

## Intolerance of uncertainty: Exploring its dimensionality and associations with need for cognitive closure, psychopathology, and personality

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### Abstract

The dimensionality and correlates of the Intolerance of Uncertainty Scale (IUS) were examined in a sample of 239 university students. In addition to completing the IUS, participants completed measures of worrying, anxious arousal, anhedonic depression, the big five personality dimensions, and the Need for Closure Scale. A factor analysis of the IUS suggested that it includes the following dimensions: (a) desire for predictability; (b) tendency to become paralyzed in the face of uncertainty; (c) tendency to experience distress in the face of uncertainty; and (d) inflexible uncertainty beliefs. Subscale scores computed on the basis of the factor analysis were differentially associated with the other variables.

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Based on theorizing and research led by Michel Dugas and Robert Ladouceur and co-workers, our understanding of worry has been advanced by the development of the concept of intolerance of uncertainty. Intolerance of uncertainty is defined as “the tendency to react negatively on an emotional, cognitive and behavioral level to uncertain situations and events” (Dugas, Buhr, & Ladouceur, 2004, p. 143). As pointed out by Dugas, Buhr, et al. (2004), “as everyday life is filled with uncertainty, a person who is intolerant of uncertainty can easily find numerous ‘reasons’ to

worry” (p. 144). Numerous studies have found that elevated levels of intolerance of uncertainty are associated with elevated levels of worry (e.g., Dugas, Gagnon, Ladouceur, & Freeston, 1998; Dugas, Schwartz, & Francis, 2004; Laugesen, Dugas, & Bukowitz, 2003).

Freeston, Rheaume, Letarte, Dugas, and Ladouceur (1994) developed a self-report instrument (in French), called the Intolerance for Uncertainty Scale (IUS) to measure the construct of intolerance of uncertainty. Later, Buhr and Dugas (2002) developed and validated an English version of this scale. Both Freeston et al. (1994) and Buhr and Dugas (2002) reported the results of principal components factor analyses of the IUS. Freeston et al. (1994) described a five-factor solution, with the five factors described as: (a) “the idea that uncertainty is unacceptable and should be avoided”; (b) “the idea that being uncertain reflects badly on a

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person”; (c) “frustration related to uncertainty”; (d) uncertainty causes stress” and (e) “uncertainty prevents action.” Buhr and Dugas (2002) described a four-factor solution, with the four factors described as: (a) “the idea that uncertainty leads to the inability to act”; (b) uncertainty is stressful and upsetting”; (c) “the idea that unexpected events are negative, and should be avoided”; and (d) “being uncertain is unfair.” Norton (2005) conducted a separate exploratory factor analysis of the IUS on each of several samples which varied in ethnicity. Norton (2005) reported that four and five-factor solutions appeared to be best, but that the solutions tended to be inconsistent across samples. More recently, Carleton, Norton, and Asmundson (in press) conducted confirmatory factor analyses of the IUS and found that a two-factor solution of an abbreviated 12-item IUS scale fit the data well. One of the two factors consisted of seven items that concern anxiety related to future events and was described by Carleton et al. (in press) as ‘prospective anxiety.’ The other factor consisted of five items that concern uncertainty inhibiting action or experience and was described by Carleton et al. (in press) as ‘inhibitory anxiety’. None of these studies examined whether the different dimensions/factors of the IUS were differentially associated with other constructs of interest (e.g., psychopathology, personality). As a result, the potential discriminant validity of different dimensions/factors of the IUS has yet to be examined.

In the present research we examined dimensionality of the IUS and whether the different dimensions are differentially associated with other theoretically relevant variables. Specifically, we examined whether the different dimensions of the IUS are differentially associated with the need for cognitive closure, measures of psychological distress, and the big five personality dimensions (e.g., Goldberg, 1993). While the construct of intolerance of uncertainty has gained increasing attention from psychopathology researchers (e.g., Holaway, Heimberg, & Coles, 2006), a similar construct, referred to as the need for cognitive closure (NCC), has been studied extensively by social psychologists for more than a decade (for a review of this literature, see Kruglanski & Webster, 1996). NCC has been defined as an “individual’s desire for a firm answer to a question and an aversion toward ambiguity” (Kruglanski & Webster, 1996, p. 264). NCC has been found to be associated with numerous social psychological phenomena, including impression formation (e.g., Heaton & Kruglanski, 1991), stereotyping (e.g., Dijksterhuis, Knippenberg, Kruglanski, & Schaper, 1996) and persuasion (e.g., Kruglanski, Webster, & Klem,

