



## Cognitive content-specificity in future expectancies: Role of hopelessness and intolerance of uncertainty in depression and GAD symptoms

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### ABSTRACT

The present study examined cognitive content-specificity in future-event predictions associated with symptoms of depression and generalized anxiety disorder (GAD). College undergraduates ( $N = 284$ ) completed measures of depression, GAD, and rated their certainty that a given set of positive and negative outcomes were or were not likely to happen in their future. Participants also completed measures of hopelessness and intolerance of uncertainty (IU). Individuals ( $N = 263$ ) completed the same measures again 6 weeks later. Certainty in an absence of positive future outcomes was associated with symptoms of depression but not GAD, and hopelessness mediated this relationship – concurrently and when examining change scores over 6 weeks. Certainty in negative outcomes was concurrently associated with both symptoms of depression and GAD, and hopelessness partially mediated these relationships. IU predicted concurrent increases in depression and GAD symptoms, and negative-outcome certainty partially mediated the IU-depression but not the IU-GAD symptom relationship. Change in certainty did not mediate the relationship between changes in IU and GAD symptoms but partially mediated the relationship between change in IU and depression symptoms over time. Hopelessness appears to play a unique role in the relationship between reduced anticipation of positive future outcomes and depression. Although less clearly suggested by the data, IU may contribute to both depression and GAD symptoms but may do so through different pathways.

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### Introduction

The way in which individuals view their future outcomes has long been implicated in their psychological well-being. Both symptoms of depression and anxiety are associated with biases in anticipating the future. For instance, depressed individuals tend to hold pessimistic views of the future – that is, they tend to expect that negative events will occur and that positive events will not occur (Alloy & Ahrens, 1987; Andersen, 1990; Cropley & MacLeod, 2003; Strunk, Lopez, & DeRubeis, 2006).<sup>1</sup> Similarly, symptoms of anxiety are associated with anticipating future threat. In particular, Generalized Anxiety Disorder (GAD) is characterized by worry about future events (Dugas et al., 1998), and such worry tends to involve thoughts about the possible occurrence of negative outcomes (Borkovec, 1994). While there is considerable overlap between the types of future expectancies involved in depressive and anxious cognitions, prior research has attempted to identify

specific cognitive content that distinguishes depression from anxiety – i.e., to establish cognitive content-specificity in depressive vs. anxious thinking.

#### *Cognitive content-specificity in depression and anxiety*

Although there is support for cognitive content-specificity, the empirical literature reveals that the ability of anxious and depressive cognitions to discriminate symptoms of anxiety and depression is limited. A recent meta-analysis suggests that whereas depressive cognitions are specific to depressive symptomatology, anxious cognitions show no such specificity and instead are comparably associated with both depressive and anxious symptomatology (Beck & Perkins, 2001). Recent efforts have been made to integrate the cognitive content-specificity literature with other models that distinguish between depression and anxiety – such as the tripartite model (Clark & Watson, 1991). The tripartite model of depression and anxiety posits that anxiety and depression share a “general distress factor” of high negative affect (NA), characterized by the feeling of distress or unpleasantness. Over this common affective experience, depression is distinguished from anxiety by diminished positive affect (PA), defined by anhedonia and lack of energy, while anxiety is specified by physiological hyperarousal

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<sup>1</sup> It should be noted that depression is also associated with biased recollections of the past (e.g., Raes et al., 2006).

(Clark & Watson, 1991; Clark, Watson, & Mineka, 1994; Mineka, Watson, & Clark, 1998; Watson & Tellegen, 1985).

Evidence from clinical samples demonstrates that the constructs of the cognitive content-specificity and tripartite models are meaningfully correlated, and that integration of the models may better discriminate between anxiety (high NA and anxious cognitions) and depression (high NA, low PA, and depressive cognitions) than either model alone (Beck, Benedict, & Winkler, 2003; Jolly, Dyck, Kramer, & Wherry, 1994; Jolly & Dykman, 1994). In an effort to improve model integration along these lines, Beck et al. (2001) found that hopelessness, in comparison to a more global construct of depressive cognition, was a statistically stronger and more discriminative indicator of low PA and depressive symptomatology. Similarly, worry was a stronger and more discriminative indicator of high NA and anxious symptomatology than was more global anxious cognitive content. Nevertheless, the overall pattern was consistent with previous research in better supporting depressive content-specificity than anxious content-specificity.

#### *Depression, future-event predictions, and hopelessness*

Depression has been distinguished from anxiety by a reduced anticipation of positive future outcomes. Individuals with clinical or analogue major depression show a reduced anticipation of potential positive events that might happen in their future, compared to both controls (Andersen & Limpert, 2001; MacLeod & Salaminou, 2001) and to individuals with an anxiety disorder (e.g., panic disorder; MacLeod, Tata, Kentish, & Jacobsen, 1997). Similarly, a study by MacLeod and Byrne (1996) compared individuals who scored high on self-report measures of depression and anxiety (primarily GAD symptoms) to those who scored high only on anxiety symptoms and found that those with a mix of anxiety and depression symptoms generated fewer positive future events, while both the “anxious-depressed” group and the anxious-only group showed an increased anticipation of negative future events, compared to controls (MacLeod & Byrne, 1996). Furthermore, symptoms of depression are associated with greater *certainty* in anticipating both negative future outcomes and an absence of positive future outcomes, compared to symptoms of GAD, which are associated with greater certainty in negative future outcomes only (Miranda & Mennin, 2007).

Beck's (1967) theory of a negative cognitive triad of beliefs in depression holds that depressed persons acquire, through early experiences, maladaptive mental representations of their futures, or negative future-event schemas, which bias their anticipations of the future. Similarly, the hopelessness model of depression asserts that coming to expect that aversive outcomes are inevitable and that desired outcomes are unattainable, along with feelings of helplessness to affect these outcomes, is a *proximal and sufficient* cause of depression (Abramson, Metalsky, & Alloy, 1989). Hopeless expectations about the future have been found to distinguish individuals with major depression from those with GAD (Beck, Riskind, Brown, & Steer, 1988).

