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Exploring the Dynamics of Cognitive Control using Virtual Reality

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Abstract

Hand-tracking research indicates that different components of reaching behaviour can be used to index the functioning of dissociable processes underlying cognitive control. This study assessed the feasibility of using virtual reality (VR) in reach-tracking versions of the Simon task (Simon, 1969; N = 44) and the flanker task (Eriksen & Eriksen, 1974; N = 40), and aimed to replicate the manual dynamics observed with electromagnetic systems in prior studies (Erb & Marcovitch, 2019; Erb et al., 2018). Results showed patterns of effects consistent with earlier findings in initiation time, movement time, curvature, and changes of mind. Additionally, we present preliminary oculomotor dynamics findings during these tasks. These results suggest VR effectively targets cognitive processes previously captured using electromagnetic reach-tracking systems, offering an accessible alternative for cognitive control research. Moreover, VR provides unique opportunities for capturing oculomotor dynamics in cognitive studies. This work demonstrates that VR presents a promising avenue for ecological approaches to investigating human cognition.