



Illuminare:
A Student Journal in
Recreation, Parks, and Tourism Studies

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Online Publication Date: June 13, 2017

Publication details, instructions for authors, and subscription information can be found at <http://scholarworks.iu.edu/journals/index.php/illuminare/>

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Outward Bound Veterans Programs: Opportunities for Heart Rate Variability Training

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Abstract

Post-traumatic stress disorder (PTSD) is a stress-related disorder associated with trauma that may cause intense distress and physiological reactions for military veterans. One of the treatment options available, the Outward Bound Veterans (OBV), offers several outdoor courses designed for returning military. In addition to the course design heart rate variability (HRV), a measure of autonomic regulation, may be a useful tool for individuals to regain control of their stress responses. The purpose of this article is to outline a potential treatment approach utilizing HRV in the context of OBVP and other outdoor expeditionary programs.

Keywords: heart rate variability; Outward Bound; PTSD

Background

Post-traumatic Stress Disorder (PTSD) was first included in the American Psychiatric Association's (APA) Diagnostic and Statistical Manual (DSM) in 1980 (Friedman, 2007). According to Friedman (2007), early in our understanding, diagnosis required an individual to have been through a historically significant stressor, such as war or natural disaster. More recently, PTSD has been moved from its early classification as a nostalgic condition to a new class of "trauma and stressor-related disorders (APA, 2013). The criterion for diagnosis includes (a) stressor, (b) intrusive recollection, (c) avoidant/numbing, (d) hyper-arousal, (e) duration, and (f) functional significance (APA, 2013). More specifically, symptoms may include dissociative flashbacks, intense distress, physiologic reactions, avoidance, reduced interest, detachment, disinterest, lack of foresight, and significant distress for individuals and their families (APA, 2013). PTSD may become chronic, with delayed onset and lifelong relapses (Friedman, 2007).

Heart rate variability (HRV) is a measure used to assess the autonomic nervous system (ANS) and an individual's adaptive capabilities for coping with stress (Tan, Dao, Farmer, Sutherland, & Gevirtz, 2010). Individuals with PTSD may also show other physiological and cardiac signs, including increased heart rate (HR) and decreased parasympathetic activity (Hauschildt, Peters, Moritz, & Jelinek, 2011). In a recent study (Hauschildt et al., 2011), measured HR and HRV at rest and as a response to a variety of emotionally stimulating video clips, examining correlations between PTSD severity, dissociation, and depression. During baseline measures, HRV recordings were higher among individuals with PTSD and HRV decreased across conditions. In individuals who had been exposed to trauma, lower HRV was

associated with higher state dissociation with depression being negatively correlated with HRV. The negative relationship between HR and HRV suggest a parasympathetic contribution on basal and tonic HR. Overall, PTSD severity was associated with lower baselines, which was consistent and somewhat rigid throughout the visual stimuli.

In a study assessing the viability of HRV biofeedback training as treatment for veterans with combat-related PTSD, baseline and treatment measurements were compared to assess physiological reactivity (Tan et al., 2011). HRV and breath rate measures were taken, with HRV being analyzed by averaging a five-minute period of the standard deviation of sequential interbeat intervals. Participants completed 30-minute sessions of HRV training with biofeedback in eight weekly sessions. Pre and post measures were taken with traditional PTSD measurement surveys. The results of the study indicated that HRV may be a useful tool for the reduction of PTSD symptoms. Additionally, the study had a high compliance and nine out of ten participants, when interviewed at the six month follow up, used breathing successfully to reduce their symptoms. Addressing the ANS dysfunction as a manifestation of PTSD may aid in recovery, symptom improvement, and reintegration. Additionally, biofeedback training, which helps individuals regulate and process emotional habits, may further aid in healthy engagement and provide a more synergistic treatment (Tan et al., 2011).