Andersen (1990), Andersen and Lyon (1987), and Andersen, Spielman, and Bargh (1992) suggest that individuals become hopeless when they develop certainty that negative outcomes will occur or that positive future outcomes will not occur – i.e., the point at which they develop *depressive predictive certainty*. Furthermore, they distinguish depressive predictive certainty from pessimism, in that while pessimism involves the tendency to expect the presence of negative outcomes and an absence of positive outcomes, it is the point at which individuals become 100% certain in these pessimistic expectations that they fall into hopelessness and experience the onset of depressive affect (Andersen & Lyon, 1987). Such a conceptualization of the role of hopelessness in depression is consistent with the helplessness–hopelessness model of anxiety

and depression (Alloy, Kelly, Mineka, & Clements, 1990), which suggests that anxiety arises from initial experiences of helplessness in affecting one's future outcomes, while depression arises when individuals become certain about their helplessness, and even more so when this helplessness becomes hopelessness.

#### *Generalized anxiety disorder, negative future expectancies, and intolerance of uncertainty*

Anticipation of threat in one's future has been shown to distinguish individuals with GAD from non-GAD anxious individuals (Butler & Mathews, 1983; Dugas, Freeston, et al., 1998). The increased belief that negative future events are highly likely can be conceptualized as a component of worry – a central characteristic of GAD. Individuals high in worry, when asked to generate reasons why a future negative personal outcome would occur, provide more explanations for the event's occurrence than those low in worry (MacLeod, Williams, & Bekerian, 1991). Furthermore, among individuals reporting clinical levels of anxiety (as assessed by self-report and by a clinician), an increased tendency to think of reasons why negative events will occur, vs. why they will not occur, along with ease in visualizing these events, is associated with an increased subjective probability that they will occur (Raune, MacLeod, & Holmes, 2005).

Dugas and colleagues have developed a cognitive model of GAD implicating intolerance of uncertainty in the onset of pathological worry (Bur & Dugas, 2006; Dugas, Freeston, & Ladouceur, 1997; Dugas, Gagnon, Ladouceur, & Freeston, 1998; Dugas, Gosselin, & Ladouceur, 2001). Intolerance of uncertainty (IU) represents a constellation of cognitive, emotional, and behavioral reactions to uncertain or ambiguous situations, and differs importantly from earlier conceptualizations of intolerance of ambiguity (e.g., Frenkel-Brunswick, 1948) in its emphasis on *future* uncertain events as opposed to present ambiguous situations (Grenier, Barrette, & Ladouceur, 2005). Individuals high in IU believe that uncertainty about the future is stressful, upsetting, and unfair, that uncertain events are negative and should be avoided, and that uncertainty leads to inability to act (Buhr & Dugas, 2002; see also Dugas, Buhr, & Ladouceur, 1994). High IU has been shown to distinguish between individuals with a diagnosis of GAD and nonclinical individuals (Dugas, Gagnon, et al., 1998), and more specifically between patients with GAD and those with other anxiety disorders, such as panic disorder, obsessive-compulsive disorder (OCD), and social phobia (Dugas, Marchand, & Ladouceur, 2005; Ladouceur et al., 1999). However, recent research using an analogue sample of individuals with GAD and OCD found no difference between these groups in IU, suggesting that IU may also be relevant to other anxiety disorders (Holaway, Heimberg, & Coles, 2006). Additional research suggests that IU is related not only to GAD occurrence and maintenance, but also to symptom severity (Dugas et al., 2007). In nonclinical samples, experimental manipulation of increased IU has been linked to increased worry (Ladouceur, Gosselin, & Dugas, 2000). IU has been similarly related to anxiety-relevant information processing, such that individuals high in IU show biased recall for words indicating uncertainty and greater concern and overestimation of threat in the interpretation of ambiguous situations (Dugas et al., 2005).

Miranda and Mennin (2007) have speculated that IU may contribute to the biased prediction of negative future events found among anxious persons, such as individuals with GAD. They suggest that IU may represent an underlying cognitive bias in future-event predictions, distinct in content from the bias that results in the more global pessimistic predictions associated with depression – in that the inability to tolerate the uncertainty of possible negative future events may result in a need to disambiguate these outcomes by becoming increasingly certain that they will occur (Miranda &

Mennin, 2007). That is, intolerance of uncertainty may lead people to become certain that negative future events will occur. Little research has examined the relationship between intolerance of uncertainty and depression, although there is some evidence of a positive association between IU and symptoms of depression (Ciarrochi, Said, & Dean, 2005; Norton, Sexton, Walker, & Norton, 2005). Prior research also suggests an association between depression symptoms and intolerance of ambiguity – a related construct (Andersen & Schwartz, 1992) – in that individuals high in intolerance of ambiguity are more likely to experience depressive certainty and symptoms of depression in response to negative life events. However, intolerance of uncertainty has been found to be more strongly associated with cognitive processes implicated in GAD (e.g., worry) than to those implicated in depression (e.g., dysfunctional attitudes; Dugas, Schwartz, & Francis, 2004).

