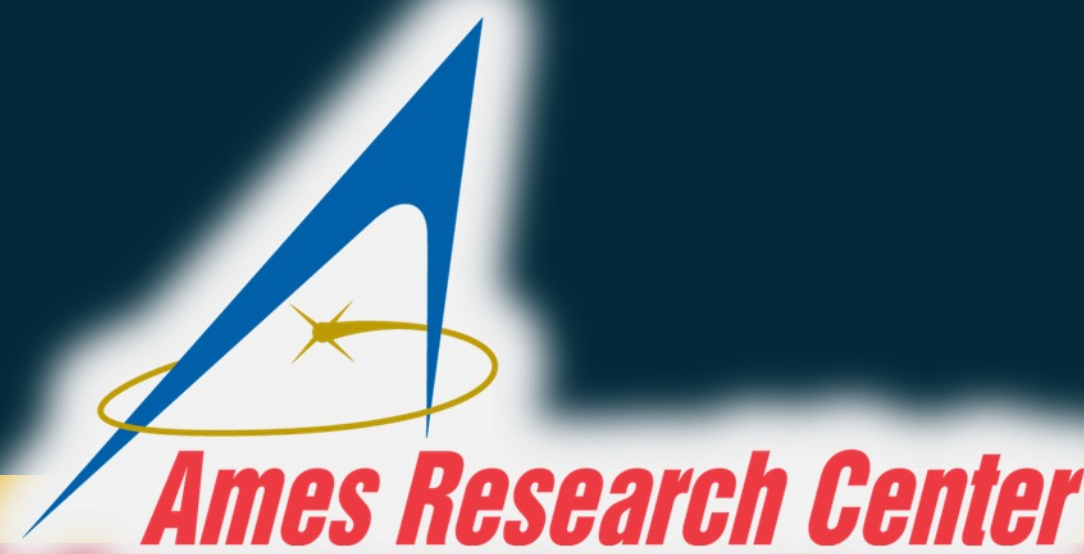




Modified Autogenic Feedback Training Produces Effect on Motion Sickness

Allison Ludwig^{1,5}, Patricia Cowings², William Toscano², Gary Ellis^{1,5}, Mary Nimmer^{4,5}, Tayton Hess^{4,5}, Mariateresa Sestito^{4,5}, Fernando Espinosa,^{2 3} Kevin Novak⁵.



Introduction

- Motion sickness (MS) (i.e., airsickness) is a common occurrence among military aviators that can impair their ability to fly.¹
- While pharmacological interventions exist, they are often associated with side effects (e.g., sedation), which may pose a significant risk to safety.¹
- Autogenic Feedback Training Exercise (AFTE) is a non-pharmacological intervention that combines physiological and perceptual training techniques that include Autogenic Therapy and Biofeedback.²
- AFTE trains individuals to self-regulate various physiological parameters to mitigate MS symptoms.
- While standard AFTE involves 6 hours of training, research suggests improvements are possible with as little as 2 hours of training.²
- The present study investigated whether a modified protocol (i.e., 2 hours of AFTE) can effectively mitigate MS symptoms.

