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The effects of modifying interpretation bias on worry in generalized anxiety disorder

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ABSTRACT

This study investigated whether facilitating a benign interpretive bias decreases negative thought intrusions in generalized anxiety disorder (GAD). Clients were randomly allocated to an interpretation modification condition in which they repeatedly accessed benign meanings of emotionally ambiguous homographs and scenarios, or to a control condition in which they accessed threat and benign meanings with equal frequency. Worry frequency was assessed using a breathing focus task that involved categorising the valence of thought intrusions before and after an instructed worry period. Interpretation bias was assessed during the modification tasks, and on a different measure of interpretation bias (sentence completion) following a period of worry. The experimental procedure modified interpretations made during training, and in the later sentence completion task. Furthermore, compared to the control group, the benign group showed fewer negative thought intrusions during breathing focus (as rated by both participants and an assessor). These findings show that it is possible to induce a more benign interpretive bias in GAD clients and that this reduces negative thought intrusions.

The key defining feature of Generalized Anxiety Disorder (GAD) is excessive and uncontrollable worry about multiple topics that is experienced as being difficult to stop. Supporting such reports, Ruscio and Borkovec (2004) found that, following instructions to worry about a current personally relevant topic, individuals with GAD had more negative thought intrusions during a subsequent task than did non-clinical high worriers. While cognitive-behaviour therapy (CBT) is effective in reducing the symptoms of GAD, around half of treated clients fail to achieve high end state functioning (Borkovec, Newman, Pincus, & Lytle, 2002). To improve effectiveness and efficiency of interventions it is important to gain a better understanding of the mechanisms that maintain the cardinal feature of GAD – excessive worry.

GAD is associated with the interpretation of ambiguous events in a threatening manner (Eysenck, MacLeod, & Mathews, 1987; Eysenck, Mogg, May, Richards, & Mathews, 1991; Mathews, Richards, & Eysenck, 1989; Mogg, Bradley, Miller, & Potts, 1994), increasing perceived danger, and perhaps triggering worry (Mathews, 1990). In contrast, non-anxious individuals are characterised by an opposing bias favouring benign interpretations of ambiguous events (Hirsch & Mathews, 1997; 2000). However, correlations between a threatening interpretive bias and anxiety are clearly insufficient to demonstrate a causal relationship between them.

Recent research has demonstrated that a threatening interpretive bias can be induced in non-anxious individuals through repeated practice in accessing negative outcomes of emotionally ambiguous information, and causes heightened anxiety when confronted with a threatening event (e.g., Hirsch, Mathews, & Clark, 2007; Mathews & Mackintosh, 2000; Wilson, MacLeod, Mathews, & Rutherford, 2006). Related methods have been used to induce a more benign interpretive bias in highly anxious individuals, leading to reductions in anxiety reactivity (e.g., Mathews, Ridgeway, Cook, & Yiend, 2007; Murphy, Hirsch, Mathews, Smith, & Clark, 2007).

Of most relevance to the current research, Hirsch, Hayes, and Mathews (2009) demonstrated that non-clinical high worriers given repeated practice accessing benign meanings of threat-related homographs and emotionally ambiguous scenarios showed less negative thought intrusions than a control group who accessed threatening and benign meanings with equal frequency. The question remains of whether it is possible to facilitate a more benign interpretive bias in clients with GAD and if so, whether this also leads to reductions in worry frequency.

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The present study investigated this question, using similar methods to Hirsch et al. (2009).

Worry frequency has been assessed in GAD clients by Ruscio and Borkovec (2004) using a task which required participants to focus on their breathing and report on thought intrusions both before and after an instructed worry period. This paradigm was adapted by Hirsch et al. (2009) to include assessor ratings of intrusions in addition to that of participants. The current study similarly included assessor ratings of the valence of thought intrusions reported by GAD clients. The persistence of interpretive bias changes was assessed using an adapted version of a sentence completion task developed by Huppert, Pasupuleti, Foa, and Mathews (2007).

Method

Design

The experiment involved three consecutive phases: an interpretation modification phase (including both homograph and ambiguous scenario tasks); a worry assessment phase (breathing focus task); and an interpretation bias assessment phase (sentence completion task). GAD patients were randomly allocated to benign interpretation modification or a control condition. The benign group accessed benign meanings of threat-related homographs and ambiguously threatening scenarios, while the control group accessed threat or benign meanings with equal frequency. Following a filler task, participants completed the worry assessment phase, which involved focusing on their breathing and categorising the valence of thought intrusions before and after an instructed worry period. Participants subsequently provided expanded descriptions of these thought intrusions to allow an assessor to categorise their valence. Finally participants performed the sentence completion task to assess interpretive bias. In keeping with Hirsch et al. (2009), it was predicted that the benign group would report less negative intrusions than the control group, both before and after instructed worry.

