

BRIEF REPORT

The Extent and Nature of Imagery During Worry and Positive Thinking in Generalized Anxiety Disorder

Colette R. Hirsch

King's College London and University of Western Australia

Sarra Hayes

King's College London

Andrew Mathews

University of California, Davis

Gemma Perman

King's College London

Tom Borkovec

Pennsylvania State University

Clients in treatment for Generalized Anxiety Disorder (GAD) were compared to a control group to assess the extent and nature of imagery during worry or while thinking about a personally relevant positive future event. Two methods were used to assess mentation and were completed in counter balanced order within the worry and positive conditions. One method assessed the occurrence of imagery by requiring participants to categorize their mentation as verbal thoughts or images every 10 s. The other method involved participants estimating the duration of any imagery that occurred in the previous 10 s. Imagery during worry occurred less often than while thinking about a positive event for both groups, but GAD clients had a more pronounced deficit of imagery during worry than the control group. Images that occurred were briefer during worry than while thinking about a positive future event and were briefer in the GAD than the control group for both worry and positive conditions. The results thus confirmed that imagery is less common during worry in clients with GAD but also demonstrated that the imagery that does occur in GAD is briefer.

Keywords: generalized anxiety disorder, worry, imagery, verbal thoughts, cognitive avoidance theory

The defining feature of Generalized Anxiety Disorder (GAD) is chronic, excessive, and uncontrollable worry about multiple topics (American Psychiatric Association, 2000). Subjectively, worry is often experienced as being like talking to oneself about potential negative outcomes, and studies assessing the form of mentation that occurs during worry typically reveal an excess of verbal thoughts over images. Borkovec and Inz (1990) employed a men-

tation sampling method to examine the occurrence of verbal thoughts versus images among GAD clients and nonanxious controls during worry and relaxation. Three samples of mentation type were taken during each condition and revealed that during worry, both GAD clients and nonanxious controls reported similarly high levels of verbal thoughts as opposed to images. In contrast, when engaging in relaxation, the control group had higher levels of imagery than verbal thought, whereas the GAD group reported images or verbal thought equally as often. Using a different method, Behar, Zullig, and Borkovec (2005) asked volunteers to rate the percentage of the time they had noticed the occurrence of imagery or verbal thoughts during the previous five minutes of relaxation or worry. Again worry was associated with a predominance of verbal thought over imagery, and relaxation was associated with equal proportion of imagery and verbal thoughts for both nonselected volunteers and others selected for symptoms of GAD. These findings have been replicated using questionnaires (Freeston, Dugas, & Ladouceur, 1996) and interviews (Hoyer, Becker, & Roth, 2001).

The cognitive avoidance theory of worry (Borkovec, Alcaine, & Behar, 2004) posits that images of negative future events during worry are avoided by engaging in worrisome verbal thoughts. Consequently, verbal thought predominates during worry. One unintended consequence of this is that worry-related thoughts are

This article was published Online First August 15, 2011.

Colette R. Hirsch, Department of Psychology, King's College London, London, UK, and Department of Psychology, University of Western Australia, Perth, Australia; Sarra Hayes, Department of Psychology, King's College London, London, UK; Andrew Mathews, Department of Psychology, University of California, Davis, California; Gemma Perman, Department of Psychology, King's College London, London, UK; Tom Borkovec, Department of Psychology, Pennsylvania State University, University Park, PA.

This research was supported by a Wellcome Trust grant. We thank Siobhan Commins and Adrien Temper for completing the assessor ratings, Susie Clark for data checking and assessor ratings, and Petrishia Paulraj for help with references and tables.

Correspondence concerning this article should be addressed to Colette Hirsch, PO77, Department of Psychology, Institute of Psychiatry, King's College London, De Crespigny Park, London SE5 8AF, United Kingdom. E-mail: colette.hirsch@kcl.ac.uk

more likely to intrude again later, thus perpetuating the worry cycle (see Stokes & Hirsch, 2010; Hirsch, Perman, Mathews, Borkovec, & Hayes, in preparation). However, evidence from studies examining the overall proportion of imagery compared to verbal thinking does not reveal whether or how any such avoidance might actually be manifested during worry. If avoidance of emotional imagery is a well established habit, then it might be that images occur only very infrequently during worry, or, if worry mentation switches rapidly between imagery and verbal thought, it could be that images occur quite frequently in worry but are very brief. In order to better understand imagery during worry, it is thus important to assess both the occurrence and duration of imagery during worry. To accomplish this goal in the present study, two mentation assessment methods were employed during separate phases of the experiment. During one phase, the *occurrence* of images was assessed via frequent mentation sampling (every 10 s) during worry. During the other phase, the *duration* of any images that occurred was assessed.