### The present study

The present study sought to further elucidate the nature of the cognitive content specific to future outcome expectancies in depression and GAD by examining the roles of hopelessness and intolerance of uncertainty in the relationship between certainty in pessimistic future outcome expectancies and symptoms of depression and GAD, respectively. Specifically, it was hypothesized that hopelessness would mediate the relationship between being certain when expecting both positive future outcomes *not to occur* and negative outcomes *to occur* and symptoms of depression. It was expected that intolerance of uncertainty would be associated with certainty in the occurrence of negative future outcomes and GAD symptoms, and that being certain about negative future outcomes would mediate the relationship between intolerance of uncertainty and GAD symptoms. Furthermore, change in hopelessness over time was specifically expected to mediate the relationship between change in certainty regarding positive and negative outcomes and depression over time, while change in negative-outcome certainty was expected to be a specific mediator of the relationship between change in intolerance of uncertainty and increases/decreases in GAD symptoms over time. In replicating previous findings (Miranda & Mennin, 2007), GAD symptoms were expected to be associated with anticipating negative future outcomes only, while symptoms of depression were expected to be associated with anticipation of both the presence of negative future outcomes and an absence of positive outcomes.

## Method

### Participants

An ethnically diverse sample of 284 college undergraduates (230 female), ages 18–48 ( $M = 20.48$ ,  $SD = 4.83$ ) from a public university in the northeastern United States took part in this study for credit in their Introduction to Psychology courses. The ethnic distribution of the sample was as follows: 35% Caucasian, 14% African-American/Caribbean Islander, 18% Hispanic, 26% Asian/Pacific Islander, and 7% of other ethnicities. Approximately 45% of the sample was born outside of the US, with the total number of years spent in the US ranging from 1 to 33 ( $M = 10.20$ ,  $SD = 5.72$ ). In order to examine change in the measures of interest, a sub-sample of 263 participants (214 female), ages 18–47 ( $M = 20.40$ ,  $SD = 4.58$ ) returned approximately 6 weeks later to take part in a second study session. The ethnic distribution of participants who took part in both study sessions was 35% Caucasian, 14% African-American/Caribbean Islander, 17% Hispanic, 27% Asian/Pacific Islander, and 7% of other ethnicities, and 47% of the sample was born outside of the US. There were no statistically significant demographic differences between participants who did or did not take part in both study sessions.

## Measures

### BDI-II

The Beck Depression Inventory, Second Edition (BDI-II; Beck, Steer, & Brown, 1996) is a self-report questionnaire consisting of 21 items measuring various symptoms of depression in the previous 2 weeks – including sadness, anhedonia, diminished attention/concentration, psychomotor agitation/retardation, and sleep/appetite disturbance. Each item is scored on a 4-point Likert scale ranging from 0 (e.g., *I do not feel sad*) to 3 (e.g., *I feel so sad or unhappy that I can't stand it*), with total scores ranging from 0 to 63. Along with good test–retest reliability ( $r = .91-.93$ ) in college-student samples, the BDI-II has demonstrated good predictive, convergent, and divergent validity in clinical and nonclinical samples (Beck et al., 1996; Dozois, Dobson, & Ahnberg, 1998; Whisman, Perez, & Ramel, 2000). The BDI-II showed high internal consistency in the present sample, both at time 1 ( $\alpha = .88$ ) and time 2 ( $\alpha = .91$ ). Average baseline scores on the BDI-II in the present sample were in the minimal range at both time 1 ( $M = 11.85$ ,  $SD = 8.13$ ) and time 2 ( $M = 10.08$ ,  $SD = 8.30$ ) but ranged from no symptoms (score of 0) to clinically significant symptoms (score of 38 at time 1 and 44 at time 2).

### GAD-Q-IV

The Generalized Anxiety Disorder Questionnaire-IV (GAD-Q-IV; Newman et al., 2002) is a 9-item self-report measure used to measure symptoms of GAD, as consistent with the 4th Edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV; APA, 1994). Three initial questions inquire about whether individuals experience excessive and uncontrollable worry, and subsequent questions inquire about physical symptoms (e.g., restlessness, muscle tension), as experienced in the previous 6 months. The GAD-Q-IV can be used to screen for a diagnosis of GAD, or it can also be scored continuously, with scores ranging from 0 to 13. The GAD-Q-IV has demonstrated good convergent validity, as evidenced by high agreement with a GAD diagnosis based on a diagnostic interview. In addition, it discriminates individuals with GAD from those with panic disorder and social phobia and also correlates more highly with the Penn State Worry Questionnaire (Meyer, Miller, Metzger, & Borkovec, 1990) than with self-report measures of social anxiety or posttraumatic stress symptoms. Finally, the GAD-Q-IV has good test–retest reliability over a 2-week period (Newman et al., 2002). Internal consistency for the GAD-Q-IV in the present sample ranged from  $\alpha = .80$  at time 1 to  $\alpha = .82$  at time 2. Scores on the GAD-Q-IV ranged from 0 to 13 at time 1 and from 0 to 12 at time 2, with an average of 5.85 ( $SD = 3.23$ ) at baseline and 5.06 ( $SD = 3.46$ ) at follow-up.

### BHS

The Beck Hopelessness Scale (BHS; Beck & Steer, 1988; Beck, Weissman, Lester, & Trexler, 1974) is a self-report inventory of general negative expectancies about the future. The BHS solicits true/false responses to 20 statements (e.g., *I look forward to the future with hope and enthusiasm, It is very unlikely that I will get any real satisfaction in the future*) and results in a score ranging from 0 to 20, with a higher score indicating greater hopelessness. The BHS has shown good predictive, convergent, and divergent validity, along with high test–retest reliability (Beck et al., 1974), and in the current sample, showed good internal consistency at both times 1 and 2 ( $\alpha_{t1} = .78$ ,  $\alpha_{t2} = .82$ ).

