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Rumination and attention in major depression

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Abstract

Up until recently, it had been assumed that attentional biases for negative information do not exist in depression. However studies using post-conscious exposure durations have produced contradictory results. The limitations of common attentional tasks, suitability of stimulus materials and differences in stimulus duration times may have contributed to these inconsistencies. We aimed to address many of these issues and examine attentional responses in major depression at two post-conscious exposure times. We also investigated possible roles for rumination and distraction in increasing and lessening attentional biases for negative information. We used a fully controlled experimental design to test the effects of both induced and trait rumination and distraction on attention in patients with major depression and healthy controls. Attention was assessed using the dot-probe task. The findings revealed an attentional bias for negative information in depressed patients only at the longer post-conscious exposure duration. Furthermore although this bias was not influenced by either induced or trait distraction, it was related to trait rumination. Overall, the results showed that depression is associated with a strategic attentional bias towards negative information and that this bias is stronger in individuals who habitually ruminate.

Keywords: Rumination; Depression; Attention

Introduction

Recently there has been interest in the similarities that may exist in the cognitive and behavioural processes that underlie different psychological disorders (Harvey, Watkins, Mansell, & Shafran, 2004). It could be argued that this transdiagnostic approach is especially relevant to understanding anxiety and depressive disorders given that they are often highly comorbid (e.g. Angold, Costello, & Erkanli, 1999), share considerable joint genetic vulnerability (Kendler, 1996) and can both respond to the same drugs (Kuzma & Black, 2004). However, for many years numerous empirical studies have emphasized the differences between these disorders in terms of information-processing biases (e.g. Bradley & Mathews, 1983; Clark & Teasdale, 1982; Mathews, 1990). In turn, this research led to several theories which sought to explain the dichotomy between anxiety and depression.

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An example of an influential theory that upheld this dichotomy is that of Williams, Watts, MacLeod, and Mathews (1988, 1997), which proposed that attention biases operate in anxiety but not depression. This assertion would seem to be largely based on the considerable body of literature that has demonstrated an anxiety-specific attentional bias for pre-consciously presented negative information (e.g. Bradley, Mogg, Millar, & White, 1995; Mathews, Ridgeway, & Williamson, 1996; Mogg & Bradley, 1998; Mogg, Bradley, & Hallowell, 1994; Mogg, Bradley, & Williams, 1995; Mogg, Bradley, Williams, & Mathews, 1993). By contrast, in depression there is yet to be a single clear instance of attentional biases under pre-conscious conditions (Mathews et al., 1996; Mogg et al., 1995). So far these findings would seem to support Williams et al.'s theory; however, data derived from experiments with post-conscious exposure durations have provided a less clear view of attentional processing in depression. That is, in the majority of experiments using exposure durations of 500–750 ms there has been a failure to find attention biases on the emotional Stroop and dot-probe tasks with clinically depressed individuals (e.g. Bradley et al., 1995; MacLeod, Mathews & Tata, 1986;Mogg et al., 1993). However, in studies using durations of at least 1000 ms (Gotlib & Cane, 1987; Mogg et al., 1995) biases *have* been found, although overall these investigations have produced mixed results with some inconsistent findings even being generated within the same study (e.g. Bradley, Mogg, & Lee, 1997: Study 1 and 2).

Contradictions in the findings may be related to limitations of the experimental tasks, differences in design and/or variability in stimulus duration times. This explanation has been invoked by several authors in this field. For example, Nunn, Mathews, and Trower, (1997) have said that the demonstration of attentional effects in depression may depend 'on variations in experimental method, or on the material employed' (p. 490). Similarly, Mogg and Bradley (2005) consider the possibility that 'variation in methodology (e.g. stimulus presentation conditions) may explain variation in findings across studies' (p. 31).

In terms of experimental tasks, the two main paradigms used to measure attention are the dot-probe and Stroop tasks. In the dot-probe task, two word stimuli are presented in different locations on a computer screen. After the display is terminated, a neutral probe appears in the former location of one of the words. Participants' responses to the probe are timed and used to infer the allocation of attentional resources as responses will be faster to probes that appear in an attended rather than unattended area (Posner, Snyder, & Davidson, 1980). In the Stroop task, there is only one stimulus with two dimensions (word meaning and ink colour) in the same location. Attentional biases are inferred from slower colour-naming times for negative words compared in neutral words, the assumption being that word meaning has caused interference and disrupted the participants' ability to colour-name.

The use of these different paradigms is likely to account for some of the discrepancies across findings as the dot-probe and Stroop tasks probably do not measure the same processes and it is debatable whether the Stroop task measures selective attention exclusively or even at all. Indeed, MacLeod (2005) has commented 'The fact that colour information receives inadequate attention does not require the conclusion that attention is diverted instead to the processing of word content' (p. 52). Furthermore, Mogg, Millar, and Bradley (2000) have concluded that 'the Stroop task does not provide an unambiguous measure of selective attention' and go on to say 'it is unclear whether colour-naming interference reflects competition at the input (attentional) stage or at the output or response selection stage' (both p. 696). This view would seem to be based on the fact that the Stroop task contains the stimulus and response factors within the same presentation. By contrast, in the dot-probe task the probe occurs after the word display and therefore the manual response is made when the word is no longer on the screen. Several other research groups have expressed similar reservations about the Stroop task and accordingly have expressed a preference for the dot-probe when measuring selective attention (e.g. Musa, Lepine, Clark, Mansell, & Ehlers, 2003).

With regard to design factors that could be influencing results, while studies that have examined attentional biases in depression often have some design strengths (e.g. matching word pairs in the dot-probe task according to word frequency), several are flawed in important ways. For example, some older studies did not use depression-relevant negative words and instead used social and physical threat words (e.g. MacLeod et al., 1986; Mathews et al., 1996). Furthermore, some dot-probe experiments from this time used a design that probed all critical but not all non-critical trials, thereby creating a contingency between target words and probes (e.g. MacLeod et al., 1986; Mathews et al., 1996). The use of non-clinical populations in the majority of studies (e.g. Hill & Dutton, 1989) has also created problems as the findings may not generalize to patients with major depression. A last criticism is the inclusion of uncategorized neutral stimuli in many studies (e.g.