VIRTUAL REALITY AS A MEDIUM FOR SENSORIMOTOR ADAPTATION TRAINING AND SPACEFLIGHT COUNTERMEASURES

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With the upcoming shift to extra-long duration missions (1 year) aboard the ISS, sensorimotor adaptations during transitory periods in-and-out of microgravity are more important to understand and prepare for. Advances in virtual reality technology enables everyday adoption of these tools for entertainment and use in training. Experiencing virtual environments (VE) allows for the manipulation of visual flow to elicit automatic motor behavior and produce sensorimotor adaptation (SA). Recently, the ability to train individuals using repeatable and varied exposures to SA challenges has shown success by improving performance during exposure to a novel environment (Batson 2011). This capacity to 'learn to learn' is referred to as sensorimotor adaptive generalizability and, through the use of treadmill training, represents an untapped potential for individualized countermeasures. The goal of this study is to determine the feasibility of present head mounted displays (HMDs) to produce compelling visual flow information and the expected adaptations for use in future SA treadmill-based countermeasures. Participants experience infinite hallways providing congruent (baseline) or incongruent visual information (half or double speed) via HMD while walking on an instrumented treadmill at 1.1m/s. As gait performance approaches baseline levels, an adaptation time constant is derived to establish individual time-to-adapt (TTA). It is hypothesized that decreasing the TTA through SA treadmill training will facilitate sensorimotor adaptation during gravitational transitions. In this way, HMD technology represents a novel platform for SA training using off-the-shelf consumer products for greater training flexibility in astronaut and terrestrial applications alike.

Meeting information:

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