Worry involves thinking about personally relevant and potentially negative future events. Given this, an appropriate control condition to test the extent that any effects found are specific to worry involves thinking about another personally relevant future event that is *not* related to worry. Consequently, in the present study each participant's current worrying was compared to thinking about a personally relevant future positive event. In order to assess whether any differences in the form of mentation during worry or when thinking about a personally relevant positive future are evident in people without GAD, a community control group was also included.

In summary, the present study was designed to assess whether images during worry occur less often, or are briefer, than images generated when thinking about a personally relevant future positive event, and whether any such differences are more marked in clients with GAD than in a non-GAD control group.

Method

Design

Types of imagery assessment (occurrence and duration) and type of condition (worry and positive topics) were administered in counterbalanced order across participants within GAD and control groups. A filler task was used to separate worry and positive conditions.

Participants

Forty participants were selected for this study: 20 who met diagnostic criteria for GAD and 20 community volunteers who comprised the control group. GAD participants were patients who were receiving current treatment for GAD and had been 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. Such participants initially completed a screening of the Generalized Anxiety Disorder Questionnaire (GAD-Q-IV; Newman et al., 2002) and were invited to take part in the study if they met screening criteria for GAD and were currently undergoing a recognized form of treatment for GAD (e.g., medication; psychological therapy). No participant reported that their

treatment had involved discussing imagery about their worry. To be included in the GAD group, on the day of testing participants had to meet current criteria for GAD on both the GAD-Q-IV and the Structured Clinical Interview for *DSM-IV* Axis I Disorders (SCID-I; First, Spitzer, Gibbon, & Williams, 1996)¹. Community volunteers were recruited through a pool of people from the local community who had previously indicated that they were interested in taking part in psychological research or from King's College London. No participant in the control group met GAD criteria on the GAD-Q-IV or the SCID-I.

There were 6 males and 14 females in the GAD group, and 7 males and 13 females in the control group, with no difference in gender distribution between the groups ($\chi^2 = 0.11$, $df = 1$, $p = .74$). The average age was 41.65 years ($SD = 12.89$) in the GAD group and 41.15 years ($SD = 11.60$) in the control group, with no significant difference between groups, $t(38) = 0.13$, $p = .90$. The average level of education was 14.70 years ($SD = 2.20$) in the GAD group and 15.10 years ($SD = 2.47$) in the control group, $t(38) = 0.54$, $p = .59$. As would be expected, the GAD group had significantly higher scores on the Penn State Worry Questionnaire (PSWQ; Meyer, Miller, Metzger, & Borkovec, 1990), with $M = 66.18$, $SD = 9.96$ for the GAD group, $M = 37.65$, $SD = 6.85$ for the control group, $t(38) = 10.56$, $p < .001$; the State-Trait Anxiety Inventory (STAI-T; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983), with $M = 58.74$, $SD = 8.87$ for the GAD group, $M = 39.60$, $SD = 5.45$ for the control group, $t(38) = 8.17$, $p < .001$; and the Beck Depression Inventory (BDI; Beck, Rush, Shaw, & Emery, 1979), with $M = 18.45$, $SD = 9.28$ for the GAD group, $M = 4.20$, $SD = 2.97$ for the control group, $t(38) = 6.54$, $p < .001$.

Materials

Emotional Assessment Instruments

Generalized Anxiety Disorder Questionnaire (GAD-Q-IV). The GAD-Q-IV (Newman et al., 2002) is a self-report measure designed to screen for generalized anxiety disorder that has 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 (ADIS; Brown, Di Nardo, & Barlow, 1994). The dimensional scoring system was used, which has a good 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 et al., 1996) is a clinician administered semistructured diagnostic interview used to classify *DSM-IV* Axis I disorders which has been shown to have high levels of interrater and test-retest reliability (Zanarini et al., 2000). The SCID was used to assess diagnostic criteria for GAD.

