect for angles in literature. Architects responded more slowly but with greater accuracy than controls and revealed a smaller distance effect for accuracy than controls. On the contrary, we did not find evidence for a SNARC-like effect in any group in any task. Based on these results, we conclude that professional architects reveal a more precise representation of angle magnitude than controls, however, this representation is nonspatial in both groups.

HOW DOES THE CONTEXT SHAPE THE SNARC EFFECT? EVIDENCE FROM DIFFERENT TASKS EMPLOYING A CLOCKFACE DISPLAY

Mauro Murgia[1], Serena Mingolo[1], Claudia Virginia Manara[1], Alberto Mariconda[1], Valter Prpic[2]; *[1]University of Trieste, [2]University of Bologna*

Our study investigated the role of contextual factors on the well-known SNARC effect, which consists in faster left-key responses to small numbers and faster right-key responses to large numbers. Previous research has shown that contextual factors can modify or even reverse the SNARC effect. In the present study we focused on the salience of the context, progressively increased across three experiments. In Experiment 1, participants were asked to mentally represent a clock-face before performing a magnitude classification and a parity judgement task, and a typical SNARC effect was observed, indicating that the context did not change the pattern. In Experiment 2, a secondary task (go/no-go) was added to induce participants to retrieve the clock-face configuration, and no SNARC effect was found, likely due to a moderate interference of the context. In Experiment 3, the clock-face configuration was relevant for the primary task (clockface position task) and a reversed SNARC emerged, consistent with previous research. Our findings suggest that the context alters the SNARC effect only when task demands increase the salience of the context itself, making it relevant for participants' responses.

ASSESSING CHILDREN'S UNDERSTANDING OF THE NUMBER CONCEPT THROUGH CARDINALITY TASKS

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Children know how to count when they master the cardinal principle, which means they understand that the last numeral stated corresponds to the number of objects in the set. This principle is traditionally assessed using the "How Many" task, where children determine the number of objects in a set, and the "Give N" task, where they produce a set of a certain number of objects. However, it is unclear whether these tasks genuinely test the cardinality principle, as children might simply repeat the last number or stop giving objects when a label is reached. To address this issue, we added the “Give N+1” task where after giving "N" objects, children are asked to give "N+1". This task tests the successor principle which theoretically should be mastered by cardinal-principle knowers because the relationship between numerals and cardinality is governed by this principle (3 is 1, then 1, then 1). However, out of 107 5½-year-old children who passed the two traditional tasks with a set of nine objects, 20 failed the “Give N+1” task. Thus, traditional counting tasks may overestimate children's mastery of cardinality. Alternatively, the cardinality principle might not always reflect a complete and deep semantic understanding of the number concept.

COUNT ON THE €URO! INTERFERENCE BETWEEN THE SIZE AND THE VALUE OF THE COINS IN THE JUDGMENT OF THE MONETARY VALUE

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Coins serve as tokens for everyday economic exchanges. Cash appearance influences economic behavior. Although the relation between size and monetary value of coins has been studied with individual coins, the present work is the first to examine whether people extract this relation when looking at large sets of various coins. In a money value judgment task, participants were briefly exposed to a set of coins and asked to decide whether the monetary sums were smaller/larger than a given reference value. Results showed that the decision about the monetary value of coins was improved when their semantic information was congruent with their real-world visual size (e.g., a physically larger coin has a higher monetary value), compared to incongruent information (e.g., a physically larger coin has a lower monetary value), or neutral information (e.g., all coins have the same size). Further, by separating the unit (0.01€, 0.02€, 0.05€), tens (0.1€, 0.2€, 0.5€), and mixed categories, we show that the boundary conditions for obtaining such effects depend on the stimulus characteristics. We conclude that a positive correlation between coin size and values can lead to more accurate monetary calculations, thereby facilitating economic behavior.

DOES COGNITIVE LOAD INFLUENCE FLEXIBILITY? A STUDY OF ARITHMETIC REASONING AMONG CHILDREN AND ADULTS

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Evidence suggests that non-mathematical knowledge affects the encoding of mathematical word problems, by promoting intuitive representations of problem situations. Finding the optimal (least costly) solving strategy to certain problems thus requires switching from an intuitive representation to an alternative, counterintuitive one. We investigate whether modulating the cognitive load attached to a problem alters the ability of adults and 4th-5th graders to perform such recoding when presented with problems whose optimal solving strategy calls for a counterintuitive representation. In two experiments, we manipulate either extraneous cognitive load with a dual-task paradigm or intrinsic cognitive load by varying numerical values. We predicted that increasing extraneous load would hinder participants' ability to perform recoding, by burdening the executive resources necessary for cognitive flexibility, whereas increasing intrinsic load would foster recoding, by encouraging participants to switch to a more optimal strategy to reduce the computational cost of solving the problem. Our findings are discussed with regard to these hypotheses, shedding light on the interactions between cognitive load and flexibility in arithmetic reasoning.

DOES AGE HAVE AN EFFECT ON THE SNARC EFFECT IN TURKISH CHILDREN AGED 4-6 WHO GO TO KINDERGARTEN?

