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Biofeedback Training to Promote ANS Resilience in Army ROTC Cadets

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Introduction: Stressors experienced by military personnel encompass both operational and environmental challenges. These challenges are both chronic (requiring sustained vigilance) and acute (requiring immediate action). Exposure to these stressors can eventually lead to fatigue and physical and emotional exhaustion. Preliminary data suggest that prewar physiologic stress reactivity and recovery may be important determinants of immediate postdeployment physical health in soldiers returning home from Iraq or Afghanistan. Therefore, the investigation of methods to modulate stress reactivity and promote autonomic nervous system resilience in military personnel is warranted. This study investigated the impact of biofeedback training, with an emphasis on heart rate variability (HRV) training, on the physiologic and stress reactivity patterns of Army ROTC cadets.

Methods: Forty-two cadets were recruited from the Army ROTC. Participants were randomly assigned to either the wait-list control group or the treatment group. The treatment group received an 8-week course of 45-minute multimodality biofeedback sessions with a primary emphasis on HRV training utilizing the resonant frequency protocol described by Lehrer, Vaschillo, and Vaschillo. Both groups underwent a psychophysiologic stress profile (PSP) in weeks 1, 8, and 16 of participating in the study.

The PSP data were utilized to determine the impact of biofeedback training on autonomic nervous system (ANS) indices. Program Post-Training Self-Report Measurement (PTSRM) forms were administered at week 16 to assess changes in energy level, ability to focus, emotional regulation, quality of sleep, and recovery skills.

Results: There were no significant differences in retrospective self-reports of preintervention average daily energy level ratings for the treatment-versus-control groups. Postintervention daily energy ratings for the treatment group revealed perceived improvement; however, there was no significant difference between the postintervention treatment and control group scores. This is as we might expect, given that both groups have now completed the intervention. The results of the impact of the training on ANS indices are pending physiologic data analysis.

Discussion: The study intervention was designed to increase autonomic flexibility in the service of helping individuals utilize their full autonomic capacity in case of strong metabolic need (ie, military service). The data to address the overall hypothesis are not yet available. Retrospectively, those in both the treatment and wait-list control groups perceived better energy and improved emotional regulation, quality of sleep, recovery skills, and ability to focus after the intervention than before. In addition, the lack of difference in posttraining energy ratings for the treatment and control groups suggests that the gains the control group perceived immediately posttraining were still maintained by the treatment group another 8 weeks after the intervention. In future studies it would be optimal to take self-report measurements both pre- and postintervention rather than retrospectively. Modulation of stress reactivity and faster recovery could prove beneficial for soldiers in combat and may ultimately result in improved postdeployment physical health and emotional well-being.