Examination of the Relationship between Intolerance of Uncertainty and Worry

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Abstract

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The present paper consists of two studies intended to further the understanding of intolerance of uncertainty and its relationship to worry. The first study examined 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 4-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 not fair. The IUS has excellent internal consistency, good test-retest reliability, and convergent and divergent validity when assessed with symptom measures of worry, depression, and anxiety. The second study attempted to assess the unique relationship between intolerance of uncertainty and worry, beyond constructs already associated with worry such as perfectionism and control. Furthermore, the study assessed the distinction between intolerance of uncertainty and intolerance of ambiguity. The results suggest that worry has a stronger relationship with intolerance of uncertainty than perfectionism, control, and intolerance of ambiguity. Moreover, the results indicate that intolerance of uncertainty and intolerance of ambiguity are distinct constructs. 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.

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Table of Contents

List of Tables

List of Appendices

Examination of the Relationship between Intolerance of Uncertainty and Worry

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 (e.g., 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 (see MacLeod, Williams, & Bekerian, 1991). Worry is common in both clinical and nonclinical 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). 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 (e.g., Davey, 1993; Dugas, Freeston, Doucet, Lachance, & Ladouceur, 1995). However, attention has shifted towards the examination of specific constructs related to worry (e.g., 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 demonstrated that the tendency to worry is related to positive beliefs about the function of worry, the tendency to avoid upsetting mental imagery, negative problem orientation, and intolerance of uncertainty (Dugas et al.,

1998). Similarly, researchers have found that worry is related to both positive and negative beliefs about worry, and the negative appraisal of worry (Wells & Carter, 1999).

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 (i.e. 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, 2001). 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 nonworriers. 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 nonworriers (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 et al., 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, 1991), 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 (Ladouceur, Blais, Freeston, & Dugas, 1998), and cognitive avoidance (Butler, Wells, & Dewick, 1995).

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 (2001) assessed the relationship

between intolerance of uncertainty, worry, obsessions/compulsions, and panic sensations. The results showed that, in a nonclinical sample, intolerance of uncertainty is highly related to worry, moderately related to obsessions/compulsions, and weakly related to panic sensations. In addition, research examining generalized anxiety disorder (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., 2000). Moreover, changes in intolerance of uncertainty generally precede changes in worry, over the course of treatment (Dugas et al., 1998). 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 (Ladouceur, Gosselin, & Dugas, 2000). 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 the effect that intolerance of uncertainty has on 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 investigate 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.

Although the research demonstrating the relationship between intolerance of uncertainty and worry is beginning to accumulate, research still needs to compare the contributions of intolerance of uncertainty to worry against other measures that have already been established as factors related to worry. This step is necessary for assessing whether the contributions of intolerance of uncertainty to worry are not better explained by other factors. If intolerance of uncertainty does not add anything unique to the understanding of worry, then the focus on intolerance of uncertainty should be shifted to factors that play a more prevalent role in worry.

There are a number of factors that have been linked to excessive worry. For example, researchers have suggested that personality traits such as perfectionism are related to anxiety and worry (Pratt, Tallis, & Eysenck, 1997). As stated previously, researchers have postulated that worry may be related to elevated evidence requirements

(Tallis et al., 1991). The need for additional information may be related to the attempt to find the "perfect" solution. Individuals with perfectionist personality styles are likely to experience anxiety or worry when attempting to discover perfect solutions or outcomes, given that such outcomes are rare. Research has supported this link and demonstrated that worry is significantly related to perfectionism (Kawamura, Hunt, Frost, & BiBartolo, 2001; Stoeber & Joormann, 2001).

Research has also shown that worry and anxiety may be related to specific dimensions of perfectionism. Self-oriented perfectionism, or the tendency to place specific demands and expectations on oneself, is associated with adjustment problems including anxiety (Flett, Hewitt, & Dyck, 1989). Other research has linked anxiety with both self-oriented perfectionism and socially-prescribed perfectionism, which is the attempt to meet the expectations of others (Flett & Hewitt, 1991). This indicates that individuals who place high demands on themselves or feel that others have placed such demands on them are likely to feel anxious and worried about meeting those demands. More recent findings have shown that worry is related to socially-prescribed perfectionism or the need to meet the expectations of others (Flett, Hewitt, Endler, & Tassone, 1995). Again, when an individual feels pressure to live up to certain standards this can generate high levels of worry. Although previous research has not found a clear link between worry or anxiety and other-oriented perfectionism, or the tendency to place high standards on others, further data is still needed.

Worry has also been linked to perceived control (Davey, 1994). More specifically, worry has been shown to be related to a lack of perceived control over problem solving. This suggests that worriers believe that they have no control over the

problem-solving process. A perceived lack of personal control has been shown to be strongly related to worry (Zebb & Beck, 1998). Moreover, the lack of personal control had a stronger relationship with worry than to somatic anxiety. It is likely that a lack of perceived control would result in heightened levels of worry. If someone believes that they have no control over what is happening this could increase their concerns and worries over the situation.

Although intolerance of uncertainty is a relatively new construct, the concept of intolerance towards ambiguity is not new. Part of establishing the role of intolerance of uncertainty in worry will also require researchers to demonstrate a distinction between the newer construct, intolerance of uncertainty, and the concept of tolerance of ambiguity. This can be a difficult task given that "uncertainty" and "ambiguity" appear to share many features.

Tolerance or intolerance for ambiguity is an idea that has generated interest for many years. In fact, research from as early as the late 1940s examined the relationship between intolerance of ambiguity and authoritarian personality styles (see Frenkel-Brunswik, 1948, 1949). This early research defined the construct as "the tendency to perceive ambiguous situations as sources of threat" (Budner, 1962). Ambiguous situations were thought to represent novel, complex, or insoluble situations. Although initial examination of the definition suggests that it is compatible with the definition of intolerance of uncertainty, which states that the individual finds the possibility of a negative outcome occurring unacceptable, they are different to some degree.

For instance, Furnham (1994) reviewed a number of measures assessing intolerance of ambiguity and his overview of the existing measures of that construct

suggest that it is a much broader concept. In fact, his review suggested that the most common measures of intolerance of ambiguity contain underlying factors that include such things as conservative points of view, anxiety induced from ambiguity, adventurousness, variety, originality, clarity, and regularity. In addition, the specific factors identified vary from measure to measure. Given the broad areas assessed by measures of intolerance of ambiguity, it is not surprising to find that these measures were used to examine a broad range of concepts that included religious beliefs, attitudes towards censorship, career choices, rigidity, conservatism, and hostility (see Furnham, 1994 for a review). Researchers examining intolerance of uncertainty believe that this construct is assessing something quite specific and varies greatly from the original concept of intolerance of ambiguity (Freeston et al., 1994). It will be important to establish intolerance of uncertainty as a specific construct related to worry and to separate it from the traditional broad concept of intolerance of ambiguity.

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 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 consists of two separate studies that will attempt to further the understanding of intolerance of uncertainty. The first study will examine the psychometric properties of an English translation of the Intolerance of Uncertainty Scale (IUS) in order to establish its reliability and validity. The second study

will attempt to ascertain whether intolerance of uncertainty adds to our understanding of worry beyond what is explained by other constructs associated with worry such as perfectionism and control. Finally, the study will attempt to distinguish intolerance of uncertainty from the broader concept of intolerance of ambiguity, which has been used to study very different concepts.

Study One

The original French version of the Intolerance of Uncertainty Scale (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, Posa, & Borkovec, 1991). 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 4 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, reflects badly on a person, and leads to frustration, stress, and the inability to take action.

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 5-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 = .91) and its test-retest reliability over a five-week period was good (r = .78; test-retest from Dugas et al., 1997). The scale was able to differentiate between groups of high and low worriers in a nonclinical 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 Intolerance of Uncertainty Scale (IUS) was translated from French to English using a well established method (see 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 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. Second, 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 state. Finally, based on participants' responses to a questionnaire assessing the presence of GAD, 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.

Method

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.

Instruments. The participants completed the following questionnaires in random order: the Intolerance of Uncertainty Scale (IUS), the Penn State Worry Questionnaire (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 Intolerance of Uncertainty Scale (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 5-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 = .91), good test-retest reliability over a five week period ($r = .78$) and demonstrated convergent and discriminant validity (test-retest from Dugas et al., 1997; Freeston et al., 1994).

The Penn State Worry Questionnaire (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 5-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 (Brown et al., 1992; Davey, 1993; Meyer et al., 1990). The PSWQ is a unifactorial measure with excellent internal consistency (α = .86 to .95) and test-retest reliability (r = .74 to .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 Worry and Anxiety Questionnaire (WAQ: Dugas, Freeston, Provencher, Lachance, Ladouceur, & Gosselin, 2001) 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 includes physiological symptoms such as muscle tension. The WAQ can be used to identify whether individuals do not meet 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 those three categories and seldom meet only the cognitive criteria (Freeston et al., 1994). The WAQ shows good test-retest reliability after a 4-week period (r = .76; Beaudoin et al., 1997) and excellent criterion-related validity for discriminating between GAD patients and matched controls (Dugas et al., 2001).

The Beck Depression Inventory II (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 2 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 = .92) and excellent test-retest reliability over a one-week period for an outpatient sample (r = .93; Beck et al., 1996). In addition, the measure has demonstrated convergent and divergent validity (see 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 = .93; Beck et al., 1996) but has a stronger factor structure (Dozois, Dobson, & Ahnberg, 1998).