Penn State Worry Questionnaire (PSWQ). Trait worry level was measured using the PSWQ (Meyer et al., 1990), a

¹ We included other sections of the SCID-I as necessary to ensure that excessive worry was evident for multiple worry topics that were unrelated to other Axis I disorders from which that person may have been suffering. All participants in the GAD Group met diagnostic criteria for GAD on both the clinical interview and the GAD-Q-IV.

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 high internal consistency, retest reliability, and convergent- and criterion-related validity (Brown, Antony, & Barlow, 1992; Davey, 1993).

State-Trait Anxiety Inventory-Trait Version (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 and test-retest reliability (Barnes, Harp, & Jung, 2002).

Beck Depression Inventory (BDI). Depressive symptoms were measured using the BDI (Beck et al., 1979), consisting of 21 depression-related questions that participants rate according to how they have been feeling during the past two weeks. Scores range between 0 and 63, with a higher score indicating greater depression. The BDI has good internal consistency and test-retest reliability (Beck & Steer, 1984).

Mood ratings. Two visual analogue mood rating scales, each 100 mm in length, assessed current anxiety (anxious-relaxed scale) and depression (sad-happy scale). Scales were labeled "extremely anxious" or "extremely depressed" at one end and "extremely relaxed" or "extremely happy" at the other end. Participants placed a cross (*x*) on each scale, and scores were assigned by measuring its position, ranging from 0 (*extremely anxious/depressed*) to 100 (*extremely relaxed/happy*).

Imagery Assessment Tasks

Topic identification. In the worry condition, participants were asked to think of a personally relevant current worry topic. The experimenter then asked a series of questions for about 2 min following the form, "What would be bad about that?" to identify and prime salient aspects of the topic (Davey & Levy, 1998; Vasey & Borkovec, 1992). The positive condition followed the same format for each imagery task, except that participants were required to identify a personally relevant positive topic, and the corresponding questions took the form, "What would be good about that?" (Startup & Davey, 2001). A written record was made of worry and positive topics. Later an assessor, who was not informed about group allocation or topic type, rated the valence of the topic summaries on a 6-point scale with the following markers: -3 "high negativity"; -2 "medium negativity"; -1 "low negativity"; 1 "low positivity"; 2 "medium positivity"; and 3 "high positivity." Another assessor rated 16 participants' worry and positive thought topics in the same way to provide interrater reliability. The interrater reliability was $k = 0.84$ on the worry topic categorization and $k = 0.95$ on the positive topic categorization.

Imagery occurrence task. For the imagery occurrence task, participants were instructed that thinking about this topic would be their main task but that computer-generated beeps would be heard every 10 s. Whenever a beep occurred, participants were required to indicate whether their mentation at that moment was in imagery or verbal form by saying "imagery" or "verbal." Participants responded to 18 beeps over 3 min.

Imagery duration task. For the imagery duration task, participants were again instructed that thinking about the identified topic would be their main task but that computer-generated beeps would be heard every 10 s. Whenever a beep occurred, participants were required to estimate the duration of any imagery that had occurred in the previous 10 s. To assist participants in making this estimation, they were given a sheet with a rating scale 10 cm in length with the word "beep" at each end to illustrate the 10-s interval between beeps, as well as the following markers: 0 "no images"; 1 "images very quick, like a flash"; 5 "images lasted about half the time"; and 10 "images lasted the whole time." Participants were instructed that every time they heard a beep they should say a number between 0 and 10 to indicate the average duration of any images during the previous 10 s. Participants responded to 18 beeps over 3 min.

Filler Task

To reduce the likelihood of carry-over effects across the worry and positive conditions, we administered the unrelated filler task of listening to music (Holmes, Mathews, Dalgleish, & Mackintosh, 2006). This task required participants to listen to a set of 15 classical music extracts, each lasting 40 s. Following each section of music, participants were asked to rate how pleasant they found it on a scale of 1 to 9, where 1 indicated "extremely unpleasant" and 9 "extremely pleasant." This task lasted for 10 min.

Experimental Apparatus

A Sony VAIO laptop computer with E-Prime software version 1 (Schneider, Eschman, & Zuccolotto, 2002) was used to administer all experimental tasks. An Olympus WS-200S digital voice recorder was used to record participants' expanded descriptions for imagery content that occurred during the imagery occurrence task.

