

Written Emotional Disclosure about Potential Problems

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Abstract

According to leading psychosocial models of worry, the reduced imagery and concreteness of worries may prevent emotional processing and ultimately maintain fear. Given that Pennebaker's written emotional disclosure paradigm may facilitate emotional processing, the present study investigated whether writing about potential problems about which individuals were worried had physical and psychological health benefits similar to the benefits of writing about other emotionally meaningful topics (e.g., decreased physician visits, reduced symptoms of psychopathology). Participants were randomly assigned to write either emotionally or objectively about a potential problem worrying them or a neutral topic (a 2 x 2 between-participants design). Each group completed four 15-min writing sessions on four consecutive days. Physician visits, generalized anxiety symptoms, trait worry, and problem appraisals were monitored six weeks before (visits), immediately after (all variables), one month after (symptoms, worry, and appraisals), and 3 months after (visits) writing. Contrary to past research, the present research revealed no beneficial effects of written emotional disclosure about potential problems. However, among emotional disclosure participants who wrote about the *same* worry across all four writing sessions, there was a subsequent decrease in trait worry scores one month later. Affective data suggested that disclosure facilitated slight fear activation and habituation, although these effects were small. Potential reasons for these findings and suggestions for future research are discussed.

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Introduction

Despite its pervasiveness, worry had received little attention from psychological researchers until the early 1980s. In fact, some researchers originally questioned whether worry was even a useful construct to study (e.g., O’Neill, 1985a,b). For example, O’Neill argued that worry is a vague term with many different meanings and is an unreliable mental process because it cannot be directly observed. As such, studying worry would contribute little to our understanding of human behavior. However, three decades of research since O’Neill’s claims have indicated that worry *is* an important psychological construct. Indeed, excessive worry is now considered the central feature of generalized anxiety disorder (GAD) and is a common feature of all anxiety disorders (Barlow, 1988; Borkovec, 1994). Furthermore, research aimed at understanding worry may help to improve the effectiveness of treatment for individuals suffering from anxiety disorders.

But what exactly is meant by the term, “worry”? Based on initial research and anecdotal observation, Borkovec, Robinson, Pruzinsky, and DePree (1983) offered the first formal definition of “worry” as a

chain of thoughts and images, negatively affect-laden and relatively uncontrollable. The worry process represents an attempt to engage in mental problem-solving on an issue whose outcome is uncertain but contains the possibility of one or more negative outcomes (p. 10).

Consistent with this definition, phenomenological research has confirmed that worry is an attempt to problem-solve (Davey, 1994), although often an ineffective one (Stober, Tepperwien, & Staak, 2000). In addition, worry is often uncontrollable and distressing (Borkovec, 1994). Also, worry is predominantly negatively affect-laden and focused on

future-oriented negative outcomes (Borkovec et al., 1983). Further, research has indicated that worry is associated with increased perceived likelihood of negative outcomes (MacLeod, 1994; MacLeod, Williams, & Bekerian, 1991). However, the claim that worries consist of chains of “thoughts and images” has not been fully supported, in that researchers have found that worries consist predominantly of thoughts and of a relative lack of imagery (Behar & Borkovec, 2002; Borkovec & Inz, 1990; East & Watts, 1994; Freeston, Dugas, & Ladouceur, 1996)

One important question concerns whether individual differences in worry exist in a dimensional or a categorical manner. The former notion has guided worry research over the past three decades and has begun to receive empirical support. For example, In a taxometric investigation of the latent structure of worry, Ruscio, Borkovec, and Ruscio (2001) confirmed that nonclinical and clinical worry exist on a continuum—the distinction being quantitative rather than qualitative in nature. This distinction is important because if worry exists in a dimensional nature, then worry can be studied throughout the continuum (i.e., in nonclinical samples) and the findings should be relevant to individuals at any point (including the clinical end) of the continuum. Thus, the dimensional nature of worry allows researchers to use nonclinical samples and to reach conclusions cautiously that may enhance psychopathologists’ understanding of GAD. Note that this reasoning does not imply the absence of any differences between pathological and nonpathological worriers. Rather, these differences are continuous in nature. For instance, relative to non-pathological worriers, pathological worriers report their worry to be less controllable (Borkovec, 1994), spend more time engaged in worry

(Craske, Rapee, Jackel, & Barlow, 1989), and typically worry about a greater number of topics (Roemer, Molina, & Borkovec).

The use of nonclinical samples in worry research has led to many important findings about the worry process. One robust finding is that although worry is an attempt to problem solve, it is a distressing activity that does little to resolve problems (Borkovec, 1994). This finding leads one to wonder why people do worry. Borkovec and colleagues maintain that one reason is that they hold a variety of erroneous beliefs about the benefits of worrying (Borkovec et al., 1998; Borkovec, Hazlett-Stevens, & Diaz, 1999). For example, individuals believe that worrying (a) helps them to determine how to prevent the occurrence of undesirable events, (b) decreases the chances of something bad happening, (c) distracts them from more emotional and distressing topics, (d) helps them to prepare for negative experiences, (e) motivates them, and (f) is an effective way to problem-solve. In addition, Davey and colleagues have identified two positive beliefs about worry that distinguish pathological from nonpathological worriers (Davey, Tallis, & Capuzzo, 1996). First, they found that high (but not low) worriers believe in the motivational value of worry (e.g., “In order to get something done I have to worry about it.”). Second, worriers believe that worry aids analytic thinking (e.g., “Worrying gives me the opportunity to analyze situations and work out the pros and cons”; pp. 503-504).

There is little evidence that beliefs about the benefits of worry are accurate. First, although worriers may believe the non-occurrence of the situations they are worrying about indicates that worry successfully prevented the event, this belief is probably unfounded. For example, Borkovec et al. (1998) noted that individuals worry about very low probability events that usually would not have occurred whether the individual had

worried or had not. However, a “superstitious reinforcement paradigm” exists in which individuals may attribute the non-occurrence of such events to their worrying (Borkovec et al., p. 566). Second, the evidence is at best mixed regarding the notion that worry aids in problem solving. Although some studies have found worry and problem solving coping to be positively correlated (e.g., Davey, 1993; Davey, Hampton, Farrell, & Davidson, 1992), others have found worry to be unrelated to problem solving ability and even negatively related to problem solving confidence (e.g., Davey, 1994; Ladouceur, Blais, Freeston, & Dugas). Third, Stober et al. provide a compelling theoretical argument suggesting that worry should be unlikely to aid problem solving. Specifically, worriers usually generate abstract thoughts, whereas successful problem solving may require concrete thinking because appropriate definition and analysis of problems are considered important steps to problem solving (D’Zurilla & Goldfried, 1971). Stober et al. argue that these steps are unlikely to be achieved successfully if individuals’ problem elaborations or thoughts about potential problems are often vague (rather than concrete). In short, a variety of erroneous beliefs about the positive effects of worry may help to explain why individuals engage in the seemingly counterproductive process of worrying.

Beliefs about the benefits of worry are not, however, the only reason why individuals worry. According to Borkovec (1994), they also worry as a form of motivated avoidance of distressing imagery. Borkovec and colleagues noted from their clinical experience that when individuals worry, their mental content comprises a predominance of thoughts and a relative lack of imagery. For example, if an individual is worried about failing an exam, thoughts about failing may be less distressing than images of failing (e.g., a paper with an “F” in red ink on it), as images about emotional material typically

evoke stronger physiological responses than do thoughts about the same material (Vrana, Cuthbert, & Lang, 1986). Note that Borkovec's contention is not that imagery is completely absent during worry, but rather that thoughts are predominant. In fact, there is evidence that imagery and thought activity must occur simultaneously during mentation (e.g., Paivio & Marschark, 1991). Rather, Behar and Borkovec (2002) contend that when individuals worry, distressing images will inevitably enter their minds on occasion. Because distressing imagery increases physiological activity (e.g., Vrana et al.), individuals shift to verbal linguistic thought as a means of reducing this distress. Worry may then become reinforced due to the short-term gain that it provides by reducing emotional distress and/or physiological reactivity to threat-related stimuli (e.g., imagery).

Despite this short-term gain, reduced physiological distress and avoidance of imagery are problematic because they prevent habituation of the anxiety response to the stimulus, according to emotional processing theory (Foa & Kozak, 1986). According to the theory, emotions are represented by information structures in memory. Emotional processing refers to the modification of these memory structures and is considered crucial for the reduction or elimination of fear to occur. According to Foa and Kozak, there are two necessary conditions for emotional processing: First, the entire fear structure in memory must be activated. Second, a change in meaning must occur via exposure to incompatible information. Thus, Borkovec has argued that because worry reduces short-term physiological arousal by helping individuals to avoid processing threatening imagery, it prevents the activation of and thus habituation to the feared stimuli (Borkovec, 1994; Borkovec et al., 1998).

Foa and Kozak (1986) proposed three indicators of emotional processing during psychotherapy. First, increased physiological arousal and self-reported fear indicate the activation of the fear structure. For example, individuals who benefited the most from exposure (and thus, it is assumed, most fully processed their emotions) in two outcome studies showed the greatest increases in heart rates during initial exposure (Borkovec & Sides, 1979; Lang, Melamed, & Hart, 1970). Second, when successful emotional processing occurs, the arousal upon exposure gradually decreases over time *within* sessions of exposure to feared stimuli. Finally, when emotional processing occurs, arousal upon exposure decreases *across* sessions of exposure (e.g., Foa, Grayson, Steketee, Doppelt, Turner, & Latimer, 1983).

To test the theory that a function of worry is to avoid aversive imagery, Borkovec assigned patients with GAD and nonclinical control participants to relax and then to worry for ten minutes each (Borkovec & Inz, 1990). At various intervals, participants were asked through an intercom whether their mental content consisted of thoughts, images, or both (or whether they were unsure). During worry, both participant groups reported the presence of “thoughts” about twice as often as the presence of “images.” This pattern was unique to worry in that during relaxation there was a significant predominance of images for control participants and an even balance of thoughts and images for the GAD patients (see also East & Watts, 1994). Subsequent research has revealed that the predominance of thoughts over imagery is also unique to worry in that it does not extend to another form of distressing mental content: the recall of traumatic experiences, in which imagery is predominant (Behar & Borkovec, 2002).

Although there is now ample evidence that worries do lack imagery, researchers have only begun to examine why they do. Stober argues that worries lack imagery because they lack concreteness (Stober, 1998, 2000; Stober & Borkovec, 2002). He conceptualizes “concrete” thought as being “distinct, situationally specific, unequivocal, clear, singular,” whereas “abstract” thought is “indistinct, cross-situational, equivocal, unclear, aggregated” (p. 231). An example of an abstract thought would be, “I may be a failure.” This statement is cross-situational in that the individual has not restricted the conclusion that he or she is a failure to only one area or situation but instead has reached a broad conclusion about himself or herself. A more concrete corollary thought would be, “I may not do well on my biology final exam.” This thought focuses on a situationally specific, distinct event and does not reach a broad conclusion about the individual but rather only about one particular performance.

According to cognitive research, the level of concreteness of a thought strongly correlates with the degree of imagery associated with it. For example, Pavio and Marschark (1991) found that relative to abstract words, concrete words elicit imagery more easily, quickly, and vividly. In fact, the concreteness of words and the ease with which they elicit imagery correlate at around .80 to .90 (Marschark & Cornoldi, 1991). Based on these findings, Stober (1998) speculated that the reduced concreteness of individuals’ worries may play an important role in the reduced imagery associated with them.

To test this hypothesis, Stober and Borkovec (2002) examined the concreteness of thoughts about potential problems in individuals with high (i.e., participants with GAD) versus low (i.e., nonclinical controls) trait worry. Participants were instructed to describe

two major problems that they were currently worried about and to elaborate on the potential negative consequences associated with the problems. The degree of concreteness of individuals' elaborations of the negative consequences was assessed. As expected, the problem elaborations of high worriers were significantly less concrete than those of low worriers. Furthermore, after successful treatment, the worries of the patients were comparable in concreteness to those of the nonclinical controls. Additional research has shown that even among nonclinical participants, problems about which individuals worry "a great deal" are significantly less concrete than problems about which they worry only "a little" (Stober et al., 2000). Stober and colleagues concluded that the concretization of worries may increase imagery and play a key role in the reduction of pathological worry by facilitating emotional processing (Stober, 2000; Stober et al., 2000; Stober & Borkovec, 2002).

Given that worry lacks imagery and given that exposure to the entire fear structure is necessary to activate and modify fear (Foa & Kozak, 1986), Borkovec and Hu (1990) examined whether worry actually does prevent fear activation. Participants who were speech phobic were randomly assigned to read sentences that characterized worrying about giving a public speech (the worry condition), to read neutral sentences about common daily activities (control condition), or to read sentences about common ways of relaxing (relaxation condition). As expected, when participants later visualized themselves giving a speech, those in the worry condition experienced no cardiovascular response over the prospect of giving a speech, indicating that the fear structure in memory had not been activated. In contrast, participants in the neutral and relaxing conditions experienced arousal over the prospect of giving a speech, indicating that the

fear structure had been activated. Moreover, consistent with the idea that the reduced emotional arousal associated with worry comes at the expense of preventing emotional processing and maintaining fear, the worry group showed significantly greater self-reported fear of the phobic imagery (images of giving a speech). Similarly, Wells and Papageorgiou (1995) reported that worrying about a stressor (a distressing film) led to an increase in intrusive thoughts about the stressor over the next three days compared to a relaxation control condition. Wells and Papageorgiou argued that worry had prevented emotional processing and thus maintained preoccupation with the stressor.

In sum, then, the lack of imagery and the reduced concreteness of worries may prevent individuals from accurately identifying the problem in the actual “here and now.” Instead, they catastrophize about one potential problem leading to another and another. Thus, there is no exposure to the actual problem, as it has become a distant part of the chain of the individuals’ catastrophic thoughts. Lack of exposure to the actual problem leads to decreased arousal. This decreased arousal may be beneficial in the short-term, but it may prevent the fear activation and habituation in the long-term. Thus, increasing the concreteness of and imagery associated with worries may facilitate the activation and processing of individuals’ worries.

It would follow, then, that worry could be reduced if worriers could (a) expose themselves to the images underlying their worries and (b) increase the concreteness of their worries. One means of achieving both goals may be through Pennebaker’s (1997) written emotional disclosure paradigm.

Inspired by the robust finding that emotional expression usually is beneficial, Pennebaker proposed that writing about emotional experiences might be therapeutic. In a

typical written emotional disclosure study, participants are randomly assigned to write about either an emotional topic (e.g., traumatic experiences, adjusting to college, life goals, unemployment) in the experimental disclosure condition or a trivial topic (e.g., how they use their free time) in the control condition. Writing usually occurs for about 15 to 30 minutes each day during anywhere from one to five days. Researchers have investigated a wide range of writing topics, including traumatic experiences, job loss, bereavement, life goals, and positive life experiences. In addition, the beneficial effects of disclosure do not appear to depend on writing topic (Pennebaker, 1997).

Researchers have identified a wide range of benefits of written emotional disclosure in samples as diverse as children, the elderly, honors students, and maximum security prisoners (for a meta-analysis, see Frattaroli, 2006; Harris, 2006; Smyth, 1998). Although disclosure leads to brief increases in distress (Pennebaker, 1997; Smyth, 1998), it also leads to a wide range of long-term positive physical, psychological, and behavioral outcomes. Participants typically maintain these gains at post-writing assessments ranging anywhere from one month (e.g., Greenberg, Wortman, & Stone, 1996) to seventeen months (e.g., Pennebaker, Barger, & Tiebout, 1989). Note that these benefits occur for participants in the written emotional disclosure condition but not in the control condition, demonstrating that writing is effective only when the topic is personally relevant and emotions are expressed.

Physical health benefits include decreased physician visits (e.g., Greenberg & Stone, 1992; Greenberg et al., 1996; Pennebaker & Beall, 1986; Pennebaker & Francis, 1996; Pennebaker, Colder, & Sharp, 1996), improvements in lung functioning among asthma patients and symptom reduction among rheumatoid arthritis patients (Smyth,

Stone, Hurewitz, & Kaell, 1999), and decreased self-reported physical health symptoms (e.g., Greenberb & Stone; Pennebaker & Beal). Written emotional disclosure has also led to improved immune functioning as indicated by t-helper cell growth in response to phytohemagglutinin (Pennebaker, Kiecolt-Glaser, & Glasser, 1988), Hepatitis B antibody levels (Petrie, Booth, Pennebaker, Davison, & Thomas, 1995), natural killer cell activity (Christensen et al., 1996), and Epstein-Barr virus antibody titers (e.g., Esterling, Antoni, Fletcher, Margulies, & Schneiderman, 1994). Behavioral effects of writing include improved grade point averages among undergraduates (e.g., Pennebaker, Colder, & Sharp, 1990), speedier re-employment following job loss (Spera, Buhrfeind, & Pennebaker, 1994), and reduced absenteeism from work (Francis & Pennebaker, 1992). Psychological benefits include reduced distress, negative affect, and depressive symptoms (e.g., Greenberg & Stone, 1992; Greenberg et al., 1996; Muray & Segal, 1994). Note that although some inconsistent findings have emerged regarding the effects of written emotional disclosure (e.g., Broderick, Stone, Smyth, & Kaell, 2004; Graybeal, Sexton, & Pennebaker, 2002; Gidron, Peri, Connolly, & Shalev, 1996; Kloss & Lisman, 2002), meta-analyses have found reliable positive effects (moderate in magnitude; Frattaroli, 2006; Harris, 2006; Smyth, 1998).