The Beck Anxiety Inventory (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 4-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 = .92), high test-retest reliability over a 1-week period (r = .75), and demonstrated convergent and divergent validity in an outpatient sample (see Beck et al., 1988). Creamer, Foran, and Bell (1995) have established the reliability and validity for this measure in a nonclinical sample.

Procedure. Participants were asked to complete the five questionnaires and supply demographic information. The questionnaires were completed during one 30-minute 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 were asked to complete the Intolerance of Uncertainty Scale (IUS) for a 5-week retest of the measure.

Results

Overview of Statistical Analysis. To examine the reliability of the IUS, a coefficient alpha was used in conjunction with an item analysis. Furthermore, the measure was assessed for test-retest reliability after a five-week interval, using a correlation between initial IUS scores and subsequent scores.

To evaluate the factor structure of the IUS, the Kaiser (1970) measure of sampling adequacy was employed to determine whether the data was appropriate for factor analysis. Following this initial test, principal components extraction and Cartell's scree test (1966) were used to determine the number of appropriate factors. Principal factors extraction with Promax (oblique) rotation, which takes into account the correlation between factors, was performed and the final rotated factors were assessed for internal consistency.

A correlation matrix was used to determine the relationships between study measures and partial correlations were utilized to examine the unique relationship between intolerance of uncertainty and worry, once variance shared with anxiety and depression was removed. Moreover, a hierarchical regression was performed to assess the predicted variance of worry (PSWQ), by entering demographic information (age and

gender) in the first step, followed by measures of anxiety (BAI) and depression (BDI-II), and finally the measure of intolerance of uncertainty (IUS).

Finally, a one-way between groups Analysis of Variance (ANOVA) was performed using intolerance of uncertainty scores. Individuals were grouped according to their responses on the WAQ. This analysis was used to test the final hypothesis that the IUS would be able to distinguish between groups of participants who met the full diagnostic criteria for GAD, those who met only the somatic criteria, and those who met none (neither the cognitive nor the somatic) criteria for GAD.

Preliminary Data Analysis. Prior to any specific statistical analysis the data were screened to determine whether statistical assumptions were met and to ascertain if the data was appropriate for further statistical analysis (see Tabachnick and Fidell, 1996 for a review of data screening procedures). The data, excluding demographic information, were transformed into z-scores to evaluate the presence of extreme scores that were more than 3.29 standard deviations from the mean in either direction. Seven participants were identified as univariate outliers for having extreme scores on study measures and were removed from further analysis. Mutlivariate outliers were assessed by examining Mahalanobis distance and Cook's distance. For this analysis, all study measures, excluding demographic information, were included and the PSWQ was identified as the dependent variable. The resulting Mahalanobis distance for each participant was compared against a critical X^2 value. Two participants were identified as multivariate outliers due to scores exceeding this critical value. However, neither of these cases produced a Cook's distance that was greater than the criterion of 1, suggesting that the cases were not significantly effecting the regression; therefore, they were not deleted.

The data were also assessed for normality by examining the skewness and kurtosis of the distribution for each measure. Only the Intolerance of Uncertainty Scale (IUS) was identified as being significantly skewed; therefore, it was transformed using logarithms. This process resulted in a normal distribution on the IUS. The assumption of linearity and homoscedasticity was verified through the examination of the bivariate scatterplots between PSWQ and all other measures (IUS, BAI, BDI-II, and WAQ). The assumption of linearity was considered to be violated if a nonlinear relationship was found. In addition, the assumption of homoscedaticity was met if the pattern on the scatterplot suggested variance was normally distributed. However, the BAI and BDI-II appeared to violate these assumptions and the scatterplots indicated heteroscedasticity and skewness. In an attempt to rectify these violations, both measures were transformed using square roots and the resulting scatterplots suggest that the assumption of linearity and homoscedasticity were met. Finally, the data were examined to determine whether the assumption of multicollinarity and singularity were met and the analysis indicated that there was no significant overlap between measures.

Statistical Analysis. 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 ($\alpha = .94$) and item-total correlations ranged from .36 to .77 and are displayed in Table 2. A group of 66 participants were re-tested on the IUS after 5 weeks, and the reliability coefficient was $r = .74$.

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	.44
2	Being uncertain means that a person is disorganized.	1.60	.86	.36
3	Uncertainty Makes life intolerable.	1.84	.97	.61
4	It's unfair having no guarantees in life.	2.06	1.12	.56
5	My mind can't be relaxed if I don't know what will happen tomorrow.	1.94	1.05	.63
6	Uncertainty makes me uneasy, anxious, or stressed.	2.52	1.12	.71
7	Unforeseen events upset me greatly.	2.09	1.04	.58
8	It frustrates me not having all the information I need.	2.86	1.15	.56
9	Uncertainty keeps me from living a full life.	1.64	.98	.72
10	One should always look ahead so as to avoid surprises.	2.51	1.21	.52
11	A small unforeseen event can spoil everything, even with the best planning.	1.96	1.04	.47
12	When it's time to act, uncertainty paralyses me.	1.73	.94	.60
13	Being uncertain means that I am not first rate.	1.63	.96	.58
14	When I am uncertain, I can't go forward.	1.81	.91	.64
15	When I am uncertain, I can't function very well.	1.90	.94	.69
16	Unlike me, others seem to know where they are going with their lives.	2.19	1.30	.62
17	Uncertainty makes me vulnerable, unhappy, or sad.	1.98	1.08	.77
18	I always want to know what the future has in store for me.	2.50	1.21	.59
19	I can't stand being taken by surprise.	1.82	.94	.52
20	The smallest doubt can stop me from acting.	1.98	.99	.46
21	I should be able to organize everything in advance.	2.55	1.08	.39
22	Being uncertain means that I lack confidence.	2.13	1.19	.51
23	I think it's unfair that other people seem to be sure about their future.	1.62	.95	.46
24	Uncertainty keeps me from sleeping soundly.	1.93	1.10	.45
25	I must get away from all uncertain situations.	1.64	.93	.52
26	The ambiguities in life stress me.	2.01	1.02	.58
27	I can't stand being undecided about my future.	2.38	1.23	.52

Note. r_{tol} = Corrected item-total correlations.

Factor analysis was used to identify the factor structure of the IUS. Kaiser's measure of sampling adequacy for the intercorrelation matrix was .94, which Kaiser (1970) considered "marvelous" 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, .89, .84, .74, .71, and .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 5 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 5-factor, 4-factor, and 3-factor solutions were examined. The scree test and item loadings were used to identify a 4-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 4 factors is provided in Table 3. Keeping with the factor analysis of the French version, loadings of .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

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.	**.63**	-.15	.10	-.01	.32
2	Being uncertain means that a person is disorganized.	.27	**.36**	-.14	-.09	.21
3	Uncertainty Makes life intolerable.	.04	**.73**	-.03	-.04	.51
4	It's unfair having no guarantees in life.	-.05	**.33**	.12	.29	.37
5	My mind can't be relaxed if I don't know what will happen tomorrow.	-.20	**.74**	.09	.10	.55
6	Uncertainty makes me uneasy, anxious, or stressed.	.05	**.71**	.09	.00	.63
7	Unforeseen events upset me greatly.	.03	**.53**	**.51**	**-.34**	.59
8	It frustrates me not having all the information I need.	-.06	**.35**	**.41**	.02	.42
9	Uncertainty keeps me from living a full life.	**.41**	**.38**	.07	.00	.59
10	One should always look ahead so as to avoid surprises.	-.09	.10	**.63**	.09	.49
11	A small unforeseen event can spoil everything, even with the best planning.	.28	-.12	**.54**	-.05	.35
12	When it's time to act, uncertainty paralyses me.	**.67**	-.04	.15	-.03	.49
13	Being uncertain means that I am not first rate.	**.59**	.16	-.05	.00	.46
14	When I am uncertain, I can't go forward.	**.62**	.20	-.16	.10	.60
15	When I am uncertain, I can't function very well.	**.51**	**.43**	-.15	.01	.64
16	Unlike me, others seem to know where they are going with their lives.	**.33**	.07	-.11	**.64**	.61
17	Uncertainty makes me vulnerable, unhappy, or sad.	.24	**.49**	.00	.19	.67
18	I always want to know what the future has in store for me.	-.12	-.10	**.42**	**.60**	.59
19	I can't stand being taken by surprise.	.00	-.01	**.66**	.07	.49
20	The smallest doubt can stop me from acting.	**.64**	-.15	.26	-.01	.46
21	I should be able to organize everything in advance.	.09	.09	**.58**	.05	.36
22	Being uncertain means that I lack confidence.	**.54**	.11	.03	.10	.50
23	I think it's unfair that other people seem to be sure about their future.	.07	.12	-.06	**.55**	.43
24	Uncertainty keeps me from sleeping soundly.	.09	**.53**	-.08	.16	.44
25	I must get away from all uncertain situations.	**.33**	.02	.25	.24	.48
26	The ambiguities in life stress me.	.07	**.45**	.15	.18	.54
27	I can't stand being undecided about my future.	-.03	.09	.13	**.62**	.54
	Eigenvalues	**8.07**	**8.71**	**6.10**	**7.11**	

Note. Salient regression coefficients are those ≥ .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.

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 .42 to .69 ($p < .001$) and are presented in Table 4, thus verifying the use of oblique rotation. Finally, all 4 factors were highly correlated with the overall IUS score and the correlations ranged from .82 to .94.

