

Distinct Negative Beliefs About Uncertainty and Their Association With Worry: An
Exploration of the Factors of the Intolerance of Uncertainty Scale and Their Correlates

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ABSTRACT

Distinct Negative Beliefs About Uncertainty and Their Association With Worry: An Exploration of the Factors of the Intolerance of Uncertainty Scale and Their Correlates

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Intolerance of uncertainty, “a dispositional characteristic that results from a set of negative beliefs about uncertainty and its implications” (Dugas & Robichaud, 2007, p. 24), has been implicated in worry/generalized anxiety disorder (GAD). Despite significant advances in our understanding of its role as a cognitive vulnerability for GAD, questions remain regarding its measurement and construct validity, as a reliable set of negative beliefs has yet to be identified. The goal of this research was therefore to discern the specific negative beliefs about uncertainty which result in intolerance of uncertainty. In the first study, the factor structure of the Intolerance of Uncertainty Scale (IUS; Buhr & Dugas, 2002; Freeston et al., 1994) was re-examined in separate large non-clinical samples, and the association of these factors with GAD symptomatology was explored. A second study further examined the convergent, discriminant, and criterion-related validity of these negative beliefs about uncertainty, as well as their specificity, in relation to similar behavioural and cognitive constructs and to information-processing biases. To this end, the Ambiguous Situations Questionnaire (ASQ) was developed to further assess interpretive biases in specific ambiguous situations and to differentiate the cognitive, behavioural, and emotional reactions that characterize these distinct beliefs about uncertainty.

Two replicable negative beliefs about uncertainty were identified: 1) the belief that Uncertainty has Negative Behavioural and Self-Referent Implications, and 2) the belief that Uncertainty is Unfair and Spoils Everything. The first of these was specifically associated

with indecisiveness, procrastination, the tendency to personalize negative situations, and with perceptions of specific ambiguous situations as having negative personal implications. This belief also showed stronger correlations with GAD analogue status, trait anxiety, somatic anxiety, and depressive symptoms. In contrast, the second of these beliefs was associated with a preference for order in the environment, with self-oriented and other-oriented perfectionism, and with perceptions of specific ambiguous situations as unfair and disruptive. Both negative beliefs about uncertainty were also associated with information-seeking, with negatively biased interpretations of ambiguous situations, and with pathological worry.

Collectively, these studies' findings suggest that uncertainty is experienced as aversive by individuals who believe it negatively impacts their ability to function and who show a tendency to personalize these perceived difficulties. It is also experienced as aversive by individuals who believe it to be unfair, as it contradicts their expectations of structure in the environment and may be perceived as hindering elevated personal standards from being met. These findings further support the validity of this construct, and are consistent with a growing literature which suggests that intolerance of uncertainty contributes to information-processing biases and confers vulnerability to excessive and uncontrollable worry.

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Dedication

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Contributions of Authors

This Ph.D. thesis consists of two manuscripts:

Study 1 (see Chapter 2)

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Study 2 (see Chapter 3)

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Relative Contributions

I developed the research idea in collaboration with my research supervisor, Dr. Michel Dugas, and suggested the focus of the studies. I had a principle role in the definition of research questions, formulation of hypotheses, design and methodology, data management, statistical analyses and interpretation, and manuscript writing and revisions. Dr. Dugas provided guidance throughout.

For Study 1, I was responsible for management of the data set, data screening across the archival samples, statistical analyses, interpretation of the findings, and the writing of the manuscript. Dr. Dugas provided consultation regarding the interpretation of findings and the most relevant statistical strategies to use in relation to the research hypotheses, and offered specific suggestions for refinement of the manuscript. I was responsible for revising the manuscript based on suggestions from Dr. Dugas and from three anonymous reviewers.

For Study 2, I was responsible for designing the study's methodology, with the help of Dr. Dugas. I developed a revised version of the Extended Ambiguous/Unambiguous Situations Diary (Davey, Hampton, Farrell, & Davidson, 1992; extended version: Koerner & Dugas, 2008), and generated additional questions for each of the items. I constructed rating scales for all new and revised items, carried out pilot-testing, and was responsible for item revisions and selection of the final vignettes. Dr. Dugas and his research team assisted with the refinement of this revised and renamed Ambiguous Situations Questionnaire in laboratory meetings. My thesis committee members, Dr. Adam Radomsky and Dr. Andrew Ryder, and our colleagues Dr. Naomi Koerner, Dr. Kristin Buhr, and Dr. Melisa Robichaud provided additional expert feedback regarding the face validity of the separate subscales.