One of the programs designed to address PTSD in the returning military population is Outward Bound for Veterans (OBVP). Outward Bound (OB) had its first PTSD veterans program after partnering with the Veterans Administration (VA) Medical Center PTSD Unit in 1983 (Rheault, 1987, as cited in Attarian & Gault, 1992). Other programs have been developed and are now offered free of charge through a donation program

with several Outward Bound schools (www.outwardbound.org). Several courses are specifically designed for returning military, with purposive tasks. For example, immersive courses utilize nature, teamwork, and challenge-based activities to address the challenges veterans with PTSD are facing (Ewert, Frankel, van Puymbroeck, & Luo, 2010). Adventure education experiences tend to move an individual's locus-of-control in an internal direction, giving the participant strength and confidence to work to improve their own situations (Hans, 2000). These experiences have previously revealed to have additional lasting effects at follow up than traditional education models (Hattie, Marsh, Neill, & Richards, 1997). Research on OB programs provides evidence of their ability to impact individuals coping with PTSD.

The five-day model for Vietnam veterans was a bridging program between two phases of treatment at the VA. Participants are admitted as a cohort to the OB program, and given introduction and an orientation before the experience (Attarian & Gault, 1992). The course begins with gear hand out and some skill training, as well as framing the course to address fears common to individuals with PTSD. Activities are designed incrementally to build trust, involvement, fun, and success as each learning experience applies to the next. After introductory activities and allowing time for group bonding, a two-day expedition allows participants opportunities to learn new skills, resolve interpersonal conflict, and engage in activities designed to bring up similar war experiences (Rheault, 1987, as cited in Attarian & Gault, 1992). Activities are mixed with time for discussion among the group members, and nightly conversations help increase transference. Activities are designed with relevance to everyday obstacles that may provide new, concrete insights (Attarian & Gault, 1992). For

instance, a rock-climbing element builds trust and responsibility, a high ropes obstacle bolsters feelings of success and accomplishment, and the overall trip provides a high point and personal affirmation. OB trips conclude with a graduation, where participants may remove self-imposed isolation. Participants award diplomas to each other, and patches are given with reflection on how it was earned, and what it means to the participant. The OBV trips have built trust, opened individuals up to treatment, and enforced accountability with a spirit that remains after the course is completed (Attarian & Gault, 1992).

Evaluations of these multi-day trips indicate that they may help veterans develop confidence, feelings of physical and emotional safety, feelings of success, and knowledge (Ewert et al., 2010). Veterans reported less growth in other areas, measured on the Outward Bound Outcomes Instrument, presumably because they already possess leadership, respect, responsibility, and teamwork skills. The approximation of outdoor occurrences to everyday stressors and problems, paired with intentional reflection and trained facilitation, may provide an ideal mix as an intervention for returning veterans (Ewert et al., 2010).

Other studies have shown less impressive results. In one study, the greatest predictor of change after an OB program was the participants' home VA center. (Hyer, Boyd, Scurfield, Smith, & Burke, 1996). The study, however, does not describe the level of veteran specific programming of other studies and did not include any war-trauma processing. The course described in the study was more typical of OB standardized experiences and did not include specific components aimed at addressing veterans' unique typology and program needs. Program participation did not show measurable changes, but future studies should look at the components of change and the effectiveness of

leaders on this type of intervention experience. However, despite not showing improvement in PTSD may have been related to severity of chronic symptomatology or other factors. Participants reported that they enjoyed life again, and overcame negative emotions to gain self-control and positive self-concept. OB program methodology may need adjusted for future success with veteran and PTSD programs (Hyer et al., 1996).

