Substance Cue Exposure in Virtual Reality: Task Development and Early Results

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Substance craving is a clinically important phenotype for the development and maintenance of addiction. Pictorial cue-exposure paradigms are conventionally used to induce craving in the lab; however, these paradigms are limited in their ability to simulate naturalistic substance use contexts. Thus, traditional cue-exposure paradigms may not effectively induce a true craving state. This report outlines the development of one of the first, naturalistic virtual reality (VR) paradigms designed to invoke craving and simultaneously assess eye-gaze, a potential psychophysiological marker of craving, in substance users. The process of developing a substance cue-exposure paradigm with eye-tracking in VR, including limitations and solutions, will be discussed. Pilot eye-tracking data acquired from a small sample (n=13) of young adult (M=21.67) heavy alcohol users tested on the alcohol version of the VR paradigm will also be presented. Analyses of this data revealed an effect for cue eye-gaze times (t(12) = 2.73, p < .05, d = .76) and subjective craving (t(12) = 2.13, p = .055; d = .59), indicating that heavy alcohol drinkers attend to VR alcohol cues more so than neutral cues and that active VR scenes invoke greater subjective alcohol craving than neutral scenes. These preliminary results suggest that this novel VR paradigm effectively invokes alcohol craving in the lab and advances eye-tracking as an additional, valid psychophysiological marker of craving in substance users. Once fully tested and validated, this VR paradigm could prove useful for enhancing measurement of in-lab craving and serve as a platform for novel treatment development.