Researchers have discussed several possible mechanisms by which written emotional disclosure may lead to improved psychological and physical health outcomes. Pennebaker's initial studies were guided by the notion that not disclosing traumatic experiences was a form of inhibition, which required active effort (Pennebaker, 1988; Pennebaker & Beall, 1986). Pennebaker argued the stress of this prolonged effort contributed to health problems such as infections, ulcers, and hypertension. He further

argued that the more individuals attempt to inhibit thoughts and emotions, the more they think about these thoughts and emotions and the harder they actively work to avoid further thinking about them. In contrast to inhibition, expression of traumatic experiences should reduce stress and facilitate the integration or cognitive reorganization of the experiences. Thus, the benefits of written emotional disclosure may be due to terminating the physiological work of inhibition.

Although inhibition theory guided the initial disclosure research, Pennebaker (1997) has acknowledged that recent studies have challenged the model. For instance, Greenberg and Stone (1992) assigned participants to write about (a) previously undisclosed traumas, (b) previously disclosed traumas, or (c) trivial topics. According to the disinhibition hypothesis, beneficial effects should be greater for writing about previously undisclosed than previously disclosed traumas. However, Greenberg and Stone found no beneficial effects in either writing condition. Greenberg et al. (1996) found even more compelling evidence against the disinhibition hypothesis. Specifically, they found that the benefits of writing about traumas individuals have experienced themselves were comparable to the benefits of writing about traumas that *someone else* had experienced. This study indicates that even in the absence of inhibition, writing about emotional material can have beneficial effects. Thus, the original disclosure/inhibition theory cannot fully account for the effects of written emotional disclosure.

Pennebaker and colleagues have since proposed that narrative formation or cognitive processing is the key mechanism (Pennebaker & Seagal, 1999). Specifically, writing helps individuals to organize and construct a coherent story or narrative about complex emotional experiences. This narrative formation helps them to achieve

resolution with the experiences. Such resolution enhances their perceived control over future emotional experiences and also leads to decreased rumination. This reasoning was sparked by the observation that the essays of individuals who benefited the most from writing appeared to be written more intelligently, thoughtfully, and emotionally. Inspired by this observation, Pennebaker and colleagues created a computer program called the *Linguistic Inquiry and Word Count (LIWC)* to analyze dozens of features of the texts of written essays, including the use of causal (e.g., *because, reason*) and insight (*understand, realize*) words. A robust finding is that individuals who benefit the most from disclosure are the ones whose use of insight and causal words increases from the first to the last writing session (for a review, see Pennebaker, 1997). According to Pennebaker and colleagues, this finding suggests that individuals benefit from writing because it helps them to form a coherent narrative and to achieve resolution with emotional experiences.

A related mechanism highlighted by Sloan and colleagues is that disclosure facilitates exposure to aversive stimuli (Sloan & Marx, 2004; Sloan, Marx, & Epstein, 2005). Sloan and Marx noted that the typical mood effects immediately after writing are consistent with an exposure model. That is, immediately after the first writing session, the disclosure group typically experiences an increase in negative affect relative to the control group, indicating fear activation. However, this negative affect is lower after subsequent writing sessions, indicating habituation. More direct support for the exposure hypothesis has now emerged as well. For example, increased physiological reactivity (salivary cortisol levels) to the first writing session is associated with reduced psychological symptoms for disclosure but not for control participants (Sloan & Marx,

2004; Sloan, Marx, & Epstein, 2005). Further, the decrease in self-reported emotional arousal from the first to the final writing session correlates with beneficial long-term functioning for disclosure but not control participants (Lumley & Provenzano, 2003; Sloan, Marx, & Epstein, 2005). Note, however, that the evidence does not always support exposure models. For example, disclosure sometimes does not lead to fear activation (Bernard, Jackson, & Jones, 2006). In addition, another study found that negative mood did not decrease from the first to the final writing session among disclosure participants (Kloss & Lisman, 2002; McGuire, Greenberg, & Gevirtz, 2005). However, McGuire et al. still found beneficial long-term effects of disclosure on blood pressure and heart rate, indicating that such effects can occur even in the absence of habituation. At this point, it is unclear whether or when exposure mediates written disclosure effects.

Note that although findings of studies testing narrative formation and exposure hypotheses are generally consistent with these theories, they typically do not provide full tests of mediation. Specifically, in these studies there is typically no test of whether the independent variable (writing condition) affects the proposed mediator (causal and insight word use). Instead, only the path from the mediator to the dependent variable is examined. However, one requirement of mediation is that the independent variable cause the mediator (Baron & Kenny, 1986). It is thus unclear whether narrative formation and exposure are causes or merely correlates of improved long-term outcomes.

Pennebaker and Beall (1986) proposed an additional potential mechanism behind the effects of written emotional disclosure. They suggested the effects of written emotional disclosure might result from increased concretization of one's feelings and thoughts. This concretization may result in greater self-knowledge. Note that Pennebaker

and Beall did not define “concretization.” However, they appear to use the term to refer to clarifying and gaining insight into one’s thoughts and feelings. According to Jourard (1971, as cited in Pennebaker & Beal, 1986), poor mental health results when the motive toward self-understanding is blocked. Until individuals disclose their thoughts and feelings, self-understanding is blocked, resulting in poor mental health. Disclosing these thoughts and feelings enables individuals to concretize their thoughts and emotions, which in turn facilitates individuals’ search for self-understanding. This enhanced self-understanding, in turn, leads to better mental health. Although plausible, this concretization account has not been subjected to empirical investigation.

Another possibility is that reductions in anxious and depressive cognitions may account for the beneficial effects of written emotional disclosure. Beck and other cognitive therapists have maintained that cognitions play a crucial role in the development of worry, anxiety, and other forms of psychopathology (e.g., Beck, Emery, & Greenberg 1985; Beck, Rush, Shaw, & Emery, 1979). There is now strong evidence that cognitions do play such a role and that psychotherapy based on modifying cognitions can alleviate worry (e.g., Salkovskis, 1996a). Although past research has revealed that written emotional disclosure can lead to changes in cognitions related to the topic of writing (e.g., increased insight; Pennebaker, 1997), no studies have examined whether written emotional disclosure leads to broader changes in anxious and depressive cognitions or whether these broad changes, in turn, are responsible for the broad effects of written emotional disclosure. As with the concretization viewpoint, this account also has not been investigated.

Thus, there appear to be numerous routes by which written emotional disclosure may lead to enhanced functioning. Given that researchers have found beneficial effects of written disclosure about many different writing topics, one might wonder, why would the effects not extend to worry writing? Despite the breadth of writing topics studied in written emotional disclosure research, no research to date has examined the impact of writing on the experience of worry. Most previous research has examined the impact of writing about *past* problems, but worry of course concerns future problems. However, research on a cognitive bias known as “thought-action fusion” (TAF) raises the possibility that there might not be comparable beneficial effects for writing about potential future negative experiences. Specifically, researchers have found that individuals tend to believe that thinking about an anxiety-provoking future experience may make the experience more likely to occur (Berle & Starcevic, 2005; Shafran, Thordarson, & Rachman, 1996). If this effect were to occur, it could inflate estimates of the likelihood of the problem and thus interfere with writing. It is expected, however, that due to exposure and narrative formation, such writing will be beneficial. Specifically, it is proposed that written emotional disclosure may serve to (a) increase worriers’ exposure to the events and situations of which they are afraid; (b) increase the extent to which their worries are expressed in distinct, concrete (as opposed to abstract), unequivocal, and situationally specific terms; and (c) help individuals to organize and gain insight into their future concerns. These processes should lead to a reduction in the frequency and intensity of worry and anxiety.

In addition to examining the effectiveness of writing about worries, the present study also sought to address a limitation of past research. Most studies have confounded

emotional expression with emotional valence of the writing topic. (For an exception, see Pennebaker & Beall, 1986). That is, conceivably one might write emotionally or neutrally about either an emotional or a neutral topic (producing the 2x2 design shown in Table 1). However, most studies have assessed the effects of writing tasks from only two of these four quadrants (written emotional disclosure about an emotional topic and neutral writing about a neutral topic). Thus, one question is whether or not individuals must access their deepest thoughts and feelings about a meaningful topic, or whether they could just write neutrally, to experience beneficial effects?

Table 1

A Fully Crossed, 2x2 Manipulation of Writing Topic and Writing Instruction

		Writing Topic	
		Emotional	Neutral
Writing Instruction	Emotional		
	Neutral		

This question seems particularly relevant to writing about worries because worries are characterized by threat overestimation. For example, worry results in part from the tendency to see a future threat as catastrophic, highly likely (Borkovec, 1994), and difficult to cope with (Salkovskis, 1996b). Perhaps encouraging participants to view a potential problem from an outsider's neutral (nonemotional) perspective might reduce

worry. With this reasoning in mind, all four quadrants of the 2 x 2 table were included in the present investigation.

An additional rationale guided the inclusion of a condition in which participants wrote objectively about worries. Specifically, some researchers have argued that the trivial topic control condition used typically in disclosure research may lack credibility or may not plausibly appear therapeutic (Greenhalgh, 1999; Lumley & Provenzano, 2003). It is possible, however, that individuals would view writing objectively about and thus gaining distance from worries as a more credible task. Further, in contrast to previous disclosure experiments, the present experiment gave participants in the objective writing condition several suggestions as to how to write objectively and factually. These instructions make this control condition more comparable to the emotional writing condition instructions, which typically include several suggestions on how to write emotionally (Pennebaker, 1994). In fact, Frattaroli's (2006) meta-analysis found stronger effects of disclosure when the instructions give participants specific questions to answer than when such guidance is not given. Thus, a comparable control group should provide similar guidance.

A final issue addressed is whether writing about the same topic or multiple topics during writing sessions would be most beneficial. The standard Pennebaker writing instructions allow participants to switch to a new topic once they feel they have finished their thoughts on the initial topic. As Sloan et al. (2005) note, however, this instruction may be inconsistent with an exposure perspective (and with a cognitive processing perspective, although this perspective is not the focus of their research). According to both exposure and cognitive processing perspectives, writing about the same topic might

be more beneficial. With this reasoning in mind, the present study investigated the potential moderating role of topic consistency, or the extent to which participants wrote about the same (vs. different) topics across writing sessions.

Research Questions

The following questions were addressed in the present studies:

1. What impact does writing about worries have on the frequency and intensity of trait worry and anxiety symptoms?
2. What impact does writing about worries have on more general markers of well-being such as mood and physician visits?
3. To what extent are the benefits of writing about worries associated with any of the following variables:
 - a. increased concretization of thoughts about potential problems;
 - b. emotional processing;
 - c. changes in anxious and depressive cognitions; or
 - d. increased insight;
4. Can nonemotional written disclosure produce beneficial long-term effects?
5. Are the beneficial effects of disclosure restricted to participants who write about the same (as opposed to multiple) worry topic across sessions?

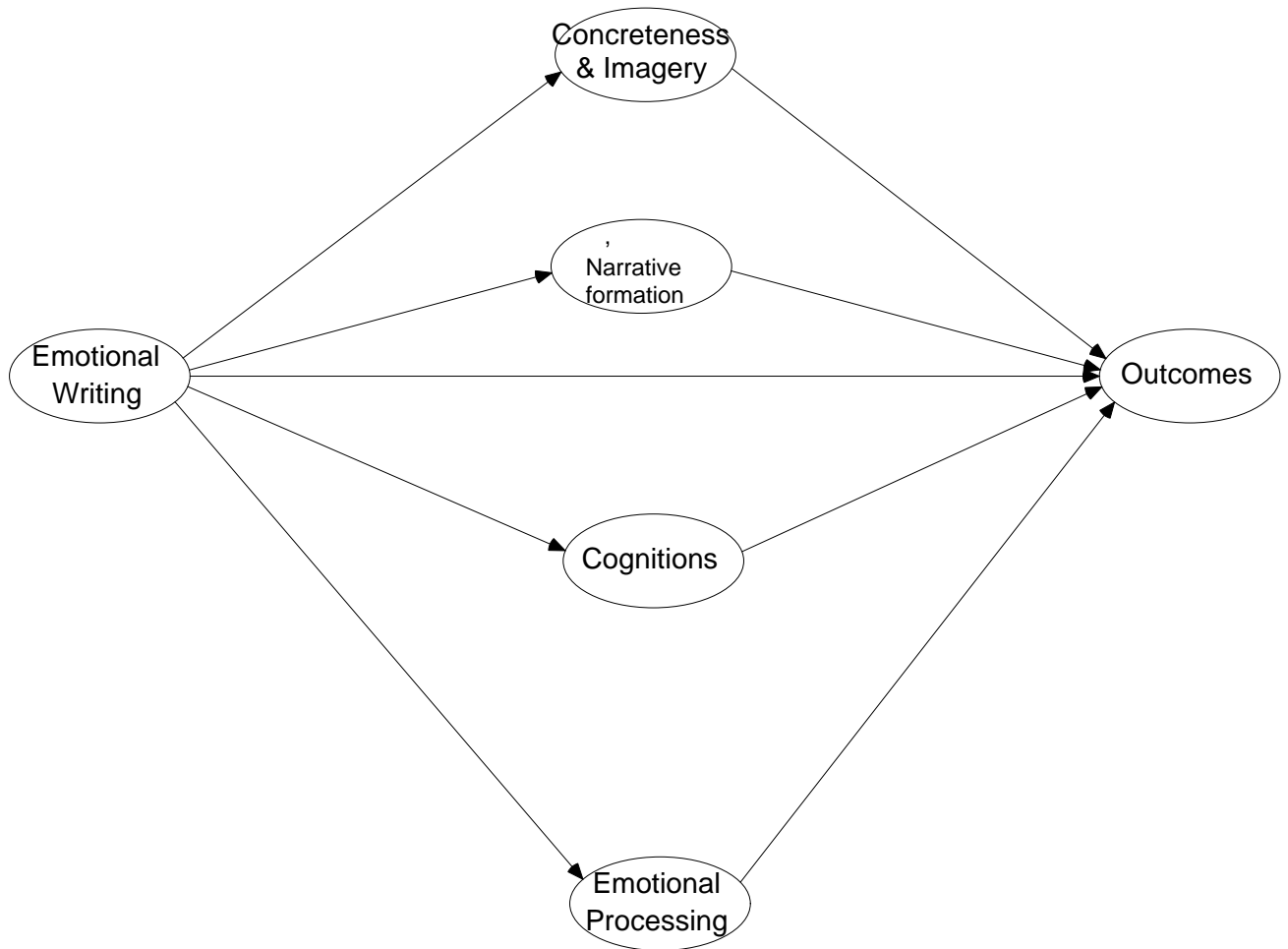
Hypotheses

Written emotional disclosure about potential problems is expected to lead to more adaptive problem appraisals, less trait worry, and fewer physician visits. A full model of the possible pathways through which writing about worries may lead to beneficial outcomes is shown in Figure 1. One or more of the following variables may mediate

these long-term effects: Narrative formation, exposure, reductions in anxious and depressive cognitions, and increased concretization of potential problems. In addition, these effects may be moderated by topic consistency such that only participants who write about the same worry across writing sessions benefit from disclosure.

Support for these hypotheses would indicate that the beneficial effects of writing about other personally meaningful topics (e.g., traumatic experiences, life goals) do in fact extend to writing about worries. Further, they would suggest that writing may serve as a useful tool for nonclinically distressed individuals and would raise the possibility that writing could be useful in clinical samples.

Figure 1: Pathways from Written emotional disclosure to Appraisals of Potential Problems



Note: Outcomes include problem appraisals, trait worry, generalized anxiety symptoms, and physician visits. Time 1 measures of these outcomes were included as covariates in all outcome analyses.

Overview

A nonclinical sample of 143 participants was administered measures of trait worry, GAD symptoms, and anxious and depressive cognitions to assess baseline functioning. They then wrote either emotionally or neutrally for 15 min about either a trivial topic or a future problem about which they were worried. (See Table 2 for full design and condition labels.) After writing, participants' mood was assessed. This

procedure was repeated on three consecutive additional days. Outcome measures assessing trait worry, GAD symptoms, cognitions, and problem appraisals were administered one month later and physician visits were assessed three months later.