Procedure

All participants first completed a consent form, the PSWQ, STAI-T, BDI, GAD-Q-IV, and mood rating scales. They were then given an explanation of what was meant by an image versus a verbal thought: "Images are when you are generating a picture in your mind and really concentrating on what you can see, feel, smell, hear, and taste in the image. Images are often very vivid because you're tuning into all of your senses. Verbal thoughts are when you're thinking using words and silently talking to yourself, like an internal running commentary or dialogue. When you're thinking in verbal thoughts you are thinking in words and sentences." They were informed that if their mental activity was ever concurrently in both images and verbal formats, they should report the more dominant form.

After instructions for the first type of imagery assessment task (occurrence or duration), participants practiced using a neutral topic requiring the participant to respond to three beeps that occurred during 10-s intervals for 30 s. They then received instructions for the second type of imagery assessment task and practiced using another neutral topic, which again required them to respond to each of three beeps, with one beep every 10 s. When it was clear that instructions for both types of imagery assessment were understood, participants identified the first topic (worry or positive

condition, depending on order assignment), followed by the occurrence and duration tasks for that topic. Each task was administered in succession followed by mood rating scales. After the filler task and another set of mood rating scales, participants identified their second topic followed by both imagery assessment tasks and the mood rating scales. Finally, the SCID-I was administered by a clinical psychologist and recorded for later rating by another clinician². Finally, participants were debriefed, thanked for their time, and paid £20 (\$30).

Results

Topic Valence Ratings

To rule out the possibility that any results could be attributed to differences in the valence of the worry and/or positive topics chosen by the two groups, assessor topic valence ratings were analyzed using Fisher's exact tests for worry and positive topics separately. There were no significant group differences on topic valence for either the worry or positive conditions (Fisher's exact tests, $p = 1.00$ for worry and $p = .82$ for positive conditions). Additionally, Wilcoxon signed-ranks test conducted within groups showed that the assessor's ratings for the positive topic were significantly higher than the ratings for the worry topic in both the GAD ($Mdn = 2.00$, $Mdn = -2.00$, $Z = -4.00$, $p < .001$) and Control ($Mdn = 2.00$, $Mdn = -2.00$, $Z = -4.01$, $p < .001$) groups.

Imagery Occurrence

A mixed-model ANOVA was conducted on the number of images reported during the imagery occurrence task, with a between-participants factor of Group (GAD vs. Control) and the repeated measures factor of Topic (Worry vs. Positive). See Table 1 for means and standard deviations. This analysis revealed a significant main effect of Group, $F(1, 38) = 8.53$, $p < .01$, $f^2 = 0.47$, reflecting the fact that the GAD group had fewer images than the Control group ($M = 9.63$ vs. $M = 13.23$). There was also a significant main effect of Topic, $F(1, 38) = 75.91$, $p < .001$, $f^2 = 1.41$, with all participants having fewer images when worrying than when thinking about a personally relevant positive topic ($M = 9.08$ vs. $M = 13.78$). Importantly that there was a significant interaction between Group and Topic, $F(1, 38) = 13.07$, $p < .005$, $f^2 = 0.59$. Significantly fewer images were reported by the GAD group than the Control group during the Worry condition, $M = 6.3$ vs. $M = 11.85$; $t(38) = 4.23$, $p < .001$, $d = 1.39$, whereas there was no difference in the number of images reported by the groups during the Positive condition, $M = 12.95$ vs. $M = 14.6$; $t(38) = 1.20$, $p = .24$, $d = 0.38$.

Table 1
Mean Occurrence of Images Reported by the GAD and Control Groups During the Worry and Positive Topic Conditions (Standard Deviations in Parentheses)

Group	Worry	Positive
GAD	6.30 (2.81)	12.95 (4.37)
Control	11.85 (5.15)	14.60 (4.35)

Table 2
Mean Duration of Images Reported by the GAD and Control Groups During the Worry and Positive Topic Conditions (Standard Deviations in Parentheses)

Group	Worry	Positive
GAD	2.65 (1.05)	4.64 (2.35)
Control	4.86 (2.78)	5.97 (2.72)

