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Patricia.s.cowings@NASA.govPRE-FLIGHT TRAINING OF AUTONOMIC RESPONSES FOR MITIGATING THE EFFECTS OF
SPATIAL DISORIENTATION DURING SPACEFLIGHT**Abstract**

The National Aeronautics and Space Administration (NASA) has identified a potential risk of spatial disorientation, motion sickness, and degraded performance to astronauts during re-entry and landing of the proposed Orion crew vehicle. The purpose of this study was to determine if a physiological training procedure, Autogenic-Feedback Training Exercise (AFTE), can mitigate these adverse effects. Fourteen men and six women were assigned to two groups (AFTE, no-treatment Control) matched for motion sickness susceptibility and gender. All subjects received a standard rotating chair test to determine motion sickness susceptibility; three training sessions on a manual performance task; and four exposures in the rotating chair (Orion tests) simulating angular accelerations of the crew vehicle during re-entry. AFTE subjects received 2 hours of training before Orion tests 2, 3, and 4. Motion sickness symptoms, task performance, and physiological measures were recorded on all subjects. Results showed that the AFTE group had significantly lower symptom scores when compared to Controls on test 2 ($p = .05$), test 3 ($p = .03$), and test 4 ($p = .02$). Although there were no significant group differences on task performance, trends showed that AFTE subjects were less impaired than Controls. Heart rate change scores (20 RPM minus baseline) of AFTE subjects indicated significantly less reactivity on Test 4 compared to Test 1 (10.09 versus 16.59, $p = .02$), while Controls did not change significantly across tests. Results of this study indicate that AFTE may be an effective countermeasure for mitigating spatial disorientation and motion sickness in astronauts.