The intolerance of uncertainty scale: psychometric properties of the English version

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Abstract

Research is now suggesting that intolerance of uncertainty may be very important in understanding worry and may play a key role in the etiology and maintenance of worry. The present study attempted to further our understanding of intolerance of uncertainty by examining the psychometric properties of the English version of the Intolerance of Uncertainty Scale (IUS), which has already been validated in French. Factor analysis indicated that the IUS has a four-factor structure that represents the idea that uncertainty is stressful and upsetting, uncertainty leads to the inability to act, uncertain events are negative and should be avoided, and being uncertain is unfair. The IUS has excellent internal consistency, good test–retest reliability over a five-week period, and convergent and divergent validity when assessed with symptom measures of worry, depression, and anxiety. Overall, this study suggests that the IUS is a sound measure of intolerance of uncertainty and supports the idea that intolerance of uncertainty is an important construct involved in worry. © 2002 Elsevier Science Ltd. All rights reserved.

1. Introduction

Interest in the area of worry is rising and this has been reflected in the increase in research examining both worry and worry related phenomena (Freeston, Rhéaume, Letarte, Dugas, & Ladouceur, 1994; Mathews, 1993; Tallis & Eysenck, 1994). Worry can be defined as concern about future events in which there is uncertainty about the outcome and where the individual experiences feelings of anxiety (MacLeod, Williams, & Bekerian, 1991). Worry is common in both clinical and non-clinical populations and research has suggested that as high as 38% of individuals in the general population worry at least once a day (Tallis, Davey, & Capuzzo, 1994).

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Further, excessive and uncontrollable worry is the central feature of generalized anxiety disorder or GAD (DSM-IV; American Psychiatric Association, 1994). Given the level of worry in the general population and the role of excessive worry in the clinical disorder, GAD, it is important to identify key constructs related to worry in order to begin to establish how excessive worry develops and what factors are responsible for maintaining it.

Research into the area of worry has generally focused on worry themes and how much time is spent worrying (Davey, 1993; Dugas, Freeston, Doucet, Lachance, & Ladouceur, 1995). However, attention has shifted towards the examination of specific constructs related to worry (Freeston et al., 1994; Russell & Davey, 1993). For instance, researchers have begun to identify constructs that may be involved in the development and maintenance of worry (Dugas, Gagnon, Ladouceur, & Freeston, 1998; Wells & Carter, 1999). Research has linked the tendency to worry to positive and negative beliefs about the function of worry (Wells & Carter, 1999), the tendency to avoid upsetting mental imagery (Borkovec & Inz, 1990), negative problem orientation (Davey & Levy, 1999), and intolerance of uncertainty (Dugas et al., 1998).

Although a number of factors are associated with heightened levels of worry, one construct is beginning to emerge as a fundamental factor associated with excessive worry. Research is now suggesting that intolerance of uncertainty may be very important in understanding worry and may play a key role in the etiology and maintenance of worry (Freeston et al., 1994). Intolerance of uncertainty may be defined as the excessive tendency of an individual to consider it unacceptable that a negative event may occur, however small the probability of its occurrence (Dugas, Gosselin, & Ladouceur, 2001b). This suggests that someone who is intolerant of uncertainty will find many aspects of life intolerable given that it is filled with uncertainty and ambiguity.

Evidence for the connection between intolerance of uncertainty and worry comes from earlier studies that established that worriers possess a number of characteristics that set them apart from non-worriers. For example, worriers have been shown to require more information before arriving at a decision, which suggests that they have elevated evidence requirements (Tallis, Eysenck, & Mathews, 1991). The need for additional information may be a result of an intolerance for uncertainty and may be a means for lowering the level of uncertainty. Furthermore, worriers display more difficulties completing tasks that are ambiguous in nature compared to non-worriers (Metzger, Miller, Cohen, Sofka, & Borkovec, 1990). These findings suggest that worriers have a lower threshold for uncertainty, which impairs their performance on ambiguous tasks. In addition, worriers tend to define ambiguous situations or events as threatening (Butler & Mathews, 1983; Russell & Davey, 1993). This reaction suggests that worriers will have more difficulties when faced with uncertain situations given that they tend to interpret them in a negative way. Overall, the findings indicate that worriers have difficulty tolerating uncertainty, which provides the initial evidence for a specific construct related to worry: intolerance of uncertainty.

