



## Selective attention to unmasked and masked threatening words: relationships to trait anger and anxiety

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### Abstract

In two experiments, unmasked and masked versions of emotional Stroop tasks were used to investigate the relationships between trait anger, trait anxiety and selective attention to threatening words. For the masked tasks individual neutral-emotional recognition thresholds were determined. In Experiment 1, participants were selected on low and high trait anger scores. Results showed a significant interaction between GROUP (low vs. high anger) and WORD-TYPE (neutral vs. threat) in the unmasked task exclusively, due to interference in the high trait anger group and facilitation in the low trait anger group. In Experiment 2, participants were selected on low and high trait anxiety scores. Here, a significant GROUP×WORD-TYPE interaction was restricted to the masked task, with the high trait anxiety group showing an attentional bias for threatening words. Theoretical and methodological issues are discussed. © 2001 Elsevier Science Ltd. All rights reserved.

*Keywords:* Anger; Anxiety; Attentional bias; Threatening words; Preconscious processing; Recognition thresholds

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### 1. Introduction

Cognitive theories of emotion (e.g. Beck, 1976; Bower, 1981; Williams, Watts, MacLeod & Mathews, 1997) claim that anxiety leads to selective attention for cues related to threat. This so-called *attentional bias* for threat is seen as a crucial factor in the etiology and maintenance of

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anxiety disorders (Williams, MacLeod & Mathews, 1996). The most successful paradigm for demonstrating attentional bias is the emotional Stroop task. In this task the color of different words has to be named while the content of the words must be ignored. Attentional bias is observed as increased latencies (interference) when color-naming threat as compared to neutral words. A large number of studies have shown that anxious individuals display this bias (for a review, see Williams et al., 1996).

Emotional Stroop effects have also been shown in masked conditions. In the masked task, conscious recognition of the word is prevented by short presentation and fast replacement of the target stimulus by a masking display in the same color. Attentional bias for masked threat words has been shown in clinically anxious individuals and high anxious normals (e.g. Mogg, Bradley, Williams & Mathews, 1993; Van den Hout, Tenney, Huygens & De Jong, 1997; Van den Hout, Tenney, Huygens, Merckelbach & Kindt, 1995). A further intriguing observation is the occurrence of attentional bias in the masked but not in the unmasked task in high anxious normals (MacLeod & Hagen, 1992; MacLeod & Rutherford, 1992; Mogg, Kentish & Bradley, 1993). A consciously mediated mood-controlling strategy in the unmasked task is suggested to be responsible for this dissociation (Mathews & McLeod, 1994). Given that the dissociation has not been shown in clinically anxious individuals, the inability to control interference for unmasked threatening words is suggested to be diagnostic of pathology (see Williams et al., 1996; but see Amir, McNally, Riemann, Burns, Lorenz & Mullen, 1996).

## **2. Experiment 1**

Research on selective processing of negatively valenced material has been primarily concerned with anxiety and depression (Williams et al., 1997). However, anger too might be associated with a heightened sensitivity to threat. Beck (1976) states that the threat of being harmed results in anxiety while the threat of being provoked or ill-treated results in anger. Whether a specific situation is perceived as being harmful or provoking requires a personal interpretation. Some people are more likely to make the latter interpretation and react with anger. In fact, just as anxiety is now considered a stable temperamental trait, so is anger (i.e. trait anxiety and trait anger; Spielberger, 1988; Spielberger, Jacobs, Russell & Crane, 1983). Thus, both anger and anxiety must be capable of determining an individual's reaction to threat. Recently, evidence was found for the latter suggestion. Eckhardt and Cohen (1997) used a variation of the emotional Stroop task and showed that insulted individuals with high trait anger levels attended towards threatening words.

For the present experiment it was hypothesized that, when using a masked version of the emotional Stroop task, high trait anger individuals would show selective attention to threatening words, relative to low trait anger individuals. No firm predictions could be made for these individuals for the unmasked version of the Stroop task. Generalizing from suggestions made by Mathews and McLeod (1994) concerning anxiety, we suggest that high trait anger individuals might also be able to counteract selective processing of threatening material which is consciously perceived. In an attempt to improve the masking procedure, individual recognition thresholds were assessed to index target presentation-time for the masked task.

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