THE EFFECTS OF HEART RATE VARIABILITY BIOFEEDBACK ON COLLEGE STUDENT ANXIETY, STRESS AND COPING: A PRELIMINARY EXAMINATION

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INTRODUCTION

The ACHA-National College Health Assessment has consistently identified stress as the number one factor impacting college student academic performance. As a result, it is imperative college health professionals explore new and innovative stress management strategies that not only provide students with long-term coping skills but easily accessible as well. The current intervention consisted of a three-week biofeedback class designed to teach students stress management skills in conjunction with heart rate variability (hrv) biofeedback. This type of biofeedback collects information about a student’s heart rhythms through a sensor attached to their earlobe. Computer software obtained from the Institute of Heartmath converts these data into visual and auditory information that clearly illustrates when a person is able to achieve balance between the sympathetic and parasympathetic branches of the nervous system (physiological coherence). This balanced state is consistent with a “relaxed and alert” state, which is important for clear thinking and effective emotion management. The biofeedback data, used in conjunction with a variety of stress management skills, allows the student to practice stress management strategies while monitoring their physiological response. This course consisted of didactic instruction and experiential practice sessions. The intervention’s ultimate goal was to provide students with the skills to manage their physiological responses through the use of feedback technology.

MATERIALS AND METHODS

Students were self-selected to participate in a three-week course (one class per week) designed to teach students stress management skills through the use of biofeedback technology. Classes were advertised through the Student Health Center, campus-wide e-mail announcements, academic class recruitment and faculty referrals. Progressive incentives were offered to students to increase retention across the intervention (week one = ice cream gift certificate; week two = $5 coffee gift certificate; week three = $10 pizza gift certificate).

Breathing techniques and emotion management strategies were taught to promote a shift in neuro-physiological responses among the study participants. Each class was conducted in a campus computer lab under instructor guidance that included approximately one hour of didactic instruction and 30 minutes of biofeedback practice time per session. Outside class, students were encouraged to practice learned skills at one of the identified campus computer labs equipped with the biofeedback technology.

RESULTS

A paired-samples, T-test was conducted to test for mean differences before and after completion of the three-week course using PSS, CSES and the Trait portion of the STAI (T-STAI).

Due to the small sample size (n = 14) and violating the assumptions of normality, this test did not provide a reliable measure of statistically significant difference. However, in Table 1 the pre- and post-mean scores do illustrate overall trend data.

INDIVIDUAL PRACTICE SESSION ANALYSIS

A one-way ANOVA was conducted to test for mean differences before and after all practice sessions (n = 59). The State portion of the STAI (S-STAI), measuring anxiety “in the moment,” decreased from pre (M=44.47, SD=11.72) to post (M=37.03, SD=12.56), revealing statistically significant findings (F=11.42, p<.001).
**Conclusion**

Students who participated in the three-week intervention showed no statistically significant differences from pre- to post-test in trait anxiety, perceived stress or positive self-coping. Trend data indicated that students reported a statistically significant decrease in state anxiety immediately post practice. Students reported greater overall stress and generalized anxiety, but reported greater confidence in their ability to deal with this stress and anxiety.

Overall, it appears that this intervention is effective in reducing state anxiety and promoting self efficacy in coping with anxiety. However, the intervention was not successful in changing trait anxiety or perceived stress. These findings suggest this type of intervention has a great deal of potential, but may require training and practice beyond three class sessions to result in more sustainable changes in college students’ mental health.

**Lessons Learned**

- Students practiced more when supplied their own ear sensors, rather than having to check them out at specific locations across campus. Based on student feedback, we modified this procedure and offered students the opportunity to “check out” sensors for extended periods from the Student Health Center.
- Incentives did not impact attendance. Students attending the classes seemed intrinsically motivated and were unaffected by the incentives. In the future, these will not be offered.
- We attempted to offer a training in one residence hall and the staff showed a great deal of interest and motivation. Despite this effort and offering of incentives, very few students registered for this class and was cancelled. It is not entirely clear why this wasn’t effective although we suspect that this target group was less motivated due to the large number of 1st year students living in the Residence hall.
- Based on the results of this pilot study, the Student Health Center has created a “biofeedback lab,” providing students a more structured opportunity to practice with staff instruction and support.
- In the future, classes should be extended and offered for academic credit and improved comprehensiveness will be explored. Future research will also recruit additional target audiences.

**References**


**Further Information**

For additional information, please contact Dr. Jeff Tarrant at tarrantj@health.missouri.edu. A PDF of this poster can be downloaded at studenthealth.missouri.edu/HP/stressresources