Recently, a number of studies have specifically linked intolerance of uncertainty to worry and have suggested that it may be one of the most significant factors involved in worry (Dugas, Freeston, & Ladouceur, 1997; Ladouceur, Talbot, & Dugas, 1997). Studies have demonstrated that intolerance of uncertainty and worry are highly related and that this relationship is not the result of shared variance with anxiety and depression (Dugas et al., 1997; Freeston et al., 1994). Given that anxious and depressive symptoms are significantly related to worry (Brown, Antony, & Barlow, 1992), these findings point to the important role intolerance of uncertainty may play in worry.

Furthermore, research has established intolerance of uncertainty as the most salient predictor of worry above positive beliefs about worry, negative problem orientation, and cognitive avoidance (Laugesen & Dugas, 2000; Robichaud & Dugas, 2000). These findings provide further support for the strong relationship between intolerance of uncertainty and worry, given that previous research has suggested that worry is highly related to beliefs about worry (Davey, Tallis, & Cappuzzo, 1996; Wells & Carter, 1999), problem orientation (Davey & Levy, 1999; Ladouceur, Blais, Freeston, & Dugas, 1998), and cognitive avoidance (Borkovec & Inz, 1990).

Recent studies have also begun to assess whether intolerance of uncertainty is specific to worry or whether it is a cognitive process involved in a number of emotional or anxiety related phenomena. Dugas and colleagues (2001a) assessed the relationship between intolerance of uncertainty, worry, obsessions/compulsions, and panic sensations. The results showed that, in a non-clinical sample, intolerance of uncertainty is highly related to worry, moderately related to obsessions/compulsions, and weakly related to panic sensations. In addition, research examining GAD, where the cardinal feature is excessive worry, has identified that level of intolerance of uncertainty distinguishes GAD patients from individuals suffering from other anxiety disorders (Ladouceur et al., 1999). This research supplies initial support for the idea that intolerance of uncertainty appears to have a stronger relationship with worry than other manifestations of anxiety.

Based on the strength of the relationship between intolerance of uncertainty and worry, researchers are now examining the possible causal role of intolerance of uncertainty in worry. Studies have shown that targeting intolerance of uncertainty in the treatment of excessive worry leads to changes in level of worry (Dugas & Ladouceur, 2000; Ladouceur et al., 2000a). Moreover, changes in intolerance of uncertainty generally precede changes in worry, over the course of treatment (Dugas & Ladouceur, 2000). A recent laboratory study has also demonstrated that manipulating an individual's level of intolerance of uncertainty resulted in changes in their level of worrisome thoughts, with increases in intolerance of uncertainty leading to more worry (Ladouceur, Gosselin, & Dugas, 2000b). According to Kraemer and associates (1997), establishing that changes in intolerance of uncertainty precede changes in worry and demonstrating that experimentally manipulating intolerance of uncertainty results in changes in worry, suggest that intolerance of uncertainty may be a causal risk factor for worry. Although more research is needed to confirm these initial findings, the results point to the role intolerance of uncertainty may play in the development and maintenance of worry.

Given the strong relationship between intolerance of uncertainty and worry and that changes in intolerance of uncertainty lead to changes in worry, it is important to consider whether they are distinct constructs. Worry has been commonly defined as concern about negative future events in which there is uncertainty surrounding the outcome and where the individual experiences feelings of anxiety (MacLeod et al., 1991). Although uncertainty is one aspect of worry, intolerance of uncertainty is the overall tendency of an individual to find it unacceptable that a negative event might occur, however small that probability. Worry might best be viewed as a *mental act*, where the individual thinks about the situation and possible outcomes. Whereas intolerance of uncertainty can be seen as a *filter* through which individuals view their environment, which might be best described as a predisposition to find uncertainty unacceptable. If an individual finds uncertainty unacceptable, when faced with uncertainty they may engage in excessive worrying. In this sense, worry may be seen as a product of intolerance of uncertainty.

One way to examine the distinction between worry and intolerance of uncertainty is to investi-

gate their relationship with other factors. For example, Ladouceur and colleagues (1997) found that although intolerance of uncertainty and worry were highly related, they displayed different patterns of correlations with specific behavioral tasks. The researchers required participants to make decisions that varied on level of ambiguity and difficulty. The results indicated that worry was not correlated with performance on any of the behavioral tasks regardless of the amount of ambiguity or level of difficulty. Alternatively, intolerance of uncertainty was correlated with performance on moderately ambiguous tasks.