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 ($r = .60$, $p < .001$); 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 ($r = .41$, $p < .001$), controlling for the BDI-II ($r = .38$, $p < .001$), and controlling for both the BAI and BDI-II ($r = .30$, $p < .001$). These results show that the relationship between intolerance of uncertainty and worry remains after partialing out anxiety and depression.

A hierarchical regression was performed to assess the predicted variance of worry (PSWQ) by entering demographic information (age and gender) 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 state 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. There were 45 (16%) participants who met the criteria for GAD by questionnaire, 97

Table 4

Correlation between Factors on the IUS (N = 276)

	Factor 1	Factor 2	Factor 3	Factor 4
Factor 1	1.00			
Factor 2	.69***	1.00		
Factor 3	.42***	.58***	1.00	
Factor 4	.65***	.63***	.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.

* $p<.05$. ** $p<.01$. *** $p<.001$.

Table 5

Correlations among Study Measures, Gender, and Age (N = 276)

Variable	IUS	PSWQ	BDI-II	BAI	GENDER[a]	AGE
IUS	_	.60***	.59***	.55***	-.10	-.06
PSWQ		_	.61***	.59***	-.39***	-.06
BDI-II			_	.59***	-.14*	-.15*
BAI				_	-.17**	-.15*
GENDER[a]					_	-.03
AGE						_

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

[a] Gender coding: 1 = Male; 0 = Female.

* $p<.05$. ** $p<.01$. *** $p<.001$.

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	.16**	.16***			
Gender[a]			-9.27	1.34	-.28***
Age			.00	.12	.01
Step 2	.52***	.36***			
BAI			2.10	.49	.23***
BDI-II			2.83	.58	.26***
Step 3	.57***	.05***			
IUS			29.64	5.36	.29***

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

[a] Gender coding: 1 = Male; 0 = Female.

* $p<.05$. ** $p<.01$. *** $p<.001$.

(35%) participants who met the somatic criteria only, and 121 (44%) participants who met none of the criteria for GAD. 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 [$F(2, 260) = 41.18$, $p < .001$]. Further, the Scheffé test for group comparisons indicated that participants who met the criteria for GAD by questionnaire scored significantly higher on the IUS than those who met only the somatic criteria and those who met none of the criteria for GAD. Moreover, those participants meeting only the somatic criteria scored significantly higher on the IUS than those who met none of the criteria for GAD.

Discussion

The results confirm the study's predictions. The English version of the Intolerance of Uncertainty Scale (IUS) has excellent internal consistency and good test-retest reliability. A 4-factor structure was identified which suggests that the items on the IUS represent the idea that intolerance of uncertainty is stressful and upsetting, uncertainty leads to the inability to act, uncertain events are negative and should be avoided, and being uncertain is not fair. Although the French version of the IUS has a 5-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 4-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 indicated that worry continued to predict intolerance of uncertainty beyond demographics and mood state. 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 and this suggests that the IUS can

play a discriminant role in the assessment of GAD. 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 nonclinical populations (Roemer et al., 1991).

At this point, the Intolerance of Uncertainty Scale (IUS) has proven 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 no gender differences on the IUS, and these results are consistent with those found in other studies (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, Gagnon 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 Intolerance of Uncertainty Scale. 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 Intolerance of Uncertainty Scale (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.

Study Two

The present study examined the specificity of the relationship between intolerance of uncertainty and worry. Although research has begun to lay the foundation for understanding the role of intolerance of uncertainty in excessive worry, it is unclear whether the relationship between intolerance of uncertainty and worry is not already accounted for by factors already believed to play a role in worry, such as perfectionism and perceived control. The present study examined the relationship between worry and perfectionism, perceived control, and intolerance of uncertainty in an attempt to demonstrate whether intolerance of uncertainty and worry share a unique relationship. Moreover, this study attempted to differentiate intolerance of uncertainty from the traditional broader concept of intolerance of ambiguity by assessing their relationship to worry.

The study had three hypotheses. First, based on the findings suggesting a strong relationship between intolerance of uncertainty and worry, it is predicted that worry will be more highly related to intolerance of uncertainty than to perfectionism, perceived control, and intolerance for ambiguity. Second, it is proposed that the relationship between intolerance of uncertainty and worry will not be accounted for by the other study variables. Finally, based on responses to a questionnaire assessing GAD criteria, it is

believed that intolerance of uncertainty will distinguish between participants meeting all, some, or none of the diagnostic criteria for GAD, controlling for perfectionism, control, and intolerance of ambiguity.

Method

Participants. One hundred and ninety-seven (N = 197) participants were recruited through various undergraduate courses. There were 152 female participants and 45 males. The mean age of participants was 22.56 (SD = 5.5). Students were invited to participate at the start of a regular undergraduate course and participation was voluntary.

Instruments. The participants completed the following questionnaires in random order: the Intolerance of Uncertainty Scale (IUS), the Penn State Worry Questionnaire (PSWQ), the Worry and Anxiety Questionnaire (WAQ), the Multidimensional Perfectionism Scale (MPS), the Sense of Control Scale (SC), and the Scale of Tolerance-Intolerance of Ambiguity (TIA),. In addition, subjects completed a demographic information form.

The Intolerance of Uncertainty Scale (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. As demonstrated in Study One, the English version of the IUS has excellent internal consistency (α = .94), and good test re-test reliability over a five-week period (r = .74). Moreover, the measure has demonstrated convergent and divergent validity when assessed with symptom measures of worry, depression, and anxiety.

The Penn State Worry Questionnaire (PSWQ: Meyer et al.,1990) measures the tendency to engage in excessive, uncontrollable, and generalized worry. As stated

previously, the PSWQ has excellent internal consistency, good test re-test reliability and demonstrated validity. See page 13 for a full description of the PSWQ.

The Worry and Anxiety Questionnaire (WAQ: Dugas et al., 2001) assesses worry themes and the DSM-IV diagnostic criteria for GAD. As stated previously, the WAQ shows good test-retest reliability and demonstrated validity. See page 14 for a full description of the WAQ.

The Multidimensional Perfectionism Scale (MPS: Hewitt & Flett, 1989) is a 45-item measure of personal characteristics and traits associated with perfectionism. The MPS has three subscales: self-oriented perfectionism (SOP), which examines self-directed perfectionism; socially-prescribed perfectionism (SPP), which assesses the need to meet the expectations of others, and other-oriented perfectionism (OOP), which taps the expectations about the capabilities of others. Participants rate items on a 7-point Likert scale ranging from 1 = "strongly disagree" to 7 = "strongly agree". Items assessing self-oriented perfectionism include "When I work on something, I cannot relax until it is perfect". Items examining socially-prescribed perfectionism include "The people around me expect me to succeed at everything I do". Finally, other-oriented perfectionism is assessed through items such as "If I ask someone to do something, I expect it to be done flawlessly". The MPS has excellent internal consistency in a student sample (SOP: α = .89; SPP: α = .86; OOP: α = .79; Hewitt & Flett, 1991). Finally, the MPS subscales have demonstrated convergent and divergent validity (Hewitt & Flett, 1991; Hewitt, Flett, Turnbull-Donovan, & Mikail, 1991).

The Sense of Control Scale (SC: Lachman & Weaver, 1998) is a 12-item questionnaire assessing an individual's sense of control through two dimensions: personal

mastery and perceived constraints. Personal mastery reflects one's personal sense of efficacy in reaching goals, while perceived constraints assesses the belief in obstacles beyond one's control that may interfere with achieving goals. Participants rate each item on a 7-point Likert scale ranging from 1 = "disagree strongly" to 7 = "strongly agree". Examples of items include "I can do just about anything I really set my mind to" and "What happens to me in the future mostly depends on me". High scores are indicative of a strong sense of control. Factor analysis supports the two dimensions and analysis indicates that the measure has high internal consistency (Personal mastery: $\alpha = .70$; Perceived constraints: $\alpha = .86$; Lachman & Weaver, 1998).

The Scale of Tolerance-Intolerance of Ambiguity (TIA: Budner, 1962) is a 16-item questionnaire that assesses intolerance of ambiguity. The scale examines the tendency to perceive ambiguous situations as a source of threat and items refer to three features of ambiguity: novelty, complexity, and insolubility. Participants are asked to rate each item on a 6-point Likert scale ranging from 0 = "strongly disagree" to 5 = "strongly agree". Examples of items include "A good job is one where what is to be done and how it is to be done are always clear" and "What we are used to is always preferable to what is unfamiliar". The scale has good test-retest reliability over a 2 month period ($r = .85$) but only moderate internal consistency ($\alpha = .49$ to .59; Budner, 1962; Furnham, 1994). However, the measure has demonstrated validity (Budner, 1962; Furnham, 1994).

Procedure. Participants were asked to complete the six questionnaires and supply demographic information. The questionnaires were completed during one 30-minute 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 constructs related to worry. In addition, participants were informed that they could discontinue the study at any time.

Results

Overview of Statistical Analysis. A correlation matrix was used to assess the relationship between study measures and test the hypothesis that worry would have a higher correlation with intolerance of uncertainty than dimensions of perfectionism, control, and intolerance of ambiguity. Furthermore, a partial correlation was utilized to assess the unique relationship between intolerance of uncertainty and worry, once shared variance with the other measures was removed. In addition, partial correlations between worry and dimensions of perfectionism, control, and intolerance of ambiguity were assessed to determine if a relationship remained once variance shared with intolerance of uncertainty was partialed out.