1993). Webster and Kruglanski (1994) developed a self-report instrument to measure this construct known as the Need for Closure Scale (NFCS). This scale consists of five subscales which have been conceptualized as distinct manifestations of the latent construct of NCC. These subscales are labeled ‘desire for predictability’, ‘preference for order and structure’, ‘discomfort with ambiguity’, ‘decisiveness’, and ‘close-mindedness’. While most researchers have used NFCS total scores, Neuberg, Judice, and West (1997) have argued that doing so is problematic. Specifically, they pointed out that while the predictability, order, and ambiguity subscales are highly related, the close-mindedness subscale is not correlated with the other subscales, and the decisiveness subscale is negatively correlated with the other subscales.

Surprisingly, the association between NCC and intolerance for uncertainty has not been directly examined. Nevertheless, there are several reasons to believe that these two constructs may be highly correlated. First, these two constructs have been defined in similar terms. Second, individual items on self-report measures of these constructs are highly comparable (e.g., IUS: “I must get away from all uncertain situations,” NFCS: “I don’t like situations that are uncertain”). Third, past research has indicated that these two constructs have similar correlates. For example, both constructs have been found to be associated with the construct of intolerance of ambiguity (Buhr & Dugas, 2006; Webster & Kruglanski, 1994).

In addition to examining NCC, we measured psychological distress and personality. We measured worry because the construct of intolerance of uncertainty grew out of the desire to explain worry. Because we were interested in the degree to which different dimensions of the IUS are associated specifically with worry (as opposed to also being associated, possibly strongly, with other facets of psychological distress), we also measured anhedonic depression and anxious arousal. Past research has demonstrated that worrying, anxious arousal, and anhedonic depression are distinguishable facets of psychological distress (e.g., Nitschke, Heller, Imig, McDonald, & Miller, 2001). We measured the big five personality dimensions because past theorizing and research has implicated them in the development of numerous forms of psychopathology (e.g., Krueger, Caspi, Moffitt, Silva, & McGee, 1996).

To summarize, the present research addressed several interrelated issues, with the goal of improving our understanding of intolerance of uncertainty and its

measurement. First, using factor analysis, we explored the dimensionality of the IUS. In addition to conducting a factor analysis, we examined how intolerance of uncertainty is associated with: (a) NCC; (b) worry, as well as two other facets of psychological distress, anxious arousal and anhedonic depression (Nitschke et al., 2001; Watson, Weber, Assenheimer, & Clark, 1995); and (c) personality. We were particularly interested in whether the different dimensions of intolerance of uncertainty are differentially associated with NCC, psychopathology, and personality. For example, might there be some dimensions of intolerance of uncertainty that are: (a) particularly strongly associated with at least some aspects of NCC; and (b) associated specifically with worry. On the other hand, might there be some dimensions of intolerance of uncertainty that are: (a) particularly strongly correlated with certain aspects of personality, particularly neuroticism; and (b) not specifically associated with worry. To the degree that different dimensions of intolerance of uncertainty are differentially associated with other psychological variables, it suggests that it may sometimes be valuable for future research, as well as treatment development, to explore the dimensions of intolerance of uncertainty separately.

## 1. Method

### 1.1. Participants and procedure

Participants were 239 university students (58.8% female) between the ages of 18 and 23 ( $M = 19.0$ ;  $S.D. = .9$ ). Of those participants reporting their race/ethnicity, the majority (75.5%) reported being European American, 9.7% reported being Asian American, 5.1% reported being Latina/o, and 4.6% reported being African American. Participants were tested in groups of 10 or fewer individuals. As part of their participation in a research project focusing on perceptions of threat (Berenbaum, Thompson, & Bredemeier, submitted for publication, Study 2), participants completed the questionnaires described below. Participants received partial credit toward a research participation requirement in exchange for their participation.

### 1.2. Measures

#### 1.2.1. Intolerance of uncertainty

Individual differences in intolerance of uncertainty were measured using the English version of the Intolerance of Uncertainty Scale (Buhr & Dugas, 2002). The IUS is composed of 27 items such as

“Uncertainty makes me uneasy, anxious, or stressed,” and “When it’s time to act, uncertainty paralyzes me.” Past research has indicated that the IUS has good convergent and discriminant validity, excellent internal consistency, and adequate test–retest reliability (Buhr & Dugas, 2002; Freeston et al., 1994). In the present sample, alpha for the IUS was .94.