Another factor that may help differentiate between worry and intolerance of uncertainty can be found in the examination of possible gender differences on these constructs. Researchers have consistently identified gender differences on measures of worry with women reporting higher levels of worry. However, gender differences have not been found for intolerance of uncertainty (Freeston et al., 1994; Robichaud & Dugas, 2000). The differentiating patterns of correlations for worry and intolerance of uncertainty and the gender differences these constructs display, support the notion that although intolerance of uncertainty and worry are related, they are in fact different constructs.

Until recently, the research focusing on intolerance of uncertainty has been carried out exclusively in French-speaking populations, using a French measure of intolerance of uncertainty. In order to assess the relationship between intolerance of uncertainty and worry in English populations, an English version of the Intolerance of Uncertainty Scale (IUS) needs to be developed and validated. Furthermore, the concept of intolerance of uncertainty is still fairly new and additional research is needed to better delineate its relationship to worry. The present study will examine the psychometric properties of an English translation of the IUS in order to establish its reliability and validity, and further our understanding of intolerance of uncertainty.

The original French version of the IUS was developed to assess emotional, cognitive, and behavioral reactions to ambiguous situations, implications of being uncertain, and attempts to control the future (Freeston et al., 1994). Items on the IUS were devised from a pool of 74 statements that were generated to reflect different aspects of intolerance of uncertainty such as the consequences of being uncertain, how uncertainty reflects on a person, expectations about the predictability of the future, attempts to control the future, frustration around uncertainty, and 'all-or-nothing responses' to uncertainty. Items were assessed on face validity by four judges and items that were deemed irrelevant or redundant were discarded.

The remaining 44 items were administered to a group of 110 university students. The students were divided into three groups depending on whether they met GAD diagnostic criteria based on their responses to the Generalized Anxiety Disorder Questionnaire-Modified version (GADQ-M; Roemer, Borkovec, Posa, & Borkovec, 1995). The three groups included those meeting the criteria for GAD by questionnaire, those meeting only the somatic criteria for GAD by questionnaire, and finally those participants who met neither the full nor somatic criteria for GAD. Statistical analysis was used to identify the items that correctly distinguished between these three groups. Twenty-three items met this requirement and an additional four items were kept because of their high correlation with the Penn State Worry Questionnaire (PSWQ; Meyer, Miller, Metzger, & Borkovec, 1990), which is a general measure of the tendency to worry. The final 27 items on the IUS reflect the idea that uncertainty is unacceptable and leads to negative reactions.

The original study (Freeston et al., 1994) examined the psychometric properties of the French version of the IUS and examined the relationship between intolerance of uncertainty and measures

of worry, anxiety, and depression. Factor analysis identified a five-factor solution that included: beliefs that uncertainty is unacceptable and should be avoided, being uncertain reflects badly on a person, uncertainty results in stress, frustration, and prevents action. The internal consistency of the scale was excellent (α=0.91) and its test–retest reliability over a five-week period was good (r=0.78; test–retest from Dugas et al., 1997). The scale was able to differentiate between groups of high and low worriers in a non-clinical sample, demonstrating criterion-related validity. Further, the IUS was highly correlated to measures of worry and to a lesser extent with measures of anxiety and depression, which supports the measure's convergent and divergent validity. In addition, once the shared variance of depressed and anxious symptoms was partialed out, the relationship to worry remained strong, suggesting that intolerance of uncertainty is specifically related to worry.

The IUS was translated from French to English using a well established method (Vallerand, 1989). Two independent translators translated the IUS into English. It was back translated by another independent translator, at which time problem items were identified and modified. Finally, a pilot version was administered to a small group of participants.

The present study, which assesses the English version of the IUS, followed a similar procedure to that used in the validation of the French version. The IUS was assessed for internal consistency, test–retest reliability, factor structure, and convergent and divergent validity using symptom measures of worry, depression, and anxiety. In addition, the IUS was assessed for its ability to distinguish between participants meeting all of the diagnostic criteria for GAD, based on their responses to a questionnaire, those meeting only some of the criteria for GAD, and participants meeting none of the criteria.

The study had a number of hypotheses. First, based on the findings from the original validation of the French version of the IUS, it was postulated that the measure would have excellent internal consistency and good test–retest reliability over a five-week period. Secondly, it was expected that factor analysis would reveal a similar factor structure when compared with the French version of the IUS. However, alternative factor analysis, which takes into account the intercorrelations between underlying factors on the IUS, was incorporated. This was expected to reveal an alternative factor structure that may better represent the underlying dimensions of the IUS. Moreover, it was proposed that intolerance of uncertainty would have a unique relationship with worry above and beyond demographics and mood. Finally, based on participants' responses to a questionnaire assessing GAD symptoms, it was hypothesized that the IUS would be able to discriminate between participants meeting all of the diagnostic criteria for GAD, those meeting only some of the criteria for GAD, and participants meeting none of the criteria.