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Recently, Bulut et al. (2023) discovered that the SNARC effect was absent in Turkish adults. This contradicts the reading direction account of the SNARC, as Turkish is read from left to right. In addition, the SNARC effect could be observed in children and newborns. We investigated the development of the SNARC effect in Turkish children aged 2-6 in two studies. In the first, we used cards with dots ranging from 1 to 9 as stimuli. We showed the kids a reference card with 5 dots centrally first. Then we replaced the reference with two identical cards shown laterally. We asked them to identify which cards had food on the back by moving a hungry toy animal toward the targets. The cards on the right were consistently chosen when the number of dots was larger than the reference and vice versa. In the second, the dots were presented on a computer screen for 5sec, then two pictures of animals appeared on either side of the screen for 300ms. The animals on the right were identified faster and more accurately when the number of dots was greater than the reference and vice versa. These findings suggest the early presence of the SNARC.

Theme

PERCEPTION

PREFERENTIAL GUIDANCE OF FOOT-RELATED MACRO-AFFORDANCES BY NATURALISTIC IMAGES OF MAN-MADE SPATIAL ENVIRONMENTS

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Modern cognitive sciences have been largely influenced by the Gibsonian notion of affordances as perceivable opportunities of actions offered by the environment. Using an incidental priming paradigm based on repeated presentation of pictures of a virtual reality environment framed from different distances from the observer, we have recently described a behavioral facilitation effect, known as "macro-affordance", for the execution of a footstep action, taken as proxy of walking, in response to distant vs. near

objects/locations in the extrapersonal space. We have subsequently shown that the "macro-affordance" effect was implicitly activated and preferentially guided by the framing distance of the environmental layout rather than by distance of isolated objects in the environment. We now finally show that the effect generalizes to pictures of real-world scenes in which distance is not metrically manipulated and that it is guided by both spatial (far vs. near distance) and semantic (man-made vs. natural landscapes) aspects of real-world scenes. These findings suggest that "macro-affordances" can be conceived as reliable measures of walking-related human affordances for spatial exploration/navigation of the large-scale environment.

ONLINE PROCESSING OF NATIVE, DIALECTAL AND FOREIGN ACCENT DURING EXTENDED LISTENING TASKS

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Previous studies show that there are differences in native and foreign speech processing, while there is mixed evidence regarding dialectal vs. foreign accent processing. The Perceptual Distance Hypothesis argues that dialectal accent processing is an attenuated version of foreign. Conversely, the Different Processes Hypothesis argues that these processing mechanisms are qualitatively different. A recent study looking at single-word EEG data suggested flexibility in processing mechanisms. The present EEG study deepens this investigation by addressing in which frequency bands native, dialectal and foreign accent processing differ during extended listening. Power spectral density results support both hypotheses depending on the level of linguistic analysis. A difference between regional and foreign was found in the frequency range 1-3 Hz, associated with prosodic processing, while these two accents followed into the same category in the frequency ranges 25-35 Hz, associated with phoneme processing. The 4-8 Hz frequency range, related to syllable processing, shows differences between all three accents. Findings support that the way the brain treats accents depends on the level of language analysis considered.

TYPICAL COLOR AFFECTS OBJECT IDENTIFICATION ON GLOBAL/LOCAL PROCESSING

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Surface color helps us to recognize objects, and typical color (e.g., red on apple) enhances objects identification. In addition, objects identification has been influenced by processing style; so-called global-local processing. However, it's unclear how typical color affects objects identification accompanied with global or local processing. Thus, we investigated the effect of typical color on object identification when global or local processing was required. A large sized object consisted of smaller sized objects, which referred Navon's study (1977), were prepared. Participants were required to identify the large (Global task) or small sized objects (Local task). The surface color was congruent with either the typical color of the large or small sized objects. Typical colored objects were identified significant faster than atypical colored ones on the Global task. Whereas there was not significant difference on the Local task. Atypical colored objects might be recognized as unfamiliar objects that related to local processing. If so, atypical colored objects identification might require local processing even in the Global task. Consequently, the effect of the typical color might differ between the Global and Local tasks.

NEURAL UNDERPINNINGS OF SELF-REFERENTIAL PROCESSING: AN EEG/FMRI STUDY OF SELF-FACE AND PERSONAL OBJECT PERCEPTION

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Recognizing own face and personal belongings is a vital part of everyday life. The abundance of studies on self-face recognition have left object-ownership perception underinvestigated. In this study we investigated the neural basis of differentiation between two categories – 'mine' and 'others' – in the processing of personal objects and self-face. In two sessions (EEG, N=37, and fMRI, N=30), participants viewed pictures of faces and objects from the two categories. EEG results showed the earliest self-face effects in the visual P1 and N170 event-related potentials. The largest object-ownership effect was found in a posterior visual P2 at about 200-300 ms. This indicates that self-related differentiation begins early in visual processing, and is faster for faces. fMRI results showed self-related activations in the fusiform and anterior temporal areas of the ventral visual stream in the right hemisphere. Several areas were common to both self-faces and owned objects. Particularly, the activity in the right inferior frontal gyrus, which may represent the convergence of processing in the ventral visual pathway, and in the ventro-medial prefrontal cortex, which may be related to self-referential processing per se.

