Pilot Study Of The Effects Of Mobile Based Resonant Frequency Breathing On Cognitive Performance In Healthy Young Adults With Elevated Stress

by

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Abstract

Objective: Prior research has shown a bidirectional relationship between breathing, emotions, behavior, and cognitive functions thought to be mediated by the autonomic nervous system (ANS). Studies have shown that deep or diaphragmatic breathing interventions are associated with improved affect and decreased stress levels, but little attention has been paid to the effects of breathing training on cognition. The few studies that have looked at this have shown improved attention, memory, and executive functioning as a result of breathing interventions. While suggestive of positive benefits, these studies used control groups that are either inactive or inappropriate for determining their respective mechanisms of action. While most studies have administered breathing training in a research laboratory, it is plausible that a home-based practice using a mobile application to guide the breathing/mindfulness exercise is more accessible and easier to implement. Participants and Methods: Eighty young, neurotypical, healthy adults ages 18-29 with elevated stress (Perceived Stress Scale cutoff scores of 13) were recruited to participate in a 4-week, single-blind, randomized, controlled trial of resonant frequency breathing training. Participants were randomly allocated to the waitlist control group or the breathing group. Participants were evaluated at baseline and post-treatment with a cognitive and behavioral battery. The participants in the breathing group were instructed to complete 40, 10-minute sessions over the course of the four weeks. Results: Findings revealed that the breathing training was feasible,

tolerable, evidenced by high retention of participants. Contrary to hypotheses, there were no greater improvements on measures of neurocognitive or behavioral functioning in the breathing group compared to the waitlist control. Mediation analyses found no effect of an indirect relationship between breathing training and stress reduction on cognitive improvement. These findings shed light on the effect of deep diaphragmatic breathing, as delivered remotely via phone application, on cognitive functioning and self-reported perceived stress. Clinical implications include the further need to evaluate the purported salutary effects of breathing training in both healthy and clinical populations.

Key words: Breathing training, cognitive functioning, neuropsychological outcomes, stress