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Brief Report

Intolerance of Uncertainty, Worry, and Depression

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This study examined the strength and specificity of the relationship between intolerance of uncertainty (IU) and worry with regards to depression in a nonclinical sample. The hypotheses were the following: (1) IU would be more highly and specifically related to worry than to depression; and (2) worry would be more highly and specifically related to IU than to dysfunctional attitudes (a cognitive process involved in depression). Two-hundred and forty (240) undergraduate students completed self-report questionnaires that assessed worry, intolerance of uncertainty, depression, and dysfunctional attitudes. Both hypotheses were confirmed: IU was more highly (although not significantly) and specifically related to worry than to depression; and worry was more highly and specifically related to IU than to dysfunctional attitudes. The findings are discussed in terms of their theoretical and clinical implications.

KEY WORDS: intolerance of uncertainty; worry; specificity; depression; generalized anxiety disorder.

Everyone worries from time to time. Although low to moderate levels of worry may be adaptive, high levels of worry often lead to distress and poor functioning. In fact, chronic, excessive, and uncontrollable worry is the main feature of generalized anxiety disorder (GAD). Why do some individuals have manageable levels of worry whereas others suffer from persistent and unremitting worry? To answer this question, one must identify the processes that underlie worrying behavior. Over the past decade, several studies have pointed to intolerance of uncertainty as a cognitive process that appears to be involved in the etiology of GAD.

Intolerance of uncertainty (IU) can be defined as a cognitive bias that affects how a person perceives, interprets, and responds to uncertain situations on a cognitive, emotional, and behavioral level. Individuals who are intolerant of uncertainty find uncertainty stressful and upsetting, believe uncertainty is negative and should be avoided, and have difficulty functioning in uncertain situations (Buhr & Dugas, 2002). A recently completed study (Dugas et al., in press) suggests that IU is associated with particular information processing biases that may contribute to

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the development and maintenance of high levels of worry and GAD. Specifically, IU was associated with the biased recall of stimuli denoting uncertainty, with participants high in IU recalling a higher proportion of uncertainty-related stimuli than those with lower levels of IU. Intolerance of uncertainty was also related to the tendency to make threatening interpretations of ambiguous situations, with participants high in IU making more threatening interpretations than those with lower levels of IU. These findings suggest that IU may lead to excessive worry and GAD via the combination of enhanced activation of internal representations of uncertain information and the tendency to make threatening interpretations of ambiguous information.

In both nonclinical and clinical populations, IU has consistently emerged as the best predictor of the tendency to worry (e.g., Dugas, Gagnon, Ladouceur, & Freeston, 1998; Laugesen, Dugas, & Bukowski, 2003). Furthermore, it appears that reducing IU leads to less worry, whereas increasing IU leads to more worry (Ladouceur, Gosselin, & Dugas, 2000). Findings from a recent treatment study also show that decreases in IU generally precede decreases in worry over the course of cognitive-behavioral therapy for GAD (Dugas & Ladouceur, 2000). Thus, a considerable amount of data suggests that IU plays a key role in the etiology of worry.

We have also begun to examine the specificity of the relationship between IU and worry. For example, nonclinical data show that the relationship between IU and worry is for the most part independent of shared variance with obsessive–compulsive symptoms and panic-like sensations (Dugas, Gosselin, & Ladouceur, 2001). Furthermore, research in clinical populations suggests that patients with GAD are more intolerant of uncertainty than patients with other anxiety disorders (Ladouceur et al., 1999). Results such as these support the idea that IU is specific to worry (and GAD), and underscore the importance of pursuing this line of research to clarify the relationship between these constructs.

Although our previous research has focused on the specificity of the relationship between IU and worry with regards to anxiety, it may be particularly important to investigate the specificity of this relationship with regards to depression. In fact, there is considerable evidence suggesting that GAD is more closely linked to depression than to most (if not all) anxiety disorders. For example, although the anxiety disorders are genetically heterogeneous, GAD and depression appear to have a similar genetic diathesis (Kendler, 1996). Phenotypic data also suggest that GAD and depression are closely related. Findings from studies using structural modeling show that general negative affect explains much of the variance in GAD and depression scores, more so than for most other anxiety disorders (Brown, Chorpita, & Barlow, 1998).