INVOLUNTARY MOTOR RESPONSES ARE ELICITED BOTH BY RARE SOUNDS AND RARE PITCH CHANGES

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Unpredictable deviations from an otherwise regular auditory sequence, as well as rare sounds following a period of silence, are detected automatically. Recent evidence suggests that the latter also elicit quick involuntary modulations of ongoing motor activity emerging as early as 100 ms following sound onset. We explored such force modulations for both rare and deviant sounds. Participants (n=20) pinched a force sensitive device and maintained a force of 1-2 N for periods of 1 min. Task-irrelevant tones were presented under two conditions. In the *Single condition*, 4000 Hz tones were presented every 8-to-16 s. In the *Mixed condition*, 4000 Hz and 2996 Hz tones were presented at rate of 1sec, with infrequent (p=1/12) frequency changes. In the Single condition, transient force modulations commensurate to those described in previous studies were observed: a nearly significant reduction at 100 ms, a significant increase at around 250 ms, and a decrease around 400 ms. A similar modulation was found in the Mixed condition: a significant increase at around 300 ms, and nearly significant decreases at 100 and 450 ms. These results suggest that both deviant and rare silence-breaking sounds evoke automatic fluctuations of motor responses.

IN SNARC-LIKE TASKS TEMPORAL SPEED PREVAILS ON TEMPORAL DURATION

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The Spatial-Numerical Association of Response Codes (SNARC) effect is evidence of an association between number magnitude and response position, with faster left-key responses to small numbers and faster right-key responses to large numbers. Similarly, studies revealed a SNARC-like effect for tempo, defined as the speed of an auditory sequence. In the current study, we designed two experiments to investigate the occurrence of a SNARC-like effect for tempo, employing a procedure for which only two auditory beats in sequence with very short interstimulus interval were used. In Experiment 1 participants judged the temporal speed of the sequence as either slow or fast. The results revealed a SNARC-like effect with faster left-hand responses to slow tempo and faster right-hand responses to fast tempo. Experiment 2 followed the same procedure as Experiment 1 but participants were required to explicitly judge the temporal duration of the interval between the two beats as short or long. The results replicated the ones of Experiment 1, with the same spatial associations pattern observed. This suggests that the direction of the SNARC-like effect was driven by temporal speed also when participants focused on temporal duration of the interval.

RECOGNISING NEWLY LEARNED FACES ACROSS CHANGES IN AGE

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We examined face recognition across substantial age-related changes using a computational model (PCA+LDA) of face recognition (Mileva et al., 2020) and three behavioural experiments. Participants and the model were trained on a set of identities (with each identity depicted in multiple images) at one age and tested with images of the same identities at a different age. The identities were aged 20 - 30 years in the younger images and aged 60 - 70 years (experiments 1, 2, 3a) or 40 - 50 years (experiment 3b) in the older images. The computational model was highly accurate but performed better when trained with younger images and tested on older images than vice versa. Human participants did not show this age-direction effect. They were relatively poor at recognising faces across a 20-year or 40-year age gap in either direction, but accuracy was significantly above chance. This suggests that identity information can be extracted to facilitate face recognition across substantial changes in outward appearance.

SOCIAL CUES IN NEWS INTERFACES: A KEY TO BUILDING PRIMARY ONLINE TRUST

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This study aimed to investigate the influence of social cues on primary online trust in news interfaces, which is a critical but understudied area, especially in the era of fake news. The research involved 137 participants between the ages of 18-35. Each participant evaluated 60 pairs of interfaces, one with a social cue and one without, and rated their trust levels on a 5-point scale. They also selected the interface they believed to be more trustworthy for others. The study identified 12 types of social cues that contributed to higher levels of trust. The results showed a statistically significant positive impact of social cues on trust levels (p<.000), except for one type of cue (chatbot icon; p=.145). The mean trust score for interfaces with a cue was significantly influenced by the participants' gender (p=.011), and the approach to choosing sources of news (p=0.30). The percent of interfaces with cue chosen was significantly influenced by gender (p=.015), age (p=.038), and the frequency of switching to the original source of the news (p=.024).

These findings offer valuable insights into the psychology of primary online trust and emphasize the importance of social cues in news interfaces.

THE POWER OF POWERFUL AVATARS: CAN EMBODYING A SUPERHERO IN VIRTUAL REALITY IMPROVE OUR PERFORMANCE?

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Embodying a differently looking virtual avatar has shown to influence a variety of perceptual, cognitive, and emotional processes and behaviour. For example, embodying Einstein has been suggested to improve cognitive performance. However, sample sizes are often small and effects limited to specific measures. Here, we investigated how embodying Superman alters subjective and objective measures of hand grip strength, math performance, and self-esteem in 60 young women. We expected better performance, higher strength, and enhanced self-esteem with Superman compared to a control avatar, especially in women with low self-esteem. Participants reported equally strong embodiment of both avatars but perceived themselves subjectively as stronger when embodying Superman. Yet, for all other measurements, data was in favour of the null hypothesis. In this preregistered, higher than typically powered study, we did not find evidence for any effects of the embodied avatars on objective measures of cognitive and physical performance, nor on the here additionally assessed subjective self-esteem. The data suggests only avatar-specific changes in self-perception rather than general increases in self-esteem and objective performance.