Methods

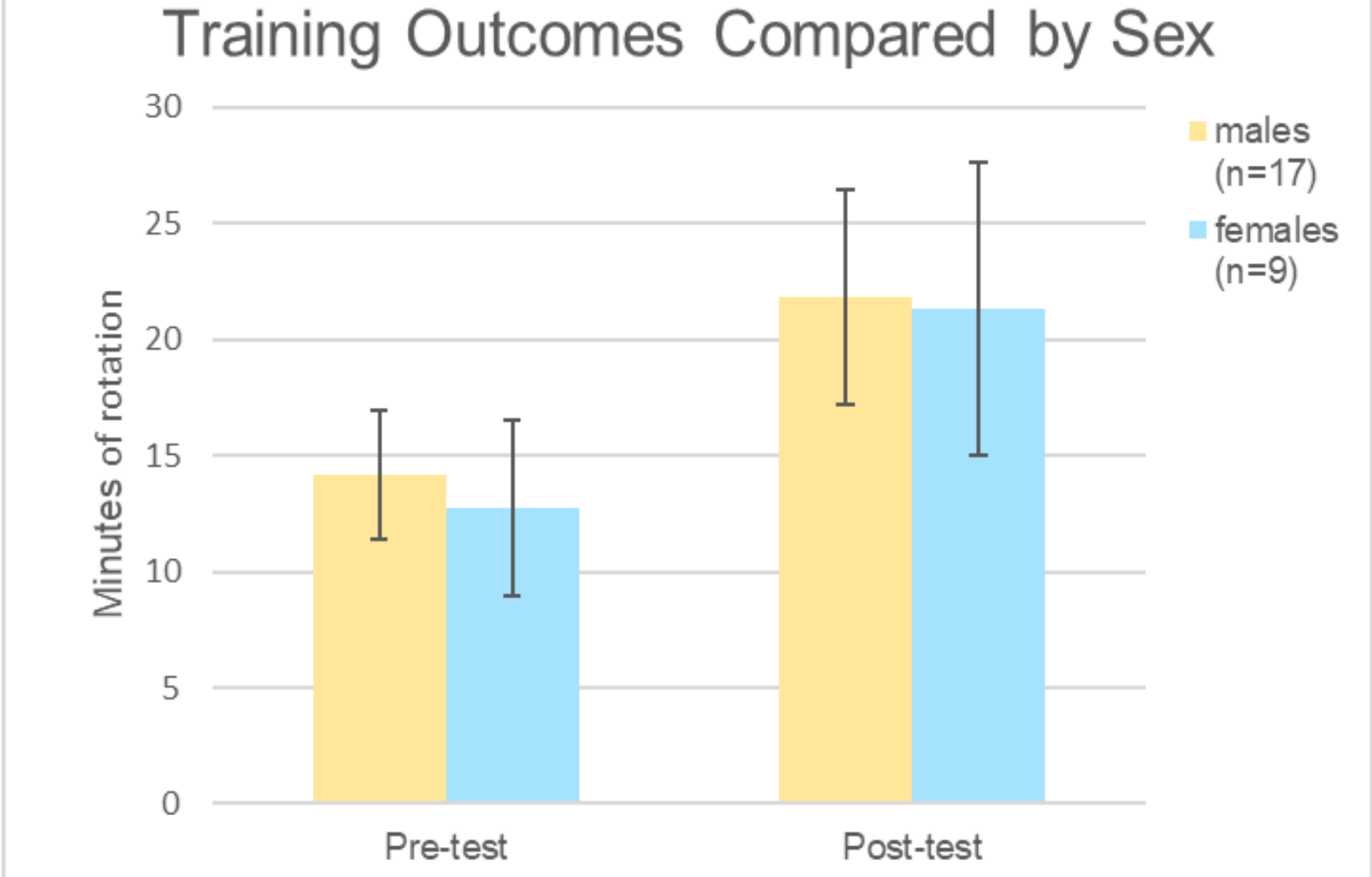
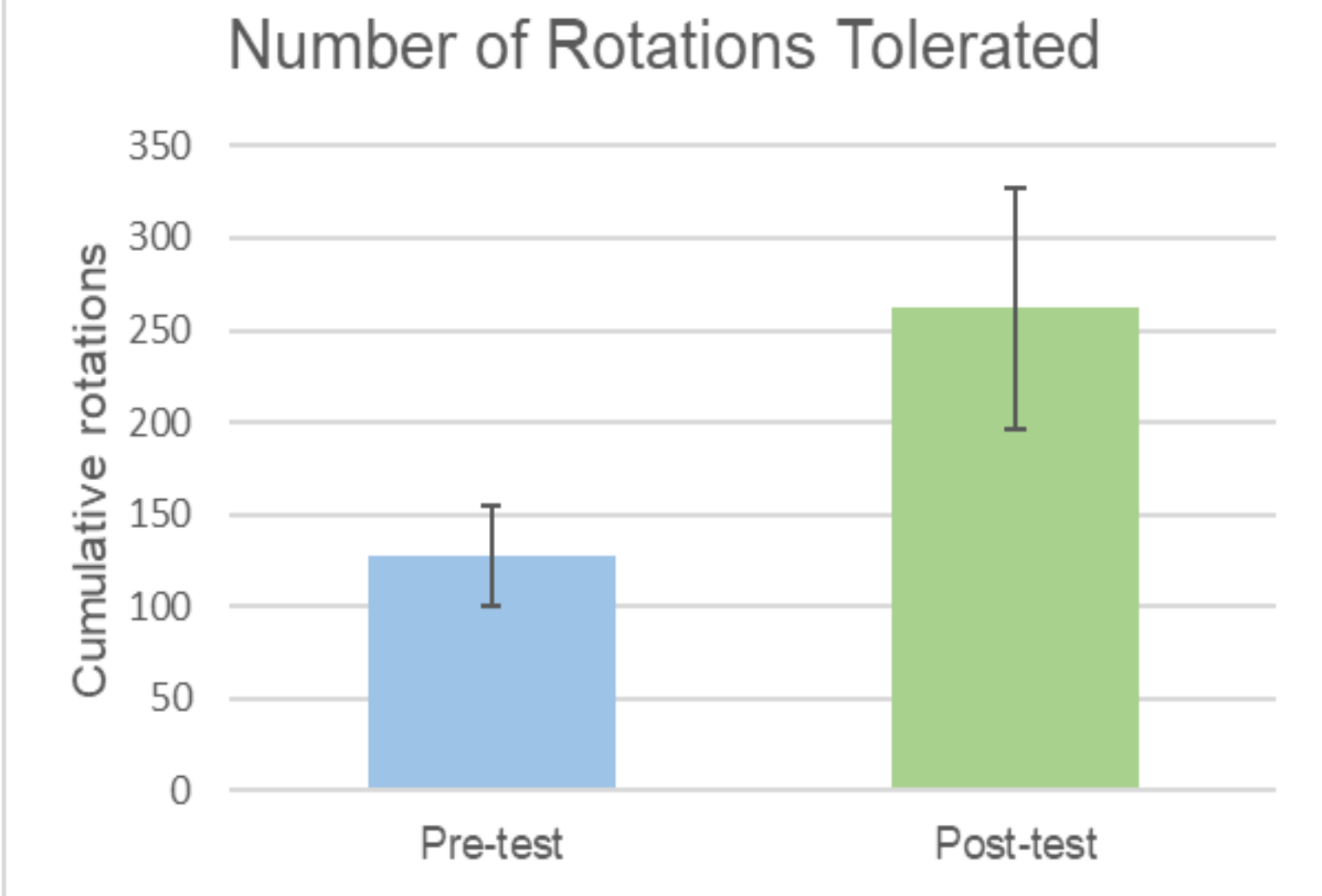
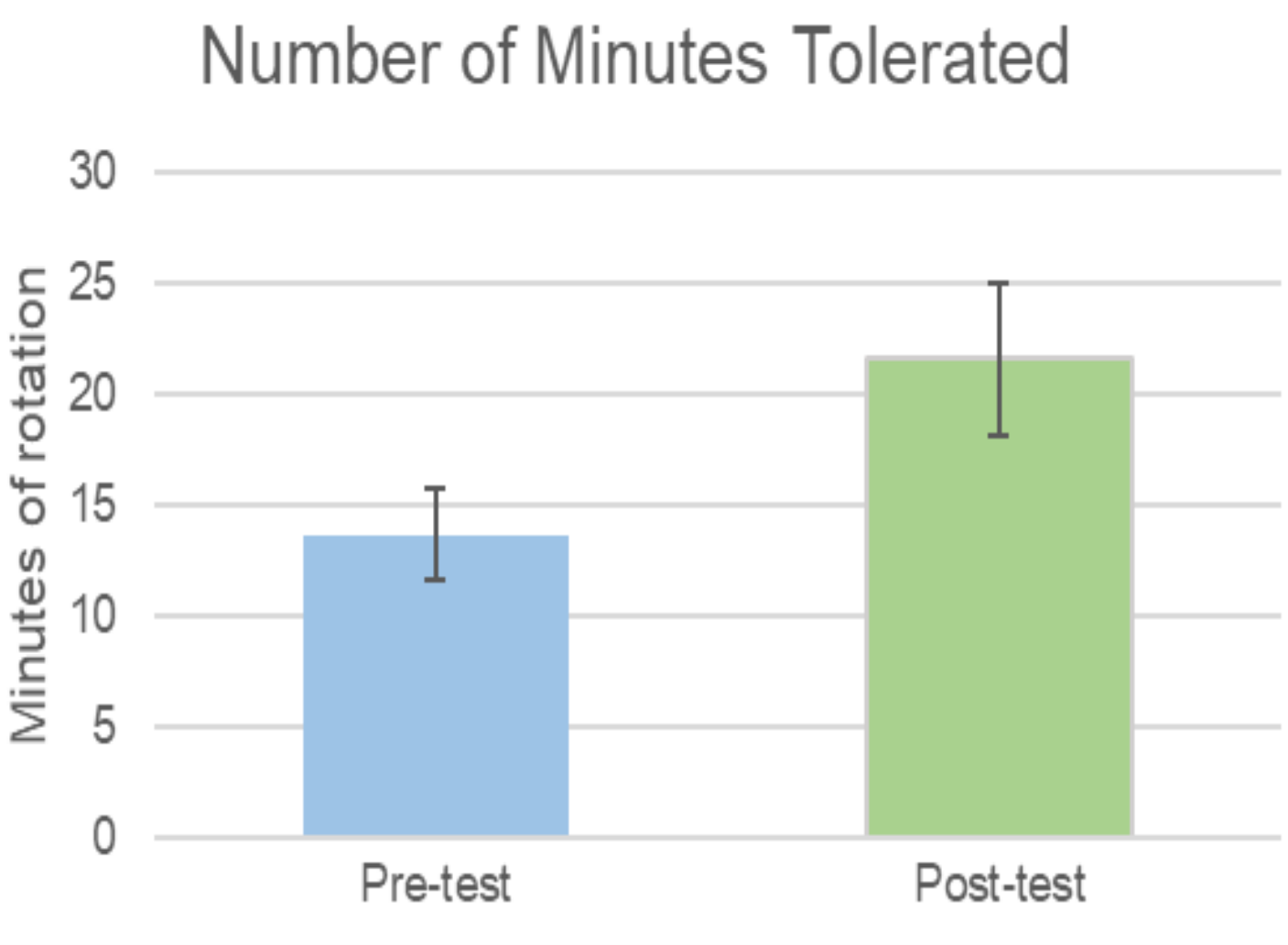
- Twenty-six participants (9 females) aged 22 – 45 ($M = 30.8$, $SD = 6.7$) completed this study.
- Rotating Chair Tests
 - Participants completed Pre- and Post-training rotating chair tests.
 - Following a 10-minute stationary (baseline) period, the chair was rotated to 6 revolutions per minute (RPM) and increased by 2 RPM every 5 minutes. Participants were asked to perform randomized 45° head movements every two seconds during each 5-minute rotational period.
 - Participants were instructed to ride for as long as possible before the onset of severe MS symptoms (e.g., severe nausea or vomiting).
 - Rotating chair tests were terminated when any of the following occurred: Participants reached a predetermined score on a periodic diagnostic assessment; participants requested that the test be terminated; participants completed 5-minutes at terminal angular velocity (i.e., 30 RPM).
- Autogenic Feedback Training
 - AFTE sessions were conducted on four consecutive days and lasted 30 minutes each session. Sessions were divided into 10 3-minute exercises that alternated between relaxation and arousal phases.
 - Relaxation phases emphasized learning the physiological sensations experienced when the body is in a relaxed state.
 - Arousal phases emphasized learning the physiological sensations experienced when the body is in an aroused or excited state.

