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IMMERSIVE NATURAL SCENES USING VIRTUAL REALITY FOR RESTORATION IN ISOLATED CONFINED ENVIRONMENTS

Abstract

Isolated, confined, and extreme (ICE) environments present novel challenges for maintaining behavioral health and cognitive functioning. Exposure to nature can reduce stress, improve mood, and renew productivity (Kaplan Kaplan, 1989). Those living and working in ICE environments cannot freely seek out natural settings, but virtual exposure to such scenes may have similar restorative benefits. For example, immersion in Virtual Reality (VR) based nature alleviated stress and promoted relaxation in a laboratory environment (Anderson et al., 2017). Building on this work, we explored the application of VR as a self-directed, autonomous psychological support tool for use in ICE environments.

16 VR scenes across 4 categories ((1) high definition, filmed natural scenes; (2) rendered natural scenes; (3) urban landscapes; and (4) natural scenes with animals) were deployed in Mission V of the HI-SEAS analog – an 8-month high-fidelity simulation of long-duration spaceflight. 6 crewmembers viewed each VR scene at least once and provided subjective feedback through 3 questionnaires: (1) the Modified Reality, Judgment, Presence Questionnaire, which assessed the extent to which the VR scene was immersive or evoked a sense of presence; (2) the Perceived Restorativeness Scale, which characterized subjective feelings of restorativeness; and (3) the Profile of Mood States, which provided a subjective measure of mood state. This questionnaire was administered both before and directly after VR viewing and changes in reported mood were calculated.

Overall, filmed natural scenes were identified as most immersive (M = 76, SD = 26) and as most strongly promoting a sense of restoration (M = 59, SD = 20). Rendered scenes scored lowest on presence and emotional engagement (M = 50, SD = 26), as well as on perceived restoration (M = 35, SD = 14). Some high-definition filmed natural scenes were also linked to improvements in mood (M = 0.88, SD = 4.75). Interestingly, so were some urban scenes (M = 0.75, SD = 5.40), despite the fact that these scenes rated lower on engagement and restorativeness.

This investigation demonstrated that VR was feasible for deployment in ICE environments as a psychosocial support tool, created a sense of "being away," and offered some beneficial improvements in mood. A high degree of individual variability was noted across participants' responses to VR, suggesting customizing the experience for different users will be important when implementing VR for psychological support in ICE environments.