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Anger potentiates the reporting of threatening interpretations: An experimental study

Natalie Barazzone, Graham C.L. Davey *

The University of Sussex, UK

ABSTRACT

This paper reports the results of an experiment investigating the effect of induced anger on interpretational bias using the homophone spelling task. Four groups of participants experienced anger, anxiety, happy or neutral mood inductions and then completed the homophone spelling task. Participants who experienced anger and anxiety inductions reported significantly more threat/neutral homophones as threats compared to control participants; moods had an emotion-congruent effect on threat reporting, with negative moods increasing the tendency to report threat/neutral homophones as threats and positive moods increasing the tendency to report positive/neutral homophones as positive. The findings provide evidence that anger potentiates the reporting of threatening interpretations and does so independently of any effect of concurrent levels of state and trait anxiety. The mechanism mediating this effect is unclear, but the results do lend support to those theories of psychopathology – and especially of PTSD – that see a causal role for anger in the maintenance of symptoms.

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There is now a wealth of compelling evidence demonstrating a strong affiliation between negative affect and particular patterns of information processing biases to threatening or emotionally salient stimuli (Davey, Bickerstaffe, & MacDonald, 2006; Williams, MacLeod, Watts, & Mathews, 1997; Williams, Mathews, & MacLeod, 1996; Wenzel & Lystad, 2005). Such research is important to the extent that it serves to elucidate underlying acquisition and maintenance processes that may be relevant to a wide range of psychopathologies characterised by negative affect. While previous research has tended to focus on the attentional and interpretative biases associated with trait anxiety (Blanchette, Richards, & Cross, 2006; Calvo & Castillo, 2001; Eysenck, MacLeod, & Mathews, 1987), more recent studies have begun to suggest that trait and state anger are also associated with cognitive biases similar to those found with anxiety (Cohen, Eckhardt, & Schagat, 1998; Eckhardt & Cohen, 1997; van Honk, Tuiten, can den Hout, et al., 2001; van Honk, Tuiten, de Haan, van den Hout, & Stam, 2001; Wenzel & Lystad, 2005).

Anger is a ubiquitous emotion, characterised as a negative feeling state associated with specific cognitive and perceptual distortion, subjective labelling, physiological changes, and action tendencies (Kassinove & Sukhodolsky, 1995). It plays a significant role in everyday life, can be short-lived, and varies in intensity (Averill, 1983). Anger is known to be experienced in a number of psychopathologies where its role can be persistent, severe and highly disruptive (Kassinove & Sukhodolsky, 1995). However, although anger has been widely studied as a general phenomenon (see Wyer & Srull, 1993), we are only beginning to learn about the specific role anger plays in psychopathology. Anger is commonly reported as part of a range of clinical presentations, including post-traumatic stress disorder (PTSD) (Biddle, Elliot, Creamer, Forbes, & Devilly, 2002; Orth & Wieland, 2006), depression (Painuly, Sharan, & Mattoo, 2005; Pasquini, Picardi, Biondi, Gaetano, & Morosini, 2004), antisocial personality disorder (Kernberg, 1992), borderline personality disorder (Zanarini et al., 1998), and conduct disorder (Dodge, 1993).

Amongst anxious psychopathologies, anger appears to be critically implicated in PTSD (Andrews, Brewin, Rose, & Kirk, 2000; Biddle et al., 2002; Chemtob, Hamada, Roitblat, & Muraoka, 1994; Orth & Wieland, 2006), where anger appears to be directly associated with PTSD severity (Frueh, Henning, Pellegrin, & Chobot, 1997; Schutzwohl & Maercker, 2000), with PTSD symptoms independently of trait anxiety (Chemtob et al., 1994), and is a primary component of combat-related PTSD (Novaco & Chemtob, 2002). This has raised the theoretical question of whether anger is a cause or an outcome of PTSD symptoms (see Orth & Wieland, 2006). Chemtob, Roitblatt, Hamada, Carlson, and Twentyman (1988) have argued that individuals suffering from PTSD have a substantially lowered threshold for perceiving events and situa-

tions as threatening and this gives rise to a vicious cycle in which the more that threat is perceived, the more anger the individual experiences, and the more anger they experience, the greater the readiness to perceive threat (Novaco & Chemtob, 2002). The credibility of such a positive feedback loop would be enhanced if it were possible to demonstrate these putative causal relationships and evidence relevant to this discussion would come from studies indicating that anger has a significant causal effect on threat perception and interpretation.

Studies of other negative emotions, such as anxiety and disgust, have already demonstrated that these emotions cause information processing and interpretational biases that may cause or maintain anxious psychopathology (e.g. Davey et al., 2006; Williams et al., 1996; Wilson, MacLeod, Mathews, & Rutherford, 2006). For example, it has been demonstrated that high trait anxious individuals are more likely to adopt threatening interpretations of threat/neutral stimuli (Richards & French, 1992), and experienced disgust has been shown to cause a shift (away from positive) towards threatening interpretations of ambiguous words (Davey et al., 2006). These attentional and interpretative biases may cause a vicious cycle in which these anxiety-provoking biases further exaggerate anxious mood and support symptoms of psychopathology, and it may well prove to be the case that anger is another negatively-valenced emotion that has such an effect.