Another advantage to OB programs lies in grounding, where our direct contact with the ground moves our body's electrical potential in a favorable electrophysiological direction. Chevalier and Sinatra (2011) utilized transcutaneous electrical nerve stimulation patches on the palms and feet of participants to ground them through a steel rod in the earth. Using participants as the control, two hours of HRV data was recorded in each session. Forty minutes into each session a switch was flipped, grounding the treatment group through their cables. Standard measurements were recorded, which showed an increase in high frequency (HF) for 33% and 65% for the non-grounded and grounded groups respectively at the end of the "grounding" treatment respectively. This may suggest vagal variability which reversed when ungrounded. Low frequency (LF) increased by 28% and 68% for the ungrounded and grounded respectively. Standard deviation of R-R peak intervals (SDRR) increased by 20% and 50 % for ungrounded and grounded groups. There was no change in LF/HF ratio. This improved balance in the ANS may aid in conventional treatment and improve clinical responses. These treatment protocols may be well suited as measurement for the effectiveness of OBV and future research in the effectiveness of OB programs for PTSD may show mutual benefit.

Proposed Method

In establishing a protocol, it may be beneficial to modify the existing OBV practices to incorporate intentional HRV training for individuals coping with PTSD. Prior to participating in an OBV program, participants should begin training with biofeedback and HRV. This may increase any gains the participant experiences during the OBV experience by allowing them to learn and be familiar with the HRV equipment prior to the outdoor trip, helping to better utilize the natural setting. The small unit also flexibility and is a minimal technological distraction on the trip. Once participants are familiar with the HRV training, it becomes a tool they may utilize on the OBV expedition or during any stressful situation. Participants should increase their ability to relax while they train, develop a better idea of how their bodies react to stress, and have opportunities to track HRV during stressful times to track personal improvement.

A cohort should be screened for selection and readiness to participate in an OBVP experience, as OB programming provides physical and emotional stressors and not everyone will do well in the outdoor setting. Phase one of the treatment should utilize existing VA treatment, with an added component of bi-weekly HRV training on personal devices (see Figure 1 Appendix A). Due to its compact and portable size, a HeartMath Inner Balance or emWave2 Sensor may be ideal. The sensors connect to a phone or independent device and provide users with a breath pacer and indication of how they are impacting their nervous system. Participants should be adequately prepared to engage in the OB experience and familiar with HRV training before the trip begins.

During the OBV program, participants should be instructed to find a quiet spot alone in

nature and train for 20 minutes on their personal HRV device. This will become a regular part of habit around camp, and may be incorporated into camp set up and break down habits. Such that individuals train before they break camp for the day and after set up in the evening. This will change the time of day, but leave activity levels relatively constant with two regular training sessions each day.

HRV biofeedback devices should be kept available throughout the day, so that when stressful situations arise individuals can retrieve the device and practice biofeedback, noting the stressor to increase learning. Utilizing the biofeedback in this way should allow participants opportunities to visualize the physiological impact of their stress, as well as walk through it with the OB facilitators. This technique may also be utilized in evening discussions and provide more material for discussion as well as training.

As part of the OB model, participants may be asked to overcome several challenges such as sailing a ship for the purpose of group building, communication, and teamwork. HRV tests should be taken following these challenges on the first full-day and last full-day of the trip for comparison. This may be valuable information to measure and understand how individuals' nervous systems are reacting when they attempt to compensate for stressors, and may provide a key example to demonstrate to participants how they have improved over the course of the week.

After the trip, participants will return to their VA program to continue with other treatment methods, and should continue practicing HRV training and applying the techniques they've learned about self-monitoring and regulation. The next phase of the VA program should check back on HRV progress, provide answers to any ques-

tions, and further encourage regular training programs.

Expected Outcomes

Previous research suggests the need for more information on how HRV of individuals with PTSD may improve over time. The previous OB data presented reveals various improvements, but is limited in scope to a fairly short time period. Projected outcomes include an increase in compliance due to increased understanding and success with the feedback device. Over the three phases of training, including VA programs before, during, and after the OB experience, participants should increase their HRV and lower their BP, increasing vagal tone and responsiveness. Individuals will also gain a greater understanding of their physiological responses to stress. From the OB experience, participants may gain self-confidence, communication, teamwork, and renewed trust that may shorten overall treatment time. Participants will also gain a sense of coherence, healthy and balanced life, and ability to set and reach new goals (Outward Bound, 2017).

