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Concreteness of idiographic worry and anticipatory processing



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ABSTRACT

Background and objectives: Worry and anticipatory processing are forms of repetitive negative thinking (RNT) that are associated with maladaptive characteristics and negative consequences. One key maladaptive characteristic of worry is its abstract nature (Goldwin & Behar, 2012; Stöber & Borkovec, 2002). Several investigations have relied on inductions of worry that are social-evaluative in nature, which precludes distinctions between worry and RNT about social-evaluative situations. The present study examined similarities and distinctions between worry and anticipatory processing on potentially important maladaptive characteristics.

Methods: Participants ($N = 279$) engaged in idiographic periods of uninstructed mentation, worry, and anticipatory processing and provided thought samples during each minute of each induction. Thought samples were assessed for concreteness, degree of verbal-linguistic activity, and degree of imagery-based activity.

Results: Both worry and anticipatory processing were characterized by reduced concreteness, increased abstraction of thought over time, and a predominance of verbal-linguistic activity. However, worry was more abstract, more verbal-linguistic, and less imagery-based relative to anticipatory processing. Finally, worry demonstrated reductions in verbal-linguistic activity over time, whereas anticipatory processing demonstrated reductions in imagery-based activity over time.

Limitations: Worry was limited to non-social topics to distinguish worry from anticipatory processing, and may not represent worry that is social in nature. Generalizability may also be limited by use of an undergraduate sample.

Conclusions: Results from the present study provide support for Stöber's theory regarding the reduced concreteness of worry, and suggest that although worry and anticipatory processing share some features, they also contain characteristics unique to each process.

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Repetitive thought is associated with both adaptive and maladaptive consequences (Harvey, Watkins, Mansell, & Shafran, 2004; Horowitz, 1985; Segerstrom, Stanton, Alden, & Shortridge, 2003; Watkins, 2008), and may serve as a transdiagnostic factor that explains the high rates of comorbidity between anxiety and mood disorders (Ehring & Watkins, 2008; McEvoy, Mahoney, & Moulds, 2010; McEvoy, Watson, Watkins, & Nathan, 2013; McLaughlin & Nolen-Hoeksema, 2011). Two types of repetitive negative thinking (RNT) that are associated with maladaptive consequences are worry and anticipatory processing. Worry, the

cardinal symptom of generalized anxiety disorder (GAD), is characterized by persistent thoughts about potential future situations or catastrophes and is often intrusive and difficult to control. Worry is associated with increases in distress and negative affect (Borkovec, Robinson, Pruzinsky, & Depree, 1983), interference with problem solving (Dugas, Letarte, Rhéaume, Freeston, & Ladouceur, 1995), and disease vulnerability (Kubzanksy, Kawachi, SpiroWeiss, Vokonas, & Sparrow, 1997; Segerstrom, Solomon, Kemeny, & Fahey, 1998). Anticipatory processing, a process that occurs in social anxiety disorder (SAD), is characterized by mental preparation for future social events by rehearsal of feared outcomes (Clark & Wells, 1995), planning methods of escape or avoidance (Hinrichsen & Clark, 2003), and focusing on perceived failures when recalling past situations or anticipating future ones (Clark & Wells, 1995; Vassilopoulos, 2005). Anticipatory processing is

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experienced more frequently by socially anxious individuals (Hinrichsen & Clark, 2003; Vassilopoulos, 2004, 2008) than those without social anxiety. It is intrusive, interferes with concentration, and leads to an increase in negative affect and anxiety (Clark & Wells, 1995; Hinrichsen & Clark, 2003; Vassilopoulos, 2004, 2005). Anticipatory processing is also associated with increased skin conductance (Wong & Moulds, 2011), increased attentional bias for interoceptive threat (Mills, Grant, Judah, & White, 2014), and poorer performance on a subsequent speech task (Brown & Stopa, 2007).

Distinguishing between worry and anticipatory processing can be challenging because concern about interpersonal situations is the most common worry topic for anxious and non-anxious individuals (Eysenck & Van Berkum, 1992), as well as among individuals with GAD (Hoyer, Becker, & Roth, 2001; Roemer, Molina, & Borkovec, 1997). However, because worry also commonly includes topics related to work, school, finances, and health (Hoyer et al., 2001; Roemer et al., 1997), research that examines worry while limiting the topic of worry to social/interpersonal situations might be more reflective of SAD than GAD and may not reflect the multitude of topics that characterize worry. Although some studies examining the transdiagnostic nature of RNT have found that measures of various forms of RNT (i.e., worry, rumination, post-event processing) load onto a unitary factor (McEvoy et al., 2010), other studies have indeed found that worry and anticipatory processing are separable constructs that differentially predict symptoms of anxiety disorders. For example, Mills, Grant, Lechner, and Judah (2014) found that worry prospectively predicted later social anxiety symptoms as well as trait anxiety, suggesting that worry might serve as a general risk factor for anxiety. In contrast, anticipatory processing did not predict symptoms of social anxiety or other anxiety symptoms; rather, anticipatory processing was predicted by prior symptoms of social anxiety. The authors suggest that anticipatory processing may therefore be specifically related to the maintenance of social anxiety symptoms. Careful examination of the characteristics of both worry and anticipatory processing may provide clues regarding the mechanisms by which these two forms of RNT lead to maladaptive outcomes.