Not surprisingly, therefore, epidemiological data show that GAD and depression often co-occur in the same individuals. The National Comorbidity Survey (NCS) found that 62.4% of individuals with lifetime GAD also met criteria for lifetime major depression (Wittchen, Zhao, Kessler, & Eaton, 1994). Furthermore, of all anxiety disorders, GAD was associated with the greatest risk of developing major depression in the NCS, with an odds ratio of 12.87 (Kessler, Zhao, Blazer, & Swartz, 1997). Finally, there is growing evidence that alterations in

similar neurotransmitter systems are implicated in the neurobiology of both GAD and depression, particularly the norepinephrine and serotonin systems (Gorman, 2002).

Over the past decade, many authors have attempted to account for the genotypic, phenotypic, diagnostic, and neurobiological similarities of GAD and depression. In particular, Mineka, Watson, and Clark (1998) have proposed an integrative hierarchical model of anxiety and depression that nicely fits the GAD and depression data. Specifically, they suggest that each disorder contains both a common and unique component. The component that is common to all anxiety and mood disorders (and other disorders as well) appears to be general distress and/or negative affect. Examples of components that may be relatively unique to specific disorders include anxiety sensitivity for panic disorder, excessive responsibility for obsessive-compulsive disorder, and fear of negative evaluation for social anxiety disorder. Mineka and colleagues go on to state that an important goal for future research is to identify the nature of the unique components for each disorder more precisely.

Accordingly, therefore, one of the goals of this study was to further investigate components unique to GAD and excessive worry, such as intolerance of uncertainty. More specifically, the goal of this study was to investigate the specificity of the relationship between intolerance of uncertainty and worry with regards to the symptoms and processes of depression. The study's first hypothesis was that IU would be more highly and specifically related to worry than to depression. The second hypothesis was that worry would be more highly and specifically related to IU than to dysfunctional attitudes, one of the cognitive processes involved in depression.

METHOD

Participants and Procedure

Two-hundred and forty (240) undergraduate students from Concordia University volunteered to participate in the study. The sample was made up of 189 female participants with an average age of 22.02 years ($SD = 3.29$) and 51 male participants with an average age of 22.06 years ($SD = 2.39$). The participants signed an informed-consent form and responded to the study's four questionnaires at the beginning of lectures in various university courses. All questionnaires were identified by a code number to preserve participant anonymity.

Instruments

The *Penn State Worry Questionnaire* (PSWQ; Meyer, Miller, Metzger, & Borkovec, 1990) is comprised of 16 items, rated on a 5-point Likert scale, designed to evaluate the tendency to engage in excessive and uncontrollable worry. Examples of items from the PSWQ include "Many situations make me worry" and "Once I start worrying, I can't stop." The PSWQ has high internal consistency, $\alpha = .86$ to .94, and

very good test–retest reliability over 8–10 weeks, $r = .92$ (Meyer et al., 1990). It also shows evidence of convergent and divergent validity as it is more highly correlated with other measures of worry than with measures of anxiety and depression (Meyer et al., 1990).

The *Intolerance of Uncertainty Scale* (IUS; Original French version: Freeston, Rhéaume, Letarte, Dugas, & Ladouceur, 1994; English translation: Buhr & Dugas, 2002) measures intolerance of uncertainty, a cognitive process known to be associated with worry. The questionnaire includes 27 items, rated on a 5-point Likert scale, relating to the idea that uncertainty is unacceptable, reflects badly on a person, and leads to frustration, stress, and the inability to take action. Items include "It's unfair not having any guarantees in life" and "I can't stand being taken by surprise." The IUS has excellent internal consistency, $\alpha = .94$, good test–retest reliability over 5 weeks, $r = .74$, and has demonstrated convergent and divergent validity (Buhr & Dugas, 2002).

The *Beck Depression Inventory* (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) is the most well known and most often used measure of depressive symptoms. The questionnaire consists of 21 groups of four statements. For example, the first group of statements begins with "I do not feel sad" and ends with "I am so sad or unhappy that I can't stand it." The BDI has excellent internal consistency, $\alpha = .87$, as well as good test–retest reliability, $r = .60$. Furthermore, the BDI accurately discriminates between depressive symptoms and anxiety-related symptoms (Beck, Steer, & Garbin, 1988).