Discussion

While there is a considerable amount of attention given to returning veterans and the treatment of PTSD, outdoor programs and HRV training hold applicability in a wide variety of settings. An individual's ability to recover from stress helps with lifelong recovery and wellness. Veterans, with particularly common and overwhelming stress reactions, must be taught a variety of techniques in addition to biofeedback for the greatest success. Furthermore, through consistent training, participants will be more prepared and better able to learn from the experiences of an OB expedition. Training must be started before, and continued after a trip for the greatest effect. Consistent training with biofeedback may not only help an individual

control their stress response, but increase their autonomic nervous systems balance, increase vagal tone, and help them feel more in control of a situation. The combined benefits of OBV and HRV training reaches beyond the social and emotional benefits of a trip to help participants understand and improve their bodies physiological reaction to stress, gaining control over their PTSD.

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Appendix A

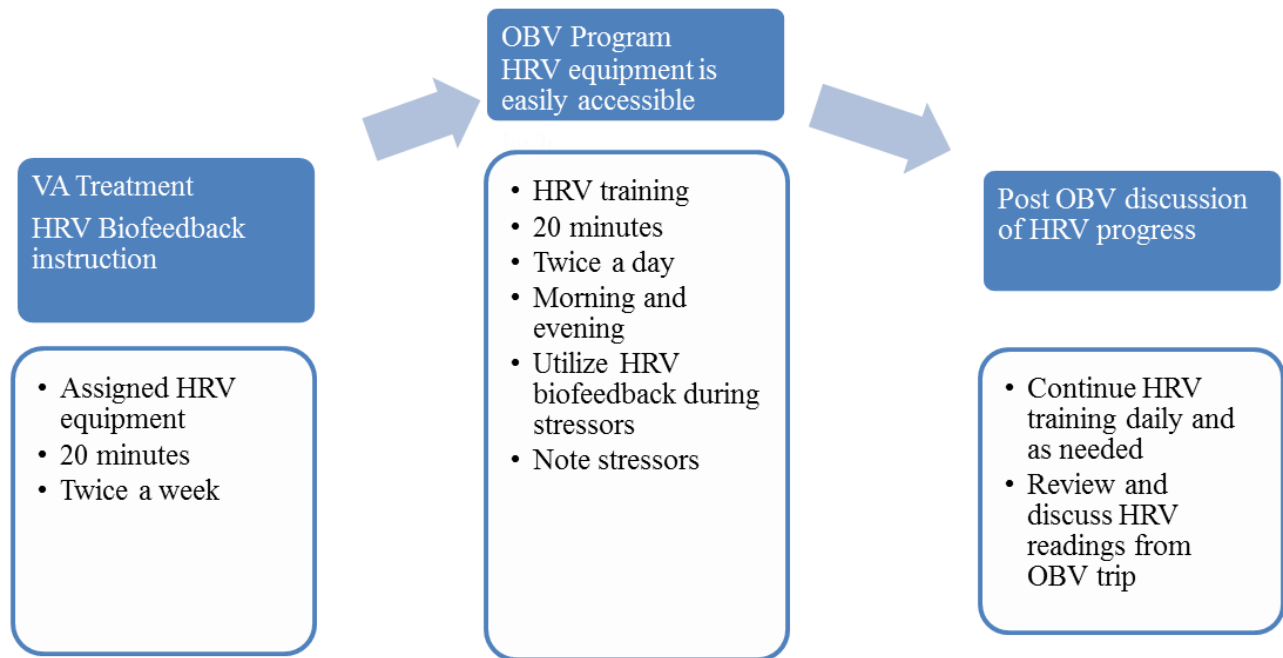


Figure 1. Process of integrating OBV with HRV training