

Original Research Reports

Psychobiological Changes from Relaxation Response Elicitation: Long-Term Practitioners vs. Novices

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Objective: *The relaxation response (RR) is a physiological state that is the counterpart to the stress response. We investigate the psychological and biological effects, as well as the correlation between these two effects that are associated with short-term vs. long-term practice of techniques that elicit the RR (“RR practice”).* **Methods:** *The study comprised both a cross sectional and an 8-week prospective design. The study sample included individuals with a long-term RR practice (“long-term practitioners” n = 28) and those with no prior RR practice experience (“novices” n = 28). The novices received 8 weeks of RR-elicitation training (“RR training”) for the prospective analysis (short-term practice).* **Results:** *Long-term practitioners reported lower levels of psychological distress than the novices before they received RR training. As a result of the 8-week RR*

training, novices significantly reduced their psychological distress to levels comparable to that of long-term practitioners. Long-term practitioners had greater immediate (after listening to a RR-eliciting CD) decreases in psychological distress level than the 8-week trained novices. Furthermore, the reduction in psychological distress levels for long-term practitioners correlated with a reduction in biological measures of stress, after controlling for baseline values. There was no reduction in biological measures and no correlation with psychological measures in the 8-week trained novices. **Conclusions:** *While our data indicate that even a short-term 8-week RR-eliciting practice can decrease psychological distress levels, only after years of RR practice does psychological distress reduction coincide with biological change.*
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The relaxation response (RR) was originally named more than 30 years ago as the counterpart to the stress response due to their opposite effects on physiological state. RR-elicitation reduces (and stress increases) heart and respiratory rates and oxygen consumption.¹ Various mind-body techniques including deep breathing exercises, guided imagery, meditation, progressive muscle relaxation, yoga, tai-chi, and qigong can be used to elicit the RR.¹ These techniques are commonly used by those with medical conditions, but also by healthy individuals in the US adult population.^{2,3}

The psychological effects of practicing techniques which elicit the RR (“RR practice”) are well documented. For example, a recent meta-analysis of studies from the past 10 years found that relaxation training (including Jacobson’s progressive muscle relaxation, autogenic train-

ing, and meditation) showed a medium effect size in the treatment of anxiety.⁴ Current evidence in the literature also supports the use of a variety of RR-eliciting techniques (such as meditation, autogenic training, and yoga) for control of pain and anxiety during cancer treatment,⁵ to decrease self-rated depression symptoms,⁶ and among

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healthy individuals to reduce stress, anxiety, and enhance spirituality.^{7,8}

Biological effects of the RR are also reported in the literature; however, study results are inconsistent and, thus, biomarkers emblematic of the RR have not been clearly identified. Some studies have found that the practice of various forms of meditation are associated with decreasing cortisol levels,^{9–12} and also with lowering an elevated cortisol response to stressors.¹³ Other studies reported no changes in cortisol levels after a short term compassion meditation intervention (6 weeks)¹⁴ or after relaxation and visualization therapy (24 days).¹⁵ It has been suggested that a longer intervention period might be necessary to evoke biological changes.

The connection between psychological and biological functioning in the human body is well-recognized in the literature. A higher proportion of depressed patients have elevated cortisol levels.¹⁶ Clinically depressed patients had higher cortisol levels after exposure to psychological stress than did non-depressed individuals.¹⁷ In clinical practice, psychobiological models have been adapted for treating various health conditions.^{18,19} Improved understanding of the interaction between psychological and biological effects that are associated with the RR practice could, therefore, contribute to a low-cost approach for improving health.

To date, very few studies have examined the association between the psychological and biological effects of RR-elicitation. A randomized trial found that a 2-week breathing-focused yoga practice significantly reduced cortisol and adrenocorticotrophic hormone (ACTH) among alcohol-dependent patients;²⁰ in addition, the reduction in cortisol level was correlated with a decrease in depression scores for the yoga practice group, but not for the control group. Another study reported that lower levels of anxiety were associated with lower cortisol levels after 24 consecutive days of relaxation and visualization therapy among cancer patients undergoing radiotherapy.¹⁵ These two studies evaluated changes from short term interventions (2 weeks and 24 days) and the biological outcomes were limited to cortisol and ACTH.

We designed the current study to investigate the psychological and biological effects as well as to examine the correlation between these two effects that are associated with short-term vs. long-term RR practice. We hypothesize that long-term practices will result in greater psychological and biological beneficial effects

than short-term practices and that these two effects are correlated.

METHODS

Study Design

We employed a cross-sectional, prospective study design as described in Dusek,²¹ which reported the genomic expression changes associated with regular elicitation of the RR. A cross-sectional design was used to investigate the long-term effects of the RR by comparing long-term practitioners to novices, who had never practiced any RR-eliciting techniques prior to study participation (Figure 1). The prospective design investigated the short-term effects of RR practice by comparing pre- and post-8-week intervention outcomes among novices (Figure 1). In addition to examining pre- and post-intervention changes of study outcomes among novices, we focused on the immediate changes during an RR practice session in a laboratory (see below) for long-term practitioners and novices. The study protocol was approved by the Committee on Clinical Investigations at the Beth Israel Deaconess Medical Center (BIDMC), Boston MA. After providing written informed consent, participants were screened by a physician and had blood tests to ensure they were in good health.

Study Sample

The study sample included 28 long-term RR practitioners and 28 novices who were in good health as determined via physical examination by the study physician. The long-term practitioners and novices were matched by age and gender, two factors that have been shown to be associated with the psychological and biological outcomes examined in this study.^{22–24} The long-term practitioners had practiced RR-eliciting techniques for a range of 4 to 20 years, 3 to 7 days per week, 15 to 60 minutes per day. Various techniques were used among these practitioners, including breath awareness, several forms of meditation, body scan, visualization, and several forms of yoga (including Kripalu yoga). Although the specific RR-eliciting technique varied, all long-term practitioners reported that they had a seated practice of at least 15 minutes per day, 3 times a week for at least 4 years. In contrast, the novices reported that they had never practiced any RR-eliciting techniques prior to study participation. All study subjects were recruited from the Boston-area community using newspaper, on-line, and posted advertisements.

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