### IUS

The Intolerance of Uncertainty Scale (IUS; Freeston, Rhéaume, Letarte, Dugas, & Ladouceur, 1994; English version, Buhr & Dugas, 2002) is a 27-item self-report measure of the following beliefs concerning uncertainty about the future: uncertainty is unacceptable, stressful, upsetting, and unfair; uncertainty makes one unable

to act; and uncertain events are negative and should be avoided. Statements such as “Uncertainty makes me uneasy, anxious, or stressed” and “I should be able to organize everything in advance” are rated on a Likert scale ranging from 1 (“Not at all characteristic of me”) to 5 (“Entirely characteristic of me”), with higher IUS scores representing greater intolerance of uncertainty. Both the French and English versions have shown high internal consistency, good test–retest reliability, and convergent and divergent validity (Buhr & Dugas, 2002; Freeston et al., 1994). In the current sample, the IUS showed high internal consistency ( $\alpha = .93$ ) at both time points.

#### Future events questionnaire

The future events questionnaire (Miranda & Mennin, 2007; see also Andersen, 1990) is a 34-item measure consisting of 17 positive and 17 negative potential future events, presented in mixed order. Participants are asked to respond to the question, “Is this likely to happen to you at some time in the future?” for each event and also rate how certain they are of each prediction on a Likert scale ranging from 0 (“Not at all certain”) to 5 (“As certain as one can be”). This measure is adapted from prior work examining future-event predictions in depression and anxiety (see Andersen et al., 1992; Andersen & Limpert, 2001; MacLeod et al., 1991; MacLeod, Byrne, & Valentine, 1996), and the format in which questions are presented was adapted from Miranda and Andersen (in preparation). This measure is used to compute two indices of *depressive predictive certainty* – i.e., the degree to which individuals predict, with complete certainty (i.e., *as certain as one can be*) either that negative outcomes will occur or that positive outcomes will not occur. Thus, two types of depressive predictive certainty were examined separately: certainty in the occurrence of negative future outcomes (i.e., number of responses “yes” to negative events with a rating of 5) and certainty when predicting that positive outcomes would not occur (i.e., number of responses “no” to positive events with a rating of 5). Internal consistency estimates for items on the Future Events Questionnaire were acceptable for both yes/no responses ( $\alpha_{t1} = .65$ ,  $\alpha_{t2} = .67$ ) and for ratings of certainty ( $\alpha_{t1} = .89$ ,  $\alpha_{t2} = .91$ ).

#### Procedure

Participants completed two study sessions, an average of 6 weeks apart ( $M = 45$  days,  $SD = 7$  days), and arrived for each session in groups of 2–8. After obtaining written informed consent, male and female research assistants administered a battery of self-report questionnaires that included the above measures. After completing the questionnaires, participants were debriefed about the purpose of the study and were provided with a list of mental health resources. Individuals who scored 20 or above on the BDI-II (moderate to clinical range) were encouraged to contact a clinician if they felt distressed or needed help in the future, and participants who endorsed active suicidal ideation (score of 2 or above on item 9 of the BDI-II) were contacted by the Principal Investigator, a clinical psychologist, to further evaluate their level of distress and to assess need for further treatment referral.

## Results<sup>2</sup>

#### Depression, GAD symptoms, and certainty in pessimistic future-event predictions

Correlational analyses indicated a significant and positive association between depressive predictive certainty in anticipating

negative future outcomes and both symptoms of depression,  $r(273) = 0.41$ ,  $p < .01$ , 95% CI = 0.31–0.50, and GAD,  $r(273) = 0.22$ ,  $p < .01$ , 95% CI = 0.11–0.33, though more so with depression,  $Z_{diff} = 3.83$ ,  $p < .01$ . However, certainty in the absence of positive future outcomes was specifically associated with symptoms of depression,  $r(273) = 0.35$ ,  $p < .01$ , 95% CI = 0.24–0.45, and not with GAD symptoms,  $r(273) = 0.08$ ,  $p = .18$ , 95% CI =  $-0.03$ – $0.20$ . Hopelessness was significantly and positively associated with certainty in an absence of positive outcomes,  $r(271) = 0.50$ ,  $p < .01$ , 95% CI = 0.41–0.58, and with certainty in anticipating negative outcomes,  $r(271) = 0.36$ ,  $p < .01$ , 95% CI = 0.25–0.46, though more strongly with the former,  $Z_{diff} = 2.47$ ,  $p < .01$ . It was also significantly and positively associated with both depression,  $r(280) = 0.59$ ,  $p < .01$ , 95% CI = 0.51–0.66, and GAD,  $r(280) = 0.32$ ,  $p < .01$ , 95% CI = 0.21–0.42, but more strongly with depression,  $Z_{diff} = 6.00$ ,  $p < .01$ . Intolerance of uncertainty (IU) was significantly and positively associated with certainty in anticipating negative outcomes,  $r(273) = 0.25$ ,  $p < .01$ , 95% CI = 0.14–0.36, but not with certainty in the absence of positive outcomes,  $r(273) = 0.11$ ,  $p = .07$ , 95% CI =  $-0.01$ – $0.23$ . It was also significantly and (equally) positively associated with depression,  $r(281) = 0.55$ ,  $p < .01$ , 95% CI = 0.46–0.63, and GAD,  $r(281) = 0.55$ ,  $p < .01$ , 95% CI = 0.46–0.63. Symptoms of depression and GAD were strongly and positively correlated,  $r(282) = 0.62$ ,  $p < .01$ , 95% CI = 0.54–0.69, and there was a significant positive correlation between hopelessness and IU,  $r(279) = 0.40$ ,  $p < .01$ , 95% CI = 0.30–0.49.

#### Hopelessness as a mediator of the concurrent relationship between depressive predictive certainty and symptoms

It was hypothesized that the relationship between depressive certainty in anticipating an absence of positive future outcomes and symptoms of depression would be more strongly accounted for by hopelessness than would the relationship between certainty in anticipating negative outcomes and depression. Statistical mediation was assessed using Baron and Kenny's (1986) criteria, which requires the following: (1) that the predictor variable be significantly related to the outcome variable; (2) that the mediator be significantly associated with both the predictor and the outcome variable; and (3) that the effect of the predictor on the outcome variable come closer to zero after adjusting for the mediator. Sobel tests were used to test the significance of the indirect effect of the predictor variable on the outcome variable through the mediator (Preacher & Leonardelli, 2001; see also Baron & Kenny, 1986; Sobel, 1982).