The avoidance theory of worry (Borkovec, Alcaine, & Behar, 2004) suggests that the verbal-linguistic quality of worry serves to decrease physiological reactivity to fear-relevant stimuli, which inhibits emotional responding to distressing stimuli. Importantly, several investigations (e.g., Behar, Zuellig, & Borkovec, 2005; Borkovec & Inz, 1990; Borkovec, Lyonfields, Wiser, & Deihl, 1993; Freeston, Dugas, & Ladouceur, 1996; Hirsch, Hayes, Mathews, Perman, & Borkovec, 2012) have found that worry is predominantly verbal-linguistic as opposed to imagery-based in nature, and that the imagery that does occur is of shorter duration (Hirsch et al., 2012). Such verbal-linguistic activity is associated with less cardiac reactivity (Vrana, Cuthbert, & Lang, 1986), increased thought intrusions (Stokes & Hirsch, 2010), greater attentional bias toward threatening information (Williams, Mathews, & Hirsch, 2014), and less effective emotional processing (Nelson & Harvey, 2002) than is imagery. Consistent with these findings, engaging in worry (versus relaxation or neutral thinking) leads to decreased cardiovascular response during subsequent fear-inducing stimuli among individuals with speech phobia (Borkovec & Hu, 1990) and GAD (Llera & Newman, 2010). Worry also leads to decreased subjective anxiety during subsequent depressive rumination (McLaughlin, Borkovec, & Sibrava, 2007) and trauma recall (Behar et al., 2005), as well as decreased emotional responding during subsequent fear- and sadness-inducing film clips (Llera & Newman, 2010). Such inhibition of emotional and physiological responding indicates incomplete activation of the fear structure, which is theoretically necessary for successful habituation and extinction (Foa & Kozak,

1986). Furthermore, although several studies suggest that worry's inhibitory effects are comparable among selected (i.e., high worriers) and unselected samples (Behar et al., 2005; McLaughlin et al., 2007), some evidence suggests that verbal-linguistic activity during worry is particularly detrimental for high worriers. For example, imagery frequency and duration deficits during worry are more pronounced among individuals with GAD than among healthy controls (Hirsch et al., 2012), and degree of verbal processing interferes with working memory to a greater extent among high worriers relative to low worriers (Leigh & Hirsch, 2011).

Stöber (2000) further suggests that worry inhibits emotional responding due to its abstract nature. Specifically, Stöber posits that worry's abstract nature leads to reductions in thought concreteness, blocking the production of vivid imagery and thereby inhibiting physiological reactivity (Stöber, 1998, 2000; Stöber, Tepperwien, & Staak, 2000). Research has demonstrated that descriptions of worrisome topics and problem elaborations (wherein individuals elaborate on their worrisome topics) are abstract in nature (Stöber & Borkovec, 2002; Stöber, Tepperwien, & Staak, 1998). Additionally, several studies have demonstrated that as individuals engage in worry, their worry becomes more abstract (less concrete) over time (Stöber, 1996a, 1996b; Stöber et al., 1998). However, because these studies examined problem elaborations (see Stöber, 1996b; Stöber, 1998; Stöber et al., 1998) as opposed to the worry process itself, they do not adequately address the question of whether idiographic worry is actually characterized by a reduction in concreteness. Importantly, however, Behar et al. (2012) found that greater concreteness during repetitive thinking about a negative future event was associated with greater imagery-based activity, lending support to Stöber's assertion that concreteness and degree of imagery during worry are intimately linked.

Two studies comparing levels of concreteness during worry and other forms of RNT have yielded mixed findings. Goldwin and Behar (2012) found that both worry and depressive rumination were more abstract compared with an uninstructed period of mentation. In contrast, Behar et al. (2012) examined the concreteness of thoughts during randomly assigned periods of positive, negative, or neutral future-oriented mentation and found that positive and negative thinking were more concrete relative to neutral thinking. Two key methodological differences may explain these discrepant findings. First, Behar et al. (2012) used standardized thought inductions, whereas Goldwin and Behar (2012) asked participants to think about idiographic topics. Second, the negative thought induction utilized by Behar et al. (2012), which entailed asking participants to think about giving a speech, was intended to elicit worrisome thinking but might have been more similar to anticipatory processing than to non-social worrisome thinking.

Although theories of worry focus on the role of verbal-linguistic thought, theories of anticipatory processing focus on the role of imagery. Socially anxious individuals selectively recall and construct negative images of the self when anticipating a social stressor (Chiupka, Moscovitch, & Bielak, 2012; Clark & Wells, 1995; Hackmann, Surawy, & Clark, 1998; Hackmann, Clark, & McManus, 2000; Moscovitch, Gavric, Merrifield, Bielak, & Moscovitch, 2011; Rapee & Heimberg, 1997). In particular, studies have shown that it is the negative content of images that serves to heighten anxiety and impair performance in social situations (Hirsch, Clark, Mathews, & Williams, 2003; Hirsch, Meynen, & Clark, 2004; Vassilopoulos, 2005). Compared to individuals without social anxiety, those high in social anxiety are more likely to retrospectively recall experiencing negative images, and are less likely to recall experiencing positive images in social situations (Hackmann et al., 2000; Moscovitch et al., 2011). Additionally, highly socially anxious individuals report experiencing a greater number of images prior to a speech, and these images are associated with greater

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