Results

- Participants were evaluated on both the number of rotations completed and cumulative minutes spun in the chair.
 - **Pre- AFTE training:** Participants rode for an average of 13.7 min ($SD = 10.51$) and completed on average 127.4 rotations ($SD = 139.41$).
 - **Post- AFTE training:** Participants rode an average of 21.7 min, ($SD = 17.61$) and completed on average 261.8 rotations ($SD = 331.95$).
 - Post-test improvements were statistically significant with a mean difference of 8.0 minutes ($SD = 9.34$; $t(25) = 4.323$, $p < .001$) and 134.4 rotations ($SD = 210.94$; $t(25) = 3.248$, $p = .003$).
- AFTE had a moderate effect on both overall time in the rotating chair (Hedge’s $g = 0.55$) and number of rotations (Hedge’s $g = 0.53$).
- Sex did not have an effect on AFTE outcomes ($F(1,25) = .027$, $p = .871$).

Discussion

- Two hours of AFTE training is effective at mitigating MS symptoms.
- AFTE is equally beneficial for both men and women.
- AFTE may be a more effective countermeasure to MS than medication because it does not induce any decrements in performance.²
- Because of the relatively brief training requirements and lack of adverse side effects, AFTE may be particularly suited for a military aviation context (e.g. motion sick student pilots receiving AFTE during flight school).
- AFTE may have potential applicability in other nauseogenic environments (e.g., virtual reality) given its demonstrated effects on motion sickness symptoms.



Study Schedule
Day 1
Initial Rotating Chair Test
Days 2-5
Autogenic Feedback Training (30 minutes/day)
Day 6
Final Rotating Chair Test

References

- 1) Leung, A., K., & Hon, K, L,. (2019). Motion sickness: an overview. *Drugs in Context*, 8, 1–11. <https://doi-org.fal.idm.oclc.org/10.7573/dic.2019-9-4>
- 2) Cowings, P. S., Toscano, W. B., Reschke, M. F., & Tsehay, A. (2018). Psychophysiological assessment and correction of spatial disorientation during simulated Orion spacecraft re-entry. *International Journal of Psychophysiology*, 131, 102–112. <https://doi-org.fal.idm.oclc.org/10.1016/j.ijpsycho.2018.03.001>

Affiliations

- 1)Leidos
- 2)National Aeronautics and Space Administration - Ames
- 3)San Jose State University Research Foundation
- 4)Oak Ridge Institute of Science and Education
- 5)Naval Medical Research Unit - Dayton