2. Method

2.1. Participants

Two hundred and seventy-six (N=276) participants were recruited through various undergraduate courses. There were 213 female participants and 62 males. Information regarding gender was missing for one participant. The mean age of participants was 22.6 (SD=5.05). Students were invited to participate at the start of a regular undergraduate course and participation was voluntary.

2.2. Instruments

The participants completed the following questionnaires in random order: the IUS, the PSWQ, the Worry and Anxiety Questionnaire (WAQ), the Beck Depression Inventory II (BDI-II), and the Beck Anxiety Inventory (BAI). In addition, participants were asked to complete a demographic form.

The IUS (Freeston et al., 1994) includes 27 items relating to the idea that uncertainty is unacceptable, reflects badly on a person, and leads to frustration, stress, and the inability to take action. Participants rate items on a five-point Likert scale ranging from 1='not at all characteristic of me' to 5='entirely characteristic of me'. Examples of items include 'Uncertainty makes me uneasy, anxious, or stressed' and 'My mind can't be relaxed if I don't know what will happen tomorrow'. The French version of the measure has excellent internal consistency (α=0.91), good test–retest reliability over a five-week period (r=0.78) and demonstrated convergent and discriminant validity (test–retest from Dugas et al., 1997; Freeston et al., 1994).

The PSWQ (Meyer et al., 1990) consists of 16 items that measure the tendency to engage in excessive, uncontrollable, and generalized worry. Participants rate items on a five-point Likert scale ranging from 1='not at all typical' to 5='very typical'. Examples of items include 'My worries overwhelm me' and 'Once I start worrying, I can't stop'. The questionnaire has demonstrated reliability and validity in both clinical and non-clinical populations (Brown et al., 1992; Davey, 1993; Meyer et al., 1990). The PSWQ is a unifactorial measure with excellent internal consistency (α=0.86–0.95) and test–retest reliability (r=0.74–0.93; Molina & Borkovec, 1994). The questionnaire has good known groups validity and substantial convergent and divergent validity demonstrating greater correlations with measures of worry than anxiety and depression (Molina & Borkovec, 1994).

The WAQ (Dugas et al., 2001a) contains 11 items that cover worry themes and DSM-IV diagnostic criteria for GAD. It examines both the cognitive criteria, such as excessive worry, and the somatic criteria, which include physiological symptoms such as muscle tension. The WAQ can be used to identify whether individuals meet none of the criteria for GAD, meet only the somatic criteria for GAD, or meet all of the criteria for GAD, which can be referred to as GAD by questionnaire. Previous research has demonstrated that individuals tend to fall into these three categories and seldom meet only the cognitive criteria (Freeston et al., 1994). The WAQ shows good test–retest reliability after a four-week period (r=0.76; Beaudoin et al., 1997). In non-clinical samples, the measure was able to discriminate between participants with high, moderate, and low levels of worry (Dugas et al., 2001a). Moreover, the WAQ has excellent criterion-related validity for discriminating between GAD patients and matched non-clinical controls (Dugas et al., 2001a).

The BDI-II (Beck, Steer, & Brown, 1996) is a 21-item self-report questionnaire, each item reflecting depressive symptoms. Participants indicate whether items are characteristic of how they have been feeling during the past two weeks. Examples of themes covered by the BDI-II include: sadness, pessimism, loss of interest, suicidal thoughts, sleeping problems, and agitation. The measure has exceptional internal consistency in a college sample (α=0.92) and excellent test–retest reliability over a one-week period for an outpatient sample (r=0.93; Beck et al., 1996). In addition, the measure has demonstrated convergent and divergent validity (Beck et al., 1996; Steer & Clark, 1997). Comparisons with the original version of the BDI (Beck, Ward, Mendelson, Mock, &

Erbaugh, 1961) suggest that the BDI-II is strongly correlated with the original version (r=0.93; Beck et al., 1996) but has a stronger factor structure (Dozois et al., 1998).

The BAI (Beck, Epstein, Brown, & Steer, 1988) is a 21-item measure that examines state anxiety with each item corresponding to common anxiety symptoms. Participants rate each item, according to how often the symptoms have bothered them in the previous week, on a four-point Likert scale ranging from 0='not at all' to 3='a lot'. Examples of symptoms assessed by the BAI include: feeling hot, nervous, shaky, scared, faint, and flushed. The BAI has excellent internal consistency (α=0.92), high test–retest reliability over a one-week period (r=0.75), and demonstrated convergent and divergent validity in an outpatient sample (Beck et al., 1988). Creamer, Foran, and Bell (1995) have established the reliability and validity for this measure in a nonclinical sample.

