A virtual reality 'Shopping Task' could help test for cognitive decline in adults

January 26 2022

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New research from the Institute of Psychiatry, Psychology & Neuroscience (IoPPN) at King's College London suggests that a virtual reality test in which participants "go to the shops" could offer a potentially promising way of effectively assessing functional cognition, the thinking and processing skills needed to accomplish complex everyday activities.

The research, published in the *Journal of Medical Internet Research*, uses a novel virtual reality shopping task called "VStore" to measure cognition, which asks participants to take part in tests designed to mirror the real world. Researchers hope that it will be able to test for age-related cognitive decline in the future.

The trial recruited 142 healthy individuals aged 20-79 years. Each participant was asked to "go to the shops," first verbally recalling a list of 12 items, before being assessed for the amount of time it took to collect the items, as well as select the corresponding items on a virtual self-checkout machine, pay, and order coffee.

Cognition tests, such as those used to measure the deficits present in several neuropsychiatric disorders including Alzheimer's disease, schizophrenia, and depression, are traditionally time-consuming and onerous. Vstore—the technology that the researchers used in this study—is designed to overcome these limitations to provide a more accurate, engaging, and cost-effective process to explore a person's cognitive health.

The immersive environment (a virtual shop) mirrored the complexity of everyday life and meant that participants were better able to engage brain structures that are associated with spatial navigation, such as the hippocampus and entorhinal cortex, both of which can be affected in the early stages of Alzheimer disease.

Researchers were able to establish that Vstore effectively engages a range of key neuropsychological functions simultaneously, suggesting that the functional tasks embedded in virtual reality may engage a greater range of cognitive domains than standard assessments.

Prof Sukhi Shergill, the study's lead author from King's IoPPN and Kent and Medway Medical School (KMMS) said, "Virtual Reality appears to

offer us significant advantages over more traditional pen-and-paper methods. The simple act of going to a shop to collect and pay for a list of items is something that we are all familiar with, but also actively engages multiple parts of the brain. Our study suggests that VStore may be suitable for evaluating functional cognition in the future. However, more works needs to be done before we can confirm this."

Lilla Porffy, the study's first author from King's IoPPN said, "These are promising findings adding to a growing body of evidence showing that virtual reality can be used to measure cognition and related everyday functioning effectively and accurately. The next steps will be to confirm these results and expand research into conditions characterized by cognitive complaints and functional difficulties such as psychosis and Alzheimer's Disease."

This study was possible thanks to funding from the Medical Research Council and the National Institute for Health Research Maudsley Biomedical Research Center. VStore was designed by Vitae VR.

More information: Lilla Alexandra Porffy et al, A Novel Virtual Reality Assessment of Functional Cognition (VStore): Validation Study (Preprint), *Journal of Medical Internet Research* (2021). DOI: 10.2196/27641

Provided by King's College London