A hierarchical regression was performed to assess the predicted variance of worry (PSWQ), by entering demographic information (age and gender) in the first step, followed by measures of perfectionism (SOP, SPP, OOP), control (SC), and intolerance of ambiguity (TIA) in the second step, and the measure of intolerance of uncertainty (IUS) was entered in the finally step.

Finally, a one-way between groups Analysis of Covariance (ANCOVA) was performed using intolerance of uncertainty scores, controlling for the other study measures (SOP, SPP, OOP, SC, TIA). Individuals were grouped according to their responses on the WAQ. This analysis was used to test the final hypothesis that the IUS would be able to distinguish between groups of participants who met the full diagnostic

criteria for GAD, those who met only the somatic criteria, and those who met none of the criteria for GAD, controlling for the effects of the other study measures.

Preliminary Data Analysis. Prior to any specific statistical analysis the data were screened to determine whether statistical assumptions were met and to ascertain if the data was appropriate for further statistical analysis (see Tabachnick and Fidell, 1996 for a review of data screening procedures). The data, excluding demographic information, were transformed into z-scores to evaluate the presence of extreme scores that were more than 3.29 standard deviations from the mean in either direction. Two participants were identified as univariate outliers for having extreme scores on study measures. Mutlivariate outliers were assessed by examining Mahalanobis distance. For this analysis, all study measures, excluding demographic information, were included and the PSWQ was identified as the dependent variable. The resulting Mahalanobis distance for each participant was compared against a critical X^2 value. The two participants that were also identified as univariate outliers were identified as multivariate outliers due to scores exceeding this critical value and were removed from further statistical analysis.

The data were also assessed for normality by examining the skewness and kurtosis of the distribution for each measure. All study measures were deemed normally distributed. The assumption of linearity and homoscedasticity was verified through the examination of the bivariate scatterplots between PSWQ and all other measures (IUS, SOP, OOP, SPP, SC, and TIA). The assumption of linearity was considered to be violated if a nonlinear relationship was found. In addition, the assumption of homoscedaticity was met if the pattern on the scatterplot suggested variance was normally distributed. These assumptions were met for all measures. Finally, the data

were examined to determine whether the assumption of multicollinarity and singularity were met and the analysis indicated that there was no significant overlap between measures.

Statistical Analysis. Means and standard deviations for the measures are presented in Table 7. Correlation coefficients were calculated between the IUS and the other measures and the correlation matrix is presented in Table 8. The strongest correlation occurred between the IUS and PSWQ ($r = .63$, $p < .001$). This correlation was significantly higher than the correlations between the PSWQ and the SPP ($r = .37$, $p < .001$), SOP ($r = .34$, $p < .001$), OOP ($r = .04$, ns), SC ($r = -.37$, $p < .001$), and TIA ($r = .26$, $p < .001$). The PSWQ was significantly correlated with all the study measures except the OOP. Moreover, the partial correlation between the IUS and PSWQ, controlling for the other measures, remained significant ($r = .45$, $p < .001$). However, examination of the partial correlation between the PSWQ and the SPP, SOP, OOP, SC, and TIA, controlling for IUS, indicated that only the correlation with the SOP remained significant ($r = .18$, $p < .05$).

A hierarchical multiple regression, predicting worry (PSWQ), was performed. Demographic information (age and gender) was entered in the first step followed by the other study measures (SOP, SPP, OOP, SC, and TIA). The IUS was entered in the final step and accounted for an additional 14% of the variance beyond demographics and the other measures. The results of the hierarchical multiple regression are presented in Table 9. The beta coefficients reported in the table were derived after all the steps had been entered.

Table 7

Means and Standard Deviations for Study Measures (N = 197)

Variable	Mean	Standard Deviation
IUS	61.25	18.98
PSWQ	48.68	14.00
SOP	68.88	14.99
SPP	50.76	12.70
OOP	57.51	10.46
SC	61.13	10.67
TIA	32.09	8.64

Note. IUS = Intolerance of Uncertainty Scale; PSWQ = Penn State Worry Questionnaire; SOP = Self-Oriented Perfectionism; SPP = Socially-Prescribed Perfectionism; OOP = Other-Oriented Perfectionism; SC = Sense of Control Scale; TIA = Tolerance-Intolerance of Ambiguity Scale.

Table 8

Correlations among Study Measures, Gender, and Age (N =197)

Variable	PSWQ	IUS	SOP	SPP	OOP	SC	TIA	Gender[a]	AGE
PSWQ	-	.63***	.34***	.37***	.04	-.37***	.26***	-.27***	-.21**
IUS		-	.33***	.52***	.11	-.48***	.43***	-.07	-.19**
SOP			-	.38***	.38***	.02	.18*	-.17*	-.05
SPP				-	.16*	-.36***	.35***	.04	-.22**
OOP					-	.01	-.15*	.13	-.15*
SC						-	-.32***	.05	.18*
TIA							-	.03	-.24**
Gender[a]								-	-.01
AGE									-

Note. IUS = Intolerance of Uncertainty Scale; PSWQ = Penn State Worry Questionnaire; SOP = Self-Oriented Perfectionism; SPP = Socially-Prescribed Perfectionism; OOP = Other-Oriented Perfectionism; SC = Sense of Control Scale; TIA = Tolerance-Intolerance of Ambiguity Scale.

[a] Gender coding: 1 = Male; 0 = Female.

* p<.05. **p<.01. ***p<.001.

Table 9

Summary of Hierarchical Multiple Regression Analysis for Variables Predicting Scores on the PSWQ (N=197)

Variables	R^2	ΔR^2	B	SE B	β
Step 1	.12***	.12***			
Gender[a]			-6.62	1.87	-.20***
Age			- .25	.14	-.10
Step 2	.34***	.22***			
SOP			.15	.06	.16*
SPP			- .03	.08	.03
OOP			- .09	.08	-.07
SC			- .13	.09	-.10
TIA			- .05	.10	-.03
Step 3	.47***	.14***			
IUS			.36	.05	.50***

Note: PSWQ = Penn State Worry Questionnaire; SOP = Self-Oriented Perfectionism; SPP: Socially-Prescribed Perfectionism; OOP = Other-Oriented Perfectionism; SC = Sense of Control Scale; TIA = Tolerance-Intolerance of Ambiguity Scale; IUS = Intolerance of Uncertainty Scale.

[a]Gender coding: 1 = Male; 0 = Female;

* p<.05. **p<.01. ***p<.001;

Finally, a one-way between groups ANCOVA was performed on intolerance of uncertainty scores, controlling for the other study measures (SOP, SPP, OOP, SC, TIA). Participants were grouped according to their responses on the WAQ. This analysis was used to test the final hypothesis that the IUS would be able to distinguish between groups of participants who met the diagnostic criteria for GAD by questionnaire, those who met only the somatic criteria, or those who met none of the criteria for GAD, controlling for the effects of the other study measures. There were 11 (5.7%) participants who met the criteria for GAD by questionnaire, 65 (33.7 %) participants who met the somatic criteria only, and 111 (57.5%) participants who met none of the criteria for GAD by questionnaire. Six (3.1%) participants were unclassifiable because of missing data and were not included in the analysis. The results of the one-way between groups ANCOVA revealed a significant group effect [F (2, 179) = 6.416, p = .002]. Further, the Scheffé test for group comparisons indicated that participants who met none of the criteria for GAD by questionnaire scored significantly lower on the IUS than those who met the full criteria for GAD and those meeting the somatic criteria. However, those meeting the somatic criteria did not score significantly lower on the IUS than those meeting the full criteria for GAD by questionnaire.

Discussion

The results of the study confirm the initial predictions. Correlations among study measures demonstrated that intolerance of uncertainty had the strongest relationship with worry. Taken a step further, when variance shared with other measures was removed, intolerance of uncertainty continued to be related to worry. These findings suggest that intolerance of uncertainty and worry share variance that is not explained by measures of

intolerance of ambiguity, perfectionism, or perceived control.

Furthermore, the relationship between intolerance of uncertainty and worry was significantly stronger than the relationship between intolerance of ambiguity and worry. Similarly, the correlation between intolerance of ambiguity and intolerance of uncertainty, although significant, does not suggest that they are measuring the same construct. Taken together, these findings clearly point to the idea that intolerance of uncertainty and the broader concept of intolerance of ambiguity are different constructs that maintain distinct relationships with worry.

Concerning the relationship between dimensions of perfectionism and worry, although self-oriented perfectionism and socially-prescribed perfectionism were significantly related to worry, other-oriented perfectionism was not. This is consistent with previous findings that show that self-oriented perfectionism is related to maladjustment problems such as anxiety (Flett et al., 1989) and that socially-prescribed perfectionism is related to worry (Flett et al., 1995). Furthermore, the study re-established the relationship between worry and perceived control (Davey, 1994). However, despite the findings confirming a relationship between worry and perfectionism and control, the hypothesis that the strongest relationship would emerge between intolerance of uncertainty and worry was confirmed.

The importance of the relationship between worry and intolerance of uncertainty was further established by examining partial correlations between worry and perfectionism, perceived control, and intolerance of ambiguity, by removing variance shared with intolerance of uncertainty. Once intolerance of uncertainty was partialed out, only the relationship between worry and self-oriented perfectionism remained. In a

further attempt to clarify the role of intolerance of uncertainty, study measures were used to predict worry. Intolerance of uncertainty emerged as the strongest predictor, continuing to predict worry above and beyond all other study measures. In fact, intolerance of uncertainty continued to predict an additional 14% of the variance in worry. These are strong findings that support the central role of intolerance of uncertainty in worry.

