THE MENTAL SCREENING-360° (MS-360°)

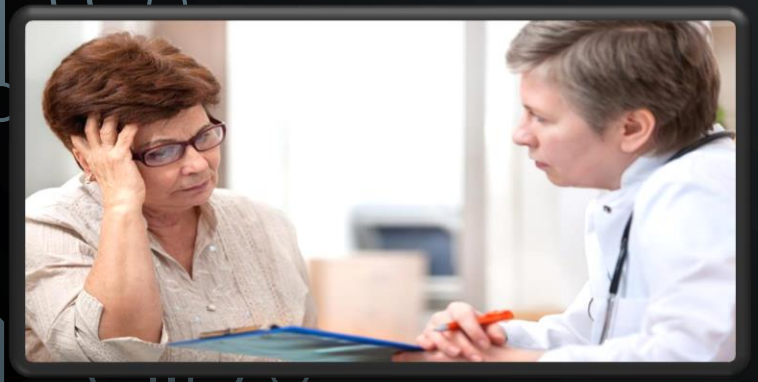
A SCREENING TEST FOR AN ECOLOGICAL ASSESSMENT OF EVERYDAY COGNITIVE FUNCTIONING

Presenter:
Luca Pieri, 3rd Year PhD Student
Department of Psychology – University of Milano-Bicocca
Mind and Behavior Technological Center (MIBTEC)

Introduction

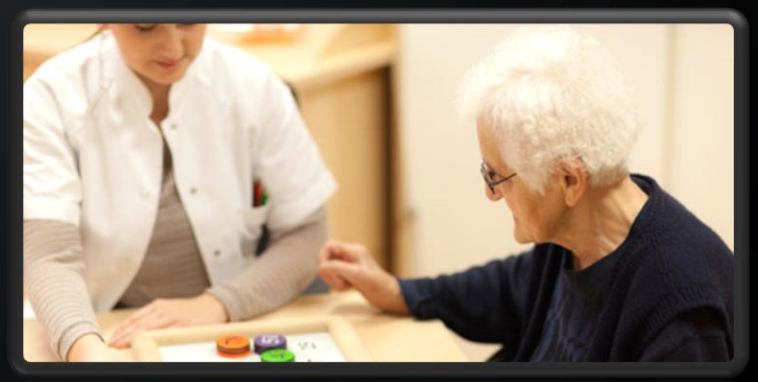
Neuropsychological Assessment

- "Neuropsychological assessment is a procedure used to evaluate the behavioral and functional expression of brain dysfunction and identify the impact of brain injury or disease on the cognitive, sensorimotor, emotional, and general adaptive capacities of an individual". (Vanderploeg, 2000)



Sources of Information:

- Clinical Interviews
- Standardized Psychometric Tests



Introduction

Low Predictive Power of Neuropsychological Tests

- Low Ecological Validity: limited generalizability of the results

A Possible Solution: Immersive Virtual Reality

- Immersivity (technology) and presence (psychology) can motivate the patients to act in a naturalistic way within a simulated environment

Introduction

Which Kind of Virtual Environment (VE)?

- **Model-Based VEs:** scenarios implementing 3D computer-generated models which resembles real-life objects
- **360° Spheric VEs:** scenarios implementing spherical photos or videos which are captured from real-life environments

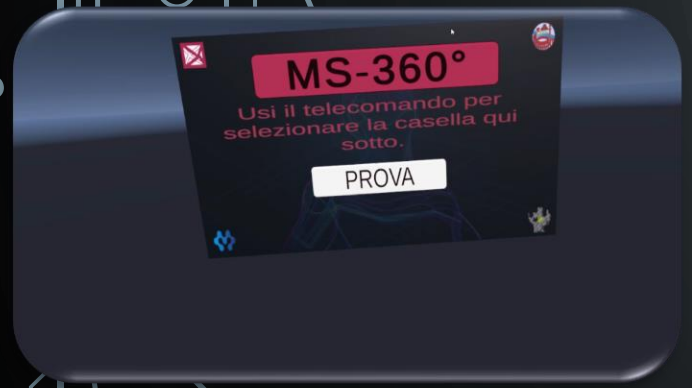
Model-Based VEs

+ Totally Customizable
+ Active Interaction
- Specific know-how for the implementation

