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Attention training to pleasant stimuli in anxiety

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ABSTRACT

Attentional bias for threatening stimuli in anxiety is a common finding in the literature. The present study addressed whether attention training toward pleasant stimuli can reduce anxiety symptoms and induce a processing bias in favor of pleasant information in nonpatients who were selected to score similarly to individuals with generalized anxiety or panic disorder on a measure of worry or physiological arousal, respectively. Participants were randomly assigned to attention training to pleasant (ATP) stimuli or to a placebo control (PC) condition. All participants completed baseline and post-test dot-probe measures of attentional bias while event-related brain potentials were recorded. As expected, worry symptoms decreased in the ATP and not PC condition. ATP was also associated with early evidence (P100 amplitude) of greater attentional prioritization of probes replacing neutral stimuli within threat-neutral word pairs from pre-to-post intervention and later RT evidence of facilitated processing of probes replacing pleasant stimuli within pleasant-threat word pairs at post compared to PC. PC was associated with later evidence (P300 latency) of less efficient evaluation of probes following pleasant stimuli within pleasant-threat word pairs from pre-to-post and later RT evidence of facilitated processing of probes following threat stimuli within pleasant-threat word pairs at post compared to ATP. Results highlight early and later mechanisms of attention processing changes and underscore the potential of pleasant stimuli in optimizing attention-training interventions for anxiety.

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1. Introduction

A large literature demonstrates evidence of attentional biases for threatening stimuli in anxious individuals (e.g., Bar-Haim, Lamy, Pergamin, Bakermans-Kranenburg, & van IJzendoorn, 2007). In line with this literature, attentional biases to threat have been proposed to be involved in the etiology and maintenance of anxiety disorders in prominent theories of anxiety (e.g., Beck, Emery, & Greenburg, 2005). Attention-training interventions aim to reduce anxiety by training attention away from threatening information (for meta-analytic reviews see Hakamata et al., 2010; Hallion & Ruscio, 2011; Mogoşe, David, & Koster, 2014). Overall, many attention-training paradigms have shown promising results in reducing attentional biases to threat stimuli and anxiety symptoms (e.g., Amir, Beard, Burns, & Bomyea, 2009; Hakamata et al., 2010; Hallion & Ruscio, 2011), but evidence of no benefit from attention training in anxiety has also been found (e.g., Carlbring et al., 2012; Julian, Beard,

Schmidt, Powers, & Smits, 2012; McNally, Enock, Tsai, & Touisan, 2013).

To date, the majority of attention-training studies in anxiety have focused on training attention to neutral and away from threatening stimuli, but training attention to pleasant information may be especially useful in increasing processing of pleasant information and reducing anxiety symptoms in anxious individuals, given evidence that individuals with anxiety may inhibit or down-regulate positive emotions (e.g., Carl, Soskin, Kerns, & Barlow, 2013; Eisner, Johnson, & Carver, 2009; Kashdan & Steger, 2006). A growing number of studies have begun to use pleasant stimuli in attention-training interventions for anxiety (e.g., Heeren, Reese, McNally, & Philippot, 2012; Li, Tan, Quan, & Liu, 2008; McNally et al., 2013; Waters, Pittaway, Mogg, Bradley, & Pine, 2013; Waters et al., 2014), with some of these initial studies indicating that individuals randomly assigned to attend to pleasant stimuli showed reduced anxiety symptoms, increased attentional processing of pleasant stimuli, and/or decreased attentional processing of threatening stimuli (e.g., Heeren et al., 2012; Li et al., 2008; Waters et al., 2013). For example, Waters et al. (2013) demonstrated that training clinically anxious children to search for happy amongst angry faces was associated with reductions in clinician-rated severity of symptoms, a reduction in those who met criteria for their principal