THE INFLUENCE OF GAZE BEHAVIOR AND PERSONALITY TRAITS ON THE RECOGNITION OF SUBTLE EMOTIONAL FACIAL EXPRESSIONS

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When observing emotional facial expressions, our gaze automatically focuses on specific regions of the face that favors emotion recognition. However, personal characteristics, such as personality traits, may also influence gaze behavior. This discrepancy between the optimal region for emotion recognition and idiosyncratic preferences may not be troublesome when emotions are intense, but may hinder the recognition of more subtle emotions. This study aimed to investigate whether personality traits can impact our ability to identify subtle emotional facial expressions by influencing our gaze behavior. To this end, we proposed a task in which participants had to identify more or less subtle emotional and neutral facial expressions while their gaze behavior was recorded. Identification scores were analyzed according to signal detection theory, and gaze behaviors using a data-driven approach. The results suggest that, when the emotion is subtle, perceptual sensitivity varies according to the emotion observed and personality trait but decision bias doesn't. This supports the relation between personality and trait congruent attention to social stimuli.

VISUALLY-FILLED VS. EMPTY REPRODUCTIONS: EFFECTS ON THE REPRODUCED DURATIONS OF AUDITORY STIMULI

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The aim of the present study was to examine how the perception of time is modified by the presence of a visual stimulus during the reproduction phase of an online time reproduction task. Participants reproduced the durations of fast and slow speech clips of different durations with either a picture or a blank screen presented during the reproduction phase. The results showed longer reproduced durations in the trials with a picture than in the trials with a blank screen. Furthermore, longer reproduced durations were obtained for the fast speeches than for the slow ones, while the reproduced durations of the short speeches were closer to the actual durations, compared to those of the long speeches. The results revealed that the effect of the presentation of the picture was additive to the effect of speed. For all speeds, the trials with the picture led to longer reproduced durations compared to the trials that included a blank screen. These results clearly demonstrate that post-encoding information can influence the reproduction of previously-encoded temporal intervals, suggesting a possible influence of attention allocation on the internal clock mechanism of timing.

USING EEG FREQUENCY TAGGING TO MEASURE THE PERCEPTION OF INDIVIDUAL AND GROUP MOVEMENTS

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Little is known about how we interpret situations with multiple people. In such situations, we must first decide who is moving together and who is acting alone. I will discuss research in which we first developed a new task using EEG frequency tagging to isolate brain responses coupled to movement processing and then applied this task to test the hypothesis that people use basic visual cues such as synchrony and common fate to bind the movements

of multiple individuals into a single group movement. First, I will show how presenting a point-light figure walking at a fixed frequency elicits a brain response coupled to walking frequency, as well as a brain response at the frequency corresponding to the trajectory of the individual dots. Interestingly, whereas the first frequency was disrupted by scrambling and inversion, the latter was enhanced by scrambling. Second, I will show how responses at the walking frequency are sensitive to synchrony, as long as the walkers are shown upright, but not to movement direction. As synchrony, in contrast to movement direction, is not just a visual but also a social cue, this suggests that social grouping may be driven by social, rather than visual cues.

FACE LEARNING STRATEGIES IN TYPICAL OBSERVERS AND IN DEVELOPMENTAL PROSOPAGNOSIA

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People with developmental prosopagnosia (DPs) show deficits in face recognition tasks and report using non-facial/peripheral cues (e.g. hairstyle) to compensate in their day-to-day lives. However, most experimental tasks use non-ecological stimuli (e.g. hair is removed), maybe inflating their observed difficulties. Recent studies highlight the importance of peripheral features for typical observers too. We thus compared recognition performance of 30 DPs and 35 controls after they studied three identities from videos. Test images showed target identities (and foils) with an appearance similar (i.e., consistent hairstyle, makeup) or dissimilar to learning. Further, images either only showed inner facial features or included peripheral features to assess their contribution. Although DPs made more errors overall than controls, error patterns were strikingly similar in both groups. Targets were missed more often when peripheral features were concealed or had changed, and false alarms were more frequent with similar looking foils. Face learning strategies of DPs and typical observers are thus comparable, which suggests that DPs represent the tail end of face recognition abilities rather than displaying qualitatively different abilities.

SPACE-VALENCE COMPATIBILITY IN AN ECOLOGICAL TOUCHSCREEN ENVIRONMENT: THE EFFECT OF HAND AND SIDE

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Experimental studies based on the body specificity hypothesis revealed associations between affective valence and hand dominance (i.e., dominant hand—positive; non-dominant hand—negative), or lateral movements of the hands (i.e., dominant hand toward the ipsilateral space—positive; dominant hand toward the controlateral space—negative). Interestingly these associations have never been investigated in a response time paradigm with a swipe gesture. In two experiments we presented on a touchscreen device 16 images (previously valenced in a manipulation check experiment) to 24 right-handers (Exp. 1) and 24 left-handers participants (Exp.2), asking them to make valence judgments in both a congruent (swipe toward dominant space to positive images, vice versa for negative images) and incongruent (the opposite) task. Results highlighted that both right-handers and left handers were faster ($p<0.001$) in the congruent condition in respect to the incongruent condition; this effect was only present in evaluations made with the dominant hand, supporting the idea that space-valence associations (i.e. faster response time to positive or negative images) depend on the congruency between spatial position/direction of swipe and hand dominance.