360° Spheric VEs

- Not Customizable
- Passive Interaction
+ Easy to implement
+ Photorealistic

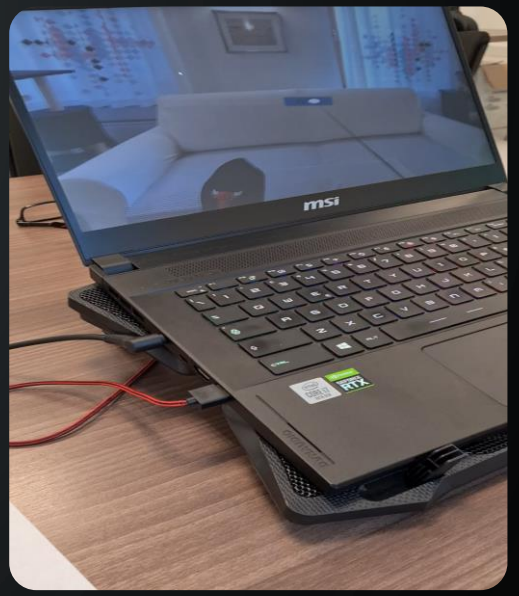
The Mental Status – 360°



Familiarization Phase

Mental Status 360° (MS-360°)

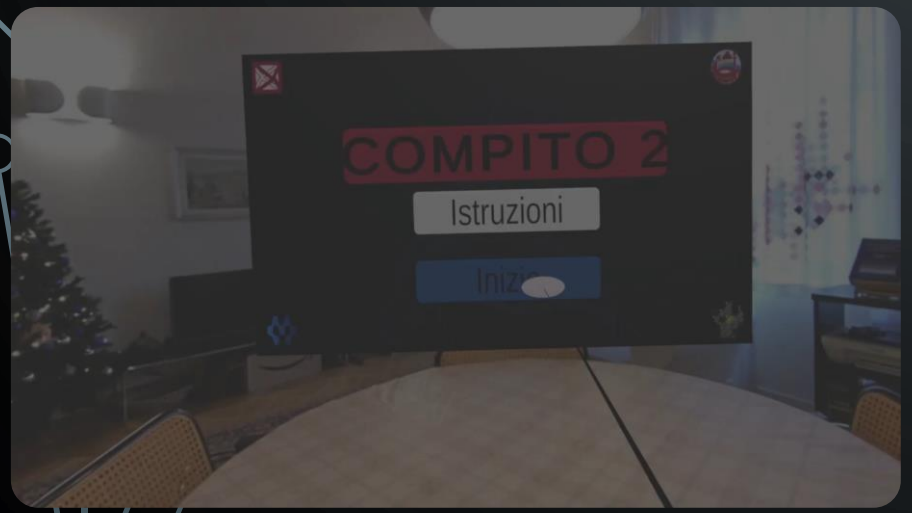
- A pilot screening tool
  - 14 scenarios
- Tasks resembling everyday activities
- Familiarization Phase → Test Phase
  - Administration: 20 minutes



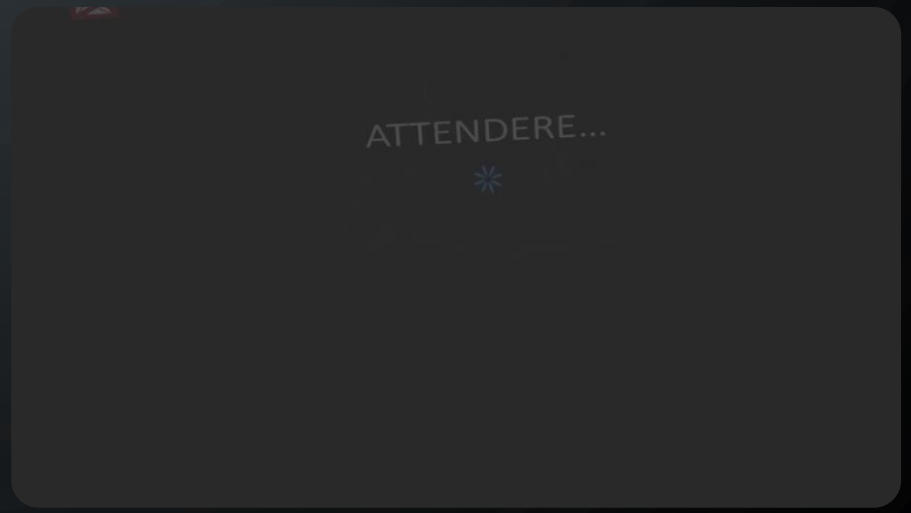
MS-360 Administration

MS-360°: Tasks

1 Visual Exploration	**2** Target Selection	**3** Object Naming	**4** Object Recall (Immediate)	**5** Story Recall (Immediate)	**6** Words Reading	**7** Verbal Production
8 Cognitive Estimates	**9** Action Planning	**10** Written Comprehension	**11** Sustained Attention	**12** Object Recognition	**13** Object Recall (Delayed)	**14** Story Recall (Delayed)