Table 2

Design of Present Study

		Writing Topic	
		Emotional	Neutral
Writing Instruction	Emotional	Emotional Writing/Worry	Emotional Writing/Object
	Neutral	Objective Writing/Worry	Objective Writing/Object

Method

Participants

One-hundred forty-three (Age: $M = 19.63$ years, $SD = 2.65$) undergraduate men and women from the University of Waterloo (Ontario, Canada) participated in this study in exchange for either \$6 Cdn for each day of participation ($n = 33$) or for credit in psychology courses ($n = 110$). The sample consisted of 27.5% men. The mean and SD of the sample's age were 19.74 and 4.04, respectively. The sample was 59% White and 22% Asian. African, East Indian, Hispanic, and Middle Eastern each comprised less than 4%. 9.5% selected "other."

Materials

Appraisal of Potential Problem Ratings. These items were developed for the present studies to assess the degree to which participants worried about the potential problem they identified, perceived likelihood and severity of the problem, perceived ability to cope with the problem, and perceived presence of external factors that would help them to cope with the problem. (See Appendix A.) These items reflect four key factors that determine individuals' anxiety over perceived threat (Salkovskis, 1996b). These ratings will serve to gauge changes in problem appraisals as a function of writing condition.

Penn State Worry Questionnaire. The *PSWQ* is a well-validated measure of trait worry comprising 16 items responded to on a 5 point scale (1 = not at all typical of me, 5 = very typical of me). The questionnaire has good internal consistency and test-retest reliability and good convergent and discriminant validity. It is also sensitive to changes in

trait worry as a result of psychotherapy (Meyer et al., 1990; for a review, see Molina & Borkovec, 1994).

Generalized Anxiety Disorder Questionnaire—IV (GADQ—IV; Newman et al., 2002). The *GADQ—IV* is a revision of the *GADQ* (Roemer, Borkovec, Posa, & Borkovec, 1995). The measure was developed to assess worry and physiological arousal—the two cardinal features of generalized anxiety disorder. The questionnaire has good reliability and good convergent and discriminant validity.

Physician Visits. The director of the University’s Health Services recorded the number of times participants in this study had visited the Health Services for illness six weeks prior to and twelve weeks after writing and sent this information to the author. Physician visits were recorded according to Pennebaker’s (1994) guidelines. Specifically, an illness visit was defined as a visit for any presenting symptoms (e.g., sore throat, swollen eye). Visits due to injuries (e.g., having a splinter removed) and repeat visits for the same problem within seven days of the initial visit were excluded. Note that if the student visited Health Services for the same problem eight or more days after the initial visit, two visits would be recorded. Also, if the student visited Health Services twice in the same week for two separate problems, two visits would be recorded. Note that all participants signed a release form authorizing use of their Health Service’s data.

Positive and Negative Affect Scales—State Version (PANAS; Watson, Clark, & Tellegen, 1988). The *PANAS* is a well-validated, frequently used measure of mood. The scale contains ten words (e.g., “enthusiastic”) assessing positive and ten words (e.g., “afraid”) assessing negative mood. Items are rated on a five-point scale ranging from 1 to

5. Instructions can be modified to assess overall mood within a specified time period. In the present study, participants rated their mood “right now.”

Cognition Checklist (CCL; Beck, Brown, Steer, Eidelson, & Riskind, 1987). The *CCL* contains 14 items (*CCL-D*) assessing depression-related and 12 items (*CCL-A*) assessing anxiety-related automatic cognitions. Participants respond to items on a 5 point scale (0 = Never, 4 = always). Both subscales have good reliability, discriminate validity, and convergent validity (Beck et al.; Roemer, 2001).

Text analyses. Participants’ written material was analyzed using the *Linguistic Inquiry and Word Count (LIWC; Pennebaker, Francis, & Booth, 2001)*. The LIWC is a computer program that Pennebaker et al. developed by instructing groups of judges to evaluate the extent to which over 2,000 words or word stems related to each of dozens of categories. Specifically, the LIWC assesses the proportion of total words in a text that fall into specific categories. The analyses below tested for group differences in causal (*because, reason*) and insight words (*understand, realize*), emotional valence of writing (i.e., positive or negative), and temporal reference writing (e.g., past, present, future). The *LIWC* has been used in past written emotional disclosure research (e.g., Pennebaker & Francis, 1996).

The concreteness of participants’ text was assessed using Coh-Metrix, a well-validated program that assesses over 200 properties of words (Graesser, McNamara, Louwerse, & Cai, 2004). Coh-Metrix’s concreteness ratings are based on ratings of 150,837 words in Coltheart’s (1981) Psycholinguistic Database. Scores for each word are derived from a merging of the Pavio, Colerado, and Gilhooly-Logie norms (Graesser et

al., 2004). Concreteness values range between 100 and 700, with higher values indicating higher concreteness.

Text from all four writing days and the one month follow-up assessment were analyzed with both the LIWC and Coh-Metrix. Text from the one-month follow-up assessment were also rated independently by two individuals with regard to the degree of concreteness and extent of imagery evoked by each sentence based on Stober (2004, Personal Communication; See Appendix B). A mean concreteness and imagery rating for each rater was thus obtained. Because these four values were high in internal consistency ($\alpha = .802$), one overall mean was calculated for each participant to represent overall sentence concreteness. This concreteness value also correlated significantly with the Coh-Metrix concreteness scores ($r = .39, p < .001$).

Consistency of Writing Topic. One coder evaluated the written text of participants from the two worry conditions to assess whether they had written about the same topic in each writing session or had changed topics. Note that participants who wrote about multiple issues (e.g., worrying about getting enough sleep to perform well on tests, worrying about getting good grades) that all revolved around the same theme (e.g., getting into graduate school) were classified as writing about one topic, because the other issues were a component of the topic. The same rater evaluated whether participants in the two object writing conditions had written about the same object in all four writing sessions.

Topic Identification and Writing Instructions. All participants identified and briefly described the most significant problem worrying them and the most important object in their room (as described in Appendix C). Participants were instructed to write

emotionally or objectively about either the object in their room or the problem worrying them (as described in Appendix D). Researchers have used similar control writing topics (Pennebaker, 1997), although they have not fully crossed emotion expression with emotion valence in a 2 x 2 design. The emotional writing instructions encouraged participants to “really let go and explore your deepest emotions and thoughts.” To make the emotional writing/object condition as comparable as possible to the emotional writing/worry condition with respect to emotional expression, the former group received the same encouragement “really let go and explore your deepest emotions and thoughts.” In contrast, objective writing instructions encouraged participants to be as objective and factual as possible. Several questions to guide participants’ writing were also included and appear in Appendix D.

Procedure

Undergraduates were invited to participate in a study involving “writing about life events.” They were informed that participating in the study would involve writing about a topic (possibly future problems they were worried about) on four consecutive days and would involve coming to the laboratory on one additional occasion one month later. The experimenter emphasized that it was essential that participants come to the laboratory on all five occasions and that they should not agree to participate if they did not believe they could fulfill this requirement. Such a procedure has worked successfully at this university (Ferguson, 1993) and in over one-hundred studies elsewhere (Frattaroli, 2006).

On the first day, participants completed the *PSWQ*, the *GADQ—IV*, and the *CCL*. These scores served as the pre-experimental (time 1) assessment to ensure equivalency across experimental groups and were also used as covariates in the analyses of long-term

outcomes, as in previous studies. Next, all participants identified the most significant potential problem about which they were worried. Participants were then randomly assigned to write for fifteen minutes about either a trivial topic or the future problem. After this writing task, participants completed the *PANAS*, marking the end of participation for the first day. On days 2, 3, and 4 of participation, the procedure was the same except that the individual difference measures (i.e., the *PSWQ*, *GADQ—IV*, *CCL*), were not administered. After the fourth writing session participants received a “partial debriefing” summarizing the tasks the participant had completed and explaining why a full debriefing could not be provided until all long-term data had been collected.

One month after the final writing session, participants came back to the laboratory to complete the *PSWQ*, *GADQ—IV*, *CCL*, and Appraisal of Potential Problem items. Participants were shown their brief description on day 1 of the potential problem worrying them as a reminder. Next, they typed a description of their potential problem for five minutes. The text of this writing was analyzed to assess whether writing condition impacted how participants subsequently described their potential problems. (See Appendix E for specific instructions.) After completing this writing task, all participants were thanked for their time. They also received a second “partial debriefing.” Finally, three months after writing (when all physician visit data were collected), participants were fully debriefed via electronic mail.

Results

Content of Individuals' Worries and Objects. Participants' worries were classified based on content into the ten domains comprising the *Student Worry Scale* (Davey et al., 1992). An eleventh category labeled "other" was used for worries that did not fall into the ten domains or overlapped multiple domains with no clear focus on one domain. The most common worry topic was academic demands (37.8%) followed by personal relationships (20.3%), job prospects (18.2), health (11.2%), other (7.0%), what people think of me (2.1%), financial concerns (2.1%), accommodation (0.7%), and world affairs (0.7%). The objects participants wrote about were classified as follows: sentimental items/gifts (40.0%); photographs of family, friends, or romantic partners (11.7%); computers (11.7%), religious symbols (10.0%); musical instruments (5.0%); art work (3.3%); and other (20.0%; e.g., "an Ikea table").

Approach to analyses of direct effects. The first set of main analyses tested whether long-term psychological and physical health effects differed by experimental condition. The effects of writing were examined using dummy coding in multiple regression as instructed by Hardy (1993). Specifically, the time 1 measure of the variable being predicted at time 2 was entered as a covariate in step 1 of all analyses. Dummy coded variables reflecting each experimental condition were entered in step 2.¹ A significant change in R^2 from step 1 would indicate that experimental condition influenced time 2 scores independent of time 1 scores. That is, this finding would indicate that the means of at least two experimental conditions differed significantly from each other on the dependent variable. The nature of this effect would be ascertained by comparing the regression coefficients for the dummy vector representing each condition.

Approach to mediational analyses. The second set examined potential mediators and moderators of the long-term effects of writing. Although many approaches to testing for mediation exist, MacKinnon and colleagues found in a large simulation study that the best balance between type I and II errors was achieved in a two-step approach that examines the joint significance of the two paths comprising the mediated effect (Mackinnon, Lockwood, Hoffman, West, & Sheets, 2002). First, the independent variable must influence the hypothesized mediator. In the present research, this effect would be indicated by differences in means between writing groups on the hypothesized mediator. Second, the hypothesized mediator must influence the dependent variable. This effect would be indicated by a significant multiple regression coefficient for the path from the hypothesized mediator to the dependent variable. In addition, the present analyses explored whether any hypothesized mediators affected outcomes only for certain writing conditions (i.e., moderated mediation). For example, emotional processing may be linked to outcomes only for written emotional disclosure participants.

Because the hypothesized mediators were comprised of changes over time, tests of mediation were complex. That is, emotional disclosure was expected to lead to *increases* in insight and causal word use and concreteness and *decreases* in immediate post-writing negative affect from days 1 to 4. These changes were expected to lead to reduced long-term trait worry and physician visits and more adaptive problem appraisals. Because the mediator was measured at multiple time points, repeated measures ANOVAs were used to examine the impact of the independent variable (writing condition) on the hypothesized mediator. The effect of the hypothesized mediator on outcomes was examined in multiple regression. Specifically, in the first two steps, covariates and

condition dummy vectors were entered as in the main effect analyses described above. In the next step, scores on the hypothesized mediator on days 1 and 4 were entered. If the effect of day 4 were significant, it would support the second component of mediation: changes in the mediator (from day 1 to day 4) impacted outcomes. In other words, day 4 scores after removing variance in day 1 scores affected outcomes. Finally, the interaction between day 4 scores and condition was explored in the next step to assess whether changes in the proposed mediator affected outcomes differently as a function of experimental condition.

Diagnostics. Standardized scores were created for all variables analyzed. Data points were excluded from analyses if they deviated from the mean by three or more standard deviations and were discontinuous from the rest of the distribution. One individual's data were excluded because her age was 9.2 standard deviations above the mean. Cases were also excluded from multiple regression analyses if the absolute value of their standardized DFBETAS was greater than 1, indicating undue influence (as recommended by Neter, Wasserman, and Kitner 1989, cited in Pedhazur, 1997). In the ANOVAs below, Cook's distance values and standardized residuals were examined. Analyses were performed both including and excluding cases with scores that were discontinuous from the rest of the sample. It is noted in the text whether or not excluding the cases of influence meaningfully changed the results. Any change in which a nonsignificant effect ($p > .05$) becomes statistically significant ($p < .05$) or a significant effect becomes nonsignificant is considered a "meaningful change," whereas any change in statistical significance that does involve a change from above to below or below to above the .05 alpha level is considered not meaningful for present purposes.

Note that three participants' data were excluded from all analyses because they were accidentally given the experimental instructions for the wrong group on one of the four writing days. Nineteen more participants were excluded because they were unavailable for the one-month follow-up. The completion rate (86.8%) is comparable to that of most expressive writing studies. Note that drop-outs did not differ from completers on any time 1 variables ($ps > .21$). The use of a completion rather than an intention-to-treat analysis is the standard decision in written emotional disclosure research (Meads, Lyons, & Carroll, 2003).

Preliminary Analyses

Means and standard deviations for all main variables appear for the full sample and by condition in Table 3. Correlations between these variables appear in Table 4. The means, standard deviations, and correlations are all generally within the expected range.

Table 3

Means by Condition and for Full Sample

<i>Variable</i>	<i>EW/W</i>		<i>OW/W</i>		<i>EW/O</i>		<i>OW/O</i>		<i>Full</i>	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
<i>Phys. Vis_T1</i>	0.37	1.00	0.24	0.58	0.13	0.34	0.10	0.31	0.22	0.62
<i>Phys. Vis_T2</i>	0.40	1.33	0.38	1.18	0.35	1.05	0.28	0.59	0.36	1.06
<i>Prob. Appraise.</i>	5.24	1.84	5.16	1.40	5.22	1.83	5.60	1.61	5.30	1.66

Table 3 (Continued)

Means by Condition and for Full Sample

<i>Variable</i>	<i>EW/W</i>		<i>OW/W</i>		<i>EW/O</i>		<i>OW/O</i>		<i>Full</i>	
<i>PANAS_NA_D1</i>	2.13	0.84	1.70	0.48	1.56	0.42	1.41	0.40	1.71	0.62
<i>PANAS_NA_D4</i>	1.83	0.72	1.42	0.38	1.47	0.53	1.31	0.40	1.51	0.55
<i>Worry_T1</i>	0.02	0.94	-0.05	1.07	-0.09	1.07	0.19	0.90	0.00	1.00
<i>Worry_T2</i>	0.09	0.97	-0.07	0.97	-0.14	1.10	0.19	0.94	0.00	1.00
<i>CCL_A_T1</i>	1.08	0.82	0.63	0.49	0.83	0.60	0.87	0.71	0.85	0.67
<i>CCL_A_T2</i>	0.98	0.82	0.71	0.64	0.78	0.55	0.97	0.79	0.83	0.69

Note: EW/W = Emotional Writing about Worries; OW/W = Objective Writing about Worries; EW/O = Emotional Writing about Objects; OW/O = Objective Writing about Objects; T1 = Time 1; T2 = Time 2; Phys. Vis = Physician Visits; Prob. Appraise. = Problem Appraisals; PANAS_NA_D1 and PANAS_NA_D4 = Positive and Negative Affect Schedule—Negative Affect scores on days 1 and 4, respectively; Worry = Worry Factor Scores; CCL_A = Cognition Checklist—Anxiety.

Table 3 (Continued)

Means by Condition and for Full Sample

<i>Variable</i>	<i>EW/W</i>		<i>OW/W</i>		<i>EW/O</i>		<i>OW/O</i>		<i>Full</i>	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
<i>CCL_D_T1</i>	1.07	0.81	0.78	0.52	0.93	0.73	1.10	0.87	0.96	0.75
<i>CCL_D_T2</i>	1.06	0.90	0.82	0.63	0.87	0.76	1.17	0.85	0.97	0.79

Note: EW/W = Emotional Writing about Worries; OW/W = Objective Writing about Worries; EW/O = Emotional Writing about Objects; OW/O = Objective Writing about Objects; T1 = Time 1; T2 = Time 2; CCL_D = Cognition Checklist—Depression

Table 4

Correlations among Dependent Measures

	Phys. Vis_ T1	Phys. Vis_ T2	PSWQ_ T1	PSWQ_ T2	GADQ -- IV_T1	GADQ-- IV_T2	CCL— A_T1
Phys. Vis_T1	1	.63**	.01	.05	.13	.14	.07
Phys. Vis_T2	.63**	1	.13	.16	.23*	.28**	.14
PSWQ_T1	.01	.13	1	.89**	.78**	.74**	.50**
PSWQ_T2	.05	.16	.89**	1	.78**	.84**	.47**
GADQ-- IV_T1	.13	.23*	.78**	.78**	1	.85**	.59**
GADQ-- IV_T2	.14	.28**	.74**	.84**	.85**	1	.54**
CCL— A_T1	.07	.14	.50**	.47**	.59**	.54**	1
CCL— A_T2	.12	.25**	.46**	.56**	.59**	.66**	.78**
CCL— D_T1	.03	.12	.55**	.56**	.57**	.53**	.63**
CCL— D_T2	.09	.20*	.51**	.59**	.57**	.58**	.56**
PANAS— NA_D1	-.09	-.09	.27**	.21*	.32**	.26**	.22*
PANAS— NA_D4	-.08	-.03	.16	.17	.25**	.20*	.25**
Worry_T1	.10	.24**	.75**	.85**	.81**	.87**	.67**
Worry_T2	.06	.18	.84**	.80**	.87**	.79**	.76**
Prob. Appraise.	-.02	.08	.51**	.54**	.54**	.53**	.43**

*Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

Note: T1 = Time 1; T2 = Time 2; Phys. Vis. = Physician Visits; PSWQ = Penn State Worry Questionnaire; GADQ—IV = Generalized Anxiety Disorder Questionnaire—IV; CCL—A = Cognition Checklist—Anxiety; CCL—D = Cognition Checklist—Depression; PANAS—NA = Positive and Negative Affect Schedule—Negative Affect (D1 and D4 = Days 1 and Days 4, respectively); Worry = factor analytically derived scores based on analyses at each time period of the PSWQ and GADQ; Prob. Appraise. = Problem Appraisals.

