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## The facilitative effects of heart-rate feedback in the emotional processing of claustrophobic fear

Michael J. Telch<sup>a,\*</sup>, David P. Valentiner<sup>b</sup>, Doron Ilai<sup>a</sup>, Diane Petruzzi<sup>a</sup>,  
Melissa Hehmsoth<sup>a</sup>

<sup>a</sup>University of Texas at Austin, Austin, TX 78712, USA

<sup>b</sup>Department of Psychology, Northern Illinois University, De Kalb, IL 60115, USA

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### Abstract

This study examines predictions derived from Foa and Kozak's theory of emotional processing. We hypothesized that the provision of heart-rate feedback would facilitate emotional processing through a fuller activation of the participant's fear structure, and by focusing participants' attention on information that is incompatible with the fear structure, i.e., the interoceptive pattern of habituation. Nonclinical students ( $N = 54$ ) showing marked claustrophobic fear received 30 min of self-directed exposure to a claustrophobic chamber. Three exposure conditions (heart-rate feedback, paced-tone control, and exposure only control) were examined across six 5-min exposure trials. Participants receiving heart-rate feedback displayed greater between-trial habituation across treatment trials and lower levels of fear at post-treatment. Treatment process findings failed to support the fear activation hypothesis. Implications of the findings for theories of fear reduction are discussed. © 2000 Elsevier Science Ltd. All rights reserved.

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### 1. The facilitative effects of heart-rate feedback in the emotional processing of claustrophobic fear

Evidence accumulated over several decades and numerous domains of situationally bound fear has demonstrated the potency of exposure-based methods in the treatment of phobic disorders (Marks, 1978; Rachman, 1978; Barlow, 1988). Nevertheless, considerable debate still exists regarding the mechanisms governing the reduction of pathological fear. Rachman (1980)

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\* Corresponding author. Tel.: +1-512-471-3393; fax: +1-512-471-5177.

E-mail address: telch@psy.utexas.edu (M.J. Telch).

proposed a theoretical account of fear reduction based on emotional processing. He defined emotional processing as the decline of emotional disturbance to the extent that other experiences and behaviors proceed without disruption, and as a process that was dependent upon direct experiencing of the emotional disturbance. Signs of incomplete processing include return of fear and disturbing dreams.

Based on Rachman's emotional processing theory and Lang's bioinformational theory of fear (Lang, 1979), Foa and Kozak (1986) outlined an emotional processing account of fear reduction that proposed two necessary conditions for emotional processing. First, the fear structure must be activated. The fear structure is hypothesized as a set of propositions about the stimulus, the response (including the physical, behavioral, and cognitive response systems), interpretive information about the meaning of the stimulus and the response. Activation of the fear structure is believed to occur by providing information that matches a part of the network, as would an accelerated heart rate match the response proposition of fear. Through generalization of activation, the other sections of the network are assumed to be activated, particularly in the cohesive networks representative of specific phobias.

According to Foa and Kozak (1986), a second necessary condition for emotional processing to occur is that information incompatible with elements of the fear structure must be made available and cognitively processed. Incompatible information is believed to emerge as a result of the experience of short-term, within-session physiological habituation. That is, reduction of arousal results in a disassociation between the stimulus and response propositions. As a result of repeated exposures, the perception of harm from the stimulus is lowered, as is the negative valence associated with the physiological responses to the feared stimulus. These cognitive changes accruing from repeated disconfirmatory experience result in less drive for preparatory arousal, in turn resulting in between-session habituation.

Accordingly, factors which inhibit initial fear activation, or which interfere with physiological habituation and cognitive change, should retard fear reduction. The factors identified by Foa and Kozak resemble those suggested by Rachman (1980) as potentially interfering with complete emotional processing. These include certain personality and stimulus factors that could impede emotional processing, with the latter category including concentration on a separate task and excessively brief presentations of the stimulus. To date, systematic investigations of these factors have been few and have exclusively focused on the role of distraction. Foa and Kozak (1986) suggested that distraction interferes with the activation of fear by disrupting the match between aspects of the stimulus setting and the fear structure. Moreover, distraction may also serve to block the adequate processing of corrective disconfirmatory information thus preventing the modification of the fear structure. Direct examinations of the effects of distraction on fear reduction have generally supported predictions from emotional processing theory (Grayson, Foa & Steketee, 1982, 1986; Sartory, Rachman & Grey, 1982; Craske, Street & Barlow, 1989; Telch, Ilai & Valentiner, 1990; Rodriguez & Craske, 1993). Interestingly, efforts to enhance emotional processing during exposure through manipulations designed to increase fear activation or increase the processing of corrective disconfirmatory information are lacking.

The aim of the present study was to test predictions derived from Foa and Kozak's emotional processing theory. Specifically, we sought to examine whether emotional processing of claustrophobic fear could be *facilitated* by a heart-rate feedback manipulation designed to

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