



Mid Atlantic Regional Chapter of the American College of Sports Medicine

Annual Scientific Meeting, November 1st – 2nd, 2019
Conference Proceedings

International Journal of Exercise Science, Volume 9, Issue 8



The Influence of Social Evaluation on Heart Rate Variability and Motor Performance: A Study of “Real-Life” Competition

Kyle F. Pietro, Michelle E. Costanzo, Ronald N. Goodman, Li-Chuan Lo, Hyuk Oh, Jeremy C. Rietschel, Mark Saffer, Trent Bradberry, Jose Contreras-Vidal, Amy Haufler, Bradley D. Hatfield, University of Maryland, College Park, College Park, MD

It is well known that stress affects performance. Heart rate variability (HRV), which has become a general indicator of stress, can be measured to examine autonomic balance. **PURPOSE:** To examine HRV in participants to determine how competition stress affects performance. **METHODS:** Participants (n=17) from the University of Maryland ROTC program completed two testing sessions: a performance alone condition (PA) and a competition condition (C). Participants completed a dry-fire pistol shooting task of 40 shots per condition. PA condition was executed without any evaluation of performance. C condition involved direct comparison to another study participant as well as superior officer observation and monetary compensation. Electrocardiogram (EKG) was collected using a Thought Technology Procomp2 system. EKG was sampled at 256 Hz through a single chest lead. HRV was analyzed through QRSTool and Kubios HRV. HRV measures were SDNN and RMSSD. **RESULTS:** SDNN decreased by condition ($F(1, 16) = 3.668, p = .074, d = 0.464$). RMSSD decreased by block, but not by condition ($F(1, 16) = 4.557, p < .05, d = 0.517$). Cortisol response ANOVA revealed a significant main effect of condition ($F(1, 16) = 12.02, p = .003, d = 1.05$) such that cortisol was higher during C compared to PA. **CONCLUSION:** The decrease in SDNN indicates a decrease in HRV in response to increased stress. This decreased HRV reflects a change in autonomic balance which is negatively correlated with adaptability and resilience. The decrease in RMSSD represents decreased parasympathetic modulation of heart rate. Although not measured directly, it is likely that participants experienced moderate fatigue throughout blocks. As cerebral cortical activity increased during C, one can speculate that the change in autonomic balance was influenced by the changes in the autonomic nervous system.

This research was supported in part by a grant from the Department of Defense, Army Research Office W911NF0810314.