#### 1.2.2. Need for cognitive closure

Individual differences in need for cognitive closure were measured using the Need for Closure Scale (Webster & Kruglanski, 1994). The NFCS is composed of 47 items making up five subfactors: desire for predictability (e.g., “I dislike unpredictable situations”), preference for order and structure (e.g., “I like to have a plan for everything and a place for everything”), discomfort with ambiguity (e.g., “I don’t like situations that are uncertain”), decisiveness (e.g., “I usually make important decisions quickly and confidently”), and close-mindedness (e.g., “I always see many possible solutions to problems I face”). The measure also contains a 5-item lie scale (“I believe that one should never engage in leisure activities”). Past research has indicated that the NFCS has excellent convergent and discriminant validity, good test–retest reliability, and adequate internal consistency (Freeman et al., 2006; Webster & Kruglanski, 1994). In the present sample, alpha for the NFCS total scale was .81. Alphas in the present sample were .77, .80, .67, .78, and .64 (for desire for predictability, preference for order and structure, discomfort with ambiguity, decisiveness, and close-mindedness, respectively). Following the recommendations of Kruglanski, individuals whose lie scores were greater than 15 ( $n = 14$ ) were treated as having missing data on the NFCS.

#### 1.2.3. Psychopathology

Individual differences in worry were measured using the Penn State Worry Questionnaire (PSWQ; Meyer, Miller, Metzger, & Borkovec, 1990) and the Worry Domains Questionnaire (WDQ; Tallis, Eysenck, & Mathews, 1992). The PSWQ is composed of 16 items such as “My worries overwhelm me,” and “I am always worrying about something.” Past research has indicated that the PSWQ has excellent test–retest reliability and good convergent and discriminant validity (Meyer et al., 1990; Nitschke, Heller, Palmieri, & Miller, 1999; Nitschke et al., 2001). In the present sample, alpha for the PSWQ was .94. Scores on the PSWQ ranged very low (16) to extremely high (80), with a mean of 49.6 ( $S.D. = 14.6$ ). Individuals with high PSWQ scores were not rare—20 participants had scores

greater than 70. Like the PSWQ, the WDQ has been found to have good psychometric properties (Stober, 1998). Whereas the PSWQ focuses on the duration, frequency, and controllability of worry, the WDQ is intended to measure worry about several different life domains (e.g., relationships, financial). For the purpose of this study we prepared five new items regarding worry about school, since such worries were expected to be common in a sample of college students; these five items were written to resemble the work domain items in the original WDQ. Because the validity of one of the domains included in the original WDQ, socio-political, is considered questionable, it was not included in this study. Thus, the WDQ was composed of 30 items such as “I worry that I will lose close friends,” and “I worry that I will make mistakes on exams.” In the present sample, alpha for the WDQ was .94. As expected, the PSWQ and WDQ were significantly correlated,  $r = .58$ ,  $p < .01$ ; consequently, we averaged across the standardized PSWQ and WDQ scores to compute a composite worry score. The patterns of results presented below were the same regardless of whether PSWQ, WDQ, or worry composite scores were used.

To explore whether the different facets of intolerance of uncertainty and the need for cognitive closure are specific to worry or are also common to other facets of anxiety and psychological distress, we also administered the anxious arousal and anhedonic depression subscales from the Mood and Anxiety Symptom Questionnaire (MASQ; Watson et al., 1995). On the MASQ, individuals indicate how frequently they have experienced a variety of different symptoms during the past week. The anxious arousal subscale is composed of 17 items, such as “heart was racing or pounding” and “hands were shaky.” The anhedonic depression subscale is composed of 22 items such as “felt like nothing was very enjoyable” and “felt really slowed down.” Past research has indicated that the anxious arousal and anhedonic depression subscales of the MASQ have good convergent and discriminant validity (Nitschke et al., 1999, 2001; Reidy & Keogh, 1997; Watson et al., 1995). In the present sample, alphas for the anxious arousal and anhedonic depression scales were .84 and .92, respectively.

