

Heart rate variability biofeedback acutely improves attentional control only in highly stressed individuals

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February 14, 2023

Abstract

Vagally mediated heart rate variability is an index of autonomic nervous system activity that is associated with a large variety of outcome variables including psychopathology and self-regulation. While practicing heart rate variability biofeedback over several weeks has been reliably associated with a number of positive outcomes, its acute effects are not well known. Because the strongest association with heart rate variability has been found particularly within the attention-related subdomain of self-regulation, we investigated the acute effect of heart rate variability biofeedback on attentional control using the revised Attention Network Test (ANT-R). Fifty-six participants were tested in two sessions. In one session each subject received a heart rate variability biofeedback intervention, and in the other session a control intervention of paced breathing at a normal ventilation rate. After the biofeedback or control intervention, participants completed the ANT-R using the Orienting Score as a measure of attentional control. Mixed models revealed that higher resting baseline heart rate variability (RMSSD) was associated with better performance in attentional control, which suggests more efficient direction of attention to target stimuli. There was no significant main effect of the intervention on attentional control. However, an interaction effect indicated better performance in attentional control after biofeedback in individuals who reported higher current stress levels. The results point to acute beneficial effects of heart rate variability biofeedback on cognitive performance in highly stressed individuals. Although promising, the results need to be replicated in larger or more targeted samples in order to reach stronger conclusions about the effects.

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