Most of the existing research on information processing and anger has focused on attentional processes. Eckhardt and Cohen (1997) and Cohen et al. (1998) demonstrated that experienced anger – induced by means of insulting participants – and also high trait anger tended to predispose participants towards processing irrelevant anger information in an emotional Stroop task and a visual search task. Interestingly, it has been shown that high trait anger individuals show selective attention towards threat words in unmasked conditions, whereas highly anxious individuals demonstrate this bias in masked conditions (van Honk, Tuiten, can den Hout, et al., 2001). Similar findings prevail also for non-verbal stimuli. van Honk, Tuiten, de Haan, et al. (2001) investigated color naming of angry and neutral faces using a pictorial emotional Stroop task and found that trait angry, but not trait anxious, individuals showed impaired color naming of the angry faces. Smith and Waterman (2003) extended this research into attentional biases using a forensic sample. Using a dot-probe and emotional Stroop task, they demonstrated that violent individuals (offenders defined by index offence) exhibited significantly greater response biases to aggressive words compared to non-violent offenders and aggressive non-offenders. This effect was found to be independent of self-reported anxiety. In addition, Wenzel and Lystad (2005) investigated interpretation biases for threatening stimuli associated with both anger and anxiety. Participants were asked to interpret ambiguous passages by selecting various explanations for the events described, that were either anger, anxiety, positive, or neutral-related. Both anger trait and anxious trait individuals exhibited interpretation biases in the context of potential threat. Specifically, anxious individuals tended to select anxiety-related explanations, and trait anger individuals tended to select both angry and anxious-related explanations. Furthermore, cognitive biases were even more exaggerated in angry compared to anxious individuals.

However, while these studies have provided evidence for an informational and interpretation bias associated with anger, the nature of this association is far from clear. For example, most studies have examined the relationship between anger and information processing biases in participants exhibiting high levels of trait anger, and while such studies may confirm this relationship they do not imply a direct causal relationship between anger and information processing biases. Secondly, most studies

fail to demonstrate that the relationship between anger and information processing biases is independent of anxiety. Furthermore, with the exception of studies conducted by Eckhardt and Cohen (1997) and Cohen et al. (1998), research to date has relied on intrinsically angry individuals (high trait anger) or self-reported anger-sensitivity in "normal" individuals as a means of assessing whether anger causes a predisposition to attend to, or interpret, ambiguous information as threatening. While these studies may claim external validity, they do not rule out the potential mediating role of anxiety. Given the strong associations between anger and anxiety (Barlow, 1991), one possibility is that it is information processing biases associated with underlying anxiety that gives rise to a negative interpretation bias rather than trait anger alone.

The present study was designed to examine whether experienced anger directly causes a threat-relevant interpretation bias under controlled laboratory induction conditions. Rather than employing trait angry individuals, this study aimed to directly manipulate anger in an analogue population of participants to ensure that any interpretation biases generated could be attributed to anger alone. Using a mood induction procedure and homophone spelling task similar to that reported by Davey et al. (2006), the study compared the effect of between-subjects anger, anxiety, happy and neutral mood inductions on the spelling of ambiguous threat/neutral (e.g. die/dye) and threat/positive (e.g. peace/piece) homophones. In is predicted that (1) if anger has an emotion-congruent effect on the interpretation of ambiguity (i.e. interpretation of ambiguous material is congruent with the valency of the experienced emotion), then induced anger should result in more threat spellings of the threat/neutral homophones and fewer positive spellings of the positive/neutral homophones than in the case of participants experiencing control mood inductions (e.g. neutral or happy mood inductions), (2) if anger causes threat-biased interpretations in a way known to be caused by anxiety, then both anger and anxiety inductions should result in more threat spellings of the threat/neutral homophones than control emotions such as neutral and happy mood inductions, and (3) if anger has an effect on threat-biased interpretations that is not mediated by concurrent anxiety, then a bias towards interpreting ambiguous material as threatening should still be observed in the anger induction group even after levels of state and trait anxiety have been controlled for.

1. Method

1.1. Participants

The total sample comprised 72 participants, males and females aged between 18 and 43 with a mean age of 24 (S.D. = 6.31). There were 52 females and 20 males, consisting predominantly of undergraduates from a range of disciplines. Participants were a convenience sample recruited through email and poster advertisements within the University of Sussex. Potential participants were told the experiment would take approximately 30 min and consist of listening to some music, completing some questionnaires, viewing some PowerPoint slides and completing a spelling task. Participation was voluntary and participants were not paid.

1.2. Materials

In order to ensure that experimental groups did not differ significantly in terms of the characteristics in question, participants were required to complete the Hospital Anxiety and Depression Scale (HADS; Snaith & Zigmond, 1994) as a means of measuring trait anxiety and depression, followed by the State-Trait