Mediational hypotheses were tested via a hierarchical linear regression analysis (see Table 1). Depression score was examined as an outcome, and predictor variables were entered in three separate blocks. Demographic variables (age, sex, and ethnicity) were entered in the first block of the analysis, followed by the two depressive predictive certainty variables (certainty in anticipating the absence of positive outcomes and certainty in anticipating future negative outcomes). Hopelessness (see left side of Table 1) was entered into the third block of the analysis. Prior to adjusting for hopelessness, both certainty in an absence of positive outcomes and certainty in anticipating negative outcomes significantly predicted concurrent increases in BDI scores ( $\beta = .22$  and  $.31$ , respectively,  $p < .01$ ), with certainty in negative outcomes a stronger predictor of depression symptoms. After adjusting for hopelessness, however, certainty in an absence of positive outcomes approached zero ( $\beta = .01$ ), Sobel's  $t = 5.70$ ,  $p < .01$ , suggesting full mediation. Certainty in negative outcomes remained a significant predictor of depression symptoms ( $\beta = .22$ ,  $p < .01$ ), although its effect was diminished significantly, Sobel's  $t = 2.97$ ,  $p < .01$ , suggesting partial mediation. Thus, the concurrent relationship between certainty in an absence of positive outcomes and symptoms

<sup>2</sup> Given that the majority of the sample was female, analyses of time 1 relationships were also conducted using females only and yielded similar results. Thus, analyses for the full sample are reported.

**Table 1**  
Hierarchical linear regressions predicting concurrent symptoms of depression and GAD, with hopelessness and intolerance of uncertainty as mediators

Predictor <sup>+</sup>	Outcome				Predictor <sup>+</sup>	Outcome			
	BDI		GAD-Q-IV			BDI		GAD-Q-IV	
	$\beta_{b2}$	$\beta_{b3}$	$\beta_{b2}$	$\beta_{b3}$		$\beta_{b2}$	$\beta_{b3}$	$\beta_{b2}$	$\beta_{b3}$
Depcert-NP	<b>.22**</b>	<b>.01</b>	Not entered		IU	<b>.55**</b>	<b>.48**</b>	<b>.56**</b>	<b>.53**</b>
Depcert-YN	<b>.31**</b>	<b>.22**</b>	<b>.24**</b>	<b>.14*</b>					
BHS	...	<b>.51**</b>	...	<b>.28**</b>	Depcert-YN		<b>.29**</b>		<b>.11*</b>

\*  $p < .05$ ; \*\*  $p < .01$ .

<sup>+</sup>Regression adjusts for age, sex, and ethnic minority status (with Caucasians as the reference group). Bold text indicates significant changes in the regression coefficients from block 2 to block 3.

$\beta_{b2}$  = Standardized regression coefficient in block 2.

$\beta_{b3}$  = Standardized regression coefficient in block 3, after adjusting for mediator.

BDI = symptoms of depression (Beck Depression Inventory-II); GAD-Q-IV = GAD symptoms (Generalized Anxiety Disorder Questionnaire for the DSM-IV); Depcert-NP = total depressive certainty when predicting an absence of positive outcomes; Depcert-YN = Total depressive certainty when predicting negative outcomes; BHS = Hopelessness (Beck Hopelessness Scale); IU = intolerance of uncertainty.

of depression was more strongly mediated by hopelessness than was the relationship between negative-outcome certainty and depression symptoms.

A similar analysis was conducted to examine whether hopelessness mediated the relationship between certainty in negative outcomes and GAD symptoms. Given that certainty in an absence of positive outcomes was not significantly associated with GAD symptoms, only certainty in anticipating negative outcomes was entered in the second block of each analysis. After adjusting for hopelessness, certainty in negative outcomes remained a statistically significant predictor of concurrent GAD symptoms, although the relationship was diminished significantly, ( $\beta_{block2} = .24, p < .01$ , vs.  $\beta_{block3} = .14, p < .05$ ; Sobel's  $t = 3.70, p < .01$ ). Thus, hopelessness partially mediated the concurrent relationship between certainty in negative future outcomes and GAD symptoms.

*Certainty in negative outcomes as a mediator of the concurrent relationship between intolerance of uncertainty and symptoms*

Two regression analyses examined certainty in the presence of negative future outcomes as a mediator of the relationship between intolerance of uncertainty and depression and GAD symptoms, respectively (see the right side of Table 1). Demographic variables were entered in the first block of each analysis, IU was entered in the second block, and certainty in negative outcomes was entered third. Given that certainty in the absence of positive outcomes was not significantly associated with IU and thus did not meet the second requirement for mediation, it was not included in either regression. When adjusting for negative-outcome certainty, the relationship between IU and depression decreased significantly ( $\beta_{block2} = .55$ . vs.  $\beta_{block3} = .48, p < .01$ ), Sobel's  $t = 3.20, p < .01$ , but the relationship between negative-outcome certainty and GAD symptoms did not change significantly, Sobel's  $t = 1.78, p = .08$ .

**Table 2**  
Correlations among difference scores (time 1 – time 2)

Difference scores (t1 – t2)	1	2	3	4	5	6
$\Delta$ BDI-II	1					
$\Delta$ GAD-Q-IV	0.46**	1				
$\Delta$ Depcert-NP	0.26**	0.04	1			
$\Delta$ Depcert-YN	0.29**	0.22**	0.35**	1		
$\Delta$ BHS	0.45**	0.08	0.30**	0.29**	1	
$\Delta$ IU	0.44**	0.31**	0.25**	0.17**	0.30**	1

\*\*  $p < .01$ .

