Wired to exit: Exploring the effects of wayfinding affordances in underground facilities using Virtual Reality

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Abstract

A virtual reality (VR) experiment with twenty-four participants was conducted using a wayfinding installation with the Oculus Rift S HMD. Participants were immersed into a simulation of a burning underground parking lot and tasked to navigate to the exit. The purpose was to investigate the high-level effect of wayfinding assistive lights on behavioral, physiological, and psychological outcomes. Participants were split into two groups: the baseline condition group was exposed to a scene without assistive lights, and the experimental condition group was exposed to the same scene with assistive lights. Results show that participants in the baseline condition traveled more, made more pauses and turns and took more time to find the exit, but these differences were not found to be statistically significant. On the contrary, differences in heart rate (HR) outcomes between the two groups were found to be statistically significant, with subjects in the baseline condition displaying an increasing HR trend during simulation. This finding is aligned with prior results on the efficacy of landmarks and wayfinding affordances in reducing cognitive demands by improving brain wiring efficiency. We discuss these findings in the context of a rich wayfinding affordances literature.

Keywords

Virtual Reality, wayfinding, underground parking, heart rate, Polar A370