Table 4 (Continued)

Correlations among Dependent Measures

	CCL— A_T2	CCL— D_T1	CCL— D_T2	PANA S— NA_ D1	PANA S— NA_ D4	Worry_ T1	Worry_ T2
Phys. Vis_T1	.12	.023	.09	-.09	-.08	.10	.06
Phys. Vis_T2	.25**	.12	.20*	-.09	-.03	.24**	.18
PSWQ_T1	.46**	.55**	.51**	.27**	.16	.75**	.84**
PSWQ_T2	.56**	.56**	.59**	.21*	.17	.85**	.80**
GADQ--IV_T1	.59**	.57**	.57**	.32**	.25**	.81**	.87**
GADQ--IV_T2	.66**	.53**	.58**	.26**	.20*	.87**	.79**
CCL—A_T1	.78**	.63**	.56**	.22*	.25**	.67**	.76**
CCL—A_T2	1	.63**	.69**	.15	.20*	.82**	.72**
CCL—D_T1	.63**	1	.90**	.21*	.24**	.77**	.82**
CCL—D_T2	.69**	.90**	1	.15	.21*	.83**	.76**
PANAS—NA_ D1	.15	.21*	.15	1	.60**	.23*	.31**
PANAS—NA_ D4	.20*	.24**	.21*	.60**	1	.24**	.28**
Worry_T1	.819**	.769**	.834**	.225*	.237**	1	.906**
Worry_T2	.72**	.82**	.76**	.31**	.28**	.91**	1
Prob. Apprais.	.51**	.59**	.63**	.21*	.23*	.33**	.56**

*Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

Note: T1 = Time 1; T2 = Time 2; Phys. Vis. = Physician Visits; PSWQ = Penn State Worry Questionnaire; GADQ—IV = Generalized Anxiety Disorder Questionnaire—IV; CCL—A = Cognition Checklist—Anxiety; CCL—D = Cognition Checklist—Depression; PANAS—NA = Positive and Negative Affect Schedule—Negative Affect (D1 and D4 = Days 1 and Days 4, respectively); Worry = factor analytically derived scores based on analyses at each time period of the PSWQ and GADQ; Prob. Apprais. = Problem Appraisals.

Manipulation Checks

Total negative and total positive emotion expression variables were created by summing the proportion of negative and positive emotion words (as identified by the LIWC) expressed on each day for each participant. A similar approach was used to create a variable reflecting future time-orientation of participants' written text. Univariate

ANOVAs revealed significant between-group differences on all three above variables, ($ps < .001$). All effects were explored with Tukey post-hoc analyses and are reported below. See Table 5 for all group means.

Table 5

Word Usage by Group

	EW/W	OW/W	EW/O	OW/O
Past	3.22 (1.73)	2.61 (1.81)	3.61 (1.31)	3.36 (1.17)
Present	10.97 (2.23)	10.97 (2.50)	10.53 (1.83)	9.43 (1.81)
Future	1.56 (0.62)	2.35 (0.91)	1.14 (0.43)	0.94 (0.50)
Negative Emotion	2.89 (0.89)	2.24 (0.94)	1.45 (0.54)	0.95 (0.41)
Positive Emotion	2.34 (0.65)	2.24 (0.85)	2.94 (0.74)	1.89 (0.66)
Causal	1.38 (0.47)	1.36 (0.60)	1.14 (0.46)	1.19 (0.54)
Insight	2.57 (0.76)	2.58 (0.75)	2.35 (0.68)	1.10 (0.42)

Note: EW = Emotional Writing/Worry; OW/W = Objective Writing/Worry; EW/O = Emotional Writing/Object; OW/O = Objective Writing/Object. Numerical values represent the group mean proportion of total words that fall into the relevant category. Standard deviations are in parentheses.

There was a main effect of condition on use of future-time orientation words in text, $F(3, 116) = 26.84, p < .001$. As expected, both worry conditions expressed significantly greater future orientation than did the objective object condition ($ps < .01$). The two worry groups also expressed more future orientation than the emotional object condition, although the difference between the emotional worry and emotional object condition was only marginally significant ($p < .06$). The only additional difference was significantly higher future orientation in the emotional worry than in the objective worry

condition ($p < .001$). Thus, findings generally supported the prediction that worry writing would lead to greater future orientation than would control writing.

There was also a main effect of condition on use of negative emotion words, $F(3, 116) = 32.79, p < .001$. As hypothesized, the emotional writing/worry group used significantly more negative emotion words than the other three conditions (all $ps < .01$). Contrary to expectations, however, the emotional writing/object group used *fewer* negative emotion words than did the objective writing/worry group ($p < .01$). The emotional writing/object group used more negative emotion words than did the objective writing/object group ($p < .04$). In addition, the objective writing/worry group used significantly more negative emotion words than did the emotional writing/object and objective writing/object conditions ($ps < .001$). No other significant between-group differences emerged. Note that the results did not change meaningfully when one point with a high Cook's distance value was eliminated. Thus, as instructed, participants in the emotional writing/worry and emotional writing/object groups did indeed express more negative emotion (although the latter group did not express more negative emotion than the objective writing/worry group).

Predicting Physician Visits

Independent of baseline physician visits, experimental condition was expected to influence visits such that at Time 2 the emotional disclosure group would have the fewest visits. Thus, in step 1, time 1 physician visits were entered as a covariate. In step 2, three dummy coded vectors were entered to represent the four experimental conditions.

In step 1, time 1 physician visits significantly predicted time 2 visits ($\beta = .63, p < .001$). Contrary to expectations, the change in R^2 from steps 1 to 2 was nonsignificant (p

= .89), indicating that experimental condition did not influence physician visits. Note that the statistical significance of no predictors changed meaningfully when the analysis was repeated without one case that exerted extreme influence. (See Table 6 for regression statistics.)

Table 6

Summary of Hierarchical Regression Analysis for Variables Predicting Time 2 Physician Visits

Variable	<i>B</i>	<i>SE B</i>	β
Step 1			
Time 1 physician visits	1.07	0.12	.61**
Step 2			
Time 1 physician visits	1.08	0.12	.64**
Emotion Writing/Worry dummy variable	-0.08	0.22	-.03
Objective Writing/Worry dummy variable	-0.01	0.22	-.01
Emotional Writing/Object dummy variable	0.09	0.21	.04

Note. $R^2 = .40$ for step 1; $\Delta R^2 = .00$ for Step 2 ($p = .90$)

** $p < .01$, * $p < .05$

Obtaining Worry Scores via Data Reduction

Two self-report indicators of worry (the *PSWQ* and *GADQ—IV*) were measured at times 1 and 2. All items from these two measures were entered in a factor analysis from the time 1 assessment and a separate factor analysis from the time 2 assessment. Based on the eigenvalue greater than 1 rule and examination of the scree plot, principle component analyses indicated a one-factor solution best accounted for the data at each

time point. This one factor, labeled “worry,” accounted for 69.2 and 73.3% of the variance at times 1 and 2, respectively. Regression-based factor scores were used in subsequent analyses.

Predicting Worry

Independent of baseline worry, experimental condition was expected to influence Time 2 worry such that the emotional disclosure/worry group would have the fewest visits. The approach to data analysis mirrored that for predicting physician visits. Thus, in step 1, time 1 worry was entered as a covariate. In step 2, three dummy coded vectors were entered to represent the four experimental conditions. In step 1, the only significant predictor of Time 2 worry was Time 1 worry ($\beta = .61, p < .001$). Contrary to expectations, the change in R^2 from step 1 to step 2 was nonsignificant ($p = .86$), indicating that experimental condition did not influence worry scores. (See Table 7 for regression statistics.)

Table 7

Summary of Hierarchical Regression Analysis for Variables Predicting Time 2 Worry

Variable	<i>B</i>	<i>SE B</i>	β
Step 1			
Time 1 Worry	0.60	0.07	.61**
Step 2			
Time 1 Worry	0.59	0.08	.60**
Emotion Writing/Worry dummy variable	-0.07	0.21	-.03
Objective Writing/Worry dummy variable	-0.17	0.21	-.07
Emotional Writing/Object dummy variable	0.14	0.21	-.06

Note. $R^2 = .37$ for step 1; $\Delta R^2 = .00$ for Step 2 ($p = .86$)
 ** $p < .01$, * $p < .05$

Predicting Appraisal of Potential Problems

The emotional writing/worry condition was expected to have the least pathological problem appraisals. An analysis with three dummy coded vectors representing the four experimental conditions entered in a regression equation as predictors appraisals was nonsignificant ($p = .75$). Thus, problem appraisals were comparable across conditions one month post-writing. (See Table 8 for regression statistics.)²

Table 8

Summary of Hierarchical Regression Analysis for Variables Predicting Problem Appraisals

Variable	<i>B</i>	<i>SE B</i>	β
Step 1			
Emotion Writing/Worry dummy variable	-0.07	0.44	-.02
Objective Writing/Worry dummy variable	0.02	0.44	.00
Emotional Writing/Object dummy variable	0.36	0.44	.10

Note. $R^2 = .10$ for step 1
 * $p < .05$

Negative Affect Mediation

The first potential mediator examined was negative affect. Recall that a decrease in immediate post-writing negative affect from days 1 to 4 was expected to predict beneficial outcomes (fewer physician visits, less worry, more adaptive problem appraisals) at time 2, but only for the emotional disclosure/worry group. Thus, the first analysis examined whether condition affected the change in negative affect from days 1 to 4. Thus, a 2 x 4 (time 1: day 1 vs 4 x experimental condition) repeated measures ANOVA was conducted with time as the within- and experimental condition as the between-participants factors. A significant main effect of condition with Tukey post-hoc analyses indicated that, as expected, the mean for *PANAS*—*NA* scores was significantly higher for the emotional writing/worry group than for the other three groups, indicating fear activation, $F(3, 116) = 7.48, p < .01$. (See Table 9 for ANOVA statistics.) No other between-group effects were statistically significant. A main effect of time indicated that negative mood dropped slightly from days 1 ($M = 1.71, SD = .61$) to 4 ($M = 1.51, SD = .55$), $F(3, 116) = 18.34, p < .01$. Contrary to expectation, however, there was no significant interaction between time and experimental condition ($p = .20$), indicating that the change in negative mood from days 1 to 4 did not differ depending on experimental condition. Note that removing one case with a high Cook's distance value did not alter the results meaningfully. The nonsignificant interaction indicates that condition did not impact the hypothesized mediator (drop in negative affect from days 1 to 4).

Table 9
Analysis of Variance for Negative Affect

Source	<i>df</i>	<i>F</i>	η	<i>p</i>
Between subjects				
Condition	3	7.475	.16	.01
Error	116	(.47)		
Within subjects				
Time	1	18.34	.14	.01
Time*Condition	3	1.57	.04	.20
Error	116	(.14)		

Note. Values enclosed in parentheses represent mean square errors.

Although condition did not affect changes in negative affect, it is still possible that such changes affected outcomes. As a test of this possibility, the same variables were entered in steps 1 and 2 to predict physician visits as in the main effect analyses reported above. The results of these two steps are not repeated here. In step 3, post-writing negative affect scores for days 1 and 4 were entered. A significant change in R^2 , and more specifically, a significant effect of day 4, would indicate that changes in negative affect predicted visits. However, no such effect emerged ($p = .83$). In step 4, cross-products between each dummy coded vector and day 4 negative affect were entered. A significant change in R^2 would indicate that changes in negative affect between days 1 and 4 related to time 2 physician visits differently as a function of experimental condition. This step also did not reach significance ($p = .21$). See Table 10 for all regression statistics.

Table 10

Summary of Hierarchical Regression Analysis for Variables Predicting Time 2 Physician Visits with Condition, Negative Affect, and Their Interaction

Variable	<i>B</i>	<i>SE B</i>	β
Step 1			
Time 1 physician visits	1.07	0.12	.61**
Step 2			
Time 1 physician visits	1.08	0.12	.64**
EW/W dummy variable	-0.08	0.22	-.03
OW/W dummy variable	-0.01	0.22	-.01
EW/O dummy variable	0.09	0.21	.04
Step 3			
Time 1 physician visits	0.54	0.06	.64**
EW/W dummy variable	-0.04	0.12	-.03
OW/W dummy variable	0.00	0.11	.00
EW/O dummy variable	0.04	0.11	.04
PANAS_NA_D1	-0.02	0.05	-.05
PANAS_NA_D4	0.03	0.05	.05
Step 4			
Time 1 physician visits	0.54	0.06	.64**
EW/W dummy variable	-0.02	0.12	-.02
OW/W dummy variable	0.01	0.12	.00
EW/O dummy variable	0.07	0.11	.6

PANAS_NA_D1	-0.01	0.05	-.01
PANAS_NA_D4	-0.09	0.10	-.17
EW/W dummy variable*PANAS_NA_D4	0.10	0.11	.13
OW/W dummy variable*PANAS_NA_D4	-0.00	0.15	-.00
EW/O dummy variable*PANAS_NA_D4	0.23	0.13	.21

Note. $R^2 = .40$ for step 1; $\Delta R^2 = .00$ for Step 2 ($p = .90$); $\Delta R^2 = .00$ for Step 3 ($p = .83$); $\Delta R^2 = .02$ for Step for Step 4 ($p = .21$).

EW/W dummy variable = Emotion Writing/Worry dummy variable; OW/W dummy variable = Objective Writing/Worry dummy variable; and EW/O dummy variable = Emotional Writing/Object dummy variable; PANAS_NA_D1 and PANAS_NA_D4 = *Positive and Negative Affect Schedule*—negative affect scores on days 1 and 4, respectively.

** $p < .01$, * $p < .05$

Similar analyses were performed separately to predict worry and problem appraisals. (See Tables 11 and 12 for regression statistics.) That is, baseline scores were entered in step 1 (only for worry; no baseline data for appraisals were collected). Next, the condition vectors were entered. To test mediation, days 1 and 4 negative affect were entered in the next step. The change in R^2 was not significant for the worry ($p = .32$), although it was for problem appraisals ($p < .01$). In the latter analysis, days 1 and 4 each did not uniquely affect problem appraisals ($\beta_s = .17$ and $.18$ for days 1 and 4, $ps > .12$). Thus, day 4 negative affect did not predict appraisals for any outcome variable when holding day 1 negative affect constant, indicating that the drop from day 1 to day 4 did not affect outcomes. In the next step, interaction terms between the dummy coded vectors and day 4 negative affect were entered. The change in R^2 for this step was not significant for the prediction of worry ($p = .35$) or problem appraisals ($p = .15$). Note that the results

did not change meaningfully when a case with a high SDFBETA was removed from the problem appraisal analysis. In sum, the results indicate that experimental condition did not impact change in negative affect from days 1 to 4 and this change did not affect outcomes. Thus, contrary to hypotheses, negative affect served no mediating role.

Table 11

Summary of Hierarchical Regression Analysis for Variables Predicting Problem Appraisals with Condition, Negative Affect, and Their Interaction

Variable	<i>B</i>	<i>SE B</i>	β
Step 1			
Emotion Writing/Worry dummy variable	-0.07	0.44	-.02
Objective Writing/Worry dummy variable	0.02	0.44	.00
Emotional Writing/Object dummy variable	0.36	0.44	.10
Step 2			
EW/W dummy variable	-0.92	0.30	-.23
OW/W dummy variable	-0.59	0.46	-.16
EW/O dummy variable	-0.47	0.42	-.13
PANAS_NA_D1	0.29	0.41	.17
PANAS_NA_D4	0.29	0.20	.18
Step 3			
EW/W dummy variable	-0.83	0.47	-.21
OW/W dummy variable	-0.51	0.43	-.13
EW/O dummy variable	-0.31	0.42	-.08
PANAS_NA_D1	0.35	0.20	.21

PANAS_NA_D4	-0.33	0.39	-.20
EW/W dummy variable*PANAS_NA_D4	0.44	0.30	.26
OW/W dummy variable*PANAS_NA_D4	0.09	0.20	.05
EW/O dummy variable*PANAS_NA_D4	0.51	0.24	.31*

Note. $R^2 = .01$ ($p = .75$) for step 1; $\Delta R^2 = .08$ for Step 2 ($p < .01$); $\Delta R^2 = .04$ for Step 3 ($p = .15$)

EW/W dummy variable = Emotion Writing/Worry dummy variable; OW/W dummy variable = Objective Writing/Worry dummy variable; and EW/O dummy variable = Emotional Writing/Object dummy variable; PANAS_NA_D1 and PANAS_NA_D4 = *Positive and Negative Affect Schedule*—negative affect scores on days 1 and 4, respectively.