TEMPORAL NEURAL DYNAMICS OF EVENT SEGMENTATION AND HOW METACONTROL AFFECTS THIS PROCESS

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Humans tend to divide continuous perception flow in their surroundings into distinct units, and the Event Segmentation Theory (EST) explains this cognitive process. However, the specific neural mechanisms that govern this process in time-resolved domain and the influence of metacontrol on this process are not yet clear. To explore these uncertainties, EEG was used to measure brain activity in two groups while they watched a narrative video and partitioned it into segments. The "Basic group" was instructed to segment the video in a meaningful but free way, while the "Fine-grain group" was told to segment it into the smallest meaningful parts possible. At the behavioral level, the Fine-grain group demonstrated a higher likelihood of video segmentation compared to the Basic group when responding to situational changes. By using EEG beamforming techniques, we discovered that the relationships between theta, alpha, and beta band activity in frontal, parietal, and occipital regions reveal a mechanistic temporal chain of processes that underlie the brain's ability to divide and structure natural scenes. This indicates the existence of an integrated system that coordinates the different subprocesses associated with event segmentation.

TASK-IRRELEVANT COLOR OR ORIENTATION CHANGE CUES TARGET OBJECT LOCATION EQUALLY WELL

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Prior research indicates that the efficiency of detecting changes in basic visual features, such as color or orientation, varies depending on the task used. Specifically, color changes are better detected in visual search tasks, while orientation changes are better detected in change detection tasks or visual working memory tasks when the feature change is relevant to the task. We tested whether this discrepancy would persist when the visual feature change was task-irrelevant. Participants were briefly presented with two consecutive arrays of five colorful bars, with the second array containing a feature change in either color or orientation of one bar. The feature change cued target appearance - once the second array disappeared, a black circle or square appeared either at the location of the change or at a different location. Participants were faster at categorizing the target when it appeared at the location of the change compared to at another location. Importantly, this effect was not influenced by the type of visual feature that was changed. Thus, when attention was not explicitly directed to visual features, the visual system could detect the changes equally well.

THE EFFECT OF SEQUENTIAL AND SPATIAL PROXIMITY ON THE GROUPING OF SIMILAR ITEMS IN VISUOSPATIAL WORKING MEMORY

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Visuospatial working memory (VSWM) can be considered as a limited-capacity system that allows the maintenance and manipulation of visual and spatial information. Previous studies have shown that perceptual grouping of the elements of the scene (e.g., color similarity) can improve VSWM performance, even when the items of the array to be remembered were presented successively and, therefore, never appeared simultaneously on the screen. In the present study, we explored the effect of spatial and sequential proximity of similarity-grouped items on the performance of VSWM in sequential presentations. To this end, we conducted 4 experiments employing a change detection task (CDT) in which 6 items were presented sequentially in six different spatial locations. Two of the items could be grouped by color similarity, and the spatial and sequential proximity of those items was manipulated in each experiment. In line with previous studies, our results showed that grouped probes were better recognized than ungrouped probes. Interestingly, spatial and sequential proximity between grouped items had an additive effect on change detection performance.

EFFECTS OF FACE FAMILIARITY ON ENSEMBLE CODING OF FACE IDENTITY

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Previous studies have shown that ensemble representation for facial identity is extracted for familiar faces as well as unfamiliar faces. This is surprising given the top-down effects of familiarity on cognitive processes. Therefore, we conducted two studies using signal detection theory (SDT) to further examine the effects of familiarity on the process of ensemble coding of facial identity. In each study, participants were presented with a set of faces and asked to determine whether a single test face was included in the initial set, using a six-point scale ranging from "sure absent" to "sure present". The test face was either an individual face or a morph of faces. The percentage of "present" responses was analyzed for each test face type, and sensitivity scores were calculated using SDT. We observed that although morph images evoked similar "present" responses for familiar and unfamiliar faces, participants presented higher sensitivity scores for familiar faces compared to unfamiliar faces when distinguishing individual test faces from morphed test faces. These findings suggest that the method of extracting ensemble representations for familiar and unfamiliar faces may differ qualitatively.

SYNCHRONOUS MARCHING IN VR INCREASES INFORMATIONAL CONFORMITY AND SELF-OTHER BLURRING

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Interpersonal movement synchrony has been associated with an increase in self-reported measures of pro-social propensity and normative conformity, such as increased compliance with authority and reliance on majority opinion. However, it remains to be investigated whether synchronous movement can also affect informational conformity (changes in perceptual decision making). In a novel virtual reality experiment, we investigated whether marching synchronously with a group can induce greater informational conformity on an unrelated perceptual task (forced choice random dot motion). We found that marching synchronously with virtual avatars increases self-other blurring and social closeness. Further, we found a higher degree of informational conformity following synchronised marching on hard trials. This indicates that, in some instances, interpersonal synchrony may induce minimal group membership by increasing self-other blurring, social closeness and informational conformity. Thus, participation in synchronised interpersonal movement has the potential to change

our perception of the world to align more closely with the synchronised group.

DOES STATIC LIGHT VARIATION INFLUENCE HOW PEOPLE ATTEND TO FEATURES DEPICTED IN STAINED-GLASS?

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Stained-glass is a unique artistic form that transmits as well as reflects light, and this makes it an attractive medium for studies of light on attention and memory. Despite emerging research on the cognitive processes associated with viewing art, there are few explorations into the effects of light variation when viewing stained-glass. Our study aimed to explore the allocation of visual attention when viewing stained-glass windows under different focal light conditions and its role in memory recall for features. We used three conditions: 'congruent' or 'incongruent' in which meaningful/non-meaningful regions of the scene were highlighted respectively, and a 'control' (diffuse lighting). The study included a learning session followed by a memory test. During learning the participant's eye movements (fixations and saccades) were recorded as they viewed images. A subsequent recognition memory test (2-AFC) measured RTs and accuracy performance to the images. The results suggest that lighting affects attentional allocation and improves memory for relevant features, moderated by familiarity and religiosity. Our findings have implications for understanding the role of light variation on cognitive appraisals of art.