$\Delta$ BDI = difference in depression symptoms (time 1 – time 2);  $\Delta$ GAD-Q-IV = difference in GAD symptoms (time 1 – time 2);  $\Delta$ Depcert-NP = difference in total depressive certainty when predicting an absence of positive outcomes (time 1 – time 2);  $\Delta$ Depcert-YN = difference in total depressive certainty when predicting negative outcomes (time 1 – time 2);  $\Delta$ BHS = difference in hopelessness (time 1 – time 2);  $\Delta$ IU = difference in intolerance of uncertainty (time 1 – time 2).

Thus, the concurrent relationship between IU and depression – but not GAD – was partially mediated by certainty in the anticipation of negative future outcomes.

*Examining mediators of change in depression and GAD symptoms*

Change in symptoms of depression and GAD over the 6-week follow-up period were also examined. Difference scores (time 1 – time 2) on each measure of interest were computed, so that a positive change in outcome scores indicated improvement in symptoms.<sup>3</sup> Once again, mediation was tested using Baron and Kenny's (1986) criteria. Initial correlations (see Table 2) indicated that change in BDI symptoms was significantly and positively associated with change in both depressive certainty involving the anticipation of the absence of positive outcomes,  $r(241) = 0.26, p < .01, 95\% \text{ CI} = 0.14\text{--}0.37$ , and the anticipation of negative future outcomes,  $r(241) = 0.29, p < .01, 95\% \text{ CI} = 0.17\text{--}0.40$ . That is, decreases in depressive certainty were associated with decreases in BDI symptoms across time, while increases in depressive certainty were associated with increases in symptoms of depression. However, change in GAD symptoms was only associated with change in depressive certainty involving the anticipation of negative outcomes,  $r(241) = 0.22, p < .01, 95\% \text{ CI} = 0.10\text{--}0.34$ , but not anticipating a lack of positive outcomes (i.e., decrease in certainty in negative outcomes was associated with decreased GAD symptoms, while an increase in certainty was associated with increased GAD symptoms). Change in IU was associated with changes in depressive certainty (in both the absence of positive and presence of negative outcomes), depression, and GAD symptoms. However, change in hopelessness, while significantly associated with change in depressive predictive certainty and symptoms of depression, was not significantly related to change in GAD symptoms (see Table 2). Thus, it was not examined as a potential mediator in predicting GAD symptoms.

Three hierarchical linear regressions were conducted to examine the mediational hypotheses regarding depression and GAD symptoms (see Table 3). The first analysis examined change in hopelessness as a mediator of the relationship between change in depressive certainty and change in depression symptoms. In this analysis, demographic variables (age, sex, and ethnicity) were entered into the first block of the regression, followed by change in certainty involving predicting the absence of positive future

<sup>3</sup> Due to a positive association between scores on the variables of interest at time 1 and decrease in those scores over time (i.e., higher initial scores were associated with greater decrease from time 1 to time 2), time 1 – time 2 difference scores – rather than time 1 scores alone – were examined as predictors of change in the outcome variables (i.e., depression or GAD symptoms) over time.

**Table 3**  
Hierarchical linear regressions predicting change (time 1 – time 2) in symptoms of depression and GAD, with change in hopelessness and intolerance of uncertainty as mediators

	Outcome		Predictor <sup>+</sup>	Outcome		Predictor <sup>+</sup>	Outcome	
	ΔBDI (t1 – t2)	β <sub>b2</sub>		β <sub>b3</sub>	ΔBDI-II (t1 – t2)		β <sub>b2</sub>	β <sub>b3</sub>
ΔDepcert-NP	<b>.18**</b>	<b>.09</b>	ΔIU	<b>.45**</b>	<b>.41**</b>	ΔDepcert-NP	<b>.34**</b>	<b>.32**</b>
ΔDepcert-YN	<b>.22**</b>	<b>.14*</b>	ΔDepcert-YN	...	<b>.22**</b>	ΔBHS	...	<b>.17**</b>
ΔBHS	...	<b>.40**</b>	ΔDepcert-YN	...	<b>.22**</b>	...	...	<b>.17**</b>

\*  $p < .05$ ; \*\*  $p < .01$ .

<sup>+</sup>Regression adjusts for age, sex, and ethnic minority status (with Caucasians as the reference group). Bold text indicates significant changes in the regression coefficients from block 2 to block 3.

β<sub>b2</sub> = Standardized regression coefficient in block 2.

β<sub>b3</sub> = Standardized regression coefficient in block 3, after adjusting for mediator.

ΔBDI = difference in depression symptoms (time 1 – time 2); ΔGAD-Q-IV = difference in GAD symptoms (time 1 – time 2); ΔDepcert-NP = difference in total depressive certainty when predicting an absence of positive outcomes (time 1 – time 2); ΔDepcert-YN = difference in total depressive certainty when predicting negative outcomes (time 1 – time 2); ΔBHS = difference in hopelessness (time 1 – time 2); ΔIU = difference in intolerance of uncertainty (time 1 – time 2).

outcomes and change in certainty involving the presence of negative outcomes. Change in hopelessness was entered in block 3.

Both change of certainty in the absence of positive outcomes and certainty in the presence of negative outcomes were statistically significant predictors of change in the BDI score from time 1 to time 2 when both were entered into the regression analysis, adjusting for demographic variables ( $\beta = .18$  and  $.22$ , respectively,  $p < .01$ ). After adjusting for change in hopelessness, only certainty involving negative future outcomes remained a significant predictor of change in depression symptoms – although the relationship diminished significantly ( $\beta = .14$ ,  $p < .05$ ), *Sobel's*  $t = 2.93$ ,  $p < .01$ . However, the relationship between change of certainty in an absence of positive outcomes and depression approached zero (*Sobel's*  $t = 3.11$ ,  $p < .01$ ), suggesting full mediation.