Imagery Duration

A mixed-model ANOVA was conducted on the average estimated duration of images reported by participants during the imagery duration task, with a between-participants factor of Group and the repeated measures factor of Topic. See Table 2 for means and standard deviations. This analysis revealed a significant main effect of Group, $F(1, 38) = 6.81$, $p < .05$, $f^2 = 0.42$, reflecting the fact that the GAD group reported significantly briefer images than the Control group ($M = 3.64$ s vs. $M = 5.42$ s). There was also a significant main effect of Topic, $F(1, 38) = 29.67$, $p < .001$, $f^2 = 0.88$, with all participants reporting briefer images when worrying than when thinking about a positive topic ($M = 3.75$ s vs. $M = 5.31$ s). The interaction between Group and Topic failed to reach significance, $F(1, 38) = 2.36$, $p = .13$, $f^2 = 0.25$.

Self-Reported Mood Before and After Imagery Tasks

A mixed-model ANOVA was carried out separately on the anxious-relaxed mood rating scales administered to participants following the imagery occurrence and duration tasks for each topic. There was one between-participants factor of Group and the repeated measures factors of Topic (Worry and Positive) and Imagery Task (Occurrence vs. Duration). These analyses revealed a significant main effect of Group, $F(1, 38) = 44.90$, $p < .001$, $f^2 = 1.09$. This reflected greater levels of anxiety reported by the GAD group than the Control group ($M = 4.74$, $SD = 1.57$ vs. $M = 7.72$, $SD = 1.22$). There was also a significant main effect of Topic, $F(1, 38) = 39.72$, $p < .001$, $f^2 = 1.02$. This reflected greater anxiety in the Worry condition than the Positive condition ($M = 5.24$, $SD = 2.65$ vs. $M = 7.22$, $SD = 1.85$). There was no main effect of Imagery Task, $F(1, 38) = 3.75$, $p = .06$, $f^2 = 0.31$. No interactions reached significance: Group and Topic, $F(1, 38) = 3.24$, $p = .08$, $f^2 = 0.29$; Group and Imagery Task, $F(1, 38) = 1.03$, $p = .32$, $f^2 = 0.16$; Topic and Imagery Task, $F(1, 38) = 0.46$, $p = .50$, $f^2 = 0.11$; Group, Topic and Imagery Task, $F(1, 38) = 1.59$, $p = .22$, $f^2 = 0.20$. The same pattern of results was observed for the sad-happy scales.

Discussion

Imagery occurred less often and was briefer during worrying than while thinking about a personally relevant future positive topic. Moreover, imagery occurred even less during worry in GAD

² Another clinical psychologist who was not informed of group allocation listened to SCID-I recordings (apart from two where the audio recording was not available due to technical reasons) to assess diagnostic reliability. The two clinicians agreed on the application of the above diagnostic criteria for all participants.

clients than in community volunteers, although the groups did not differ in the extent of imagery while thinking about the positive topic. Thus, for the measure assessing the occurrence of imagery, clients with GAD had a particularly low incidence of images while worrying. Borkovec and Inz (1990) had reported that GAD and control groups did not differ in occurrence of imagery during worry, but they only sampled mentation three times during the 10 minutes of worry, whereas we sampled mentation every 10 s over a 3-min period, thus providing more data and greater potential sensitivity to differences between groups. Alternatively, the longer and uninterrupted periods of worry allowed in the Borkovec and Inz (1990) study may have selectively reduced the occurrence of imagery in the control participants to levels similar to those with GAD. If so, then perhaps due to the habitual nature of worry in people with GAD, they may have a strong dominance of verbal thinking as soon as they engage in worry, while others may initially have more images and only later do processes that truncate imagery begin to operate.

In relation to the duration of imagery when it occurred, both groups had briefer images during worry than while thinking about a positive topic, but the GAD group reported briefer images than controls for both worry-related and positive topics. Hence, whereas worry is generally associated with shorter images, clients with GAD have an even stronger and more general tendency to experience truncated imagery. This finding suggests that those with GAD may have adopted a general mentation style favoring verbal thinking over imagery, and although this is most marked during worry, it can extend to nonworry topics as well. Alternatively, it may be that some participants in the GAD group engaged in worry even while supposedly thinking about an unrelated topic, as has been documented by Startup and Davey (2001). For example, GAD clients might find themselves worrying that an activity that should be enjoyable might turn out to have a disastrous outcome. Either way, whereas worry in general is associated with a tendency for images to be truncated relative to thinking about a positive topic, brief imagery is particularly characteristic of those with GAD.