Target Selection Task



Story Recall Task

MS-360°: Experimental Procedure

- MoCA (Montreal Cognitive Assessment, Nasreddine et al., 2005)
- SSQ (Simulator Sickness Questionnaire, Kennedy et al., 1993)
- SUS (System Usability Scale, Brooke, 1986)

MS-360°: Performance

Participants

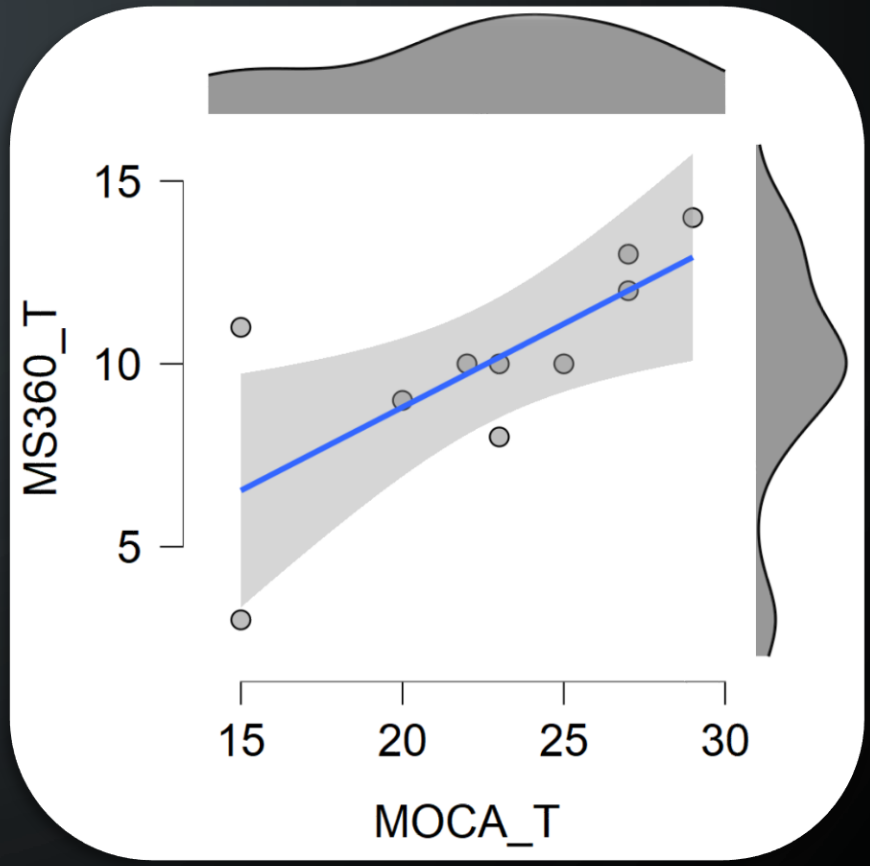
Patients reporting Subjective Cognitive Impairment (SCI)

Descriptive Statistics

	Age	Edu	MOCA_T	MS360_T
Valid	10	10	10	10
Missing	0	0	0	0
Mean	69.700	11.100	22.600	10.000
Std. Deviation	9.730	6.437	4.812	3.055
Minimum	56.000	3.000	15.000	3.000
Maximum	85.000	24.000	29.000	14.000

Abbreviations:

- **MOCA_T = MOCA Total Raw Score (out of 30)**
- **MS360_T = MS-360° Total Score (out of 14)**



Pearson's Correlations

			Pearson's r	p
MOCA_T	-	MS360_T	0.718**	0.010

Note. All tests one-tailed, for positive correlation

* p < .05, ** p < .01, *** p < .001, one-tailed

MS-360°: Simulation Sickness

Post-Exposure SSQ Scores

Descriptive Statistics

	SSQ_N	SSQ_O	SSQ_D	SSQ_TS
Valid	10	10	10	10
Missing	0	0	0	0
Mean	7.632	8.338	2.784	7.854
Std. Deviation	9.853	8.342	5.869	8.165
Minimum	0.000	0.000	0.000	0.000
Maximum	28.620	22.740	13.920	22.440