2.3. Procedure

Participants were asked to complete the five questionnaires and supply demographic information. The questionnaires were completed during one 30-min testing period and groups of participants were run on several separate occasions. Participants were told that the purpose of the experiment was to assess the relationship between worry and other emotional responses such as anxiety and depression. Participants were informed that they could discontinue the study at any time. In addition, a group of 66 participants that were previously tested was asked to complete the IUS for a five-week retest of the measure.

3. Results

Means and standard deviations for the measures are presented in Table 1. The means and standard deviations are consistent with those found for the validation of the French version of the IUS (Freeston et al., 1994). Moreover, the internal consistency of the IUS was excellent (α=0.94) and item-total correlations ranged from 0.36 to 0.77 and are displayed in Table 2. A group of 66 participants was re-tested on the IUS after five weeks, and the reliability coefficient was r=0.74.

Factor analysis was used to identify the factor structure of the IUS. Kaiser's measure of sampling adequacy for the intercorrelation matrix was 0.94, which Kaiser (1970) considered 'mar-

Table 1
Means and standard deviations for all study measures (N=276)

Variable	Mean	Standard deviation
IUS	54.78	17.44
PSWQ	47.22	13.82
BDI-II	10.54	7.84
BAI	14.15	10.74

Note: IUS=Intolerance of Uncertainty Scale; PSWQ=Penn State Worry Questionnaire; BDI-II=Beck Depression Inventory-II; BAI=Beck Anxiety Inventory.

Table 2
Means, standard deviations, and corrected item-total correlations of the IUS (*N*=276)

No.	Item	*M*	SD	r_{tol}
1	Uncertainty stops me from having a strong opinion.	2.63	1.16	0.44
2	Being uncertain means that a person is disorganized.	1.60	0.86	0.36
3	Uncertainty makes life intolerable.	1.84	0.97	0.61
4	It's unfair having no guarantees in life.	2.06	1.12	0.56
5	My mind can't be relaxed if I don't know what will happen tomorrow.	1.94	1.05	0.63
6	Uncertainty makes me uneasy, anxious, or stressed.	2.52	1.12	0.71
7	Unforeseen events upset me greatly.	2.09	1.04	0.58
8	It frustrates me not having all the information I need.	2.86	1.15	0.56
9	Uncertainty keeps me from living a full life.	1.64	0.98	0.72
10	One should always look ahead so as to avoid surprises.	2.51	1.21	0.52
11	A small unforeseen event can spoil everything, even with the best planning.	1.96	1.04	0.47
12	When it's time to act, uncertainty paralyses me.	1.73	0.94	0.60
13	Being uncertain means that I am not first rate.	1.63	0.96	0.58
14	When I am uncertain, I can't go forward.	1.81	0.91	0.64
15	When I am uncertain, I can't function very well.	1.90	0.94	0.69
16	Unlike me, others seem to know where they are going with their lives.	2.19	1.30	0.62
17	Uncertainty makes me vulnerable, unhappy, or sad.	1.98	1.08	0.77
18	I always want to know what the future has in store for me.	2.50	1.21	0.59
19	I can't stand being taken by surprise.	1.82	0.94	0.52
20	The smallest doubt can stop me from acting.	1.98	0.99	0.46
21	I should be able to organize everything in advance.	2.55	1.08	0.39
22	Being uncertain means that I lack confidence.	2.13	1.19	0.51
23	I think it's unfair that other people seem to be sure about their future.	1.62	0.95	0.46
24	Uncertainty keeps me from sleeping soundly.	1.93	1.10	0.45
25	I must get away from all uncertain situations.	1.64	0.93	0.52
26	The ambiguities in life stress me.	2.01	1.02	0.58
27	I can't stand being undecided about my future.	2.38	1.23	0.52

Note: r_{tol}=corrected item-total correlations.

velous' and appropriate for factor analysis. Cattell's (1966) scree test was used to help identify how many factors should be considered for extraction. Principal components analysis using SPSS version 10.0 was used to assess the factor structure of the 27 items on the IUS. The first 10 eigenvalues were 10.94, 1.94, 1.32, 1.13, 1.04, 0.89, 0.84, 0.74, 0.71, and 0.68. A review of the eigenvalues suggests an initial five-factor solution which is consistent with the French version and accounted for 60.7% of the variance; however, an examination of the scree test suggests that a more appropriate factor solution may include less than five factors.