The *Dysfunctional Attitude Scale* (DAS; Weissman, 1980) consists of 40 items, rated on a 7-point Likert scale, and is used to assess cognitive distortions in depression. The items on the DAS represent seven major value systems: approval, love, autonomy, achievement, perfectionism, entitlement, and omnipotence. Examples of DAS items are "If a person asks for help, it is a sign of weakness" and " I should be upset if I make a mistake." The DAS has excellent internal consistency, $\alpha = .84$ to .92, as well as high test–retest reliability over 8 weeks, $r = .80$ to .84 (Weissman, 1980).

RESULTS

Means and standard deviations on the study measures were as follows: PSWQ, 48.20 (13.79); IUS, 55.54 (17.72); BDI, 8.45 (6.73); and DAS, 118.98 (26.43). As expected, all study measures were significantly correlated: PSWQ and IUS, $r = .57$, $p < .001$; PSWQ and BDI, $r = .48$, $p < .001$; PSWQ and DAS, $r = .43$, $p < .001$; IUS and BDI, $r = .49$, $p < .001$; IUS and DAS, $r = .50$, $p < .001$; BDI and DAS, $r = .44$, $p < .001$. The results from the correlational analyses were first used to examine the issue of a differential relationship between the process of intolerance of uncertainty (IUS) and the symptoms of worry (PSWQ) and depression (BDI). Although the correlation between the IUS and the PSWQ was numerically higher than the correlation between the IUS and the BDI, a test for differences between nonindependent correlations revealed that the difference between these correlations did not reach the level of statistical significance ($z = 1.31, p > .05$).

Table I. Hierarchical Regressions: Prediction of Intolerance of Uncertainty (IUS) Scores ($N = 215$)

	ΔR^2	ΔF	B	$SE\ B$	β
First order of entry					
Variables					
Demographic	.019	2.127			
Age			0.100	0.326	.017
Gender			1.572	2.490	.035
Depression (BDI)	.226	63.912***	0.752	0.161	.287***
Worry (PSWQ)	.141	48.492***	0.562	0.081	.439***
Second Order of Entry					
Demographic	.019	2.127			
Age			0.100	0.326	.017
Gender			1.572	2.490	.035
Worry (PWSQ)	.304	97.315***	0.562	0.081	.439***
Depression (BDI)	.063	21.768***	0.752	0.161	.287***

Note. IUS = Intolerance of Uncertainty Scale; BDI = Beck Depression Inventory; PSWQ = Penn State Worry Questionnaire. Beta weights are from final step, whereas R^2 and F change values are from each step. Gender coding: 0 = female; 1 = male.
***$p < .001$.

Two hierarchical regressions predicting intolerance of uncertainty scores were then carried out to examine the specificity of the relationship between intolerance of uncertainty, worry, and depression. In the first regression, age and gender were entered in the first step, followed by depression scores in the second step, and worry scores in the third step. Given that both age and gender were correlated with some of the study measures (with younger participants scoring higher on the DAS, $r = -.16$, $p < .05$, and females scoring higher on the PSWQ, $r = -.27$, $p < .001$, the IUS, $r = -.14$, $p < .05$, and the BDI, $r = -.17$, $p < .05$), we decided to control for participant demographics in the first step of the regression. The results, which are presented in Table I, show that worry scores accounted for 14.1% of the variance in intolerance of uncertainty scores in addition to the variance already explained by demographics and depression scores. In the second regression, the order of entry was switched for worry scores (now second) and depression scores (now third). The results, which are also presented in Table I, reveal that depression scores accounted for only 6.3% of the variance in intolerance of uncertainty scores once demographics and worry scores had already been entered into the equation.

To address the issue of specificity from a second and complementary angle, we then examined the relationship between the symptom of worry (PSWQ) and the processes of intolerance of uncertainty (IUS) and dysfunctional attitudes (DAS). In this instance, a test for differences between nonindependent correlations revealed that the correlation between worry and intolerance of uncertainty was significantly greater than the correlation between worry and dysfunctional attitudes ($z = 2.58$, $p < .01$). We then used two hierarchical regressions predicting worry scores to examine the issue of specificity. In the first regression, demographics were entered in the first step, followed by dysfunctional attitudes in the second step and intolerance of uncertainty in the third step. The results, which are presented in Table II, show that intolerance of uncertainty scores explained 14.4% of the variance in worry