Abbreviations:

- N = SSQ Nausea Scale
- O = SSQ Oculomotor Scale
- D = SSQ Dizziness Scale
- TS = SSQ Total Score

Percentile Point	*SSQ Scale Value*			
	N	*O*	*D*	*TS*[a]
40	0.0	0.0	0.0	0.0
45	0.0	0.0	0.0	3.7
50	0.0	7.6	0.0	3.7
55	0.0	7.6	0.0	3.7
60	0.0	7.6	0.0	7.5
65	9.5	7.6	0.0	7.5
70	9.5	15.2	0.0	11.2
75	9.5	15.2	0.0	15.0
80	9.5	22.7	13.9	22.5
85	19.7	27.7	13.9	22.5
90	28.6	30.3	27.8	30.0
95	38.2	45.5	41.7	44.9
96	38.2	45.5	41.7	44.9
97	47.7	53.1	55.7	48.7
98	57.2	53.1	55.7	56.2
99	66.8	60.7	83.5	75.9
M	7.7	10.6	6.4	9.8
SD	15.0	15.0	15.0	15.0
Minimum	0.0	0.0	0.0	0.0
Maximum	124.0	90.9	97.4	108.6
n	1101	1111	1109	1099

Kennedy et al., 1993

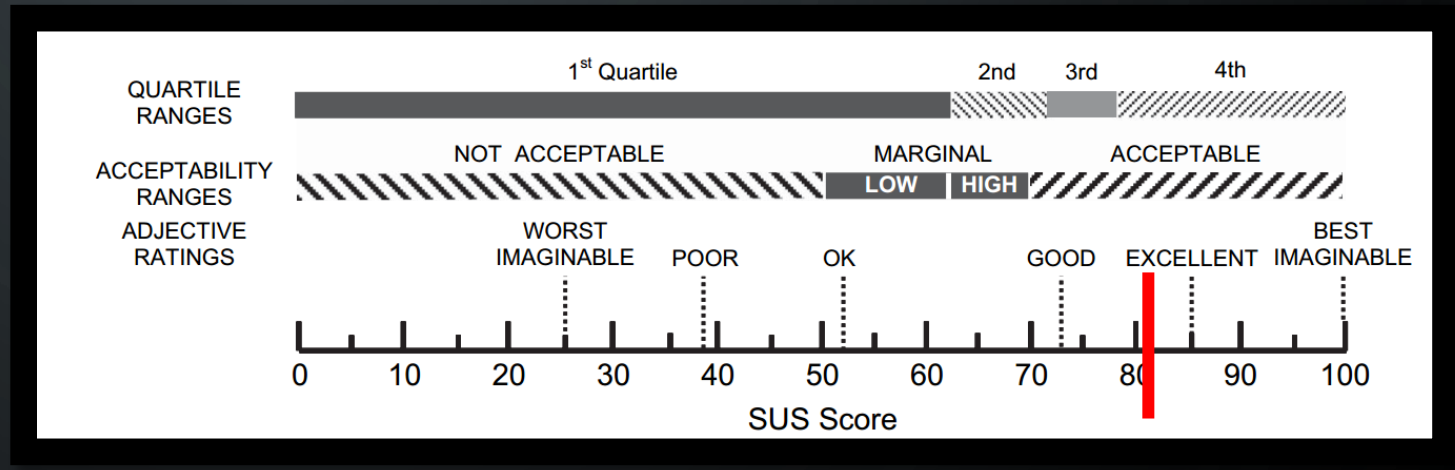
MS-360°: Usability Assessment

Descriptive Statistics

	SUS_T
Valid	10
Missing	0
Mean	82.500
Std. Deviation	15.000
Minimum	50.000
Maximum	100.000

Descriptives of the SUS Scores

MS-360° SUS Mean Score



SUS Adjective Rating Scale - Bangor et al., 2009

THANK YOU FOR YOUR ATTENTION

Luca Pieri

Daniele Romano

Valentina Moro

Giuseppe Gambina

Stefania Amato

Elena Facci

Contacts

Luca Pieri: l.pieri3@campus.unimib.it

Daniele Romano: daniele.romano@unimib.it