Finally, intolerance of uncertainty was able to distinguish between individuals who met none of the criteria for GAD by questionnaire, from those meeting the full criteria for GAD and those meeting only the somatic criteria for GAD, controlling for intolerance of ambiguity, perfectionism, and perceived control. This suggests that intolerance of uncertainty can play a discriminate role in assessing individuals experiencing excessive levels of worry and somatic anxiety.

The present study suggests that there is a significant relationship between worry and intolerance of ambiguity. However, the relationship between worry and intolerance of uncertainty was significantly stronger. Moreover, the correlation between intolerance of ambiguity and intolerance of uncertainty suggests that, although they may be related, they appear to be measuring different things. Furnham (1994) reviewed the literature on intolerance of ambiguity starting at its origins in the late 1940s and suggests that intolerance of ambiguity has been used to assess a number of different constructs and outcome measures. He cites research that linked intolerance of ambiguity to religious beliefs, attitudes towards censorship, career choices, and conservatism. Recent research continues to examine the relationship between intolerance of ambiguity and a variety of factors, such as fear of the paranormal (Houran & Lange, 1996) and political orientation

(Fibert & Ressler, 1998). The factors examined in relation to intolerance of ambiguity have not been commonly associated with worry; therefore, it is not surprising that intolerance of ambiguity itself is not as highly correlated with worry as intolerance of uncertainty. Intolerance of uncertainty maintains a stronger relationship to worry because it appears to be measuring something that is not captured by the broadly used construct of intolerance of ambiguity.

The significant relationship between worry and perfectionism is consistent with the idea that individuals who place high expectations or standards on themselves may experience worrisome thoughts around meeting those expectations. However, the link between worry and perfectionism was not as strong as the relationship between worry and intolerance of uncertainty. These findings may be a result of the underlying aspects of perfectionism. Hamacheck (1978) postulated that perfectionism is composed of two dimensions and he clearly differentiates between normal or adaptive perfectionism and maladaptive or pathological perfectionism. Hamacheck (1978) suggests that the former may be differentiated from the latter by the ability to derive pleasure from one's efforts. Individuals who have normal perfectionistic tendencies are more likely to be successful achievers who gain a sense of pleasure from reaching their goals. Alternatively, individuals with maladaptive perfectionism are likely to be engaged in efforts to obtain impossible goals and believe that things are never quite perfect. These individuals may experience distress and concern regarding their attempts for perfectionism. In this sense, the results of the present study are not surprising given that there are positive and negative aspects of perfectionism. Some aspects of perfectionism are adaptive and therefore are not likely to be associated with high levels of worry. These differing

dimensions of perfectionism may have resulted in only a moderate, albeit significant, correlation between worry and perfectionism.

To lend further support for this explanation of the present findings, Frost and colleagues (1993) performed a factor analysis on two perfectionism scales including the measure used in the present study. They identified two underlying factors: maladaptive evaluation concerns and positive striving. These two factors are consistent with Hamacheck's (1978) description of maladaptive and normal perfectionism. Common sense suggests that maladaptive perfectionism may result in distress and therefore be related to worry. However, the positive aspects of perfectionism may have detracted from the overall relationship between worry and perfectionism, and may be responsible for the lower correlation between worry and perfectionism compared to worry and intolerance of uncertainty. Alternatively, intolerance of uncertainty is not adaptive and most aspects of it can be considered negative. Someone who is intolerant of uncertainty may tend to worry regardless of whether things are perfect now, because there is uncertainty around how things will be tomorrow and that uncertainty is likely to cause them distress. Therefore, it is reasonable to expect that one would find a stronger relationship between worry and intolerance of uncertainty.

The results of the present study also demonstrated a significant relationship between worry and perceived control. It is easy to imagine how a lack of perceived control may be connected to level of worry. If someone determines that they have no direct control over situations or events they may become distressed or worried about how those situations will turn out. Other research supports this idea and has linked a lack of perceived control to a variety of mental health outcomes and constructs (see Skinner,

1996 for a review). However, despite confirming a link between worry and perceived control, the present study points to a stronger connection between worry and intolerance of uncertainty.

Perceived control can be considered a stable personality trait and as an unstable, situation-specific state. One can imagine that there are individuals who approach life with an overall sense of control. These people may believe that they have the necessary skills and abilities to have an effect on their environment. It is just as likely that there are specific situations where individuals may feel that they have more or less control. In one situation, individuals may feel that they have the necessary skills and abilities to accomplish a specific goal and further believe that there are no external obstacles in their way. In an alternative situation, those individuals may feel that they are lacking the necessary skills to accomplish a goal and believe that there are a number of external obstacles that may interfere with obtaining that goal. This suggests that there are situations where people will feel a greater sense of control and other situations where they will feel a lack of control. Therefore, the lower correlation between worry and perceived control in the present study may be due to the variations in perceived control as a result of different situations.

On the other hand, uncertainty can be found in everyday life given that most situations are not straightforward and generally contain some element of uncertainty. One can never be certain how situations will resolve. Someone who is intolerant of uncertainty, according to the definition, will find any uncertainty unacceptable. Therefore, it is not surprising to find a stronger relationship between worry and intolerance of uncertainty, because uncertainty is always present and someone who finds

uncertainty unacceptable will likely experience a great deal of concern and distress around that uncertainty.

Another possible explanation for the stronger relationship between worry and intolerance of uncertainty as opposed to worry and perceived control, may be the result of focusing on perceived control rather than other aspects of control. According to Schulz and Heckhausen (1999), research tends to focus exclusively on perceived control and ignores other aspects of control. They believe that a number of processes, functions, and behaviours are not captured by perceived control. Moreover, they suggest that just because a person has a low estimate of personal control does not mean that they are not actually engaging in behaviours that are aimed at exerting control over their environment. Perceived control may not be directly connected to objective control. Therefore, perceived control may not be the best indicator of control and accordingly a perceived lack of personal control may not mean that the person experiences worry or distress.

Finally, one must consider how people who have a lack of perceived control interpret that lack of control. It is possible that individuals who estimate that they have a low level of control may not experience anxiety or worry related to that lack of control. These individuals may adopt the attitude that because they have no control over the situation they are not responsible for the outcome and consequently feel no distress or concern over the situation. Whereas someone who is intolerant of uncertainty is unlikely to adopt an attitude where they are unconcerned about the situation because someone who is intolerant of uncertainty by definition finds uncertainty unacceptable. Individuals who are intolerant of uncertainty are likely to experience distress or worry in situations that they interpret as uncertain.

Although important findings have emerged from this study, it is not without its limitations. Similar to the first study, the majority of participants were female. The results suggest that there were gender differences on the measure of worry (PSWQ) and on one of the dimensions of perfectionism (SOP). Due to the gender differences on those specific measures, the discrepancy in the number of male and female participants may have affected the results. In addition, the study was conducted using a composite of undergraduate students, the majority of which were psychology students. Therefore, the generalizability of the results to the general population should be done so with caution. Future studies should strive to include a sample that incorporates an equal distribution of males and females and should examine alternative nonclinical populations.

Although research has suggested that similar process may be involved in both clinical and nonclinical worry (see Dugas & Ladouceur, 1998), the present study was conducted on a nonclinical sample and the results may not generalize to clinical populations. Although research in clinical populations has already incorporated the concept of intolerance of uncertainty (i.e. Dugas, Gagnon et al., 1998), future research may want to replicate the present findings in regards to the relationship between worry, and intolerance of uncertainty, perfectionism, control, and intolerance of ambiguity in a clinical sample.

Finally, the Tolerance-Intolerance of Ambiguity Scale (TIA) developed by Budner (1962) was chosen for inclusion in the present study. However, as noted earlier there are a number of measures that assess the broad concept of intolerance of ambiguity (see Furnham, 1994). These measures appear to have a variety of different underlying factors and the use of an alternative measure may have produced different results,

especially if the measure chosen was more closely related to intolerance of uncertainty. However, Furnham's (1994) review of the tolerance of ambiguity measures indicates that only a few of the factors appear to be related to intolerance of uncertainty and therefore regardless of the measure used the results would likely be consistent with the present findings.

In conclusion, the present study suggests that intolerance of uncertainty is specifically related to worry. The study showed that intolerance of uncertainty had the strongest relationship with worry when compared to factors already associated with worry such as perfectionism and perceived control. Furthermore, the study was able to demonstrate the difference between intolerance of uncertainty and intolerance of ambiguity by demonstrating their distinct relationship with worry. Finally, the results point to a unique relationship between intolerance of uncertainty and worry that cannot be explained by factors already related to worry. At this time, it appears clear that intolerance of uncertainty is a key construct in understanding excessive worry.

General Discussion

Taken together, Studies One and Two show that the Intolerance of Uncertainty Scale (IUS) is a sound measure of intolerance of uncertainty and that the relationship between intolerance of uncertainty and worry shows evidence of sensitivity and specificity. The relationship between intolerance of uncertainty and worry is not accounted for by shared variance with anxiety, depression, perfectionism, and control. In addition, the findings indicate that intolerance of uncertainty and intolerance of ambiguity are distinct constructs. Using the present results as a base, research can continue to

investigate the specificity of the relationship between intolerance of uncertainty and worry.

