

The 360° Mental Screening (MS-360°): A Screening Test for an Ecological Assessment of Everyday Cognitive Functioning

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Abstract

Background: The majority of currently available cognitive screening tools show low to moderate ecological validity, limiting their capability to detect real-life impairments. Virtual Reality (VR) technology emerged as a possible solution as it can simulate everyday tasks maintaining a standard setting in almost any possible situation [1].

Objective: The project aims to achieve incremental evidence toward the feasibility of using 360° photos and videos in the neuropsychological assessment and to create a screening test for a valid and reliable clinical application.

Methods: We are developing a screening test (The 360° Mental Screening - MS-360°) that, instead of using model-based environments as scenarios, employs 360° photos and videos to generate an innovative, highly immersive VR environments. This media can simulate real-life situations in a more photorealistic fashion, providing ecological stimuli and recording meaningful behavioral measures [2].

The MS-360° uses videos recorded with an omnidirectional camera as virtual environments, which can be administered wirelessly using a portable head-mounted display and a 5GHz Wi-Fi network. The test includes fourteen different scenarios: in each of these, the participant is asked to perform some ecological tasks aimed to elicit specific cognitive functions. We quantify the accuracy in each specific task as a measure of outcome.

We are studying two groups at the current stage: patients reporting subjective cognitive impairment and healthy controls matched for age and education. We analyze differences and correlations between the score obtained at the MS-360° test and scores obtained in other established paper-and-pencil screening tests [3].

Results: Data collection is in due course. We expect to find correlations between our test and the paper-and-pencil screening tools. Finally, we expect that the MS-360° will be able to distinguish patients' and control's performances.

Conclusions: VR is emerging as a valid tool to design neuropsychological tests. However, the lack of proper validation studies limits the evidence for widespread use of this technology for a reliable assessment of cognitive functions. Moreover, the study of the ecological value of 360° scenarios compared to paper-and-pencil tests or model-based VR has the potential to unlock a new, easy-to-use, technological improvement.

References:

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