NEGATIVE EMOTIONS FACILITATE RESPONSES TO SOUNDS WITH DESCENDING PITCH

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We aimed to investigate how emotional context influences the identification of sounds with ascending or descending pitch. In Study 1, we created visual contexts with happy/sad images and found that participants reacted faster to descending than ascending sounds when presented with sad images, revealing a facilitation effect. To further explore the role of valence and arousal in this crossmodal correspondence, we introduced a fear condition in Study 2. As happiness and sadness go to the same direction in terms of valence or arousal (positive/high, negative/low), for fear the two dimensions are disentangled (negative/high). Results indicated a congruency effect for both sad and fear conditions, suggesting that valence plays a crucial role in this crossmodal link. Moreover, Study 3 revealed that the crossmodal facilitation effect can occur even without participants' attention being focused on the task. Importantly, these congruency effects were limited to emotionally strong images in all three studies. In conclusion, our findings provide insight into the possible representational link between emotions and pitch, and demonstrate the impact of emotional context on the perception of specific sensory features such as pitch.

CAN THE FOREST BE PERCEIVED IN THE ABSENCE OF VISUAL AWARENESS? MASKED PRIMING OF GLOBAL STRUCTURE IN HIERARCHICAL VISUAL PATTERNS

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In the present study, we devised a masked priming design to study whether local elements (triangles and X-shapes) are grouped into global patterns (squares and diamonds) in the absence of visual awareness. Prime visibility was manipulated using two different prime-mask stimulus onset asynchronies (SOA-40 ms and SOA-53 ms). Online subjective measures of prime visibility were obtained in each trial by means of a four-point scale (Perceptual Awareness Scale). The online measure of prime visibility allowed us to classify trials according to the prime visibility reported by the observers. On average, participants reported being fully unaware of the masked patterns in 48% of the trials, in both the SOA-40 and SOA-53 conditions. Interestingly, response facilitation (i.e., shorter latencies on congruent trials) was observed for both global and local primes across conditions, even though the priming effects were only reliable for aware trials. Huge individual differences were observed among participants in both prime visibility and the main task, suggesting the development of new research strategies on this topic. Furthermore, we discuss the caveats of gathering online awareness reports within masked priming designs.

AUDIO-VISUAL INTEGRATION DURING KNOWLEDGE ACTIVATION IN REAL-WORLD SCENE PROCESSING

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In everyday life, auditory and visual inputs are combined and may influence each other's processing. We studied how non-verbal sounds may influence visual information gathering from real-world scenes and knowledge activation about them. Participants judged, as quickly and accurately as possible, which of two words referred to an action typically performed in the scene that followed. The scene was initially presented filtered by low or high spatial frequencies, providing mainly global or local visual information, and gradually changed into a full-spectrum image. A sound semantically consistent or inconsistent with the scene was presented at the same time, for the whole scene duration. A baseline condition had no

sound. Regardless of the filtering condition, accuracy was lower with an inconsistent sound than a consistent sound or no sound, whereas correct responses were quicker with a consistent sound than an inconsistent sound or no sound. This suggests that non-verbal, auditory inputs modulate understanding of visual scenes, but their inconsistency or consistency might impact different mechanisms, namely likelihood versus promptness of activation of appropriate knowledge, especially when visual information is incomplete.

THE ROLE OF ATTENTIONAL RESOURCES IN HAPTIC DISCRIMINATION

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Object manipulation requires dexterous hand movements; from this, we extract haptic shape. Manual dexterity is linked to attentional control of the motor system. However, there is still a lack of understanding how haptic shape perception is modulated by attentional processes. The current investigation evaluated the effect of attentional load on haptic shape perception. We used an established natural object set (i.e. replicas of bell peppers) to assess haptic shape discrimination. Fifty participants took part in our study. In the shape discrimination task, participants explored two bell pepper replicas consecutively. After each trial they had to indicate whether both bell peppers had same or different shapes. Each shape discrimination judgment was made with or without concurrent attentional load. Attentional load was introduced by asking to memorize a set of digits. Length of the presented digits spans was adapted to individual memory performance. Those with higher attentional resources performed better in the dual task condition, but attentional resources do not attune haptic shape sensitivity per se. Attentional resources, therefore, are important for successful completion of simultaneous haptic and secondary tasks.

THE TEMPORAL DYNAMICS OF TOOL-RELATED REPRESENTATIONS: AN RSA STUDY ON EEG DATA

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When seeing a tool – an object we can manipulate and use –, motor-related processing engages as fast as 140ms. Yet, little is known about when are accessed the different types of representation related to the use of tool.
In this study, we probed the temporal dynamics of three key types of tool-related representation (namely visual, manipulation and function aspects) using a representational similarity approach on EEG data for 80 different tools in a passive-viewing task. Results revealed that, following early low-level processing (102-122ms), manipulation (130-158ms) slightly preceded visual processing (142-166ms). In a third time window, the patterns reversed with visual processing (202-218ms) slightly preceding manipulation (210-218ms). A fourth time window was observed only for visual processing (278-294ms). For function, no timepoints survived correcting for multiple comparisons (uncorrected results revealed a single time window, 274-318 ms).
We discuss these results in the light of the parallel involvement of dorsal and ventral streams, in respectively 3D/grasp processing and visual recognition, and raise the possibility that tool function might require attention to yield neural representation that such approach could capture.