Table II. Hierarchical Regressions: Prediction of Worry (PSWQ) Scores ($N = 218$)

	ΔR^2	ΔF	B	$SE\ B$	β
First order of entry					
Variables					
Demographic	.077	9.324***			
Age			−0.052	0.248	−.011
Gender			−6.954	1.840	−.204***
Attitudes (DAS)	.174	50.791***	0.101	0.033	.193**
Uncertainty (IUS)	.144	50.498***	0.345	0.049	.445***
Second order of entry					
Demographic	.077	9.324***			
Age			−0.052	0.248	−.011
Gender			−6.954	1.840	−.204***
Uncertainty (IUS)	.285	97.315***	0.345	0.049	.445***
Attitudes (DAS)	.027	9.398**	0.101	0.033	.193**

Note. PSWQ = Penn State Worry Questionnaire; DAS = Dysfunctional Attitude Scale; IUS = Intolerance of Uncertainty Scale. Beta weights are from final step, whereas R^2 and F change values are from each step. Gender coding: 0 = female; 1 = male.
**$p < .01$. ***$p < .001$.

scores after demographics and dysfunctional attitudes had been entered. In the second regression, the order of entry was inverted for intolerance of uncertainty (now second) and dysfunctional attitudes (now third). The results, also presented in Table II, show that once the contribution of demographics and intolerance of uncertainty had been accounted for, dysfunctional attitudes explained only 2.7% of the variance in worry scores.

DISCUSSION

This study's first hypothesis, that intolerance of uncertainty would be more highly and specifically related to worry than to depression, was partially supported. The results show that although IU appeared to be more highly correlated with worry than depression, the difference between these correlations was not statistically significant. Although power analysis suggests that the same correlations with a sample of 350 participants would have yielded a significant difference, one could argue that a sample of 240 participants should be large enough to produce results that are meaningful. However, given that the test for differences between correlations revealed a moderate effect size ($r^2 = .085$; see Cohen, 1988, pp. 79–81), one could also argue that the difference between the correlations is in fact theoretically and clinically meaningful. In terms of specificity, this first hypothesis was supported. The results from the first set of hierarchical regressions show that worry made a larger unique contribution to the prediction of IU than did depression.

The second hypothesis, that worry would be more highly and specifically related to IU than to dysfunctional attitudes, was fully supported. The correlation between worry and IU was significantly greater than the correlation between worry and dysfunctional attitudes, and IU made a greater unique contribution to the

prediction of worry than did dysfunctional attitudes. In particular, the results from the second set of regressions suggest that the relationship between worry and dysfunctional attitudes can largely be accounted for by the relationship between worry and IU.

Overall, the results from this study argue for the specificity of the relationship between intolerance of uncertainty and worry with regards to depression and dysfunctional attitudes. These findings add to a growing body of literature suggesting that IU may be a cognitive process that is specific to nonclinical and clinical worry. Thus far, nonclinical data indicate that IU is more closely related to worry than to panic sensations, obsessions, and depression (Dugas et al., 2001; this study). Data from nonclinical populations also suggest that worry is more highly related to IU than to anxiety sensitivity, excessive responsibility, perfectionism, need for control, and dysfunctional attitudes (Buhr & Dugas, 2001; Dugas et al., 2001; this study). Clinical data show that patients with pure (non-comorbid) GAD are more intolerant of uncertainty than patients with pure panic disorder with agoraphobia (Dugas, Marchand, & Ladouceur, in press). Furthermore, primary GAD patients (with comorbid disorders) are more intolerant of uncertainty than patients with other primary anxiety disorders (Ladouceur et al., 1999). Thus, IU may be a relatively unique component of generalized anxiety disorder.

Although this study's findings are informative, their implications are restricted by a number of methodological limitations. First and foremost, the nature of the sample (i.e., a convenience sample primarily made up of female undergraduate students) limits the theoretical and clinical implications of the findings. Second, the study did not include a measure of a common process such as negative affect or measures of other potentially specific GAD processes such as cognitive avoidance or metacognitions about worry. Finally, the study used the Beck Depression Inventory rather than a measure such as the Center for Epidemiological Studies—Depression scale (Radloff, 1977), which was designed to measure depressive symptoms in the general population. Having acknowledged these limitations, however, we believe this study provides important preliminary data, which will serve as a springboard for future studies of the specificity of the processes involved in GAD.

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