** $p < .01$, * $p < .05$

Table 12

Summary of Hierarchical Regression Analysis for Variables Predicting Time 2 Worry, Negative Affect, and Their Interaction

Variable	<i>B</i>	<i>SE B</i>	β
Step 1			
Time 1 Worry	0.60	0.07	.61**
Step 2			
Time 1 Worry	0.59	0.08	.60**
Emotion Writing/Worry dummy variable	-0.07	0.21	-.03
Objective Writing/Worry dummy variable	-0.17	0.21	-.07
Emotional Writing/Object dummy variable	0.14	0.21	-.06
Step 3			
Time 1 worry	0.62	0.08	.62**

EW/W dummy variable	-0.12	0.23	-.05
OW/W dummy variable	-0.13	0.21	-.06
EW/O dummy variable	-0.18	-.20	-.08
PANAS_NA_D1	0.02	0.10	.02
PANAS_NA_D4	0.10	0.09	.11

Step 4

Time 1 worry	0.60	0.08	.60**
EW/W dummy variable	-0.12	0.23	-.05
OW/W dummy variable	-0.14	0.21	-.06
EW/O dummy variable	-0.15	0.20	-.07
PANAS_NA_D1	0.04	0.10	.04
PANAS_NA_D4	-0.01	0.19	-.01
EW/W dummy variable*PANAS_NA_D4	0.08	0.15	.09
OW/W dummy variable*PANAS_NA_D4	-0.06	0.10	-.06
EW/O dummy variable*PANAS_NA_D4	0.13	0.11	.14

Note. $R^2 = .41$ ($p < .01$) for step 1; $\Delta R^2 = .00$ for Step 2 ($p = .86$); $\Delta R^2 = .01$ for Step 3 ($p = .32$); $\Delta R^2 = .02$ for Step 4 ($p = .35$)

EW/W dummy variable = Emotion Writing/Worry dummy variable; OW/W dummy variable = Objective Writing/Worry dummy variable; and EW/O dummy variable = Emotional Writing/Object dummy variable; PANAS_NA_D1 and PANAS_NA_D4 = *Positive and Negative Affect Schedule*—negative affect scores on days 1 and 4, respectively.

** $p < .01$, * $p < .05$

Causal Word Use Mediation

The next analyses examined the hypothesis that (a) use of causal words should increase from days 1 to 4 but only for emotional-worry participants and (b) this increase should relate to improved outcomes. As with negative affect, a 2 x 4 (time: day 1 vs. 4 x experimental condition) repeated measures ANOVA was conducted with time as the within- and experimental condition as the between-participants factors. No effects of time or condition, and crucially, no time by condition interaction emerged, $F_s < 1$, $p_s > .22$. Removing one case with a high Cook's distance value did not meaningfully impact the results. Thus, condition did not affect either total causal word use or the change in causal word use from days 1 to 4. See Table 13 for all ANOVA statistics.

Table 13

Analysis of Variance for Causal Words

Source	<i>df</i>	<i>F</i>	η	<i>P</i>
Between subjects				
Condition	3	0.77	.04	.23
Error	116	(.47)		
Within subjects				
Time	1	0.13	.00	.72
Time*Condition	3	0.65	.02	.58
Error	116	(.35)		

Note. Values enclosed in parentheses represent mean square errors.

The next analyses examined whether changes in causal word had an impact on outcomes. Thus, in separate series of regression analyses predicting each of the three main outcome variables, the time 1 measure of that variable was entered in the first step

and the three condition vectors were entered in the second step. See Tables 14 through 16 for all regression statistics. In the third step, day 1 and day 4 causal word use were entered. The change in R^2 was nonsignificant for the prediction of physician visits ($p = .15$), worry ($p = .50$), and problem appraisals ($p = .16$). Thus, causal word use did not impact any outcome variables. The change in R^2 in the next step (containing interaction terms) was also nonsignificant when predicting physician visits ($p = .42$), worry ($p = .67$), and problem appraisals ($p = .32$). Note that this step was marginally significant ($p = .07$) for the prediction of physician visits but lost significance when three points of influence were removed. Thus, contrary to hypotheses, the results revealed no effect of condition on causal word use and no effect of such use on outcomes.

Table 14

Summary of Hierarchical Regression Analysis for Variables Predicting Time 2 Physician Visits with Condition, Causal Word Use, and Their Interaction

Variable	<i>B</i>	<i>SE B</i>	<i>B</i>
Step 1			
Time 1 physician visits	1.07	0.12	.61**
Step 2			
Time 1 physician visits	1.08	0.12	.64**
EW/W dummy variable	-0.08	0.22	-.03
OW/W dummy variable	-0.01	0.22	-.01
EW/O dummy variable	0.09	0.21	.04
Step 3			
Time 1 physician visits	0.55	0.06	.65**

EW/W dummy variable	-0.04	0.11	-.03
OW/W dummy variable	-0.02	0.12	-.02
EW/O dummy variable	0.03	0.11	.03
CAUSAL_D1	0.10	0.07	.12
CAUSAL_D4	-0.09	0.06	-.11
Step 4			
Time 1 physician visits	0.56	0.06	.66
EW/W dummy variable	0.20	0.26	.16
OW/W dummy variable	0.25	0.23	.20
EW/O dummy variable	-0.14	0.21	-.11
CAUSAL_D1	0.11	0.06	.12
CAUSAL_D4	-0.11	0.06	-.14
EW/W dummy variable*CAUSAL_D4	-0.12	0.12	-.22
OW/W dummy variable*CAUSAL_D4	-0.14	0.10	-.27
EW/O dummy variable*CAUSAL_D4	0.21	0.09	.37*

Note. $R^2 = .40$ for step 1; $\Delta R^2 = .00$ for Step 2 ($p = .90$); $\Delta R^2 = .02$ for Step 3 ($p = .15$); $\Delta R^2 = .04$ for Step for Step 4 ($p = .07$).

EW/W dummy variable = Emotion Writing/Worry dummy variable; OW/W dummy variable = Objective Writing/Worry dummy variable; and EW/O dummy variable = Emotional Writing/Object dummy variable; CAUSAL_D1 and CAUSAL_D4 = Causal word use on days 1 and 4, respectively.

** $p < .01$, * $p < .05$

Table 15

Summary of Hierarchical Regression Analysis for Variables Predicting Problem

Appraisals with Condition, Negative Affect, and Their Interaction

Variable	<i>B</i>	<i>SE B</i>	β
Step 1			
Emotion Writing/Worry dummy variable	-0.07	0.44	-.02
Objective Writing/Worry dummy variable	0.02	0.44	.00
Emotional Writing/Object dummy variable	0.36	0.44	.10
Step 2			
EW/W dummy variable	-0.68	0.45	-.18
OW/W dummy variable	-0.46	0.43	-.12
EW/O dummy variable	-0.52	0.45	-.13
CAUSAL_D1	0.29	0.25	.11
CAUSAL_D4	0.31	0.23	.13
Step 3			
EW/W dummy variable	0.46	0.89	.12
OW/W dummy variable	00.57	0.83	-.15
EW/O dummy variable	-0.18	1.04	-.05
CAUSAL_D1	0.33	0.26	.12
CAUSAL_D4	0.31	0.24	.13
EW/W dummy variable*CAUSAL_D4	-0.62	0.37	-.38
OW/W dummy variable*CAUSAL_D4	0.37	0.36	.22
EW/O dummy variable*CAUSAL_D4	-0.02	0.47	-.01

Note. $R^2 = .02$ ($p = .63$) for step 1; $\Delta R^2 = .03$ for Step 2 ($p = .16$); $\Delta R^2 = .03$ for Step 3 ($p = .32$)

EW/W dummy variable = Emotion Writing/Worry dummy variable; OW/W dummy variable = Objective Writing/Worry dummy variable; and EW/O dummy variable = Emotional Writing/Object dummy variable; CAUSAL_D1 and CAUSAL_D4 = Causal word use on days 1 and 4, respectively.

** $p < .01$, * $p < .05$

Table 16

Summary of Hierarchical Regression Analysis for Variables Predicting Time 2 Worry, Causal Word Use, and Their Interaction

Variable	<i>B</i>	<i>SE B</i>	β
Step 1			
Time 1 Worry	0.60	0.07	.61**
Step 2			
Time 1 Worry	0.59	0.08	.60**
Emotion Writing/Worry dummy variable	-0.07	0.21	-.03
Objective Writing/Worry dummy variable	-0.17	0.21	-.07
Emotional Writing/Object dummy variable	0.14	0.21	-.06
Step 3			
Time 1 worry	0.65	0.08	.65**
EW/W dummy variable	0.11	0.22	.05
OW/W dummy variable	0.13	0.21	.06
EW/O dummy variable	-0.03	0.21	-.01
CAUSAL_D1	-0.13	0.12	-.08
CAUSAL_D4	0.08	0.11	.05
Step 4			
Time 1 worry	0.64	0.08	.64

EW/W dummy variable	0.12	0.22	.05
OW/W dummy variable	0.15	0.22	.07
EW/O dummy variable	-0.03	0.21	-.01
CAUSAL_D1	-0.10	0.12	-.06
CAUSAL_D4	-0.02	0.23	-.01
EW/W dummy variable*CAUSAL_D4	-0.07	0.24	-.03
OW/W dummy variable*CAUSAL_D4	0.22	0.23	.10
EW/O dummy variable*CAUSAL_D4	0.07	0.20	.04

Note. $R^2 = .41$ ($p < .01$) for step 1; $\Delta R^2 = .00$ for Step 2 ($p = .86$); $\Delta R^2 = .01$ for Step 3 ($p = .50$); $\Delta R^2 = .01$ for Step 4 ($p = .67$)

EW/W dummy variable = Emotion Writing/Worry dummy variable; OW/W dummy variable = Objective Writing/Worry dummy variable; and EW/O dummy variable = Emotional Writing/Object dummy variable; CAUSAL_D1 and CAUSAL_D4 = Causal word use on days 1 and 4, respectively.

** $p < .01$, * $p < .05$

Insight Word Use Mediation

The following analyses assessed the hypothesis that (a) use of insight words should increase from days 1 to 4 but only for emotional writing/worry participants and (b) this increase should relate to improved outcomes. As with negative affect, a 2 x 4 (time: day 1 vs. 4 x experimental condition) repeated measures ANOVA was conducted with time as the within- and experimental condition as the between-participants factors. See Table 17 for ANOVA statistics. There were significant effects of both time, $F(3, 116) = 4.8, p < .001$, and condition, $F(3, 116) = 1186.14, p < .001$. The time effect indicated that insight increased slightly from day 1 ($M = 2.11, SD = 1.06$) to day 4 ($M = 2.39, SD = 1.18$). Tukey post-hoc analyses indicated that the condition effect was driven

by the use of significantly fewer insight words in the objective writing/object condition than the other three conditions (all p s < .001). No other between-group differences emerged. Further, there was no significant interaction ($p = .93$), indicating that condition did not affect the change in insight word use. Thus, the data did not support the first component of the mediational hypothesis (that condition would affect the change in insight word use).

Table 17

Analysis of Variance for Insight Words

Source	<i>df</i>	<i>F</i>	η	<i>p</i>
Between subjects				
Condition	3	1186.14	.31	.01
Error	116	(.99)		
Within subjects				
Time	1	4.98	.04	.03
Time*Condition	3	0.16	.00	.92
Error	116	(.35)		

Note. Values enclosed in parentheses represent mean square errors.

The next analyses examined whether changes in insight word use affected outcomes. Thus, in separate series of regression analyses predicting each of the three main outcome variables, the time 1 measure of that variable was entered in the first step and the three condition vectors were entered in the second step. (See Tables 18 to 20 for all regression statistics.) On the third step, day 1 and day 4 insight word use were entered. The change in R^2 was nonsignificant for predicting physician visits ($p = .63$), worry ($p =$

.26), and problem appraisals ($p = .53$). Thus, insight word use did not impact any outcomes. Removal of two points of influence in the physician visits analysis did not meaningfully impact the statistical significance of the change in R^2 values. The interaction between condition and insight was also nonsignificant for physician visits ($p = .83$), worry ($p = .79$), and problem appraisals ($p = .43$). Thus, contrary to hypotheses, the results revealed no effect of condition on changes in insight word use and no effect of such word use on outcomes.

Table 18

Summary of Hierarchical Regression Analysis for Variables Predicting Time 2 Physician Visits with Condition, Insight Word Use, and Their Interaction

Variable	<i>B</i>	<i>SE B</i>	<i>B</i>
Step 1			
Time 1 physician visits	1.07	00.12	0.61**
Step 2			
Time 1 physician visits	1.08	00.12	0.64**
EW/W dummy variable	-0.08	00.22	-0.03
OW/W dummy variable	-0.01	00.22	-0.01
EW/O dummy variable	0.09	00.21	0.04
Step 3			
Time 1 physician visits	0.55	0.07	.64**
EW/W dummy variable	0.00	0.14	.00
OW/W dummy variable	0.05	0.13	.04
EW/O dummy variable	0.08	0.12	.06

INSIGHT_D1	-0.04	0.05	-.08
INSIGHT_D4	0.00	0.04	.00
Step 4			
Time 1 physician visits	0.14	0.07	.64**
EW/W dummy variable	0.55	0.28	-.12
OW/W dummy variable	-0.15	0.27	.13
EW/O dummy variable	0.16	0.29	.04
INSIGHT_D1	0.05	0.05	-.09
INSIGHT_D4	0.00	0.04	.01
EW/W dummy variable*INSIGHT_D4	0.05	0.07	.15
OW/W dummy variable*INSIGHT_D4	-0.05	0.06	-.14
EW/O dummy variable*INSIGHT_D4	0.01	0.07	.02

Note. $R^2 = 0.40$ for step 1; $\Delta R^2 = 0.00$ for Step 2 ($p = 0.90$); $\Delta R^2 = 0.01$ for Step 3 ($p = 0.63$); $\Delta R^2 = 0.01$ for Step for Step 4 ($p = 0.83$).

EW/W dummy variable = Emotion Writing/Worry dummy variable; OW/W dummy variable = Objective Writing/Worry dummy variable; and EW/O dummy variable = Emotional Writing/Object dummy variable; INSIGHT_D1 and INSIGHT_D4 = INSIGHT word use on days 1 and 4, respectively.

** $p < 0.01$, * $p < 0.05$

Table 19

*Summary of Hierarchical Regression Analysis for Variables Predicting Problem**Appraisals with Condition, Insight Word Use, and Their Interaction*

Variable	<i>B</i>	<i>SE B</i>	β
Step 1			
Emotion Writing/Worry dummy variable	-0.07	0.44	-.02
Objective Writing/Worry dummy variable	0.02	0.44	.00
Emotional Writing/Object dummy variable	0.36	0.44	.10
Step 2			
EW/W dummy variable	-0.44	0.52	-.11
OW/W dummy variable	-0.51	0.52	-.13
EW/O dummy variable	-0.41	0.48	-.11
INSIGHT_D1	-0.15	0.17	-.09
INSIGHT_D4	0.12	0.15	.08
Step 3			
EW/W dummy variable	-0.15	1.09	-.04
OW/W dummy variable	0.83	1.05	.22
EW/O dummy variable	-0.66	1.07	-.18
INSIGHT_D1	-0.17	0.17	-.10
INSIGHT_D4	0.17	0.16	.12
EW/W dummy variable*INSIGHT_D4	-0.02	0.26	-.02
OW/W dummy variable*INSIGHT_D4	-0.39	0.24	-.40
W/O dummy variable*INSIGHT_D4	0.20	0.27	.19

Note. $R^2 = .02$ ($p = .63$) for step 1; $\Delta R^2 = .01$ for Step 2 ($p = .53$); $\Delta R^2 = .02$ for Step 3 ($p = .43$)

EW/W dummy variable = Emotion Writing/Worry dummy variable; OW/W dummy variable = Objective Writing/Worry dummy variable; and EW/O dummy variable = Emotional Writing/Object dummy variable; INSIGHT_D1 and INSIGHT_D4 = Insight word use on days 1 and 4, respectively.

