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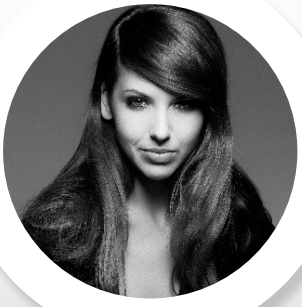
The use of virtual reality and gamification for post-stroke neurorehabilitation of cognitive deficits



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On a global scale, stroke is major health problem; being the third leading cause of death and most common cause of disability worldwide. In the Netherlands, approximately 46,000 strokes occur each year and there are over 320,000 people currently living with the consequences of suffering a stroke. Stroke is a devastating neurological disease caused by a sudden physiological disruption in the brain, affecting both grey matter, white matter, and impairing functional brain networks involved in cognitive and motor function. Consequently, depending upon the neuroanatomical location of a lesion, both motor deficits and cognitive impairment are frequently exhibited following a stroke. Neuroscientific research has demonstrated that rehabilitation contributes to neural plasticity and the ability of the brain to rewire and reorganize following a lesion, thereby facilitating functional recovery. Despite benefits, conventional stroke rehabilitation poses several limitations: it is time consuming and tiresome for patients, costly, labor and resource intensive, reliant upon the adherence of a patient, and limited in availability subject to location. Furthermore, research suggests that cognitive deficits following a stroke are often not adequately addressed as compared to motor function and should be a priority moving forward. An increasing number of studies propose that virtual reality (VR) can be successfully used for the neurorehabilitation of cognitive and motor dysfunction in stroke survivors. While there are currently only a few studies that have examined the use of VR for post-stroke neurorehabilitation of cognitive deficits, results appear promising. The adaptation of neuropsychological principles and conventional rehabilitation techniques into gamified solutions for the recovery of cognitive functions using VR, provides stroke survivors with the opportunity to perform rehabilitation in a fun and immersive way, and may possess benefits over conventional means of rehabilitation; for example, the ability to perform rehabilitation at home or in group settings.

Biography

Faviola Brugger-Dadis has graduated with her Research Master's in Cognitive Neuropsychology from the VU University Amsterdam and has completed her thesis at the University of Oxford. She is currently a Doctoral Candidate in Clinical Neuropsychology at the VU University Amsterdam and is also the CEO and Founder of NeuroReality, a startup company that is focused on developing Medical Software for Cognitive Rehabilitation using Virtual Reality. Her research focuses on the utilization of virtual reality for the rehabilitation of neurodegenerative diseases, primarily stroke and dementia.

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