Theme

REASONING

HOW DELIBERATIVE PROCESSES AFFECT THE PATTERN OF ACTIVATION IN COMPOUND REMOTE ASSOCIATE (CRA) PROBLEMS

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Solving CRA problems involves both automatic spreading of activation and deliberate generation and testing of hypotheses (Smith et al., 2012). However, the interaction between these two processes is under-researched. Our study aimed to investigate how the act of solving problems and generating hypotheses from different words affect the patterns of spreading activation. We presented participants with modified CRA problems, where one word was always ambiguous, followed by several related or unrelated words. The position of an ambiguous word was manipulated. One group of participants was told to solve problems, while the other group just read the presented words. Participants were asked to rate the semantic closeness of these words to the CRA problem (Experiment 1) or categorise words as abstract or specific (Experiment 2). The results showed that when participants were trying to solve the problems, the activation of all related words was lower compared to when they were not solving problems. The position of the ambiguous word also had an effect on the level of related words. These findings provide insight into how deliberate processes in CRA problem-solving shape and alter the patterns of spreading activation.

Theme

STATISTICS AND METHODOLOGY

VALIDATION OF A CONTROLLED SET OF SEXUALLY EXPLICIT VIDEOS – A PREREGISTERED STUDY

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Sexually explicit videos are widely used in sexuality research to elicit sexual arousal. However, researchers typically rely on publicly available stimuli and resources (e.g., online sexually explicit content) for this purpose, with limited control over stimulus content and associated affective reactions and sexual response levels. The current pre-registered study will test the effectiveness of a new set of sexual film clips specifically developed and produced for psychophysiological sex research. The videos convey different sexual behaviours involving a male and female actor, simulating pleasurable/ consensual, neutral/ ambiguous, and unpleasant/coercive sexual interactions. Forty heterosexual male participants, aged 18-40, will be asked to rate the videos in terms of their subjective sexual arousal and affective responses. They will also be asked to rate the perceived arousal and consent of the female actress. Facereader software will be used to analyse participants' facial expressions. We intend to provide information and findings on the validation of these clips in The Open Science Framework.

COGNITIVE-AFFECTIVE MAPS - A NOVEL RESEARCH TOOL TO MOTIVATE ATTITUDE CHANGE

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Recently, data collection and analyses tools for Cognitive-Affective Maps (CAMs) as a quantitative and qualitative research tool have been developed to identify, visually represent and analyze existing belief structures. In comparison to associative methods or semantic networks CAMs also include affective evaluations. By means of a mixed design (2 time-points x 3 conditions) these affective evaluations regarding a fictional technological implant have been experimentally manipulated, whereby participants who drew a CAM with positive connotations at the first measurement point elaborated a negative CAM and vice versa. Applying multivariate multilevel models, the change in the affective evaluations were stronger for participants who elaborated a negative CAM (-.76) compared to participants who elaborated a positive CAM (.52), even when controlling for initial affect. Therefore, an elaboration of a CAM of opposite valence was able to change the affective evaluation of the participants in the experimental group for a contested technology, which is further elaborated by means of additional quantitative and qualitative analyses.

Theme

VISION

UNDERSTANDING REVERSAL ERRORS IN DYSLEXIA: THE ROLE OF THE MAGNOCELLULAR/DORSAL VISUAL STREAM

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Although reversal errors (e.g., "b" vs. "d") are often considered a hallmark of dyslexia, the origin of these errors remains elusive. Neuropsychological studies suggest that the magnocellular/dorsal visual stream may play an important role in our ability to discriminate mirror images. Other studies suggest that some dyslexics have a deficient magnocellular/dorsal stream. Accordingly, we tested the hypothesis that reversal errors in dyslexia are caused by a magnocellular/dorsal deficit. We measured the ability of normo-typical and dyslexic children enrolled in 6th grade to detect mirror (e.g., "d" for "b") and phonological (e.g., "g" for "b") errors in a lexical decision task. We also measured the efficiency of their visual magnocellular/dorsal stream using a flicker fusion threshold task. The obtained results are in line with our hypothesis, as dyslexic children showing a magnocellular/dorsal deficit also have significant difficulties to detect mirror errors in the lexical decision task.

REDUNDANCY MASKING AND THE COMPRESSION OF VISUAL INFORMATION

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In redundancy masking (RM), the number of perceived items in repeating patterns is reduced. For example, when three identical items are presented in the periphery, observers often perceive only two items. RM has been shown to depend on the spatial regularity with stronger RM in regular compared to irregular arrangements. Here, we examined RM with regular and irregular line arrays consisting of 3-5 lines, varying in color, contrast polarity or length. Lines were either uniform (e.g., black-black-black (bbb) in the contrast polarity condition), alternating (e.g., bwb) or irregular (e.g., bbw), and were briefly presented in the periphery. Observers reported the number of lines and the feature values of each perceived line. Our results showed RM in all conditions. Importantly, RM patterns were highly systematic: The perception of the 2 feature values and their ratios in the alternating and irregular conditions,

and the perception of stimulus edges was largely accurate. RM occurred predominantly in the stimulus center and within subgroups of identical lines. Our results indicate that RM occurs in stimulus parts that 'ungroup' from other stimulus parts. We suggest that RM is a key mechanism that compresses redundant visual information.