#### 1.2.4. Personality

The “big five” dimensions of personality (e.g., Goldberg, 1993), neuroticism/emotional stability, extraversion, intellect/openness to experience, conscientiousness, and agreeableness, were measured using the short version (10-item scales) of the International Personality Item Pool (IPIP, 2001). Alphas in the

present sample were .89, .91, .81, .82, and .80 (for neuroticism, extraversion, intellect, conscientiousness, and agreeableness, respectively).

## 2. Results

We began by conducting a principal components factor analysis of the IUS. The Kaiser–Meyer–Olkin measure of sampling adequacy was .92, indicating that our sample size was sufficient to conduct a factor analysis. The percentages of variance accounted for by the first five factors (each of which had eigenvalues greater than one) were 38.1, 7.4, 5.7, 4.8, and 3.8. We elected to retain four factors primarily because the four-factor solution was most interpretable, but also because only a couple of items had high rotated loadings on the fifth factor when a fifth factor was retained.

Varimax<sup>1</sup> rotated factor loadings are reported in Table 1. We have chosen to label the first factor ‘Desire for Predictability’ (the items with the highest loadings were “I always want to know what the future has in store for me,” and “a small unforeseen event can spoil everything, even with the best of planning”), the second factor ‘Uncertainty Paralysis’ (the items with the highest loadings were “when it’s time to act, uncertainty paralyzes me,” and “when I am uncertain I can’t go forward”), the third factor ‘Uncertainty Distress’ (the items with the highest loadings were “uncertainty keeps me from sleeping soundly,” and “the ambiguities in life stress me”), and the fourth factor ‘Inflexible Uncertainty Beliefs’ (the items with the highest loadings were “I think it’s unfair that other people seem sure about their future,” and “being uncertain means that a person is disorganized”).

The factor loadings in Table 1 appear similar to the factor loadings reported by Buhr and Dugas (2002) in certain respects. To measure precisely how similar the factor loadings in our study were with those of Buhr and Dugas (2002), we computed Tucker’s congruence indices (Tucker, 1951) between individual factors derived in each study. These computations confirmed that the factor loadings for our first factor (Desire for Predictability) very closely align with the factor loadings for the third factor reported by Buhr and Dugas (2002) ( $\Phi = .92$ ). In fact, all seven of the items that had factor loadings greater than .40 on our first factor (and not greater than .40 on any other factor) also had loadings of at least .40 on their third factor.

<sup>1</sup> The pattern of results was quite similar when an oblique (promax) rotation was used.

Table 1  
Varimax factor loadings

IUS item	Factor 1	Factor 2	Factor 3	Factor 4
1	.06	.57	.11	.04
2	.22	.34	−.07	.66
3	.40	.20	.20	.51
4	.37	−.05	.35	.54
5	.55	.10	.48	.04
6	.58	.19	.57	−.04
7	.66	.15	.27	.17
8	.62	.28	.08	.09
9	.40	.52	.29	.17
10	.63	.22	.02	.10
11	.66	.20	−.03	.19
12	.24	.74	.15	.15
13	.16	.58	.05	.54
14	.17	.74	.16	.14
15	.25	.66	.34	.13
16	.07	.29	.53	.35
17	.37	.36	.63	.10
18	.74	.09	.23	.13
19	.64	.10	.29	.19
20	.30	.58	.29	.04
21	.57	.13	.10	.09
22	.13	.57	.28	.29
23	.07	.11	.32	.75
24	.16	.24	.71	.10
25	.19	.29	.52	.35
26	.19	.38	.66	.26
27	.10	.11	.54	.52

Although Carleton et al. (in press) did not present factor loadings for their factor analyses of the full 27-item IUS, the seven items in the present study that had factor loadings greater than .40 on our first factor (and not greater than .40 on any other factor) were the same seven items included in the first factor of Carleton et al.'s abbreviated 12-item IUS.

We also found that the factor loadings for our second factor (Uncertainty Paralysis) align fairly well with the factor loadings for the first factor reported by Buhr and Dugas (2002) ( $\Phi = .83$ ). Once again, all six of the items that had factor loadings greater than .40 on our second factor (and not greater than .40 on any other factor) also had loadings of at least .40 on their first factor. Our second factor included three of the five items included in the second factor of Carleton et al.'s abbreviated 12-item IUS. The factor loadings for our third and fourth factors did not map cleanly onto any of the factors derived by Buhr and Dugas (2002) (all  $\Phi$ 's < .8).