Although research, including the present experiment, has now established that intolerance of uncertainty and worry are highly related, it is still unclear how exactly intolerance of uncertainty might lead to elevated levels of worry. It has been proposed that intolerance of uncertainty is a filter through which individuals view their world. It would be interesting to determine how the filter functions by examining intolerance of uncertainty and information processing. Does intolerance of uncertainty result in an attentional bias for uncertainty, an enhanced memory for uncertain information, or is it a matter of interpretation?

Two recent studies, conducted by our research team, have attempted to shed some light on the relationship between intolerance of uncertainty and information processing. The first study examined whether people who are intolerant of uncertainty have a bias in how they process uncertain information (Karavidas, Dugas, & Buhr, 2001). More specifically, the study assessed whether people who are intolerant of uncertainty have a bias towards words representing uncertainty compared to matched control words. The stimuli for the study were generated from a list of words believed to contain elements of uncertainty, and included words such as "unknown", "unpredictable", and "uncertainty". A set of control words, which included "identifiable", "career", and "unitary", was matched to the uncertain words on a number of characteristics including neutrality, part of speech, familiarity, concreteness, and frequency of use. The words were shown to participants and they were later asked to recall as many words as they could.

The results suggest that individuals who are highly intolerant of uncertainty have a bias towards uncertain information. Specifically, individuals high on intolerance of uncertainty recalled a greater proportion of uncertain words, compared to individuals low on intolerance of uncertainty. Although these results suggest that individuals who are intolerant of uncertainty display a bias in processing uncertain information, it is unclear whether they selectively attend to, or have an enhanced memory for, uncertain words.

The second study attempted to ascertain how people who are intolerant of uncertainty interpret uncertain or ambiguous situations (Hedayati, Dugas, & Francis, 2001). Participants were given diary entries that were positive, negative, or ambiguous in nature. For example, "I went to Amanda's party last night, it was fun!" (positive), "I went to the hairdresser's this morning, my new hairstyle is atrocious, I look awful" (negative), and "I phoned the doctor today and was surprised to hear the results of last week's check-up" (ambiguous). The participants were asked to rate their level of concern for each entry.

The results demonstrated that individuals who were identified as intolerant of uncertainty tended to interpret ambiguous entries more negatively than individuals low on intolerance for uncertainty. In addition, the tendency to interpret ambiguous situations as threatening was more closely related to intolerance of uncertainty than worry, anxiety, and depression. Overall, these two studies suggest that people who are intolerant of uncertainty have a bias in how they process uncertain information.

Although these studies provide interesting initial findings regarding intolerance of uncertainty and information processing, more research is needed. Future research should attempt to replicate these preliminary findings and begin to tease apart the relationship

between intolerance of uncertainty and information processing. Such information can enhance the way we understand intolerance of uncertainty and may provide answers regarding who is at risk for developing excessive worry and what should be targeted in intervention strategies. Regardless of where future research endeavors lead, the present study has demonstrated that the Intolerance of Uncertainty Scale (IUS) is a valid tool for measuring intolerance of uncertainty and has further established intolerance of uncertainty as process involved in worry.

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Appendix A

Consent Form

Study One

Consent Form to Participate in Research

This is to state that I, _____, agree to participate in a program of research conducted by Kristin Buhr under the supervision of Dr. Michel J. Dugas in partial fulfillment of the requirements for the degree of Master of Arts in Psychology.

A. PURPOSE

I have been informed that the purpose of the research is to examine different aspects of worry.

B. PROCEDURE

I have been informed that the study involves the following procedures: I will be asked to fill out five (5) questionnaires that deal with the tendency to worry, worry themes, uncertainty, anxiety, and depression. There is no deception in the experiment and I will not be required to do any task other than that described above. Any general information I give will not be associated with my data in the experiment. The signed consent form will not be kept with the responses to the questionnaires; all these documents will be kept under lock and key. I understand that my participation in the experiment, and the information and data I provide, will be kept strictly confidential.

CONDITIONS OF PARTICIPATION

- I understand that I am free to decline to participate in the experiment without negative consequences.
- I understand that I am free to withdraw my consent and discontinue my participation at any time without negative consequences.
- I understand that my participation in this study is confidential (i.e. the researcher will know, but will not disclose my identity).
- I understand that the data from this study may be published.
- I understand the purpose of this study and know that there is no hidden motive of which I have not been fully informed.

I HAVE CURRENTLY STUDIED THE ABOVE AND UNDERSTAND THIS AGREEMENT. I FREELY CONSENT AND AGREE TO PARTICIPATE IN THIS STUDY.

NAME (please print) _____
SIGNATURE _____
WITNESS SIGNATURE _____
DATE _____

Appendix B

Consent Form

Study Two

Consent Form to Participate in Research

This is to state that I, _____, agree to participate in a program of research conducted by Kristin Buhr under the supervision of Dr. Michel J. Dugas in partial fulfillment of the requirements for the degree of Master of Arts in Psychology.

A. PURPOSE

I have been informed that the purpose of the research is to examine different aspects of worry.

B. PROCEDURE

I have been informed that the study involves the following procedures: I will be asked to fill out six (6) questionnaires that deal with the tendency to worry, uncertainty, control, perfectionism and ambiguity. There is no deception in the experiment and I will not be required to do any task other than that described above. Any general information I give will not be associated with my data in the experiment. The signed consent form will not be kept with the responses to the questionnaires; all these documents will be kept under lock and key. I understand that my participation in the experiment, and the information and data I provide, will be kept strictly confidential.

CONDITIONS OF PARTICIPATION

- I understand that I am free to decline to participate in the experiment without negative consequences.
- I understand that I am free to withdraw my consent and discontinue my participation at any time without negative consequences.
- I understand that my participation in this study is confidential (i.e. the researcher will know, but will not disclose my identity).
- I understand that the data from this study may be published.
- I understand the purpose of this study and know that there is no hidden motive of which I have not been fully informed.

I HAVE CURRENTLY STUDIED THE ABOVE AND UNDERSTAND THIS AGREEMENT. I FREELY CONSENT AND AGREE TO PARTICIPATE IN THIS STUDY.

NAME (please print) _____
SIGNATURE _____
WITNESS SIGNATURE _____
DATE _____

Appendix C

Test Re-Test Consent Form

Consent Form to Participate in Research

This is to state that I, _____, agree to participate in a program of research conducted by Kristin Buhr under the supervision of Dr. Michel J. Dugas in partial fulfillment of the requirements for the degree of Master of Arts in Psychology.

A. PURPOSE

I have been informed that the purpose of the research is to examine different aspects of worry.

B. PROCEDURE

I have been informed that the study involves the following procedure: I will be asked to fill out one questionnaire that deals with uncertainty. There is no deception in the experiment and I will not be required to do any task other than that described above. Any general information I give will not be associated with my data in the experiment. The signed consent form will not be kept with the responses to the questionnaires; all these documents will be kept under lock and key. I understand that my participation in the experiment, and the information and data I provide, will be kept strictly confidential.

CONDITIONS OF PARTICIPATION

- I understand that I am free to decline to participate in the experiment without negative consequences.
- I understand that I am free to withdraw my consent and discontinue my participation at any time without negative consequences.
- I understand that my participation in this study is confidential (i.e. the researcher will know, but will not disclose my identity).
- I understand that the data from this study may be published.
- I understand the purpose of this study and know that there is no hidden motive of which I have not been fully informed.

I HAVE CURRENTLY STUDIED THE ABOVE AND UNDERSTAND THIS AGREEMENT. I FREELY CONSENT AND AGREE TO PARTICIPATE IN THIS STUDY.

NAME (please print) _____
SIGNATURE _____
WITNESS SIGNATURE _____
DATE _____

Appendix D

General Information Form

General Information

Age: _____

Sex: male _____ female _____

Education

University year: 1 _____ 2 _____ 3 _____ other _____

Field of study: _____

Status: full-time _____ part-time _____

First Language:

_____

Racial Origin (check one):

Black:_____

Asian: _____

Caucasian:_____

Hispanic: _____

Other (please specify):_____

Appendix E

Intolerance of Uncertainty Scale

IUS

You will find below a series of statements which describe how people may react to the uncertainties of life.Please use the scale below to describe to what extent each item is characteristic of you. Please circle a number (1 to 5) that describes you best.

	Not at all characteristic of me				Somewhat characteristic of me				Entirely characteristic of me
1. Uncertainty stops me from having a firm opinion.	1		2		3		4		5
2. Being uncertain means that a person is disorganized.	1		2		3		4		5
3. Uncertainty makes life intolerable.	1		2		3		4		5
4. It's unfair not having any guarantees in life.	1		2		3		4		5
5. My mind can't be relaxed if I don't know what will happen tomorrow.	1		2		3		4		5
6. Uncertainty makes me uneasy, anxious, or stressed.	1		2		3		4		5
7. Unforeseen events upset me greatly.	1		2		3		4		5
8. It frustrates me not having all the information I need.	1		2		3		4		5
9. Uncertainty keeps me from living a full life.	1		2		3		4		5
10. One should always look ahead so as to avoid surprises.	1		2		3		4		5
11. A small unforeseen event can spoil everything, even with the best of planning.	1		2		3		4		5
12. When it's time to act, uncertainty paralyses me.	1		2		3		4		5
13. Being uncertain means that I am not first rate.	1		2		3		4		5

	Not at all characteristic of me			Somewhat characteristic of me	Entirely characteristic of me
14. When I am uncertain, I can't go forward.	1	2	3	4	5
15. When I am uncertain I can't function very well.	1	2	3	4	5
16. Unlike me, others always seem to know where they are going with their lives.	1	2	3	4	5
17. Uncertainty makes me vulnerable, unhappy, or sad.	1	2	3	4	5
18. I always want to know what the future has in store for me.	1	2	3	4	5
19. I can't stand being taken by surprise.	1	2	3	4	5
20. The smallest doubt can stop me from acting.	1	2	3	4	5
21. I should be able to organize everything in advance.	1	2	3	4	5
22. Being uncertain means that I lack confidence.	1	2	3	4	5
23. I think it's unfair that other people seem sure about their future.	1	2	3	4	5
24. Uncertainty keeps me from sleeping soundly.	1	2	3	4	5
25. I must get away from all uncertain situations.	1	2	3	4	5
26. The ambiguities in life stress me	1	2	3	4	5
27. I can't stand being undecided about my future.	1	2	3	4	5

Why do people worry? Personality and Individual Differences, 17, 791-802.