The second and third regressions examined change in certainty in negative future outcomes as a mediator of the relationship between change in IU and change in symptoms of depression and GAD, respectively (see the right side of Table 3). Change in negative-outcome certainty partially mediated the predictive relationship between change in IU and time 1 – time 2 change in depression symptoms, adjusting for demographic variables, but was not a mediator for change in GAD symptoms. That is, while IU remained a significant predictor of depression symptom change after adjusting for negative-outcome certainty, the strength of the relationship diminished significantly ( $\beta_{\text{block2}} = .45$ ,  $p < .01$ , vs.  $\beta_{\text{block3}} = .41$ ,  $p < .01$ ; *Sobel's*  $t = 2.08$ ,  $p < .05$ ). However, the indirect relationship between change in IU and GAD symptom change through negative-outcome certainty was not statistically significant, *Sobel's*  $t = 1.84$ ,  $p = .07$ .<sup>4</sup>

<sup>4</sup> Although both change in certainty about negative outcomes and change in certainty about an absence of positive outcomes were significantly and positively associated with IU and depression, only change in certainty involving negative outcomes predicted change in depression symptoms when both types of certainty were included in a regression model. Thus, in order to simplify interpretation of the findings, and because only certainty about negative outcomes was related to IU at time 1, certainty in an absence of positive outcomes was removed from the model before testing mediation.

## Discussion

The present study sought to expand upon previous research examining cognitive content-specificity in future-event predictions associated with symptoms of depression and GAD. In support of previous research (Miranda & Mennin, 2007) examining the relationships between depression, GAD, and future expectations, symptoms of depression and GAD were both positively associated with being certain about the occurrence of negative future outcomes, whereas certainty in expecting a lack of positive outcomes was only associated with depression, suggesting cognitive content-specificity. Certainty in the absence of positive outcomes predicted symptoms of depression both concurrently and longitudinally, with hopelessness statistically mediating these relationships. Hopelessness partially mediated the relationship between change in certainty involving negative outcomes and depression – both concurrently and over time. Hopelessness also partially mediated the concurrent relationship between certainty in negative outcomes and GAD symptoms but was not associated with change in GAD symptoms over time.

Intolerance of uncertainty predicted symptoms of depression and GAD concurrently and over 6 weeks, and certainty in the occurrence of negative future outcomes partially mediated the concurrent relationship between IU and depression (but not GAD) symptoms and the longitudinal relationship between IU and depression (but not GAD) symptoms. In other words, cognitive content of future outcome expectancies was specific to depression in terms of hopelessness-related cognitions that involved anticipating a lack of positive outcomes. On the other hand, shared cognitive content consisted of expecting negative future outcomes. Intolerance of uncertainty appears to play a role in both depression and GAD symptoms, and although the data were less conclusive, being certain when anticipating negative future outcomes may play an explanatory role in the IU-depression relationship.

These findings are in accord with prior research suggesting that hopelessness is a stronger indicator of depressive vs. anxious symptomatology (e.g., Beck et al., 2001) and provides support for the idea that it is the point at which individuals become certain about both the absence of a positive future and the presence of negative future outcomes that they become hopeless about the future, and that this certainty, in turn, results in further increases in symptoms of depression (Abramson et al., 1989; Andersen, 1990). In addition, the stronger relationship between certainty in an absence of a positive future and hopelessness, vs. certainty in negative outcomes and hopelessness, suggests that expecting an absence of a positive future is specific to becoming hopeless about the future, and thus, to symptoms of depression. However, certainty when anticipating negative future events is associated with both symptoms of depression and GAD. Intolerance of uncertainty is also associated with both symptoms of depression and GAD concurrently, although it was more strongly associated with depression symptoms than with GAD symptoms longitudinally. This finding is consistent with prior research suggesting a positive association between IU and depression symptoms (Ciarrochi, Said, & Dean, 2005; Norton, Sexton, Walker, & Norton, 2005) and also with research implicating IU in GAD symptomatology (Dugas, Gagnon, et al., 1998; Dugas et al., 2007). However, while the IU-depression relationship was partially explained by certainty in negative outcomes, the IU-GAD relationship was not accounted for by certainty.

It has been suggested that certainty in pessimistic future outcome expectancies – or depressive predictive certainty – may reflect the operation of a maladaptive, highly accessible future-event schema that leads depressed individuals to anticipate the future with relative automaticity, or fluency, and that such automaticity might be acquired through ruminative thought processes (Andersen et al., 1992; Andersen & Limpert, 2001; cf. Beck, 1967). It has

also been suggested that worry and rumination, which characterize GAD and depression, respectively, are similar in process – i.e., they are both a form of repetitive thinking (Segerstrom, Tsao, Alden, & Craske, 2000). However, they differ in content (Watkins, Moulds, & Mackintosh, 2005). For instance, worries tend to be future-oriented, while rumination has been found to be oriented towards the past (Papageorgiou & Wells, 2001; Watkins et al., 2005) and, with time, progress to thoughts about the future (McLaughlin, Borkovec, & Sibrava, 2007). Rumination about the future – which is thought to involve thoughts about both the occurrence of future negative events and the non-occurrence of future positive outcomes (Andersen et al., 1992; Andersen & Limpert, 2001) – may be one mechanism by which individuals develop certainty in pessimistic outcome expectancies involving thoughts about the occurrence of both positive and negative future events (Miranda & Andersen, in preparation). In a similar vein, worry – which primarily involves thoughts about future threat and is closely correlated with intolerance of uncertainty (Buhr & Dugas, 2006; Dugas et al., 2001; Ladouceur, Gosselin, & Dugas, 2000) – may lead individuals to become increasingly certain that aversive future outcomes will occur, but will not necessarily impact their certainty regarding positive future outcomes. Future research should examine the roles that worry and rumination serve in becoming certain about the occurrence of negative future outcomes vs. the non-occurrence of a positive future.