We used the rotated factor loadings from our study to compute two sets of scores: (a) four orthogonal factor scores computed on the basis of every item's loading on each of the four factors; and (b) four subscale scores computed by averaging across those items that had

loadings of greater than .40 on a given factor and less than .40 on all other factors. Alphas for these four IUS subscales were: Desire for Predictability (items 7, 8, 10, 11, 18, 19, 21): .84; Uncertainty Paralysis (items 1, 12, 14, 15, 20, 22): .83; Uncertainty Distress (items 16, 17, 24, 25, 26): .83; Inflexible Uncertainty Beliefs (items 2, 3, 4, 23): .74. The four IUS factor scores were, by definition, orthogonal. The four IUS subscale scores were all positively correlated ( $r$ 's ranged from .51 to .67, all  $p$ 's < .01).

Having computed the IUS factor/subscale scores, we proceeded to examine how they were associated with desire for cognitive closure, psychopathology, and personality. As can be seen in Table 2, as expected, there were many significant associations between IUS factor/subscale scores and NFCS subscales. For example, IUS Desire for Predictability was associated with NFCS Predictability, IUS Uncertainty Paralysis was associated with NFCS Decisiveness, and IUS Inflexible Uncertainty Beliefs were associated with NFCS Close-Mindedness. It is also noteworthy that the IUS factor/subscale scores were differentially associated with the different NFCS subscales. For example, the IUS Desire for Predictability subscale was significantly<sup>2</sup> more strongly correlated with NFCS predictability, NFCS Ambiguity, and NFCS Order scales than were the IUS Uncertainty Paralysis, Uncertainty Distress, and Inflexible Uncertainty Beliefs subscales (seven of the nine  $p$ 's < .01, 2-tailed, the remaining two  $p$ 's < .05, 2-tailed). Both the IUS Uncertainty Paralysis and Uncertainty Distress subscales were significantly more strongly correlated with NFCS Decisiveness than were both the IUS Desire for Predictability and IUS Inflexible Uncertainty Beliefs subscales (all  $p$ 's < .01, 2-tailed). The IUS Inflexible Uncertainty Beliefs subscale was significantly more strongly correlated with NFCS Close-Mindedness than were the other three IUS subscales (two of the three  $p$ 's < .01, 2-tailed, the remaining  $p$  < .05, 2-tailed).

We next examined how the different IUS factor/subscale scores were associated with the different psychopathology scores. As can be seen in Table 3, worry was associated with all of the IUS subscale scores and all of the IUS factor scores other than Inflexible Uncertainty Beliefs. The only IUS score that was significantly associated with worry but not with anhedonic depression was the Desire for Predictability factor score. The Uncertainty Distress and Uncertainty

<sup>2</sup> Correlations were compared using the formula recommended by Meng, Rosenthal, and Rubin (1992).

Table 2

Correlations between the Need for Closure Scale (NFCS) and Intolerance of Uncertainty (IUS) Factor/Subscale Scores

IUS Scores	NFCS subscales				
	Predictability	Ambiguity	Order	Decisiveness	Close-mindedness
Factor scores					
Desire for Predictability	.43**	.45**	.40**	.07	.16*
Uncertainty Paralysis	.12	.17*	-.06	-.43**	.06
Uncertainty Distress	.29**	.27**	.09	-.37**	.05
Inflexible Uncertainty Beliefs	.09	.11	-.11	-.06	.25**
Subscale scores					
Desire for Predictability	.47**	.55**	.32**	-.12	.20**
Uncertainty Paralysis	.32**	.38**	.08	-.50**	.15*
Uncertainty Distress	.36**	.43**	.04	-.44**	.15*
Inflexible Uncertainty Beliefs	.32**	.35**	.05	-.22**	.31**

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

Paralysis scores were most strongly associated with worry, but they were also most strongly associated with anxious arousal and anhedonic depression. Thus, the strong correlations between worry and Uncertainty Distress and Uncertainty Paralysis reflects, in part, their being associated with psychological distress in general rather than being specifically associated with worry. Just as the differential correlations between the NFCS and IUS factor/subscale scores were statistically significant, so too were the differential correlations between psychopathology and the different facets of the IUS. For example, worry was significantly more strongly correlated with the Uncertainty Distress and Uncertainty Paralysis subscale scores than with the Desire for Predictability and Inflexible Uncertainty Beliefs subscale scores (all  $p$ 's  $< .01$ , 2-tailed). Similarly, the Uncertainty Distress subscale score was significantly more strongly correlated with both anxious arousal and anhedonic depression than was the Desire

for Predictability subscale score (both  $p$ 's  $< .01$ , 2-tailed).