Appendix F

Penn State Worry Questionnaire

PSWQ

Please circle a number (1 to 5) that best describes how typical or characteristic each item is of you.

	Not at all typical		Somewhat typical		Very Typical
1. If I don't have enough time to do everything, I don't worry about it	1	2	3	4	5
2. My worries overwhelm me.	1	2	3	4	5
3. I don't tend to worry about things.	1	2	3	4	5
4. Many situations make me worry.	1	2	3	4	5
5. I know I shouldn't worry about things but I just can't help it.	1	2	3	4	5
6. When I'm under pressure, I worry a lot.	1	2	3	4	5
7. I am always worrying about something.	1	2	3	4	5
8. I find it easy to dismiss worrisome thoughts	1	2	3	4	5
9. As soon as I finish one task, I start to worry about everything else I have to do.	1	2	3	4	5
10. I never worry about anything.	1	2	3	4	5
11. When there is nothing more that I can do about a concern, I don't worry about it anymore.	1	2	3	4	5
12. I've been a worrier all my life.	1	2	3	4	5
13. I notice that I have been worrying about things.	1	2	3	4	5
14. Once I start worrying, I can't stop.	1	2	3	4	5
15. I worry all the time.	1	2	3	4	5
16. I worry about projects until they are all don	1	2	3	4	5

Meyer, T. J., Miller, M. L., Metzger, R. L., & Borkovec, T. D. (1990). Development and validation of the Penn State Worry Questionn Behaviour Research and Therapy, 28, 487-496.

Appendix G

Worry and Anxiety Questionnaire

WAQ

1. What subjects do you worry about most often?

a) _____ d) _____

b) _____ e) _____

c) _____ f) _____

For the following items, please circle the corresponding number (1 to 5).

	Not at all excessive		Moderately excessive		Totally excessive
2. Do your worries seem excessive or exaggerated?	1	2	3	4	5

	Never		1 day out of 2		Everyday
3. Over the past six months, how many days have you been bothered by excessive worry?	1	2	3	4	5

	No difficulty		Moderate difficulty		Extreme difficulty
4. Do you have difficulty controlling your worries? For example, when you start worrying about something, do you have difficulty stopping?	1	2	3	4	5

5. Over the past six months, to what extent have you been disturbed by the following sensations whe you were worried or anxious? Rate each sensation by circling a number (1 to 5).

	Not at all		Moderately		Very severely
a) Restlessness or feeling keyed up or on edge	1	2	3	4	5
b) Being easily fatigued	1	2	3	4	5
c) Difficulty concentrating or mind going blank	1	2	3	4	5
d) Irritability	1	2	3	4	5
e) Muscle tension	1	2	3	4	5
f) Sleep disturbance (difficulty falling or staying asleep, or restless unsatisfying sleep)	1	2	3	4	5

	Not at all		Moderately		Very severely
6. To what extent does worry or anxiety interfere with your life? For example, your work, social activities, family life, etc.?	1	2	3	4	5

Dugas, M.J., Freeston, M. H., Lachance, S., Provencher, M., & Ladouceur, R. (1995, November). The worry and anxiety questionnaire: clinical validation in non-clinical and clinical samples. World Congress of Behavioural and Cognitive Therapies, Copenhagen, Denmark.

Appendix H

Beck Depression Inventory-II

BDI-II

This questionnaire consists of 21 groups of statements. Please read each group of statements carefully, and then pick out the one statement in each group that best describes the way you have been feeling during the past two weeks, including today. Circle the number beside the statement you have picked. If several statements in the group seem to apply equally well, circle the highest number for that group. Be sure that you do not choose more than one statement for each group, including Item 16 (Changes in Sleeping Pattern) or Item 18 (Changes in Appetite).

1) Sadness
- 0 I do not feel sad.
- 1 I feel sad much of the time.
- 2 I am sad all the time.
- 3 I am so sad or unhappy that I can't stand it.

2) Pessimism
- 0 I am not discouraged about my future.
- 1 I feel more discouraged about my future than I used to be.
- 2 I do not expect things to work out for me.
- 3 I feel my future is hopeless and will only get worse.

3) Past Failure
- 0 I do not feel like a failure.
- 1 I have failed more than I should have.
- 2 As I look back, I see a lot of failures.
- 3 I feel I am a total failure as a person.

4) Loss of Pleasure
- 0 I get as much pleasure as I ever did from the things I enjoy.
- 1 I don't enjoy things as much as I used to.
- 2 I get very little pleasure from the things I used to enjoy.
- 3 I can't get any pleasure from the things I used to enjoy.

5) Guilty Feelings
- 0 I don't feel particularly guilty.
- 1 I feel guilty over many things I have done or should have done.
- 2 I feel quite guilty most of the time.
- 3 I feel guilty all of the time.

6) Punishment Feelings
- 0 I don't feel I am being punished.
- 1 I feel I may be punished.
- 2 I expect to be punished.
- 3 I feel I am being punished.

7) Self-Dislike
- 0 I feel the same about myself as ever.
- 1 I have lost confidence in myself.
- 2 I am disappointed in myself.
- 3 I dislike myself.

8) Self-Criticalness
- 0 I don't criticize or blame myself more than usual.
- 1 I am more critical of myself than I used to be.
- 2 I criticize myself for all my faults.
- 3 I blame myself for everything bad that happens.

9) Suicidal Thoughts or Wishes
- 0 I don't have any thoughts of killing myself.
- 1 I have thoughts of killing myself, but I would not carry them out.
- 2 I would like to kill myself.
- 3 I would kill myself if I had the chance.

10) Crying
- 0 I don't cry any more than I used to.
- 1 I cry more now than I used to.
- 2 I cry over every little thing.
- 3 I feel like crying but I can't.

11) Agitation
- 0 I am no more restless or wound up than usual.
- 1 I feel more restless or wound up than usual.
- 2 I am so restless or agitated that it's hard to stay still.
- 3 I am so restless or agitated that I have to keep moving or doing something.

12) Loss of Interest
- 0 I have not lost interest in people or activities.
- 1 I am less interested in other people or things than before.
- 2 I have lost most of my interest in other people or things.
- 3 It's hard to get interested in anything.

13) Indecisiveness
- 0 I make decisions about as well as ever.
- 1 I find it more difficult to make decisions than usual.
- 2 I have much greater difficulty in making decisions than I used to.
- 3 I have trouble making any decision.

14) Worthlessness
- 0 I do not feel I am worthless.
- 1 I don't consider myself as worthwhile and useful as I used to.
- 2 I feel more worthless as compared to other people.
- 3 I feel utterly worthless.

15) Loss of Energy
- 0 I have as much energy as ever.
- 1 I have less energy than I used to have.
- 2 I don't have enough energy to do very much.
- 3 I don't have enough energy to do anything.

16) Changes in Sleeping Pattern
- 0 I have not experienced any changes in my sleeping pattern.
- 1a I sleep somewhat more than usual.
- 1b I sleep somewhat less than usual.
- 2a I sleep a lot more than usual.
- 2b I sleep a lot less than usual.
- 3a I sleep most of the day.
- 3b I wake up 1-2 hours early and can't get back to sleep.

17) Irritability
- 0 I am no more irritable than usual.
- 1 I am more irritable than usual.
- 2 I am much more irritable than usual.
- 3 I am irritable all the time.

18) Changes in Appetite
- 0 I have not experienced any changes in my appetite.
- 1a My appetite is somewhat less than usual.
- 1b My appetite is somewhat greater than usual.
- 2a My appetite is much less than before.
- 2b My appetite is much greater than usual.
- 3a I have no appetite at all.
- 3b I crave food all the time.

19) Concentration Difficulty
- 0 I can concentrate as well as usual.
- 1 I can't concentrate as well as usual.
- 2 It's hard to keep my mind on anything for very long.
- 3 I find I can't concentrate on anything.

20) Tiredness or Fatigue
- 0 I am no more tired or fatigued than usual.
- 1 I get more tired or fatigued more easily than usual.
- 2 I am too tired or fatigued to do a lot of the things I used to do.
- 3 I am too tired or fatigued to do most of the things I used to do.

21) Loss of Interest in Sex
- 0 I have not noticed any recent change in my interest in sex.
- 1 I am less interested in sex than I used to be.
- 2 I am much less interested in sex now.
- 3 I have lost interest in sex completely.

Appendix I

Beck Anxiety Inventory

BAI

This questionnaire consists of a list of 21 symptoms associated with anxiety. symptom Please read each carefully and indicate, by circling a number (0 to 5), to what degree you have been affected by each of these symptoms over the past week, including today.