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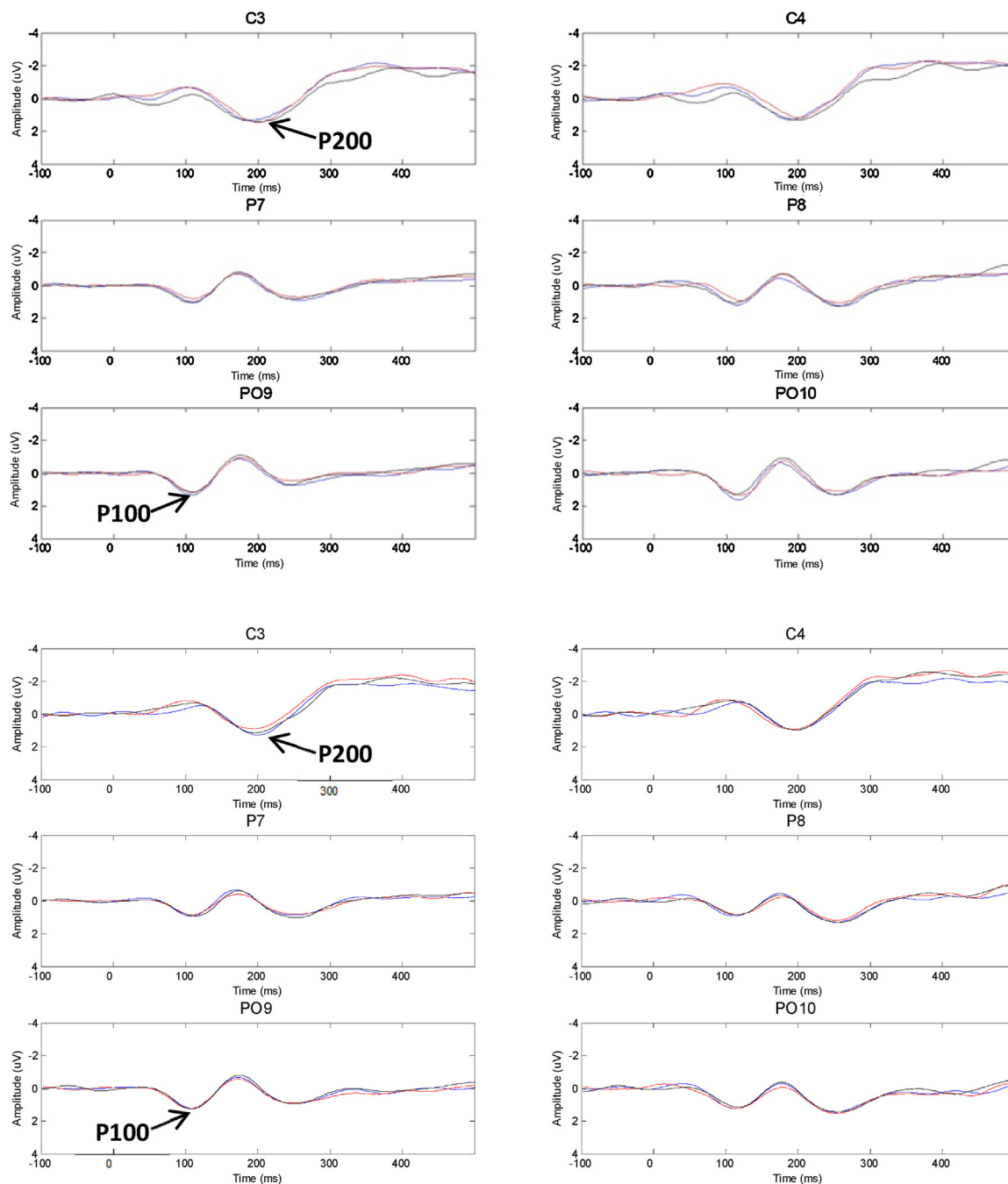


Fig. 1. Grand-average event-related potential waveforms prompted by word presentation for representative sensors, highlighting P100 amplitude at sensor PO9 and P200 amplitude at sensor C3. Top graph depicts pre training or placebo, and the bottom graph depicts post training or placebo. Blue, red, and black lines represent pleasant-neutral, threat-neutral, and pleasant-threat word pairs, respectively. Word presentation onset was at 0 ms. (for interpretation of the references to color in this figure legend, the reader is referred to the web version of this article).

anxiety diagnosis post-intervention, and an increase in attentional bias for happy faces. Heeren et al. (2012) demonstrated in a sample with generalized social phobia that training attention to “mildly smiling” and away from angry faces resulted in a reduction in anxiety symptoms, a reduction in attentional bias for angry faces, and an increase in bias for smiling faces. Li et al. (2008) showed that training attention to happy faces in nonclinical social anxiety was associated with reductions in social interaction anxiety but not in the fear of being watched or evaluated. However, not all attention-training to pleasant stimuli studies in anxiety have shown results specific to attention training. For example, McNally et al. (2013) demonstrated in a nonclinical speech-anxious sample that

training attention to joyful faces was not associated with differential reductions in speech anxiety compared to an inverse condition that trained attention to disgust faces, or a placebo condition that facilitated equal attention to joy and disgust faces, with all three groups showing anxiety symptom reductions from pre-to-post. A lack of results specific to attention training in some studies may be due to stimulus, sample, and training characteristics (for further discussion of these factors see Carlbjörk et al., 2012; Julian et al., 2012; Heeren, Mogoase, Phillipot, & McNally, 2015; McNally et al., 2013).

As can be seen from the preceding review, most of the initial studies using pleasant stimuli in attention training with anxious

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