Finally, we examined how the different IUS factor/subscale scores were associated with personality. As can be seen in Table 4, there were numerous significant correlations between the different dimensions of intolerance of uncertainty and personality, particularly neuroticism. The Uncertainty Distress subscale was especially strongly associated with neuroticism. In fact, the correlation between neuroticism and the Uncertainty Distress subscale was significantly stronger than were the correlations between neuroticism and the Need for Predictability, Uncertainty Paralysis, and Inflexible Uncertainty Beliefs (all  $p$ 's  $< .01$ , 2-tailed). The negative correlation between extraversion and the Uncertainty Paralysis subscale was significantly stronger than were the correlations between extraversion and the Need for Predictability subscale ( $p < .01$ , 2-tailed) and the Uncertainty Distress and Inflexible Uncertainty

Table 3

Correlations between the Intolerance of Uncertainty (IUS) Factor/Subscale Scores and different facets of psychological distress

IUS Scores	Worry	Anxious arousal	Anhedonic depression
Factor scores			
Desire for Predictability	.32**	.03	.08
Uncertainty Paralysis	.40**	.10	.19**
Uncertainty Distress	.51**	.21**	.32**
Inflexible Uncertainty Beliefs	.13	.04	.23**
Subscale scores			
Desire for Predictability	.50**	.12	.20**
Uncertainty Paralysis	.63**	.16*	.31**
Uncertainty Distress	.66**	.28**	.43**
Inflexible Uncertainty Beliefs	.46**	.12	.35**
IUS total score	.70**	.21**	.39**

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

Table 4  
Correlations between the Intolerance of Uncertainty (IUS) Factor/Subscale Scores and Personality

IUS Scores	Neuroticism	Extraversion	Intellect	Agree-ableness	Conscientiousness
Factor scores					
Desire for Predictability	.29**	.06	-.01	.02	.29**
Uncertainty Paralysis	.27**	-.23**	-.07	-.001	-.17*
Uncertainty Distress	.50**	-.16*	-.13*	.08	.05
Inflexible Uncertainty Beliefs	.14*	-.05	-.18**	-.16	-.24**
Subscale scores					
Desire for Predictability	.45**	-.03	-.07	-.01	.16*
Uncertainty Paralysis	.47**	-.28**	-.15*	.04	-.10
Uncertainty Distress	.63**	-.18**	-.15*	-.01	-.09
Inflexible Uncertainty Beliefs	.39**	-.13*	-.17	-.10	-.14*
IUS total score	.61**	-.19**	-.17**	-.01	.001

\*  $p < .05$ .

\*\*  $p < .01$ .

Beliefs subscales (both  $p$ 's  $< .05$ , 2-tailed). Interestingly, the correlation between conscientiousness and the Desire for Predictability subscale differed significantly from the correlations between conscientiousness and the Uncertainty Distress, Uncertainty Paralysis, and Inflexible Uncertainty Beliefs subscales (all  $p$ 's  $< .01$ , 2-tailed).

### 3. Discussion

Results of this study add to the growing body of evidence that intolerance of uncertainty is associated with worry. This study also indicates that intolerance of uncertainty, at least as measured by the IUS, encompasses several dimensions: (a) desire for predictability; (b) tendency to become paralyzed by uncertainty; (c) tendency to respond to uncertainty with distress; and (d) inflexible uncertainty beliefs.

Results of the congruence analysis comparing the results of the present factor analysis with that of Buhr and Dugas (2002) indicated the factor we labeled as Desire for Predictability appears to be very similar to, if not the same, as the third factor described by Buhr and Dugas (2002). In addition, the seven items we used to compute the Desire for Predictability subscale score were the same seven items included in the first factor of Carleton et al.'s abbreviated 12-item IUS. Of the different dimensions of intolerance of uncertainty, the Desire for Predictability was most strongly associated with the NCC predictability, ambiguity, and order subscales, suggesting that the IUS items tapping the Desire for Predictability are those that are most clearly measuring the core of the intolerance of uncertainty construct. Consistent with this, the Desire for Predictability was: (a) less strongly associated with neuroticism than was Uncertainty Distress; (b) less strongly

associated with extraversion than was Uncertainty Paralysis; and (c) the facet of intolerance of uncertainty with the greatest specificity to worry.