An iterated principal-factor analysis was then performed in which squared multiple correlations were used for the initial commonality estimates. Furthermore, a Promax (oblique) rotation was employed to identify the underlying factor structure. Item loadings for a five-factor, four-factor, and three-factor solutions were examined. The scree test and item loadings were used to identify a four-factor solution as the best representation of the results. Four eigenvalues were identified for this solution which were 8.07, 8.71, 6.10 and 7.11 and the solution accounted for 56.8% of the variance.

The pattern matrix of the standardized regression coefficients for the four factors is provided in Table 3. Keeping with the factor analysis of the French version, loadings of 0.30 or greater were considered for inclusion of items on factors. Factor 1 consisted of 10 items and represents the idea that uncertainty leads to the inability to act. Factor 2 consisted of 12 items indicating that uncertainty is stressful and upsetting. Seven items loaded on Factor 3, refer to the idea that unexpected events are negative, and should be avoided. Finally, Factor 4 consisted of 5 items that suggest that being uncertain is unfair. The correlations between the factors ranged from 0.42 to 0.69 ($p < 0.001$) and are presented in Table 4, thus verifying the use of oblique rotation. Finally, all four factors were highly correlated with the overall IUS score and the correlations ranged from 0.82 to 0.94, $p < 0.001$.

Correlation coefficients were calculated between the IUS and the other measures. The correlation matrix is presented in Table 5. The highest correlation for the IUS occurred with the PSWQ ($r = 0.60$, $p < 0.001$); however, it was not significantly higher than the correlation between the IUS and the BDI-II and BAI. Results indicated significant partial correlations between the IUS and PSWQ, when controlling for the BAI ($N = 276$, $r = 0.41$, $p < 0.001$), controlling for the BDI-II ($N = 276$, $r = 0.38$, $p < 0.001$), and controlling for both the BAI and BDI-II ($N = 276$, $r = 0.30$, $p < 0.001$). These results show that the relationship between intolerance of uncertainty and worry remains after partialing out anxiety and depression.

Although partial correlations identified a unique relationship between intolerance of uncertainty and worry, regression analysis was used to assess the extent of the relationship and to determine how much of the variance in worry is explained by intolerance of uncertainty. A hierarchical regression was performed predicting worry (PSWQ). Demographic information (age and gender) was entered in the first step, followed by measures of anxiety (BAI) and depression (BDI-II), and finally the measure of intolerance of uncertainty (IUS). Intolerance of uncertainty continued to predict worry after demographics and mood had been entered in and accounted for an additional 5% of the variance. Table 6 presents the results of the hierarchical regression. The beta coefficients reported in the table were derived after all the steps had been entered.

Finally, a one-way between groups ANOVA was performed using intolerance of uncertainty scores. Individuals were grouped according to their responses on the WAQ. Participants who indicated moderate to excessive levels of worry and reported moderate to severe levels of somatic symptoms were classified as meeting the criteria for GAD by questionnaire ($n = 45$, 16%). Individuals who reported moderate to severe levels of somatic symptoms, but did not report moderate to high levels of worry, were classified as meeting the somatic criteria only ($n = 97$, 35%). Finally, participants who did not report moderate to severe levels of worry or physical symptoms were classified as not meeting any of the criteria for GAD ($n = 121$, 44%). Thirteen (5%) participants were unclassifiable because of missing data and were not included in the analysis.

The results of the one-way ANOVA revealed that the groups differed significantly on intolerance of uncertainty [$F(2,260) = 41.18$, $p < 0.001$]. Further, the Scheffé test for group comparisons indicated that participants who met the criteria for GAD by questionnaire ($M = 70.51$, SD = 12.56) scored significantly higher on the IUS than those who met only the somatic criteria ($M = 57.12$, SD = 17.83), the latter scoring significantly higher on the IUS than those who met none of the criteria for GAD ($M = 46.61$, SD = 15.84).