Given that GAD is highly comorbid, it is possible that the findings may be accounted for by other diagnoses, although these are typically associated with prolonged rather than truncated negative imagery (e.g., social phobia; Hackmann, Clark, & McManus, 2000). Future research is needed to determine whether similar effects would be evident for worry in other psychiatric disorders. We investigated two emotionally relevant personal topics, but future research could usefully include neutral topics.

Why do GAD clients experience only very brief imagery? Those with GAD may have already learned to adopt a more verbal mode of thinking as a general strategy to reduce the distress caused by those emotional images that they find particularly distressing. This strategy to truncate imagery could be further encouraged by the erroneous belief that worry is akin to problem solving (Borkovec & Roemer, 1995), which may motivate a more verbal linguistic style of processing. If a habit of truncating imagery is already well established by the time GAD is diagnosed, the habit may have generalized somewhat to all topics and thus be applied to content not originally associated with worry, as was found here. That is, as the truncation of imagery becomes relatively automated, verbal thinking will become the habitual default manner of mentation about any personally relevant topics. However, even if this effec-

tively reduces the occurrence and duration of negative images in general, it may be that for negative images in particular this process of truncation is more frequently rehearsed, thus leading to even briefer images for worry-related images than positive images.

Given that imagery has been shown to be particularly brief in GAD, clients with this clinical problem may benefit from engaging in more prolonged imagery of worry content (i.e., what they fear will happen), as is encouraged by some forms of cognitive behavior therapy for GAD (e.g., Craske, Barlow, & Leary, 1992). Indeed, our own research has shown that when high worriers are instructed to think about their worry in imagery form, they have fewer subsequent negative intrusions than after worrying in their normal verbal manner (Stokes & Hirsch, 2010; Hirsch et al., in preparation). If the increased frequency of intrusions that follow verbal worrying has the undesired effect of precipitating new bouts of worry and thus maintains the symptoms of GAD, then reversing this process, for example by encouraging prolonged imagery of worry content, is likely to prove beneficial.

References

- American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text rev.). Washington, DC: Author.
- Barnes, L. L. B., Harp, D., & Jung, W. S. (2002). Reliability generalization of scores on the Spielberger State-Trait Anxiety Inventory. *Educational and Psychological Measurement, 62*, 603–618. doi:10.1177/0013164402062004005
- Beck, A. T., Rush, A. J., Shaw, B. F., & Emery, G. (1979). *Cognitive therapy of depression*. New York: Guilford Press.
- Beck, A. T., & Steer, R. A. (1984). Internal consistencies of the original and revised Beck Depression Inventories. *Journal of Clinical Psychology, 40*, 1365–1367. doi:10.1002/1097-4679(198411)40:6<1365::AID-JCLP2270400615>3.0.CO;2-D
- Behar, E., Zullig, A. R., & Borkovec, T. D. (2005). Thought and imaginal activity during worry and trauma recall. *Behavior Therapy, 36*, 157–168. doi:10.1016/S0005-7894(05)80064-4
- Borkovec, T. D., Alcaine, O., & Behar, E. (2004). Avoidance theory of worry and generalized anxiety disorder. In R. G. Heimberg, C. L. Turk, & D. S. Mennin (Eds.), *Generalized anxiety disorder: Advances in research and practice* (pp. 77–108). New York: Guilford Press.
- Borkovec, T. D., & Inz, J. (1990). The nature of worry in generalized anxiety disorder: A predominance of thought activity. *Behaviour Research and Therapy, 28*, 153–158. doi:10.1016/0005-7967(90)90027-G
- Borkovec, T. D., & Roemer, L. (1995). Perceived functions of worry among generalized anxiety disorder subjects: Distraction from more emotional topics? *Journal of Behavior Therapy and Experimental Psychiatry, 26*, 25–30. doi:10.1016/0005-7916(94)00064-S
- Brown, T. A., Antony, M. M., & Barlow, D. H. (1992). Psychometric properties of the Penn State Worry Questionnaire in a clinical anxiety disorders sample. *Behaviour Research and Therapy, 30*, 33–37. doi:10.1016/0005-7967(92)90093-V
- Brown, T. A., Di Nardo, P. A., & Barlow, D. H. (1994). *Anxiety disorders interview schedule for DSM-IV*. Albany, NY: Graywind Publications Inc.
- Craske, M. G., Barlow, D. H., & O'Leary, T. A. (1992). *Mastery of your anxiety and worry*. Albany, NY: Graywind Publications.
- Davey, G. C. (1993). A comparison of three worry questionnaires. *Behaviour Research and Therapy, 31*, 51–56. doi:10.1016/0005-7967(93)90042-S
- Davey, G. C. L., & Levy, S. (1998). Catastrophic worrying: Personal inadequacy and a perseverative iterative style as features of the catastrophizing process. *Journal of Abnormal Psychology, 107*, 576–586. doi:10.1037/0021-843X.107.4.576

