



Effect of worrisome and relaxing thinking on fearful emotional processing

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Abstract

This study replicated and extended previous data suggesting that worry inhibits emotional processing of fearful imagery. Female participants categorized as either victimization-fearful ($N = 24$) or victimization and speech-fearful ($N = 27$) completed trials of worrisome or relaxing thinking and tone-cued imagery. For each trial, participants engaged in 30 s of relaxing or worrisome (speech or victimization) thinking and then imagined speech or victimization fear scenes for 15 s. Heart rate and facial electromyography activity at the corrugator supercilii region were measured during the think and imagery periods to estimate degree of emotional processing of the fear imagery. Consistent with earlier findings, there was greater heart rate suppression during fearful imagery after a period of worry as opposed to relaxation. This finding, however, may have been the result of physiological differences between worrisome and relaxation *thinking*. Corrugator activation during thinking showed a similar pattern as the heart rate data while corrugator activation during fearful imagery was dependent on the baseline employed. These data, in combination with the imagery ratings data, suggest that worry may be an unsuccessful strategy for avoiding the physiological activation associated with emotional processing. © 2000 Elsevier Science Ltd. All rights reserved.

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1. Introduction

Worry, a central component of generalized anxiety disorder, has been described as an activity with both adaptive and maladaptive features (Mathews, 1990). One recent influential

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theory of worry suggests that its function is to inhibit the processing of emotional imagery (Borkovec & Hu, 1990; Borkovec, Lyonfields, Wisner & Deihl, 1993; Borkovec, 1994). Specifically, this theory proposes that worry is a verbal-linguistic activity that is “negatively reinforced by its suppressing effects on autonomic activity and by this function results in a prevention of emotional processing” (Borkovec, 1994, p. 18). Regarding the first component of this theory (the inhibiting effects of worry on physiological activation), it has been speculated that worry may serve as a form of mental avoidance of negative imagery and concomitant physiological reactions (Borkovec, 1994). Thus worry, according to Borkovec (1994) “may function to avoid imagery in order to avoid affect” (p. 19). The subsequent portion of this theory pertains to the result of this inhibitory effect, which is the failure to process fearful emotional material (Rachman, 1980; Foa & Kozak, 1986; Borkovec, 1994).

The first empirical study to specifically investigate worry’s effects on emotional processing was conducted by Borkovec and Hu (1990) and examined the processing of speech anxious emotional material. In this study, speech anxious female participants engaged in thinking about common ways of relaxing, neutral activities or worrisome thinking about giving a speech immediately prior to imagining a public speaking scene. Heart rate did not differ during the three different types of thinking. However, participants in the relaxation thinking condition showed a greater heart rate response during the subsequent image than individuals in the neutral thinking condition, who in turn evidenced larger heart rate responses than individuals in the worrisome thinking condition. Borkovec and Hu (1990) interpreted these findings as suggesting that worry may impede the processing of fear material.

A second study (again using female speech phobics) replicated the finding that heart rate did not vary as a function of worrisome versus relaxing thinking (Borkovec et al., 1993). The Borkovec and Hu (1990) findings of greater heart rate during speech imagery following relaxation than following ‘general-worry’ did not replicate. However, correlational analyses demonstrated that increased worrisome thinking during a ‘general-worry’ condition was associated with *decreased* heart rate responsivity during fearful imagery, whereas increased relaxed thinking in the relaxation condition was related to *increased* heart rate during fearful imagery. Moreover, individuals in a ‘thought-worry’ condition evidenced less heart rate activity during imagery than individuals in the relaxation condition. Borkovec et al. (1993) therefore concluded that it was worrisome thinking (rather than thinking in general) that prevented the processing of fear material, though such a conclusion would be stronger if a non-worry ‘thinking-in-general’ control condition, such as a planning task, were investigated.

Another line of research, however, has used similar procedures but has obtained different results. Vrana, Cuthbert and Lang (1986) instructed unselected male and female subjects to process neutral and fearful sentences first by thinking (defined as silent repetition of the words) and then imagining the same sentence during a separate period. This study found significant heart rate acceleration from fearful thinking to fearful imagery, and two subsequent experiments (Vrana, Cuthbert & Lang, 1989; Vrana & Lang, 1990) replicated this result. To the extent that repeating a fearful sentence in one’s head can be equated with the verbal-linguistic processing prompted by instructions to worry, these findings are contrary to the idea that worry prevents emotional processing of fear imagery. Vrana et al. (1986) did replicate previous studies (Borkovec & Hu, 1990; Borkovec et al., 1993), in that silent repetition of the neutral or fearful sentence did not elicit different heart rate effects. However, two later studies

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