Miranda and Mennin (2007) suggested that the content-specificity of future expectancies in depression and GAD – results replicated here – might reflect a need, in some individuals, to disambiguate uncertain future expectancies. The authors speculated that depressed and anxious individuals may *correct* for heightened sensitivity to future-event outcomes by controlling (and increasing) their pessimistic certainty. The emphasis on future threat associated with GAD, as opposed to the more general pessimistic cognitions of depression, may help explain the present findings, such that GAD symptoms are associated with increased certainty in the occurrence of negative events but not in the non-occurrence of positive events. The present results are consistent with recent research integrating cognitive content-specificity with the tripartite model of depression and anxiety (Beck et al., 2001, 2003; Clark & Watson, 1991). The notion that GAD is characterized not only by anxious cognition but also by heightened negative affect and physiological arousal, whereas depression is characterized by depressive cognition, heightened negative affect, and *diminished positive affect*, is broadly consistent with the results presented here.

If disambiguation of future expectancies plays a role and is guided by disorder-specific future-event sensitivities, the distinct affective and cognitive profiles of GAD and depression would determine the individual's disambiguation "strategy." It would follow that an anxious person's concerns about future negative affect, paired with heightened intolerance of uncertainty, would lead in the posited disambiguation process to increased certainty for negative future events. For example, an anxious college student might experience chronic worry about her academic performance, with symptoms manifesting as physiological discomfort, repetitive thoughts about not studying enough, and hypervigilance to cues that she is underperforming. If she is also high in IU, she may reduce the discomfort associated with uncertainty by becoming increasingly certain about her poor performance and likelihood of failure. This explanation is also consistent with Dugas and colleagues' proposal that IU leads to heightened sensitivity to ambiguous situations, biased threat estimation of ambiguous stimuli, and generation and exacerbation of "What if?" questions that develop into pathological worry (Dugas, Freeston, et al., 1998; Dugas et al., 2005; Dugas, Marchand, & Ladouceur, 2005). The anxious individual who is also high in IU is likely more concerned with negative future events than positive events; his or her tolerance for

uncertainty may in fact be higher for positive events, because lack of positive affect does not factor as importantly in the profile of anxiety and thus may play a less focal role in future expectancy.

By contrast, the depressed person's additional concern about future diminished positive affect would require disambiguation in both directions, leading to increased certainty in the occurrence of negative events and the lack of positive events. For instance, a college student who is both hopeless and depressed might not only be certain that he will fail his courses, but also arrive at conclusions that he will never earn a good salary, make his family proud, or make a difference in the world. Moreover, the construct of hopelessness expresses a more "actively" pessimistic future-event approach than that of IU – an expectation (and as evidenced here and elsewhere, a certainty) of a negative future and an absence of a positive future. IU, however, expresses more of a reactive discomfort with future-oriented ambiguity rather than the active, all-encompassing cognitive-affective experience of hopelessness. It may be that disambiguation in anxiety – associated with IU – may only require increased certainty in the occurrence of negative events, while disambiguation in depression – associated with hopelessness – may demand increased certainty in the lack of positive events as well. Further research is necessary to address these possibilities.

This study has several limitations: First, the sample was non-clinical, as the majority of participants reported few symptoms of depression and GAD, and change in symptoms was examined continuously. It may be more useful to examine the prediction of clinical levels of depression and GAD. Thus, this study should be replicated with individuals assessed for clinical diagnoses of these disorders. Such a design may better illuminate the roles of hopelessness and IU in cognitive-content-specificity models that address the high rates of comorbidity between depression and GAD, including the tripartite model (Clark & Watson, 1991) and the helplessness–hopelessness theory (Alloy et al., 1990). Secondly, the period of time examined (i.e., approximately 6 weeks) may not have been long enough to adequately track change in symptoms. Examining symptom change over a longer period of time may allow for more meaningful tracking of change in symptoms that might occur as individuals encounter a variety of circumstances. Nonetheless, significant and theory-relevant patterns of change consistent with prior literature were found over this 6-week period, although it should be noted that research methodologists have suggested that such correlations among difference scores be interpreted with caution (Griffin, Murray, & Gonzalez, 1999).

Thirdly, measures of worry and rumination were not included in the study. Perhaps IU leads to greater GAD symptoms by increasing worry, and worry may lead individuals to be certain that negative outcomes will occur. Similarly, IU may lead to increases in rumination about the future, and such rumination may result in both depressive predictive certainty and depression. Inclusion of measures of worry and rumination may have better elucidated the nature of the relationship between IU and symptoms of GAD and depression, respectively. Finally, this sample was a predominantly female, college-student sample, which limits the generalizability of the findings to community samples of individuals and also to males. However, a strength of the present sample is its greater ethnic diversity than prior studies of its kind (e.g., Miranda & Mennin, 2007).

This study expands upon prior research suggesting that the cognitive content of future-event expectancies that distinguish symptoms of depression from GAD involve certainty when anticipating a lack of positive outcomes, while both types of symptoms are associated with expecting negative future outcomes. Furthermore, the relationship between certainty in an absence of positive future outcomes and depression symptoms is accounted for by hopelessness. Intolerance of uncertainty is implicated in both depression and GAD symptoms but more strongly predicts change in

depression symptoms, with negative-outcome certainty partially explaining the relationship. Treatments focused on ameliorating symptoms of depression should target hopeless expectations about the future – perhaps by decreasing certainty in both negative outcomes and in an absence of positive future outcomes – and also, to some degree, by increasing uncertainty tolerance regarding negative outcomes. Symptom change in GAD might focus on reducing negative expectancies and also increasing the individual's ability to tolerate the possibility that negative future outcomes might occur.

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