Participants

Participants were patients who were receiving current treatment for GAD, recruited via either the South London & Maudsley National Health Service Trust, or an advertisement placed in a local London newspaper for clients in treatment for GAD. Of the 40 GAD clients, 20 were randomly allocated to the benign condition and 20 to the control condition. There were 4 males and 16 females in the benign group, and 5 males and 15 females in the control group. Average age was 43.0 years ($SD = 13.6$) in the benign, and 41.0 years ($SD = 9.3$) in the control group, with no significant difference between groups, $t < 1$. The average level of education was 13.1 years ($SD = 2.5$) in the benign group, and 13.8 years ($SD = 2.1$) in the control group, $t < 1$. Groups did not differ in Penn State Worry Questionnaire scores (PSWQ; Meyer, Miller, Metzger, & Borkovec, 1990; $M = 69.32$, $SD = 9.75$ for the benign group; $M = 68.11$, $SD = 7.35$ for the control group, $t < 1$); or State-Trait Anxiety Inventory trait scores (STAI-T; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983; $M = 61.49$, $SD = 8.24$ for the benign group; $M = 63.05$, $SD = 6.57$ for the control group, $t < 1$).

Materials

Emotional assessment instruments

Generalized Anxiety Disorder Questionnaire (GAD-Q-IV). The GAD-Q-IV (Newman et al., 2002) is a self-report diagnostic measure of generalized anxiety disorder that has demonstrated good test–retest reliability, convergent and discriminant validity, and a high level of diagnostic agreement with a clinical assessor on the Anxiety Disorders Interview Schedule (Brown, Di Nardo, & Barlow, 1994).

Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I). The SCID-I (First, Spitzer, Gibbon, & Williams, 1996) is a clinician administered semi-structured diagnostic interview used to classify DSM-IV Axis I disorders which has been shown to have high levels of inter-rater and test–retest reliability (Zanarini et al., 2000).

Penn State Worry Questionnaire (PSWQ). Trait worry level was measured using the PSWQ (Meyer et al., 1990), a 16-item measure consisting of statements about worry (e.g., "Once I start worrying, I can't stop"), each with a 5-point answer scale ranging from 1 (*not at all typical of me*) to 5 (*very typical of me*) yielding a total score ranging from 16 to 80, with higher scores indicating greater worry levels. The PSWQ has good psychometric properties in student, community, and clinical samples, with studies reporting high internal consistency, short-term retest reliability, and convergent and criterion related validity (Brown, Antony, & Barlow, 1992; Davey, 1993).

State-Trait Anxiety Inventory (STAI-T). Trait anxiety was measured using the STAI-T (Spielberger et al., 1983), consisting of 20 anxiety symptoms that participants rate for frequency of occurrence. Scores range between 20 and 80, with a higher score indicating greater anxiety. The STAI-T has good internal consistency (0.89) and test–retest reliability (0.88; Barnes, Harp, & Jung, 2002).

Mood ratings. Three visual analogue mood rating scales, each 100 mm in length, assessed current anxiety, depression, and happiness using scales labelled 'not at all' at one end and 'extremely' at the other. Participants placed a cross (*x*) on each scale, and scores were assigned by measuring its position, ranging from 0 (*not at all*) to 100 (*extremely*). These mood rating scales have been shown to have good construct validity, with anxious and depressed mood ratings showing a significant increase from after the first breathing focus period to after instructed worry, as well as a significant decrease from after instructed worry to after the second breathing focus period, with happiness ratings significantly changing in a converse direction (Hirsch et al., 2009). In a sample of 20 community volunteers, good concurrent validity was also demonstrated by significant positive correlations with the State-Trait Anxiety Inventory State version (STAI-Spielberger et al., 1983), between anxiety and depression ratings ($r = 0.66$, $p < 0.01$; $r = 0.45$, $p < 0.05$ respectively), and negatively with happiness, $r = -0.61$, $p < 0.01$.

Interpretation modification tasks

(1) Homograph task

This consisted of 250 trials: an initial block of 200 interpretation modification trials; followed by 20 test trials; and then a short 'booster' block of 30 modification trials. The first block of modification trials consisted of 200 word pairs used by Grey and Mathews (2000) and Hirsch et al. (2009): there were 100 cue words of which 80 were homographs (e.g., *patient*) with both threat (e.g., *sick*) and non-threat (e.g., *kind*) meanings, and 20 were non-homograph fillers. Each cue word was presented twice, followed by a different word associate in fragment form (a to-be-completed word with one letter missing, e.g., batter – *f_sh*). Homographs were paired with benign or threat word fragments (depending on assigned condition), while non-homograph fillers were always paired with neutral word fragments.