** $p < .01$, * $p < .05$

Table 20

Summary of Hierarchical Regression Analysis for Variables Predicting Time 2 Worry, Insight Word Use, and Their Interaction

Variable	<i>B</i>	<i>SE B</i>	β
Step 1			
Time 1 Worry	0.60	0.07	.61**
Step 2			
Time 1 Worry	0.59	0.08	.60**
Emotion Writing/Worry dummy variable	-0.07	0.21	-.03
Objective Writing/Worry dummy variable	-0.17	0.21	-.07
Emotional Writing/Object dummy variable	0.14	0.21	-.06
Step 3			
Time 1 worry	0.64	0.08	.64**
EW/W dummy variable	0.01	0.25	.00
OW/W dummy variable	0.01	0.26	.00
EW/O dummy variable	-0.02	0.24	-.01
INSIGHT_D1	0.05	0.08	.05
INSIGHT_D4	-0.12	0.08	-.14

Step 4

Time 1 worry	0.65	0.08	.64**
EW/W dummy variable	0.44	0.53	.18
OW/W dummy variable	0.31	0.51	.13
EW/O dummy variable	0.20	0.53	.09
INSIGHT_D1	0.05	0.08	.05
INSIGHT_D4	-0.10	0.08	-.12
EW/W dummy variable*INSIGHT_D4	-0.09	0.13	-.14
OW/W dummy variable*INSIGHT_D4	-0.04	0.12	-.07
EW/O dummy variable*INSIGHT_D4	-.01	0.13	-.02

Note. $R^2 = .41$ ($p < .01$) for step 1; $\Delta R^2 = .00$ for Step 2 ($p = .86$); $\Delta R^2 = .02$ for Step 3 ($p = .26$); $\Delta R^2 = .01$ for Step 4 ($p = .79$)

EW/W dummy variable = Emotion Writing/Worry dummy variable; OW/W dummy variable = Objective Writing/Worry dummy variable; and EW/O dummy variable = Emotional Writing/Object dummy variable; INSIGHT_D1 and INSIGHT_D4 = INSIGHT word use on days 1 and 4, respectively.

** $p < .01$, * $p < .05$

Concreteness Mediation

The analyses below tested the hypothesis that the concreteness of participants' writing, as assessed by Coh-Metrix, should increase from days 1 to 4 but only for emotional-worry participants and (b) this increase should relate to improved outcomes. Again, a 2 x 4 (time: day 1 vs. 4 x experimental condition) repeated measures ANOVA was conducted with time as the within- and experimental condition as the between-participants factors. (See Table 21 for ANOVA statistics.) There were significant effects of both time, $F(3, 116) = 4.97, p < .01$, and condition, $F(3, 116) = 63,854.03, p < .001$.

The time effect indicated that concreteness decreased slightly from day 1 ($M = 351.17$, $SD = 24.84$) to day 4 ($M = 346.59$, $SD = 26.63$). Tukey post-hoc analyses indicated that the effect of condition was driven by the use of significantly more concrete words in the objective writing/object condition than the other three conditions (all $ps < .001$).

Participants in the emotional writing/object condition also used significantly more concrete words than did those in either worry condition ($ps < .02$). Contrary to expectation, the interaction between condition and time was nonsignificant ($p = .70$), indicating that the change in concreteness over time did not vary by condition.

Table 21

Analysis of Variance for Concreteness

Source	<i>df</i>	<i>F</i>	η	<i>P</i>
Between subjects				
Condition	3	63854.03	.998	.01
Error	114	(448.96)		
Within subjects				
Time	1	4.97	.04	.03
Time*Condition	3	0.59	.02	.63
Error	114	(.35)		

Note. Values enclosed in parentheses represent mean square errors.

The next analyses examined whether changes (from day 1 to day 4) in concreteness influenced outcomes. Thus, in separate series of regression analyses predicting each of the three main outcome variables, the time 1 measure of that variable was entered in the first step and the three condition vectors were entered in the second

step. (See Tables 22-24 for regression statistics.) On the third step, day 1 and day 4 concreteness scores were entered. The change in R^2 was nonsignificant for predicting physician visits ($p = .93$), worry ($p = .91$), and problem appraisals ($p = .81$). Thus, insight word use did not impact any outcomes. The interaction between condition and insight was also nonsignificant for physician visits ($p = .90$), worry ($p = .65$), and problem appraisals ($p = .44$). Thus, change concreteness did not relate to outcomes differentially as a function of condition. Contrary to hypotheses, the results revealed no effect of condition on changes in concreteness and no effect of this change on outcomes.

Table 22

Summary of Hierarchical Regression Analysis for Variables Predicting Time 2 Physician Visits with Condition, Concreteness, and Their Interaction

Variable	<i>B</i>	<i>SE B</i>	<i>B</i>
Step 1			
Time 1 physician visits	1.07	00.12	0.61**
Step 2			
Time 1 physician visits	1.08	00.12	0.64**
EW/W dummy variable	-0.08	00.22	-0.03
OW/W dummy variable	-0.01	00.22	-0.01
EW/O dummy variable	0.09	00.21	0.04
Step 3			
Time 1 physician visits	0.55	0.07	.64**
EW/W dummy variable	0.01	0.18	.01
OW/W dummy variable	0.05	0.17	.04

EW/O dummy variable	0.08	0.14	.07
CONCRETE_D1	0.00	0.00	.02
CONCRETE_D4	0.00	0.00	.02
Step 4			
Time 1 physician visits	0.54	0.07	.63**
EW/W dummy variable	-1.45	2.67	-1.15
OW/W dummy variable	-1.58	2.44	-1.18
EW/O dummy variable	-0.48	2.19	-.39
CONCRETE_D1	0.00	0.00	.02
CONCRETE_D4	0.00	0.00	-.04
EW/W dummy variable*CONCRETE_D4	0.00	0.01	1.10
OW/W dummy variable*CONCRETE_D4	0.00	0.01	.42
EW/O dummy variable*CONCRETE_D4	0.00	0.01	1.17

Note. $R^2 = 0.40$ for step 1; $\Delta R^2 = 0.00$ for Step 2 ($p = 0.90$); $\Delta R^2 = 0.01$ for Step 3 ($p = 0.93$); $\Delta R^2 = 0.00$ for Step for Step 4 ($p = 0.90$).

EW/W dummy variable = Emotion Writing/Worry dummy variable; OW/W dummy variable = Objective Writing/Worry dummy variable; and EW/O dummy variable = Emotional Writing/Object dummy variable; CONCRETE_D1 and CONCRETE_D4 = INSIGHT word use on days 1 and 4, respectively. Some B coefficients are greater than the absolute value of 1 because several predictors are uncorrelated with the criterion but are correlated with each other.

** $p < 0.01$, * $p < 0.05$

Table 23

*Summary of Hierarchical Regression Analysis for Variables Predicting Problem**Appraisals with Condition, Concreteness, and Their Interaction*

Variable	<i>B</i>	<i>SE B</i>	β
Step 1			
Emotion Writing/Worry dummy variable	-0.07	0.44	-.02
Objective Writing/Worry dummy variable	0.02	0.44	.00
Emotional Writing/Object dummy variable	0.36	0.44	.10
Step 2			
EW/W dummy variable	-0.80	0.72	-.20
OW/W dummy variable	-0.84	0.68	-.22
EW/O dummy variable	-0.65	0.56	-.18
CONCRETE_D1	-0.00	0.01	-.05
CONCRETE_D4	-0.00	0.01	-.06
Step 3			
EW/W dummy variable	-3.74	10.37	.95
OW/W dummy variable	-16.18	9.35	-4.21
EW/O dummy variable	-3.00	8.45	-.81
CONCRETE_D1	-0.00	0.01	-.05
CONCRETE_D4	-0.01	0.01	-.20
EW/W dummy variable*CONCRETE_D4	0.01	0.03	.64
OW/W dummy variable*CONCRETE_D4	0.01	0.02	.56
EW/O dummy variable*CONCRETE_D4	0.00	0.03	3.90

Note. $R^2 = .02$ ($p = .63$) for step 1; $\Delta R^2 = .00$ for Step 2 ($p = .81$); $\Delta R^2 = .02$ for Step 3 ($p = .44$)

EW/W dummy variable = Emotion Writing/Worry dummy variable; OW/W dummy variable = Objective Writing/Worry dummy variable; and EW/O dummy variable = Emotional Writing/Object dummy variable; CONCRETE_D1 and CONCRETE_D4 = Insight word use on days 1 and 4, respectively. Some B coefficients are greater than the absolute value of 1 because several predictors are uncorrelated with the criterion but are correlated with each other.

** $p < .01$, * $p < .05$

Table 24

Summary of Hierarchical Regression Analysis for Variables Predicting Time 2 Worry, Concreteness, and Their Interaction

Variable	B	$SE B$	β
Step 1			
Time 1 Worry	0.60	0.07	.61**
Step 2			
Time 1 Worry	0.59	0.08	.60**
Emotion Writing/Worry dummy variable	-0.07	0.21	-.03
Objective Writing/Worry dummy variable	-0.17	0.21	-.07
Emotional Writing/Object dummy variable	0.14	0.21	-.06
Step 3			
Time 1 worry	0.64	0.08	.63
EW/W dummy variable	-0.12	0.34	-.05
OW/W dummy variable	-.23	0.32	-.10
EW/O dummy variable	-0.24	0.26	-.11

CONCRETE_D1	0.00	0.00	.00
CONCRETE_D4	-0.00	0.00	-.05
Step 4			
Time 1 worry	0.64	0.08	.64
EW/W dummy variable	-1.40	4.89	-.58
OW/W dummy variable	-3.68	4.58	-1.59
EW/O dummy variable	2.74	3.94	1.24
CONCRETE_D1	0.00	0.00	.00
CONCRETE_D4	-0.00	0.01	-.05
EW/W dummy variable*CONCRETE_D4	0.00	0.01	.54
OW/W dummy variable*CONCRETE_D4	-0.01	0.01	-1.34
EW/O dummy variable*CONCRETE_D4	0.01	0.01	1.49

Note. $R^2 = .41$ ($p < .01$) for step 1; $\Delta R^2 = .00$ for Step 2 ($p = .86$); $\Delta R^2 = .00$ for Step 3 ($p = .91$); $\Delta R^2 = .01$ for Step 4 ($p = .65$)

EW/W dummy variable = Emotion Writing/Worry dummy variable; OW/W dummy variable = Objective Writing/Worry dummy variable; and EW/O dummy variable = Emotional Writing/Object dummy variable; CONCRETE_D1 and CONCRETE_D4 = CONCRETE word use on days 1 and 4, respectively. Some B coefficients are greater than the absolute value of 1 because several predictors are uncorrelated with the criterion but are correlated with each other.

** $p < .01$, * $p < .05$

Cognitive Mediation

The following analyses tested (a) whether experimental condition produced changes in time 2 anxious and depressive cognitions (independent of time 1 scores) as measured by the *CCL-A* and *CCL-D* and (b) whether these changes were related to outcomes. Because the two subscales were highly correlated at times 1 and 2 ($r_s = .52$

and .69, $ps < .01$), a multivariate general linear model was conducted. Specifically, condition and time 1 scores were entered as predictors of time 2 anxious and depressive cognitions. Time 1 *CCL-A* and *CCL-D* were each significant predictors of time 2 scores ($ps < .001$). Time 1 *CCL-A* was a significant multivariate predictor, $F(3, 116) = 50.96, p < .001, \eta^2 = .47$. Similarly, Time 1 *CCL-D* was a significant multivariate predictor $F(3, 116) = 168.51, p < .001, \eta^2 = .75$. Condition did not, however, influence time 2 scores ($p = .83$), $\eta^2 = .01$.

The subsequent analyses examined whether changes in *CCL-A* and *-D* scores impacted outcomes. Thus, in separate series of regression analyses predicting each of the three main outcome variables, the time 1 measure of that variable was entered in the first step and the three condition vectors were entered in the second step. In step 3, time 1 and time 2 *CCL-D* scores were entered. (*CCL-A* scores are examined later.) The change in R^2 was nonsignificant when predicting physician visits ($\Delta R^2 = .02, p = .11$), although it was significant when predicting worry and problem appraisals ($\Delta R^2 = .16$ and $.39, ps < .001$). For the latter two variables, time 2 but not time 1 *CCL-D* was a significant predictor ($\beta_s = .53$ and $.50$, respectively, $ps < .01$). In step 4, all previous variables plus the interaction between condition and time 2 *CCL-D* scores were entered. The change in R^2 was less than .01 and nonsignificant for physician visits ($p = .41$), worry ($p = .88$), problem appraisals ($p = .71$). Note that steps 3 and 4 were significant ($p < .05$) when predicting physician visits until a multivariate point of influence was removed. In summary, no evidence emerged to support the hypothesis that disclosure would affect depressive cognitions or that such cognitions would mediate the effects of disclosure. However,

depressive cognitions did have significant unique associations with worry and problem appraisals.

The same analysis as above was conducted with *CCL-A* scores. Again, in separate series of regression analyses predicting each of the three main outcome variables, the time 1 measure of that variable was entered in the first step and condition was entered in the second step. In step 3, time 1 and time 2 *CCL-A* scores were entered. The change in R^2 was nonsignificant when predicting physician visits ($\Delta R^2 = .03, p = .19$), although it was significant when predicting worry and problem appraisals ($\Delta R^2 = .18$ and $.25, ps < .001$). For the latter two variables, time 2 but not time 1 *CCL-A* significantly predicted worry ($\beta = .45, p < .001$) and problem appraisals ($\beta = .35, p < .02$). Note that step 3 was significant for physician visits until two points of influence were removed. In step 4, all previous variables plus interaction terms were entered. The change in R^2 was nonsignificant when predicting physician visits, worry, and problem appraisals ($\Delta R^2 < .03, ps > .45$). Note that removing one point with a high SDFBETA in the problem appraisal analysis did not meaningfully impact the results. Thus, no evidence emerged to support the hypothesis that disclosure would influence anxious cognitions or that such cognitions would mediate the effects of disclosure. However, anxious cognitions did have significant unique associations with worry and problem appraisals.

Consistency of Writing Topic

41.4% of participants in the two worry conditions combined wrote about the same worry topic on all four days, whereas 58.6% wrote about two or more topics. In the two object conditions, only 11.7% wrote about the same object across all four days, whereas 88.3% changed topics at least once. The first analyses examined whether topic

consistency moderated outcomes. The second set of analyses examined mediation of any such moderation.

In a two-way ANOVA, time 1 worry was entered as a covariate and condition and topic consistency were entered as fixed factors to predict time 2 worry. Main effects and the interaction between condition and consistency were explored. Although the effects of time 1 worry, $F(1, 116) = 77.87, p < .01$, and topic consistency, $F(1, 116) = 4.44, p < .01$, were significant, the effect of the interaction was not, $F(3, 116) = 2.65, p = .13$. However, when a case with a high Cook's distance value was removed, the effects of the covariate and topic consistency remained significant while the interaction between consistency and condition became significant. (See Table 25 for ANOVA statistics.) Note that the effect of consistency was driven by significantly lower worry scores at time 2 for those who wrote about the same ($M = -0.303$, Standard Error = 0.182) than those who wrote about two or more topics ($M = 0.118$, Standard Error = 0.083). ANOVAs were conducted separately by group to explore the nature of the interaction. Writing about the same topic was related to lower trait worry one month later than writing about multiple topics in the emotional writing/worry and objective writing/object conditions, $F_s(1, 29) > 5.32, p_s < .03$, both $\eta^2_s = .17$. Thus, as expected, participants experienced reductions in worry if they wrote emotionally about the same worry across writing sessions, although the objective writing/object condition finding was unexpected. Topic consistency did not affect worry in the other two conditions, $F_s = < 1$.

Table 25

Analysis of Variance for Time 2 Worry with Time 1 Worry, Condition and, Topic Consistency as Predictors

Source	<i>df</i>	<i>F</i>	η	<i>P</i>
Between subjects				
Time 1 Worry	1	77.87	.42	.01
Condition	3	1.08	.36	.03
Consistency	1	4.44	.04	.04
Condition x Consistency	1	2.65	.07	.06
Error		(.56)		
Total	115			

Note. Values enclosed in parentheses represent mean square errors.

Two separate ANOVAs were conducted to examine the effects of consistency, writing condition, and their interaction on physician visits (after entering time 1 visits as a covariate) and problem appraisals. (See Tables 26 and 27.) The only significant predictor of time 2 physician visits was time 1 physician visits. Note that removal of two points with high Cook's distance and standardized residual values did not meaningfully impact the results. In addition, no variables significantly predicted problem appraisals. Thus, in contrast to the worry analyses, the physician visit and problem appraisals analyses revealed no moderating role of topic consistency.

Table 26

Analysis of Variance for Problem Appraisals with Condition and Topic Consistency as Predictors

Source	<i>df</i>	<i>F</i>	η	<i>P</i>
Between subjects				

Condition	3	0.29	.01	.83
Consistency	1	0.66	.01	.42
Condition x Consistency	2	0.96	.02	.39
Error		(2.63)		
Total	114			

Note. Values enclosed in parentheses represent mean square errors.