Table 3
Promax-rotated iterated-principal-factor standardized regression coefficients and final communality estimates (h^2) of the IUS (N=276)

No.	Item	I	II	III	IV	h^2
1	Uncertainty stops me from having a strong opinion.	**0.63**	−0.15	0.10	−0.01	0.32
2	Being uncertain means that a person is disorganized.	0.27	**0.36**	−0.14	−0.09	0.21
3	Uncertainty makes life intolerable.	0.04	**0.73**	−0.03	−0.04	0.51
4	It's unfair having no guarantees in life.	−0.05	**0.33**	0.12	0.29	0.37
5	My mind can't be relaxed if I don't know what will happen tomorrow.	−0.20	**0.74**	0.09	0.10	0.55
6	Uncertainty makes me uneasy, anxious, or stressed.	0.05	**0.71**	0.09	0.00	0.63
7	Unforeseen events upset me greatly.	0.03	**0.53**	**0.51**	**−0.34**	0.59
8	It frustrates me not having all the information I need.	−0.06	**0.35**	**0.41**	0.02	0.42
9	Uncertainty keeps me from living a full life.	**0.41**	**0.38**	0.07	0.00	0.59
10	One should always look ahead so as to avoid surprises.	−0.09	0.10	**0.63**	0.09	0.49
11	A small unforeseen event can spoil everything, even with the best planning.	0.28	−0.12	**0.54**	−0.05	0.35
12	When it's time to act, uncertainty paralyses me.	**0.67**	−0.04	0.15	−0.03	0.49
13	Being uncertain means that I am not first rate.	**0.59**	0.16	−0.05	0.00	0.46
14	When I am uncertain, I can't go forward.	**0.62**	0.20	−0.16	0.10	0.60
15	When I am uncertain, I can't function very well.	**0.51**	**0.43**	−0.15	0.01	0.64
16	Unlike me, others seem to know where they are going with their lives.	**0.33**	0.07	−0.11	**0.64**	0.61
17	Uncertainty makes me vulnerable, unhappy, or sad.	0.24	**0.49**	0.00	0.19	0.67
18	I always want to know what the future has in store for me.	−0.12	−0.10	**0.42**	**0.60**	0.59
19	I can't stand being taken by surprise.	0.00	−0.01	**0.66**	0.07	0.49
20	The smallest doubt can stop me from acting.	**0.64**	−0.15	0.26	−0.01	0.46
21	I should be able to organize everything in advance.	0.09	0.09	**0.58**	0.05	0.36
22	Being uncertain means that I lack confidence.	**0.54**	0.11	0.03	0.10	0.50
23	I think it's unfair that other people seem to be sure about their future.	0.07	0.12	−0.06	**0.55**	0.43
24	Uncertainty keeps me from sleeping soundly.	0.09	**0.53**	−0.08	0.16	0.44
25	I must get away from all uncertain situations.	**0.33**	0.02	0.25	0.24	0.48
26	The ambiguities in life stress me.	0.07	**0.45**	0.15	0.18	0.54
27	I can't stand being undecided about my future.	−0.03	0.09	0.13	**0.62**	0.54
	Eigen values	**8.07**	**8.71**	**6.10**	**7.11**	

Note. Salient regression coefficients are those >0.30 and appear in boldface. Factor I=uncertainty leads to the inability to act; factor II=uncertainty is stressful and upsetting; factor III=unexpected events are negative and should be avoided; factor IV=being uncertain about the future is unfair.

Table 4
Correlation between factors on the IUS (*N*=276)

	Factor 1	Factor 2	Factor 3	Factor 4
Factor 1	1.00			
Factor 2	0.69***	1.00		
Factor 3	0.42***	0.58***	1.00	
Factor 4	0.65***	0.63***	0.53***	1.00

Note: factor I=uncertainty leads to the inability to act; factor II=uncertainty is stressful and upsetting; factor III=unexpected events are negative and should be avoided; factor IV=being uncertain about the future is unfair.
*p<0.05; **p<0.01; ***p<0.001.

Table 5
Correlations among study measures, gender, and age (*N*=276)

Variable	IUS	PSWQ	BDI-II	BAI	Gender[a]	Age
IUS	–	0.60***	0.59***	0.55***	−0.10	−0.06
PSWQ		–	0.61***	0.59***	−0.39***	−0.06
BDI-II			–	0.59***	−0.14*	−0.15*
BAI				–	−0.17**	−0.15*
Gender[a]					–	−0.03
Age						–

Note: IUS=Intolerance of Uncertainty Scale; PSWQ=Penn State Worry Questionnaire; BDI-II=Beck Depression Inventory-II; BAI=Beck Anxiety Inventory.
*p<0.05; **p<0.01; ***p<0.001.
[a] Gender coding: 1=Male; 0=Female.