- First, M. B., Spitzer, R. L., Gibbon, M., & Williams, J. B. N. (1996). *Structured clinical interview for DSM-IV Axis I disorders (clinician version)*. Washington, DC: American Psychiatric Press.
- Freeston, M. H., Dugas, M. J., & Ladouceur, R. (1996). Thoughts, images, worry, and anxiety. *Cognitive Therapy and Research, 20*, 265–273. doi:10.1007/BF02229237
- Hackmann, A., Clark, D. M., & McManus, F. (2000). Recurrent images and early memories in social phobia. *Behaviour Research and Therapy, 38*, 601–610. doi:10.1016/S0005-7967(99)00161-8
- Hirsch, C. R., Perman, G., Mathews, A., Borkovec, T. D., & Hayes, S. (2011). *Processing worry in imagery or verbal form: The effect of considering negative or positive outcomes*. Manuscript in preparation.
- Holmes, E. A., Mathews, A., Dalgleish, T., & Mackintosh, B. (2006). Positive interpretation training: Effects of mental imagery versus verbal training on positive mood. *Behavior Therapy, 37*, 237–247. doi:10.1016/j.beth.2006.02.002
- Hoyer, J., Becker, E. S., & Roth, W. T. (2001). Characteristics of worry in GAD patients, social phobics and controls. *Depression and Anxiety, 13*, 89–96. doi:10.1002/da.1021
- Meyer, T. J., Miller, M. L., Metzger, R. L., & Borkovec, T. D. (1990). Development and validation of the Penn State Worry Questionnaire. *Behaviour Research and Therapy, 28*, 487–495. doi:10.1016/0005-7967(90)90135-6
- Newman, M. G., Zuellig, A. R., Kachin, K. E., Constantino, M. J., Przeworski, A., Erickson, T., & Cashman-McGrath, L. (2002). Preliminary reliability and validity of the Generalized Anxiety Disorder Questionnaire-IV: A revised self-report diagnostic measure of generalized anxiety disorder. *Behavior Therapy, 33*, 215–233. doi:10.1016/S0005-7894(02)80026-0
- Schneider, W., Eschman, A., & Zuccolotto, A. (2002). *E-Prime user's guide*. Pittsburgh, PA: Psychology Software Tools Inc.
- Spielberger, C. D., Gorsuch, R. C., Lushene, R. E., Vagg, P. R., & Jacobs, G. A. (1983). *Manual for the State Trait Anxiety Inventory*. Palo Alto, CA: Consulting Psychologists Press.
- Startup, H. M., & Davey, G. C. L. (2001). Mood as input and catastrophic worrying. *Journal of Abnormal Psychology, 110*, 83–96. doi:10.1037/0021-843X.110.1.83
- Stokes, C., & Hirsch, C. R. (2010). Engaging in imagery versus verbal processing of worry: Impact on negative intrusions in high worriers. *Behaviour Research and Therapy, 48*, 418–423. doi:10.1016/j.brat.2009.12.011
- Vasey, M. W., & Borkovec, T. D. (1992). A catastrophizing assessment of worrisome thoughts. *Cognitive Therapy and Research, 16*, 505–520. doi:10.1007/BF01175138
- Zanarini, M. C., Skodol, A. E., Bender, D., Dolan, R., Sanislow, C., Schaefer, E., . . . Gunderson, J. G. (2000). The Collaborative Longitudinal Personality Disorders Study: Reliability of axis I and II diagnoses. *Journal of Personality Disorders, 14*, 291–299. doi:10.1521/pedi.2000.14.4.291

Received November 4, 2010

Revision received April 14, 2011

Accepted May 27, 2011 ■