Table 27

Analysis of Variance for Time 2 Physician Visits with Time 1 Physician Visits, Condition and, Topic Consistency as Predictors

Source	<i>df</i>	<i>F</i>	η	<i>P</i>
	Between subjects			
Time 1 Physician Visits	1	16.39	.13	.01
Condition	3	1.38	.04	.25
Consistency		0.33	.00	.57
Condition x Consistency	3	0.97	.03	.41
Error	115	(.43)		
Total				

Note. Values enclosed in parentheses represent mean square errors.

The next analyses examined the effects of topic consistency, condition, and their interaction on the hypothesized mediators. The first analysis examined whether

consistency moderated the effect of condition on negative affect at day 1 or 4 and whether it moderated the change in negative affect from days 1 to 4. Thus, condition and consistency were entered as between-participants predictors and time was entered as a within-participants predictor. All two- and three-way interactions between the three predictors were included. No effects reached significance ($F_s < 1.42, p_s > .24$) except that the effects of time and condition were significant (as reported earlier). These effects indicated that negative affect was highest in the emotional writing/worry condition and decreased across sessions in all conditions. Removing one case with a high Cook's distance did not meaningfully impact the results.

Next, identical separate analyses were performed replacing day 1 and day 4 negative affect with day 1 and day 4 scores for causal, insight, and concreteness ratings. No variables significantly affected causal word use ($p_s > .14$). However, after removing two cases with high Cook's distance values, the effect of consistency became significant ($p < .03$). Contrary to expectations, participants who wrote about multiple topics ($M = 1.30, SE = 0.06$) used more causal words than did participants who wrote about the same topic ($M = 0.95, SE = 0.15$), $F(1, 105) = 5.62, p < .03, \eta^2 = .05$. Also contrary to hypotheses, this effect of consistency was not moderated by time or condition, $F(3, 105) = .16, p = .92$.

All variables were nonsignificant predictors of insight word use, $F_s < 1.70, p_s > .17$, except for the effect of condition. As reported earlier, participants in the objective writing/object condition used significantly fewer insight words than did those in the other three conditions. Removing two cases with high Cook's distance values did not meaningfully influence the results. No variables were significant predictors of

concreteness ($F_s < .93$, $p_s > .34$) except for condition (as reported earlier) consistency ($p < .04$). As reported earlier, the effect of condition was driven by more concrete writing in the objective writing/object condition than in the other three conditions. The effect of consistency lost significance ($p = .21$) after two cases with high Cook's distance values were removed. In summary, the results did not support the hypothesis that writing emotionally about the same worry topic would lead to habituation or to increases in concreteness, insight, or causal word use.

Linguistic analyses one-month post-writing

The next analyses examined whether the text participants' used to describe their potential problems one month after participating in the experiment differed as a function of condition with regard to concreteness and use of insight and causal words. Coh-Metrix and rater assessed scores of concreteness were entered as dependent variables in a multivariate general linear model with writing condition as the independent variable. The effect of condition was nonsignificant, $F(3, 113) = .71$, $p > .64$, indicating that all groups described their potential problems comparably with respect to concreteness.

LIWC causal word use scores were entered as the dependent variable in an ANOVA with condition as the independent variable. The effect of condition was nonsignificant, $F(3, 111) = 1.81$, $p = .10$. When the same analysis was repeated with insight as the dependent variable, the effect of condition was also nonsignificant, $F(3, 111) = 1.30$, $p = .28$. Thus, the writing manipulation did not affect the extent to which participants used causal or insight words when describing their potential problems one month later.

Discussion

By integrating the imagery avoidance theory of worry and written emotional disclosure research, the present investigation examined whether written disclosure could help individuals to cope with problems worrying them and have beneficial psychological and physical health effects. The results did not support the hypotheses for main or mediating effects, although decreased trait worry did result from writing emotionally about the same worry. Although most studies have found beneficial effects of written emotional disclosure (Frattaroli, 2006; Harris, 2006; Smyth, 1998), many have not (Bell-Pringle, Jurkovic, & Plate, 2004; Bower, Kemeny, Taylor, & Fahey, 2003; Broderick et al., 2004; Deters & Range, 2003; Earnhardt, Martz, Ballard, & Curtin, 2002; Freyd, Nest, & Allard, 2005; Gallan & Lafreniere, 2003; Gidron, et al., 1996; Gortner, Rude, & Pennebaker, 2006; Graybeal et al., 2002; Greenberg & Stone, 1992; Kloss & Lisman, 2002; Koopman, Ismailji, Holmes, Classen, Palesh, & Wales, 2005; Kovac & Range, 2002; Largo-Marsh & Spates, 1990; Marlow & Wagner, 1999; O'Connor, Allen, Kaszniak, 2005; Range, Kovac, & Marion, 2000; Schwartz & Drotar, 2004), suggesting that many factors, including writing topic, may moderate the effect of disclosure. The discussion examines the moderating role of writing topic and writing content consistency across days in the present research in the context of past research and theory. Subsequently, potential explanations for the present findings, the implications of these findings for worry and written emotional disclosure theories, and potential directions for future research are offered.

Although there were no beneficial effects of emotional disclosure about worries, there was a decrease in worry one month post-writing for participants who had disclosed

emotionally about the same one worry (but not for those who had written about multiple worries). The moderating effect on trait worry of topic consistency is consistent with Sloan et al.'s (2005) findings and with emotional process theory. Specifically, according to the theory, exposure to the same feared stimulus on multiple occasions should be more likely to lead to habituation than should switching the exposure stimulus. This effect must be viewed cautiously, however, for four reasons. First, it did not extend to the other two main outcome variables (physician visits and problem appraisals). Second, topic consistency for the most part did not impact the proposed mediators in the hypothesized fashion. That is, writing emotionally about the same worry did not lead to more habituation, narrative formation, or concrete writing than did writing emotionally about different worries. Third, these mediators did not relate to outcomes differently as a function of topic consistency.

However, regardless of topic consistency, there was an immediate increase and subsequent decrease (across sessions) in post-writing negative affect among emotional writing/worry participants. The finding that there was a decrease in worry only for those who had written about the same topic suggests that the decrease in negative affect may represent habituation for these participants while being the result of avoidant coping among participants who switched topics (as they may have been switching to avoid the distress of full exposure). However, if habituation had occurred for those who wrote about the same but not multiple worry topics, it should predict better outcomes only for the former group. This expectation was not supported, though, as habituation did not relate to outcomes for either group. Thus, the mechanism(s) behind the effect of topic consistency remain unclear and warrant future investigation.

Finally, topic consistency unexpectedly impacted long-term worry for participants who wrote objectively about objects as well such that lower worry was associated with writing about the same than different objects. It is possible that some participants in this condition wrote about objects that they were excessively attached to emotionally (e.g., gifts from a former romantic partner or a deceased relative). Perhaps writing objectively about the same object across writing sessions helped them to come to terms with their feelings about the object. It is noteworthy that concreteness increased across writing sessions in this condition. Perhaps writing objectively increased concreteness, which in turn decreased the extent of worry individuals experienced over the meaning of the interpersonal relationships represented by the object. This reasoning, however, is purely speculative. The potential moderating role of topic consistency requires further investigation.

In contrast to the present findings, Sloan et al.'s analyses were consistent with an exposure framework. Specifically, reduced salivary cortisol response from the first to the final writing session (indicating habituation) predicted decreases in post-traumatic stress and depressive symptoms. (Note, however, that Sloan et al. did not examine whether the manipulation impacted the proposed mediator.) Thus, although it is possible that writing emotionally about the same worry does have beneficial effects, the above reasons highlight the possibility that the one moderating effect on trait worry in the present study was only a chance finding. Attempts to replicate this moderation would help to clarify this issue. Such attempts should also include assessments of the same mediators as in the present research. An experimental design comparable to Sloan et al.'s would also help to

clarify the potential causal role in worry writing of topic consistency on emotional processing and long-term outcomes.

Despite the moderating role of topic consistency on long-term worry levels, most of the main and moderating effects did not support the hypotheses. Specifically, there were few beneficial effects of emotional disclosure on worry, physician visits, or problem appraisals. The discussion below attempts to integrate the present findings with previous research and current theoretical perspectives of emotional disclosure.

One possibility is that thought-action fusion (TAF) biases may have interfered with the worry writing task. Recall that one component of the TAF bias is the tendency to believe that thinking about future anxiety-provoking events may increase the likelihood of their occurrence (Shafran et al., 1996). Along these lines, writing about potential problems may increase the perceived likelihood of these problems. Contrary to this reasoning, however, the probability estimate item of the problem appraisal question set was unrelated to experimental condition at both assessment times ($p_s > .84$). Thus, potential TAF biases do not appear to explain the present findings. Further explanations of the present findings will rely instead on habituation and narrative formation views of disclosure, imagery avoidance theory of worry, and specific methodological issues.

One proposed mechanism for the effects of emotional disclosure is exposure (Sloan & Marx, 2004; Sloan et al., 2005). In the present study, emotional processing was expected to occur only for the emotional writing/worry participants. Specifically, these participants were expected to experience an increase in negative affect immediately after the first writing session, indicating fear activation. This negative affect was expected to decrease across writing sessions, indicating habituation. Further, this decrease in negative

affect was expected to lead to beneficial outcomes (fewer physician visits, more adaptive problem appraisals, and less trait worry).

Consistent with the emotional processing predictions, immediate post-writing negative affect was slightly higher for emotional disclosure/worry participants than for the other three groups, suggesting successful fear activation. Note, however, that the negative affect in this group was still fairly low (on a 1 to 4 scale, $M = 2.12$, $SD = 0.86$), indicating minimal fear activation. The data also indicated that negative affect decreased significantly across writing sessions, indicating habituation. However, this decrease was also minimal and was no larger for this group than for the other three groups. The general decrease across experimental conditions may indicate that participants habituated to the laboratory setting. The lack of a condition by day interaction suggests no habituation to the worry topic occurred for the emotional writing/worry group. The lack of such habituation is inconsistent with most studies (e.g., Lumley & Provenzano, 2003; Sloan et al., 2005), although consistent with Bernard et al.'s (2006) findings. One possibility is that written emotional disclosure had no beneficial long-term effects because it did not lead to emotional processing. (Potential explanations for the lack of emotional processing among disclosure participants are discussed later.)

Pennebaker's (1997; Pennebaker & Seagal, 1999) cognitive processing model provides an alternative viewpoint from which to interpret the present findings. Pennebaker argues that an increased understanding and more adaptive appraisals of emotional experiences are key elements to our well-being. In other words, writing helps to organize complex emotional experiences and to view the experiences as more manageable. As a result, individuals are able to reach resolution with such experiences

and have a greater sense of predictability and control over their lives. As evidence of narrative formation, Pennebaker has found that increases in insight and causal word use from the first to the final writing session typically correspond to improvement in long-term functioning for disclosure but not for control participants.

There was minimal evidence, however, of a relation between writing and cognitive variables in the present study. Specifically, the manipulation did not affect the total number of causal words used or the change in causal words across writing sessions. Consistent with cognitive models, however, participants in the emotional writing/worry condition did use more insight words than did objective writing/object participants (the standard control group). Further, insight word use increased across writing sessions in the emotional writing/worry group, although it also did in all other writing conditions. Although it is tempting to conclude that the writing manipulation caused emotional writing/worry participants to gain insight, it is also possible that individuals are simply unlikely to use insight words when writing objectively about trivial topics.

To clarify this issue, one month later, participants in all four conditions described their potential problems and the content of their text was analyzed. There were no differences in insight (or causal) word use at this point or in concreteness scores, suggesting that the emotional writing/worry group had not gained insight into their potential problems or formed a coherent narrative. Also, contrary to the Pennebaker (1997) findings, the change in insight and causal word use across writing sessions did not relate to any dependent measures. Thus, minimal support emerged for cognitive mediation of the effects of disclosure. Further, it is possible the writing manipulation did not lead to beneficial effects because it did not influence the hypothesized cognitive

processing mediators. Note that although most relevant studies have found support for these mediators, some have found cognitive variables and outcomes to be unrelated to each other (e.g., Burton & King, 2004).

Another possibility is that the writing manipulation did not produce the hypothesized effects because it did not affect anxious and depressive cognitions. Beck and other cognitive therapists have argued that cognitions play a crucial role in the development of worry, anxiety, and other forms of psychopathology (e.g., Beck, Emery, & Greenberg 1985; Beck, Rush, Shaw, & Emery, 1979). There is now strong evidence that cognitions do play such a role and that psychotherapy based on modifying maladaptive cognitions can alleviate various forms of psychopathology (e.g., Salkovskis, 1996a,b). In the present study, it was hypothesized that changes in anxious and depressive cognitions might partly mediate the long-term effects of writing. The findings did not support this hypothesis, however, as writing did not impact cognitions at the one-month follow-up assessment. Whether such cognitions mediate the effects of other forms of written disclosure is unclear, however, as researchers have not yet examined such a hypothesis. Given the close connection between cognitions and emotional well-being, such a hypothesis may be worth investigating in future writing studies.

It is unclear why the affective and cognitive processing data were consistent with mediation hypotheses in most past research but not in the present research. This discrepancy could be due to the nature of the writing task (worry writing) or to the use of different statistical analyses in the present research than in past research. Specifically, researchers have assessed the relation between proposed mediators and outcomes in past research and have generally found support for exposure and narrative formation

perspectives. However, as described above, they have not conducted full assessments of mediation in that they have not assessed whether the writing manipulation impacts the proposed mediators. Thus, it is possible that, consistent with the present worry writing results, emotional disclosure about traumas and other topics that researchers have investigated does not impact changes in insight or causal word use or negative mood. In this case, it would be difficult for researchers to argue that these variables do mediate the effects of emotional disclosure. The typical finding that these mediators tend to correlate with outcomes is consistent with mediational models but is nonetheless not a complete test of mediation. Thus, the present results highlight the need for more detailed analyses of mediating processes in future emotional disclosure research.

Given the present findings, one might wonder why the writing manipulation did not lead to emotional processing or narrative formation. One possible reason is that the writing of emotional writing/worry participants may have contained minimal imagery and may have been too low in concreteness. Accessing vivid imagery and viewing a problem concretely are necessary components of fear activation and thus necessary components of emotional processing (Vrana, Cuthbert, & Lang, 1986; Stoeber, 1998, 2000). Likewise, it is possible that the reason participants in the two worry writing conditions did not gain insight into their potential problems is that they did not write concretely. It seems unlikely that writing in abstract, vague, global terms (e.g., “I worry I am a failure”) will lead individuals to gain insight into their potential problems or to form a coherent narrative.

This reasoning raises the question of why participants’ writing evoked little imagery and was vague. The answer to this question may rely on Borkovec’s (1994)

avoidance theory of worry. Borkovec argues that individuals' worries are low in imagery because such imagery is distressing. It is much less anxiety-provoking to think in abstract, low-imagery, vague terms about potential problems. The low negative affect scores of participants in the emotional writing/worry group, suggests that these participants were avoiding rather than accessing distressing imagery. Similarly, the finding of significantly less concrete writing in this condition than in the objective writing/object condition suggests that the worry participants may have used verbal abstraction to avoid distressing, concrete thoughts (and perhaps vivid imagery). Recall that this avoidance is problematic according to emotional process theory (Foa & Kozak, 1986) because it prevents full exposure and habituation to the feared stimulus. Without full exposure to the entire fear structure (including imagery), a change in meaning and emotional processing will not occur. Thus, although Pennebaker's (1997) written emotional disclosure paradigm may encourage emotional processing of traumatic experiences (Sloan & Marx, 2004; Sloan et al., 2005), it may be that full fear exposure to problems worrying individuals is too distressing without the guidance of a therapist.

One might wonder why beneficial effects of trauma disclosure have emerged, given that a common response to trauma is avoidance (Craske, 1999). Two specific components of the standard disclosure instructions may help to explain why avoidance does not interfere with trauma writing but may still interfere with worry writing. First, the standard Pennebaker trauma disclosure instructions indicate, "What I would like to have you write about for the next four days is the most traumatic, upsetting experience of your entire life" (Pennebaker, 1994, p. 3). Because the intervention usually does not take place immediately after traumatic experiences, many participants may write about experiences

from the distant past. Given that Sudin and Horowitz's (2003) meta-analysis revealed that avoidant coping decreases over time following traumatic experiences, many participants may be writing about "older" traumas that do not elicit intense avoidance efforts. In contrast, participants in the present study were instructed, "Think about potential future problems about which you are worried. Of these, which is the one that worries you the most?" They were then asked to write about this worry. Because participants likely selected concerns currently worrying them, avoidance efforts may have been high (Borkovec, 1994). This reasoning suggests that avoidance might be lower if participants were instructed to disclose "old" worries, or issues that once did but no longer do worry them.

Second, the standard Pennebaker (1994) trauma disclosure instructions state, "In addition to a traumatic experience, you can also write about major conflicts or problems that you have experienced or are experiencing now" (Pennebaker, p. 3). Thus, many participants might not actually be writing about traumatic experiences. They may instead be writing about personal issues that do not elicit avoidance.