The factor we labeled Uncertainty Paralysis appears to be quite similar to, if not the same, as the first factor described by Buhr and Dugas (2002). The Uncertainty Paralysis factor also overlapped some, though not especially well, with the second factor of Carleton et al.'s abbreviated 12-item IUS. Uncertainty Paralysis was the dimension of intolerance of uncertainty that was most strongly associated with the NCC decisiveness subscale and with extraversion. It was not, however, associated with the NCC Order subscale, and it was significantly less strongly associated with NCC predictability and ambiguity than was Desire for Predictability. Uncertainty Paralysis was also significantly associated with worry; in fact, Uncertainty Paralysis was more strongly correlated with worry than was Desire for Predictability. However, the stronger correlation with worry came at the expense of it also being more strongly correlated with other facets of psychological distress—Uncertainty Paralysis was also significantly correlated with both anxious arousal and anhedonic depression. Thus, it appears that the items that loaded most clearly on the Uncertainty Paralysis factor most likely measure a combination of two phenomena: (a) how individuals respond to uncertainty; and (b) the degree to which individuals have a tendency to be introverted, indecisive, and to freeze into inaction, which are features common to multiple forms of psychological disturbance.

In addition to being associated with worry, Uncertainty Distress was also significantly correlated with both anxious arousal and anhedonic depression. Uncertainty Distress was also strongly associated with neuroticism, more strongly in fact than it was with any

of the NFCS subscales. Thus, the IUS appears to include a number of items that in addition to being relevant to uncertainty also seem to be measuring the tendency, most likely associated with neuroticism, to respond to most if not all undesirable events and circumstances with distress. In addition to containing items that appear to partly reflect neuroticism, the IUS also appears to include some items concerning inflexible beliefs related to uncertainty. These items were significantly associated with lower levels of intellect (openness to experience) and with higher levels of close-mindedness. Considering that depression is associated with inflexible and irrational thinking (e.g., Beck, Rush, Shaw, & Emery, 1979), it should not be surprising that these items were almost as strongly associated with anhedonic depression as they were with worry.

We believe the results of this study confirm the importance of the construct of intolerance of uncertainty for understanding worry, and the utility of the IUS as an instrument for measuring the construct. The results of this study also suggest that researchers may sometimes wish to use the Desire for Predictability and possibly the Uncertainty Paralysis subscales rather than IUS total scores. Items we used to compute the Desire for Predictability subscale score emerged on common factors in this and a previous study (Buhr & Dugas, 2002), and overlapped perfectly with the seven items that comprised the first factor in Carleton et al.'s abbreviated 12-item IUS. There was modest resemblance/overlap between the Uncertainty Paralysis subscale we identified and the first factor described by Buhr and Dugas (2002), as well as the second factor in Carleton et al.'s abbreviated 12-item IUS. Both the Desire for Predictability and Uncertainty Paralysis subscales had reasonable levels of internal consistency. When researchers wish to maximize the strength of the association with worry, they will be best served by using IUS total scores. In contrast, when researchers wish to either measure that aspect of intolerance of uncertainty which is most specifically associated with worry, or to examine a specific aspect of intolerance of uncertainty, they will probably be best served by using a subscale rather than the total score. For example, when testing why some individuals are more likely to respond with worry than with other forms of psychological distress, or testing hypotheses that specifically concerns the desire for predictability (e.g., that individuals with a high desire for predictability will try hardest to avoid unpredictable circumstances), researchers would probably be best off using the Desire for Predictability subscale.

The finding that there are several dimensions (e.g., Desire for Predictability, Uncertainty Paralysis) that are

associated with worry and other facets of psychological distress, as well as with the big five personality dimensions, may be used by some researchers and clinicians who wish to replace the current categorical psychiatric classification system, the DSM-IV, with a dimensional classification system. The finding that there are replicable dimensions underlying the IUS is also relevant to future treatment development. Interventions that target intolerance of uncertainty (among other things) have been found to be relatively efficacious (Dugas et al., 2003; Ladouceur et al., 2000). The results of the present study raise the possibility that it may be valuable to target separately the desire for predictability, which may directly increase worry, and uncertainty paralysis, which likely contributes to avoidant behavior that helps maintain a pattern of worrying and can be an obstacle in implementing treatments that involve exposure to feared stimuli.

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