	Not at all	A little	Somewhat	A lot
1. Numbness or tingling.	0	1	2	3
2. Feeling hot.	0	1	2	3
3. Wobbliness in legs.	0	1	2	3
4. Unable to relax.	0	1	2	3
5. Fear of the worst happening.	0	1	2	3
6. Dizzy or lightheaded.	0	1	2	3
7. Heart pounding or racing.	0	1	2	3
8. Unsteady.	0	1	2	3
9. Terrified.	0	1	2	3
10. Nervous.	0	1	2	3
11. Feelings of choking.	0	1	2	3
12. Hands trembling.	0	1	2	3
13. Shaky.	0	1	2	3
14. Fear of losing control.	0	1	2	3
15. Difficulty breathing.	0	1	2	3
16. Fear of dying.	0	1	2	3
17. Scared.	0	1	2	3
18. Indigestion or discomfort in abdom	0	1	2	3
19. Faint.	0	1	2	3
20. Face flushed.	0	1	2	3
21. Sweating (not due to heat).	0	1	2	3

Beck, A.T., Epstein, N., Brown, G., &Steer, R.A. (1988). An inventory for measuring clinical anxiety: Psychometric properties Journal of Consulting and Clinical Psychology, 56, 893-897.

Appendix J

Multidimensional Perfectionism Scale

MPS

Listed below are a number of statements concerning personal characteristics and traits. Read each item and decide whether you agree or disagree and to what extent. If you strongly agree, circle 7; if you strongly disagree, circle 1; if you fell somewhere in between, circle any numbers between 1 and 7. If you feelneutral or undecided the midpoint is 4.

	Strongly Disagree	Moderately Disagree	Slightly Disagree	Neutral	Slightly Agree	Moderately Agree	Strongly Agree
1. When I am working on something, I cannot relax until it is perfect.	1	2	3	4	5	6	7
2. I am not likely to criticize someone for giving up too easily.	1	2	3	4	5	6	7
3. It is not important that the people close to me are successful.	1	2	3	4	5	6	7
4. I seldom criticize my friends for accepting second best.	1	2	3	4	5	6	7
5. I find it difficult to meet others' expectations of me.	1	2	3	4	5	6	7
6. One of my goals is to be perfect in everything I do.	1	2	3	4	5	6	7
7. Everything that others do must be top-notch quality.	1	2	3	4	5	6	7
8. I never aim for perfectionism in my work.	1	2	3	4	5	6	7
9. Those around me readily accept that I can make mistakes too.	1	2	3	4	5	6	7
10. It doesn't matter to me when someone close to me does not do their absolute best.	1	2	3	4	5	6	7
11. The better I do, the better I am expected to do.	1	2	3	4	5	6	7
12. I seldom feel the need to be perfect.	1	2	3	4	5	6	7
13. Anything I do that is less than excellent will be seen as poor by those around me.	1	2	3	4	5	6	7

	Strongly Disagree	Moderately Disagree	Slightly Disagree	Neutral	Slightly Agree	Moderately Agree	Strongly Agree
14. I strive to be the best at everything I do.	1	2	3	4	5	6	7
15. It is very important that I am perfect in everything I attempt.	1	2	3	4	5	6	7
16. I have high expectations for the people who are important to me.	1	2	3	4	5	6	7
17. I strive to be the best at everything I attempt.	1	2	3	4	5	6	7
18. I do not have very high standards for those around me.	1	2	3	4	5	6	7
19. The people around me expect me to succeed at everything I do.	1	2	3	4	5	6	7
20. I demand nothing less than perfection for myself.	1	2	3	4	5	6	7
21. Others will like me even if I don't excel at everything.	1	2	3	4	5	6	7
22. I can't be bothered with people who won't strive to better themselves.	1	2	3	4	5	6	7
23. It makes me uneasy to see error in my work.	1	2	3	4	5	6	7
24. I do not expect a lot from my friends.	1	2	3	4	5	6	7
25. Success means I must work even harder to please others.	1	2	3	4	5	6	7
26. If I ask someone to do something, I expect it to be done flawlessly.	1	2	3	4	5	6	7
27. I cannot stand to see people close to me make mistakes.	1	2	3	4	5	6	7
28. I am perfectionistic in setting my goals.	1	2	3	4	5	6	7
29. The people who matter to me should never let me down.	1	2	3	4	5	6	7

	Strongly Disagree	Moderately Disagree	Slightly Disagree	Neutral	Slightly Agree	Moderately Agree	Strongly Agree
30. Others think I am okay, even when I do not succeed.	1	2	3	4	5	6	7
31. I feel that people are too demanding of me.	1	2	3	4	5	6	7
32. I must work to my full potential at all times.	1	2	3	4	5	6	7
33. Although they may not show it, other people get very upset with me when I slip up.	1	2	3	4	5	6	7
34. I do not have to be the best at whatever I am doing.	1	2	3	4	5	6	7
35. My family expects me to be perfect.	1	2	3	4	5	6	7
36. I do not have very high standards for myself.	1	2	3	4	5	6	7
37. My parents rarely expected me to excel in all aspects of my life.	1	2	3	4	5	6	7
38. I respect people who are average.	1	2	3	4	5	6	7
39. People expect nothing less than perfection from me.	1	2	3	4	5	6	7
40. I set very high standards for myself	1	2	3	4	5	6	7
41. People expect more from me than I am capable of giving.	1	2	3	4	5	6	7
42. I must always be successful at school or work.	1	2	3	4	5	6	7
43. It does not matter to me when a close friend does not try their hardest.	1	2	3	4	5	6	7
44. People around me think I am still competent even if I make a mistake	1	2	3	4	5	6	7
45. I seldom expect others to excel at whatever they do.	1	2	3	4	5	6	7

Hewitt, P. & Flett, G. (1991). Perfectionism in the self and social contexts: conceptualization, assessment, and association with psychopathology. Journal of Personality and Social Psychology, 60, 456-470.

Appendix K

Sense of Control Scale

SC

On this page is a series of attitude statements. Each represents a commonly held opinion. There are no right or wrong answers. You will probably agree with some items and disagree with others. We interested inthe extent to which you agree or disagree with such matters of opinion. Read each statement, decide if you agree or disagree, and the strength of your opinion, and then circle the appropriate number (1 to 7).

	Disagree strongly	Disagree somewhat	Disagree a little	Don't know	Agree a little	Agree somewhat	Agree strongly
1. I have little control over the things that happen to me.	1	2	3	4	5	6	7
2. What happens to me in the future mostly depends on me	1	2	3	4	5	6	7
3. There is really no way I can solve all of the problems I have.	1	2	3	4	5	6	7
4. There is little I can do to change many of the important things in my life.	1	2	3	4	5	6	7
5. I can do just about anything Ireally set my mind to.	1	2	3	4	5	6	7
6. I often feel helpless in dealing with the problems of life.	1	2	3	4	5	6	7
7. Sometimes I feel that I'm being pushed around in life.	1	2	3	4	5	6	7
8. When I really want to do something, I usually find a way to succeed at it.	1	2	3	4	5	6	7
9. Whether or not I am able to get what I want is in my own hands.	1	2	3	4	5	6	7
10. Other people determine most of what I can and cannot do.	1	2	3	4	5	6	7
11. What happens in my life is often beyond my control.	1	2	3	4	5	6	7
12. There are many things that interfere with what I want to do.	1	2	3	4	5	6	7

Appendix L

Scale of Tolerance-Intolerance of Ambiguity

TIA

Listed below are a number of statements describing a set of beliefs. Please read each statement carefully andindicate, by circling a number (0 to 5), how much you think each statement is true.

	Strongly Disagree	Moderately Disagree	Slightly Disagree	Slightly Agree	Moderately Agree	Strongly Agree
1. An expert who doesn't come up with a definite answer probably doesn't know much.	0	1	2	3	4	5
2. There is really no such thing as a problem that can't be solved.	0	1	2	3	4	5
3. A good job is one where what is to be done and how it is to be done are always clear.	0	1	2	3	4	5
4. In the long run it is possible to get more done by tackling small, simple problems rather than larger and complicated ones.	0	1	2	3	4	5
5. What we are used to is always preferable to what is unfamiliar.	0	1	2	3	4	5
6. A person who leads an even, regular life in which few surprises or unexpected happenings arise, really has a lot to be grateful for.	0	1	2	3	4	5
7. I like parties where I know most of the people more than ones where all or most of the people are strangers.	0	1	2	3	4	5
8. The sooner we all acquire similar values and ideas the better.	0	1	2	3	4	5
9. I would like to live in a foreign country for a while.	0	1	2	3	4	5
10. People who fit their lives to schedules probably miss most of the joy of living.	0	1	2	3	4	5
11. It is more fun to tackle a difficult problem than solve a simple one	0	1	2	3	4	5

	Strongly Disagree	Moderately Disagree	Slightly Disagree	Slightly Agree	Moderately Agree	Strongly Agree
12. Often the most interesting and stimulating people are those who don't mind being different and original.	0	1	2	3	4	5
13. People who insist on a yes or no answer just don't know how complicated things really are.	0	1	2	3	4	5
14. Many of our most important decisions are based upon insufficient information.	0	1	2	3	4	5
15. Teachers or supervisors who hand out vague assignments give a chance for one to show initiative and originality.	0	1	2	3	4	5
16. A good teacher is one who makes you wonder about your way of looking at things.	0	1	2	3	4	5

Budner, S. (1962). Intolerance of ambiguity as a personality variable. Journal of Personality, 30, 29-59.