



Implicit memory bias and trait anxiety: a psychophysiological analysis

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Abstract

The effect of threatening words and anxiety upon implicit memory performance was investigated. It was predicted that anxious individuals would show a bias to threat-related material. In addition, psychophysiological measures were obtained to assess the attentional and encoding processes that might underlie this cognitive bias. Forty participants were equally allocated to high and low trait anxious groups, according to pre-determined cut-offs. All participants were exposed to threat and non-threat words and following a filler task, were asked to complete primed and unprimed wordstems. Implicit memory performance was assessed in terms of accuracy and reaction time for completion. Heart rate and electrodermal responses were measured. Results demonstrated initial increased cardiac deceleration to threat stimuli, subsequent cardiac acceleration to non-threat stimuli, and an implicit memory bias to non-threat material by all participants. These findings are discussed in relation to the 'vigilance-avoidance' model of attention to threat stimuli.

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1. Introduction

Contemporary models of emotional disorders (e.g. Williams et al., 1988, 1997) have emphasised dissociations in cognitive processes subsuming attention and memory within anxiety and depression. Essentially, attentional biases towards affective material, such as threatening information, are said to be more prevalent within anxiety compared to depression. In contrast, biases in the mood congruent recall of past events, such as autobiographical or explicit memory tasks, are said to characterise depressive disorders. Measures of implicit memory, on the other hand, are thought to reflect the pre-attentive integrative processes that underlie attentional biases demonstrated in anxiety. Consequently, Williams et al. (1988, 1997) proposed that anxious individuals would also demonstrate implicit memory biases for threatening information.

Unfortunately, studies that have examined emotional biases in implicit memory tasks have reported somewhat equivocal findings in both clinical and trait anxious samples (Eysenck and Byrne, 1994; Lang and Craske, 1997; Mathews et al., 1989; Richards and French, 1991; Bradley et al., 1994; Mathews et al., 1995; Nugent and Mineka, 1994). Indeed, Russo et al. (1999) recently reviewed the literature and, together with their own studies of implicit memory, concluded that there was no substantive evidence to support an anxiety bias within implicit memory.

Given the importance of implicit memory tasks in providing a theoretical link between attentional and perceptual encoding explanations of emotionally related cognitive biases, the present study set out to re-examine the processes underlying these reported biases in word completion tasks. Explicitly, the study sought to relate attentional performance during the encoding (priming) phase of a wordstem completion task to subsequent performance on the task itself. It was predicted that implicit memory would be greater for threat related stimuli, compared with non-threat related material within high trait anxious individuals and that such an effect would be related to greater attention for threat stimuli during the priming phase of the wordstem completion task. To date such an approach has seldom been adopted which is understandable given the complexities of combining attentional bias paradigms (i.e. Stroop or Dot-probe) alongside word completion tasks. In recognition of these procedural difficulties, the current study adopted a different approach, relying upon a psychophysiological analysis of the relevant experimental paradigms. It will be argued that psychophysiological responses quantified during the encoding phase should provide measures of both perceptual and emotional processing which could be related to subsequent task performance. The rationale for such an approach is elaborated below.

It is surprising that given the recent emphasis on information processing models of cognitive bias in emotional disorders, few studies have employed psychophysiological measures. At a conceptual level, the attentional shifts described within the cognitive-emotional literature bear many similarities to current theoretical positions regarding psychophysiological models of orienting and attention (Graham, 1997). Although these traditional information processing approaches within psychophysiology have tended to focus on the physical attributes of stimuli, these frameworks

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