Although avoidant coping may help to explain the ineffectiveness of disclosure about worries, it is also possible that methodological changes could enhance emotional processing even for worry writing and thus lead to beneficial writing outcomes. First, the effect of topic consistency could be manipulated as described earlier based on the hypothesis that writing about the same worry topic should aid emotional and cognitive processing. (See Sloan et al., 2005, as well.) Second, it may be beneficial to manipulate writing duration. Specifically, Borkovec et al. (1983) found that 15 min of worrying led to more negative thought intrusions than did no worrying or 30 min of worrying.

Although participants did not actually write in the Borkovec study, it is possible that 15 min (the duration of writing in the present study) is not sufficient for fear habituation. Consistent with this reasoning, there was an increase in initial negative affect among emotional writing/worry participants but there was no more habituation among these than among participants in the other three groups. The 15 min duration was selected to be consistent with past research, although many studies have used up to 30 min of writing. (See Pennebaker, 1997, for a discussion.) Although Smyth's (1998) meta-analysis found that length of writing sessions did not moderate the effects of writing, the Borkovec et al. finding suggests that writing about worries may be a special case in which writing duration is important. Thus, it may be worthwhile in future research to examine whether 30 min of emotional writing about worries leads to emotional processing and has beneficial long-term effects on worry, physical health, and problem appraisals.

Third, it is possible that writing instructions that facilitate exposure to disconfirming information might be more beneficial than the standard written disclosure instructions. For example, Salkovskis' (1996b) argues that the four determinants of anxiety (presumably including worry) are the perceived (a) likelihood of, (b) awfulness or severity of, (c) external factors that would help the individual to avoid, and (d) ability to cope with, threatening events. Consistent with point (a), MacLeod, Williams, and Beckerman (1991) found that instructing individuals to write reasons about why a potential problem would not occur led to lower estimates of the likelihood of the potential problem than did writing about reasons why it might occur. However, the connection between these likelihood estimates and worry and the long-term effects of such a task are unknown. The finding does suggest the possibility, however, that a worry intervention

using the Pennebaker paradigm might yield beneficial outcomes if it were to emphasize explicitly one or more of the Salkovskis determinants of anxiety. Fourth, given the roles of imagery and concreteness in avoidance theory of worry (Borkovec, 1994; Stober, 2000), instructions that encourage imagery expression and concrete writing might yield beneficial outcomes. For example, imagery might be enhanced by instructing participants to engage in an imagery priming task in which they try to visualize their problem occurring. During the writing period, they might be instructed to write as concretely (in as much detail as possible) about what they had visualized during the imagery priming task.

Additional Issues

A secondary aim of the present study was to remove the confound in previous research between the emotional valence of the writing topic and the emotional nature of the writing task. In the typical writing study, participants are assigned to write emotionally about an emotionally meaningful topic or to write neutrally about an emotionally neutral topic. It is thus unclear whether the emotional valence of the topic or the emotional nature of the writing (or both) accounts for long-term outcomes. Note that the Pennebaker and Beall (1986) study is a rare exception in that three of the four quadrants from Table 2 were included. (They included neutral writing about a traumatic experience.) Most studies, however, have included only the upper left and bottom right quadrants, leaving the precise nature of causation unclear. In addition, it is possible that neutral or objective writing may be helpful for some topics but not for others. As described earlier, topics that involve threat overestimation may be particularly suitable to neutral writing (perhaps from an outsider's perspective), as such writing might aid

individuals to view the topic more objectively. Thus, the present study addressed these issues by using a fully crossed 2 x 2 design. (See Table 2.) In addition, previous studies have provided control participants little guidance on how to write “factually” or “objectively,” even though instructions on how to express emotions are provided for the emotional disclosure group. Thus, the comparison control groups in the present study included detailed suggestions on how to write objectively in order to make the instructions more comparable to the emotional disclosure instructions.

Because all four experimental groups were comparable on all outcome variables, the present study does little to disambiguate the extent to which beneficial effects of writing are due to the emotional valence of the writing topic versus the emotional valence of the writing instructions. The finding that the emotional writing/worry participants (who wrote about the same worry) were the only participants who experienced any beneficial effects (decreased trait worry) suggests that both the emotional valence of the topic and the emotional nature of the writing instruction are important. However, this effect must be viewed cautiously for the reasons previously listed. A fully crossed, 2 x 2 design like that of the present study should be used in future studies investigating the effects of writing about topics that researchers have already found beneficial effects for in previous disclosure studies (e.g., traumatic experiences, life goals, the transition from high school to university, job loss). Future worry writing studies should also use the same 2 x 2 design while implementing the potential modifications to the writing instructions described previously.

A related issue was whether writing nonemotionally or objectively would be a beneficial way to cope with potential problems individuals are worried about. Recall that

threat overestimation is a key component of Salkovskis' (1996a,b) theory of anxiety. Thus, the present study examined whether attempting to help individuals to view threats from an outsider's perspective would help to reduce worry (the objective writing/worry condition). There was no trace of beneficial effects of such writing. It is possible, however, that writing instructions that specifically target these factors might yield beneficial effects. For example, individuals could be encouraged to write (either objectively or emotionally) about reasons why a threat might not occur, might not be so severe, or might not be so difficult to cope with. They could, perhaps, focus on one of these factors during each of the writing sessions.

It is also possible, however, that individuals can utilize their emotions and still be "objective" at the same time. Indeed, many functional accounts of emotion view emotion as an important source of information (e.g., Schwarz & Clore, 2003). Further, objectivity would require taking into account all important, including affective, information. With this reasoning in mind, it may be beneficial for future investigations to encourage objectivity *and* emotion expression. These two factors could be combined implicitly by merely mentioning both objectivity and emotion expression in the instructions, or explicitly by encouraging individuals to utilize their emotional reactions as a valid source of information.

Finally, the current findings are relevant to the interpretation of recent findings by the present author and colleagues (Markowitz, Purdon, & Oakman, 2007). Markowitz et al. have argued that in written emotional disclosure research, the standard control and disclosure groups may differ on five potential confounding variables. Specifically, compared to the control group, the disclosure group may have higher expectations of

improvement and may experience greater cognitive dissonance over not improving and greater perceived demand to improve. In addition, active emotion inhibition efforts and resentment over the writing task may be higher in the control group. Further, these five variables may in part account for the between-group outcome differences commonly reported in the disclosure literature. To test these hypotheses, Markowitz et al. randomly assigned 204 participants to read a description of the standard emotional disclosure, standard control, or a modified control writing task, after which they answered questions assessing their perceptions of the task with regard to these five variables. The modified control group was designed to control for the five variables. In this condition, instructions were clarified to reduce the likelihood of emotion inhibition and to increase perceived credibility. To achieve the latter goal, Markowitz et al. used “time management” instructions, as time management may appear more credible than writing about trivial topics (Pennebaker, 1994).

An ANOVA with planned comparisons provided support for the hypotheses. Specifically, the standard control and disclosure groups differed significantly on all five variables in the hypothesized direction (although the effect on demand characteristics was only marginal, $p = .086$). Further, the modified control group did not differ from the standard disclosure group in expectancies and demand characteristics, suggesting these modifications would help to reduce the potential confounding impact of these two variables.

The Markowitz et al. (2007) findings suggest that controlling for these five variables in disclosure research is important. Because the present study provided detailed instructions on how to write objectively and encouraged individuals to view meaningful

topics from the perspective of an outsider, it may have appeared more credible. This possibility is particularly strong for the objective writing/worry condition, as obtaining emotional distance from a worry might be viewed as beneficial. It is thus noteworthy that the emotional disclosure condition did not differ from any of the other three conditions. However, the extent to which the comparison conditions removed variance in the five potential confounds Markowitz et al. discuss is unknown, as these variables were not directly assessed in the present study. Admittedly, the present study was designed years before the Markowitz et al. findings. In future disclosure studies, researchers should assess participant perceptions of the writing task using questions comparable to Markowitz et al.'s to ensure that between-group outcome differences are independent of these variables. In addition, the present study did include an explicit emotion-avoidance instruction, which the Markowitz et al. findings suggest should be modified in control instructions in future research. Specifically, although control participants should still be instructed not to write about their emotions, it should be emphasized in future studies that they also should not effortfully avoid or suppress their emotions.

Summary

Worry tends to serve an imagery avoidance function that is maladaptive in the long-run in that it prevents emotional processing. The present study attempted to address this problem by examining whether emotional processing of feared potential problems could be enhanced via emotional disclosure. Although there was a beneficial effect on trait worry among emotional disclosure participants who wrote about the same worry, most findings did not support the idea that emotional disclosure would enhance emotional processing.

It is possible that emotional processing did not occur because individuals did not fully engage in the writing task or because the writing instructions did not elicit sufficient imagery and sufficiently concrete writing, which in turn may have prevented cognitive and emotional processing. With these ideas in mind, several methodological changes are recommended for future research, all of which involve altering the content and/or duration of writing.

Conclusions

We all worry at times. Yet for some people, this worry is so extreme that it interferes with their quality of life. Despite the pervasiveness of worry, some researchers initially questioned the utility of studying worry scientifically (O'Neil, 1985a,b). Three decades of research, however, have demonstrated the utility of such research. Indeed, several existing psychotherapy and psychopharmacological treatments now exist for worry, generalized anxiety, and the anxiety disorders. It is hoped that researchers will continue to investigate pharmacological and psychological (including writing) treatment methods for individuals suffering from excessive worry.

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Footnotes

¹The data were also analyzed with three effect-coded variables: one for the emotional valence of the writing instruction (emotional vs. objective), one for the emotional valence of the writing topic (worry vs. object), and one for the interaction of these two variables. The results did not differ meaningfully in any analyses with this approach. The data are reported using dummy coding because this approach conveniently allows readers to compare the means of each condition with that of the standard control condition in disclosure research (the objective writing/object condition) by examining the statistical significance of the regression coefficients for each vector.

²Whether the time 1 covariate interacted with experimental condition was examined for each dependent measure. In no case did such an interaction reach statistical significance (all $ps > .05$).

Appendix A: Appraisal of Potential Problem

DIRECTIONS: Please **CIRCLE** your answer to each question.

1. How worried are you about this situation?

0	10	20	30	40	50	60	70	80	90	100
Not worried at all										Very worried

2. How bad would the consequences be if this situation actually happened?

0	10	20	30	40	50	60	70	80	90	100
Not very bad										The most terrible consequences I can imagine

3. The probability that the situation will occur is about:

0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
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4. If this situation happened, I would be able to cope with the consequences:

0	10	20	30	40	50	60	70	80	90	100
Very, very poorly										Very well

5. If this situation happened, people (friends, family, etc.) would be able to help me deal with it:

0	10	20	30	40	50	60	70	80	90	100
People would not be helpful at all										People would be very helpful

Appendix B: Concreteness and Imagery Ratings

Taken from J. Stober, February 9, 2004, personal communication; modified slightly for present purposes.

1	2	3	4	5
abstract	Moderately abstract	Neither abstract nor concrete	Moderately concrete	concrete
Indistinct, cross-situational, equivocal, unclear, aggregated				Distinct, situationally specific, unequivocal, clear, singular

Explications and Guidelines Regarding Concreteness Ratings

Category	Further explications/Examples
1	Abstract concepts without any extensions/details; broad, general “phrases.”
2	Abstract concepts with some detail, but still rather vague and unclear
3	Neutral
4	Sequences with details and concrete examples, rather clear and decided (e.g., with definite articles or possessive pronouns)
5	Concrete examples with details such as person, time, or place involved

Some Standard Ratings/Examples

- Events/actions (e.g., a fight, an argument) are rather definite and should be given ratings closer to the concrete end of the continuum.
- Traits/hypothetical constructs (e.g., insecurity, self-doubts, lazy, etc.) are rather aggregated and cross-situational and should be given ratings closer to the abstract end of the continuum.
- Insecurity markers such as “somehow,” “perhaps,” etc., are additions that make statements less concrete and should be given ratings closer to the abstract end of the continuum.

Imagery Ratings

Background Information for Raters:

An important feature of words is their imagery value. Words differ in their capacity to arouse mental images of things or events. Some words may arouse images very quickly and easily, whereas other words may do so only with difficulty (i.e., after a long delay). For example, think of the two words “apple” and “democracy.” In most persons, the first word would evoke a mental image rather easily and fast, whereas imagery for the second word would be more difficult and more slowly.

Also sentences differ with respect to imagery. Consider again our previous examples:

- (1) Today, I will drive to Philadelphia and go shopping.
- (2) Maybe something bad will happen.

In most persons, the first sentence would evoke imagery rather fast and easily, whereas the second sentence would evoke imagery more slowly and with difficulty.

Your task

Please give each sentence in the problem elaboration chart of each participant a rating for imagery, using the following scale from 1 to 5:

Evokes a mental image...

1	2	3	4	5
not at all or only very reluctantly and slowly	moderately reluctantly and slowly	neither/nor	moderately easily and fast	very easily and fast

Appendix C: Topic Identification

Identification of Worry

Instructions: Please think about potential future problems about which you are worried. Of these, which is the one that worries you the most? Ideally, we would like you to write about a situation that you have not discussed in great detail with other people. Please briefly describe the situation in a few sentences below.

Identification of Important Object

Instructions: Please take a moment to think about the objects in your room or home. Which one is the most important and meaningful to you? Ideally, we would like you to write about an object that you have not discussed in great detail with other people. Please briefly describe this object in a few sentences below.

Appendix D: Writing Instructions for Each Experimental Condition

Written emotional disclosure—Worry

On each day of this study, we will give you a writing assignment on the worry you identified earlier. For the next fifteen minutes, we would like you to write about this worry. In your writing, we want you to really let go and explore your very deepest emotions and thoughts. You might tie the worry you write about to other parts of your life. For example, how is it related to your childhood, your parents, people you love, who you are, and who you want to be? In addition, you may choose to write about what might happen or what the consequences might be if the situation you are worried about were to occur. Or you might write about what factors might make the situation more (or less) likely to occur. Whatever you choose to write, however, it is critical that you really delve into your deepest emotions and thoughts.

If you feel you have fully expressed your feelings about this potential problem before the 15 minutes is up and have nothing left to write about, you may write about a different worry. Again, please be sure that you really delve into your deepest emotions and thoughts.

Objective Writing—Worry

On each day of this study, we will give you a writing assignment on the worry you identified earlier. For the next fifteen minutes, we would like you to write about this worry. However, we do **not** want you to let go and explore your deepest emotions and thoughts. Instead, we want you to be as objective and factual as possible. For example, how would this situation be viewed from the perspective of an outsider or a person unfamiliar with your situation? How would an objective bystander report the details and facts of the situation to someone else? Objectively speaking, what factors would make the problem better or worse? Whatever you choose to write, however, it is critical that you be as objective and factual as possible.

If you feel you have fully expressed your feelings about this potential problem before the 15 minutes is up and have nothing left to write about, you may write about a different worry. Again, please be sure that you be as objective as possible and avoid delving into your deepest emotions and thoughts altogether.

Written emotional disclosure—Neutral Topic

On each day of this study, we will give you a writing assignment on the important object you identified earlier. For the next fifteen minutes, we would like you to write about this object. In your writing, we want you to really let go and explore your very deepest emotions and thoughts. You might try to relate the object to other aspects of your life. For example, how is it related to your childhood, your parents, people you love? What does it say about your personality, your interests, who you are, and who you want to be? In addition, what might happen or what might the consequences be if you were to lose this

object? Whatever you choose to write, however, it is critical that you really delve into your deepest emotions and thoughts.

If you feel you have fully expressed your feelings about this object before the 15 minutes is up and have nothing left to write about, you may write about different objects in your room/home. Again, please be sure that you really delve into your deepest emotions and thoughts.

Objective Writing—Neutral topic

On each day of this study, we will give you a writing assignment on the important object you identified earlier. For the next fifteen minutes, we would like you to write about this object. However, we do **not** want you to let go and explore your deepest emotions and thoughts. Instead, we want you to be as objective and factual as possible. For example, how would this object be described from the perspective of an outsider? How would an objective bystander describe the details and facts of the object to someone else? Objectively speaking, what might be the consequences if you were to lose this object? Whatever you choose to write, however, it is critical that you be as objective and factual as possible.

If you feel you have fully expressed your feelings about this object before the 15 minutes is up and have nothing left to write about, you may write about different objects in your room/home. Again, please be sure that you be as objective as possible and avoid delving into your deepest emotions and thoughts altogether.

Appendix E: Instructions for Potential Problem
Descriptions at One-Month Follow-Up Assessment

For the next five minutes, we would like you to write about your worry. You are free to write about any aspects of the situation, such as your emotions about it, the consequences that there might be if the situation were to occur, factors that might make the situation more or less likely to occur, or how you might manage to cope with the situation. You might tie the problem you write about to other parts of your life. For example, how is it related to your childhood, your parents, people you love, who you are, and who you want to be? You may also try to describe the situation objectively and factually, perhaps by taking the perspective of an outsider or someone unfamiliar with the situation. For instance, how might an outsider describe this situation to someone else?