Theme

VISUO-SPATIAL POCESSING

THE EFFECT OF INTERNAL AND EXTERNAL VISUALIZATION OF ROTATION ON POSTURAL STABILITY

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It is assumed that participants internally visualize a rotation during mental rotation tasks, but mental rotation has also been linked to external visualization of rotation. Angular disparity in mental rotation also influences postural sway. We compare the external visualization of rotation on a screen with the suspected internal visualization during mental rotation tasks. We suspect that both are similar and thus produce a comparable effect on postural sway. Participants complete three mental rotation tasks with cube figures, two of them aided by external visualization. Their center of pressure is measured throughout. The effects of external visualization, angular disparity, and their interaction on postural sway are compared using Bayesian statistics. Recruitment continues until the Bayes factors reach the decision boundary of 3 or 1/3. Current results indicate no larger sway for external visualization. Mental rotation possibly induces larger range of sway, but results are not decisive yet. Data are still being collected and can be presented at the conference. The current results support the notion that the visualization of rotation is central to postural sway during mental rotation and thus an integral part of mental rotation.

AN ADVANTAGE BY DYSLEXIC OVER TYPICAL READERS IN THE IMPOSSIBLE FIGURE TASK

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An intriguing advantage of dyslexic over typical readers was found in two independent studies using the impossible figure task, where participants decide if a 3D shape is or is not possible (Diehl et al., 2014; von Karolyi, 2001). Framed by the Neuronal Recycling Hypothesis (Dehaene & Cohen, 2007, 2011), we aimed to replicate this finding in a highly-controlled setting and to examine whether the putative dyslexics' advantage was related to reading abilities. To these aims, dyslexic adults (n= 16) and chronological-age and IQ-matched controls (n= 19) performed a possible/impossible figure decision task, and reading fluency and text comprehension tasks. Dyslexic readers were significantly faster and more accurate than controls, especially for possible figures. Performance in this task was correlated with reading fluency but not with text comprehension in controls, but no such association was found in dyslexic readers. Possible mechanisms driving this effect are discussed considering how learning to read might affect nonlinguistic visuospatial processing.

INVESTIGATION OF NON-SNARC IN A MAGNITUDE COMPARISON TASK

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The SNARC effect refers to the phenomenon where people respond faster to small numbers with their left hand and faster to large numbers with their right hand, or vice versa. Although it is considered a robust measure of spatial numerical associations, most supporting data come from Western cultures. A previous work evidenced the absence of SNARC in Turkish participants in a parity judgment task. Thus, the aim of the present study was to investigate the SNAs using a non-symbolic magnitude comparison task with a constant reference (30 dots) and varying dot array ratios (0.5, 0.66, and 0.83). The participants (*N*=60) judged that the magnitudes of the target stimuli contained fewer or more dots with their left and right hands. Findings indicated a significant distance effect among all ratios. Also, right-side responses to the larger targets and left responses to the smaller targets were significantly faster, indicating a regular SNARC effect. This data is particularly interesting since it provides suggestive evidence for the distinctive cognitive processes playing a role in non-symbolic magnitude comparison and parity judgment tasks. It's also the first study to demonstrate the SNARC in a sample without a typical parity judgment.

INTERHEMISPHERIC SYNCHRONY IN VISUAL WORKING MEMORY

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Visual working memory (VWM) is the ability to remember, manipulate and reproduce visual stimuli even in their physical absence. VWM is associated with changes across brain areas and frequency bands, however it is not clear how local oscillations interact through de-/synchronization, and how this relates to differences in cognitive performance. Specifically, it is not known if interhemispheric synchronization underlies higher capacity of bilateral VWM. In this study, we examined the role of cortical oscillations in uni- and bilateral VWM during a lateralized delayed

match-to-sample task with high-density EEG and MRI-based source reconstruction. We found a behavioral advantage for bilateral presentation of visual stimuli that increased with memory load. Bilateral VWM was associated with a stronger decrease in early alpha-band amplitude and stronger increase in both late high alpha-band amplitude and synchronization. The latter correlated well with hit rates and thus seemed to be predictive of bilateral VWM performance. These results provide novel information about the dynamic networks underlying VWM and performance differences.

TRACKING WORKING MEMORY LOAD OR SELECTION WITH MULTIVARIATE PATTERN ANALYSIS FROM ELECTROENCEPHALOGRAPHIC DATA

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The use of Multivariate Pattern Analysis (MVPA) to decode electroencephalographic (EEG) data has become a popular technique to study the neural substrates of Visuospatial Working Memory (VWM). However, previous research points to the potential confounds that can easily arise when using this type of analysis. The present work is another example. Previous studies have shown that removing information from Visual Working Memory (VWM) follows a specific time course. In the present study, we wanted to track these temporal dynamics. To that aim, participants performed a VWM task involving delayed color recognition and we examined the behavioral time course of removing part of the information and its EEG correlate. Specifically, we applied MVPA to this EEG data aiming to decode the predicted VWM load drops after a retro-cue that signaled some information as relevant. Results show that decoding VWM load from EEG data might not be as straightforward as previous research pointed out and that it can be easily confounded with other processes, such as the selection of information in VWM. Additionally, our results also show parallelism in the involvement of eye movements to select information from the environment and within VWM.