Table 6
Summary of hierarchical multiple regression analysis for variables predicting scores on the PSWQ (*N*=276)

Variables	R^2	ΔR^2	B	SE B	β
Step 1	0.16**	0.16***			
Gender[a]			−9.06	1.38	−0.28***
Age			0.00	0.12	0.00
Step 2	0.52***	0.36***			
BAI			0.28	0.07	0.22***
BDI-II			0.45	0.10	0.26***
Step 3	0.57***	0.05***			
IUS			0.23	0.04	0.28***

Note: PSWQ=Penn State Worry Questionnaire; BAI=Beck Anxiety Inventory; BDI-II=Beck Depression Inventory-II; IUS=Intolerance of Uncertainty Scale.
*p<0.05; **p<0.01; ***p<0.001.
[a] Gender coding: 1=Male; 0=Female.

4. Discussion

Overall, the results confirm the study's predictions. The English version of the IUS has excellent internal consistency and good test–retest reliability. A four-factor structure was identified, which suggests that the items on the IUS represent the idea that uncertainty is stressful and upsetting, uncertainty leads to the inability to act, uncertain events are negative and should be avoided, and being uncertain is unfair. Although the French version of the IUS has a five-factor solution, the ideas represented by the factors are similar enough to support the consistency of the IUS across the French and English versions. However, the four-factor solution identified in this study, appears to more clearly capture the underlying factors of the IUS. While this may allow researchers to assess different aspects of an individual's intolerance of uncertainty and better understand the underlying themes, it does not seem appropriate to use the factors as sub-scales due to the apparent overlap of factors and items on those factors. Further, all the factors are significantly related to the overall score on the IUS and there are no significant differences between those relations. At this point in time, although the four factors allow researchers to get a fuller idea of the breadth of intolerance of uncertainty, the data suggest that the overall IUS score should be used.

Although the correlation matrix follows an expected pattern of results with the highest correlation occurring between intolerance of uncertainty and worry, this correlation was not significantly higher than the correlation between intolerance of uncertainty and anxiety and depression. Research has already demonstrated that worry is closely related to mood states such as anxiety and depression; therefore, it is not surprising to find high correlations between these constructs (Andrews & Borkovec, 1988; Borkovec, Robinson, Pruzinsky, & DePree, 1983; Zebb & Beck, 1998). However, significant partial correlations indicate a unique relationship between intolerance of uncertainty and worry that goes beyond the shared variance with negative affect. In addition, regression analysis was used to examine how much of the unique variance in worry is explained by intolerance of uncertainty. The results indicated that intolerance of uncertainty continued to predict a significant amount of the variance in worry, beyond demographics and mood. This supplies further evidence for the unique relationship between intolerance of uncertainty and worry.

The IUS was able to distinguish between groups of participants who met the criteria for GAD by questionnaire, those who met the somatic criteria only, and those who met none of the criteria for GAD by questionnaire. Specifically, participants who met the criteria for GAD by questionnaire scored significantly higher on the IUS than participants who met only the somatic criteria and those who met none of the criteria for GAD. Moreover, those who met the somatic criteria for GAD by questionnaire scored significantly higher on the IUS than those who met none of the criteria for GAD. These results support the measure's criterion related validity. Finally, it is important to note that although a high percentage of individuals meeting the criteria for GAD by questionnaire were identified (16%), this is typical of self-report measures and is consistent with previous research that found a high rate of false positives when using questionnaires to assess for the presence of GAD in non-clinical populations (Roemer et al., 1995).

At this point, the IUS appears to be a valid and reliable instrument for the assessment of intolerance of uncertainty. However, there are some limitations to the present study. The first limitation stems from the fact that 77% of the participants were female. Although the results revealed that gender was not significantly correlated with the IUS and these findings are consistent

with previous research (Robichaud & Dugas, 2000), gender differences were noted for the other measures and this may have affected the results.

Secondly, the participants in the study were undergraduate students and the results may not generalize to other populations. Although research in clinical samples using the French version of the IUS has demonstrated its ability to distinguish between GAD patients, patients suffering from a variety of other anxiety disorders, and normal controls (Dugas et al., 1998; Ladouceur et al., 1999), further research is needed to replicate the present findings with the English version in both community and clinical samples.

In summary, the present study has demonstrated the sound psychometric properties of the English version of the IUS. These findings are consistent with those found for the French version and support the use of this measure. Future research should attempt to focus on validating the English version with different populations and attempt to establish further the specificity of the relationship between intolerance of uncertainty and worry. However, at this point it seems clear that the IUS, which has been shown to be a reliable and valid instrument, will play a key role in the further exploration of the relationship between intolerance of uncertainty and worry.

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