I proposed additional self-report measures to include in Study 2. Dr. Michel Dugas assisted me in the choice of questionnaires, and Dr. Naomi Koerner was available for consultation. I was responsible for the recruitment of participants in the Concordia University sample, and assisted in scheduling participants for testing. The data collection and data entry was primarily carried out by dedicated undergraduate student volunteers in Dr. Dugas' research laboratory, under supervision and with additional assistance from the team's research assistant. Dr. Koerner and the research assistant in her laboratory at Ryerson University in Toronto completed the data collection and data entry for the Ryerson sample. I carried out the scoring and screening of the data from both sites, conducted all statistical analyses, interpreted the findings, and wrote the manuscript. Dr. Dugas and Dr. Koerner provided feedback on earlier reports of these findings for conference presentations, and Dr. Dugas provided specific suggestions to refine the manuscript. I revised all written work according to their suggestions and comments.

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Chapter 1

Introduction

Cognitive theory proposes that individual vulnerability to anxiety disorders is conferred by underlying cognitive schemas or beliefs that affect how individuals view the world and influence which situations tend to be identified as threatening, typically excessively so (Clark & Beck, 2010). These beliefs are hypothesized to alter information processing in threatening situations and to affect “the direction and/or strength of association between stress and symptom onset” (Clark & Beck, 2010, p. 103). Research into the cognitive vulnerabilities that predispose individuals to worry/generalized anxiety disorder (GAD) has identified intolerance of uncertainty as a putative cognitive risk factor. However, further research is needed to distinguish the negative core beliefs about uncertainty that underlie this predisposition to experience uncertainty as intolerable. This set of studies sought to identify the negative beliefs about uncertainty that comprise this cognitive vulnerability to worry/GAD. In addition, these studies investigated the construct validity of these core beliefs by exploring whether they lead to hypothesized maladaptive behaviours, information-processing biases, or other cognitive and emotional responses in uncertain or ambiguous situations, as proposed by cognitive theory.

Individual Differences in Tolerance for Uncertainty and Its Impact on Adaptive Coping

A preference for certainty in events is common, in some situations perhaps even ubiquitous, and at high levels uncertainty is salient and typically experienced as aversive. High situational uncertainty therefore frequently pulls for a response, either to avoid it (e.g., Curley, Yates, & Abrams, 1986), to seek out further information in order to reduce

it (e.g., Ladouceur et al., 1997), or to problem-solve a way out of it. The preferred use of different coping strategies may be situationally dependent, or it may reflect stable individual differences, or traits. Nonetheless, the adaptiveness of a given strategy is to a certain extent dependent on its applicability to the situation at hand (e.g., see Masel, Terry, & Gribble, 1996, for a review). Adaptive functioning therefore depends on the ability to be flexible in the choice of coping strategy, in order to select the coping response which will effectively resolve the situational uncertainty or prevent it from impeding goal attainment. Difficulties arise when situational expectations and preferred coping styles have become inflexible. Individuals who confront stressful, uncertain situations with the belief that events should be consistent with their expectations and dispositional coping style are vulnerable to having their expectations thwarted, and additionally may have less problem-solving options available to them to resolve the issue. Thus, individuals with more inflexible attitudes towards uncertainty will likely experience unpredictable or ambiguous situations as more stressful or aversive.

Among individuals high in intolerance of uncertainty, it has been established that a demand for certainty renders these individuals vulnerable to distress in response to not only highly uncertain situations, but moderately uncertain situations as well (e.g., Ladouceur et al., 1997). As such, it is apparent that at high trait levels of intolerance of uncertainty, situational expectations and coping preferences have become inflexible and individuals are no longer responding effectively to the demand characteristics of a problem situation. In addition, the anxiety and distress generated by perceived threats in moderately ambiguous situations have the potential to further interfere with appropriate coping responses. Intolerance of uncertainty may therefore interfere with adaptive

functioning and contribute to distress both directly and indirectly.

Intolerance of uncertainty as a cognitive vulnerability for worry/GAD. Since it was first proposed as a potential contributor to worry (see Freeston Rhéaume, Letarte, Dugas, & Ladouceur, 1994), much research has examined the usefulness and validity of the construct of intolerance of uncertainty. An accumulating body of research has demonstrated a prominent relationship between intolerance of uncertainty and GAD symptomatology, consistent with its proposed role as a cognitive vulnerability for worry. For instance, intolerance of uncertainty has been shown to be a robust predictor of worry, even after controlling for other symptom variables such as anxiety and depressed mood (Buhr & Dugas, 2002) and generalized vulnerability factors such as negative affect (DeBruin, Rassin, & Muris, 2007; Norton & Mehta, 2007; Norton, Sexton, Walker, & Norton, 2005; van der Heiden et al., 2010, Sexton, Norton, Walker, & Norton, 2003). Intolerance of uncertainty similarly predicts the severity of worry and somatic anxiety symptoms within clinical GAD populations (Dugas et al., 2007).

Mounting evidence suggests this association between intolerance of uncertainty and worry/GAD symptomatology is causal in nature. Consistent with proposed criteria to establish cognitive vulnerability (see Garber & Hollon, 1991; Kraemer et al., 1997; Riskind & Alloy, 2006), intolerance of uncertainty has demonstrated manipulability (DeBruin, Rassin, & Muris, 2006; Grenier & Ladouceur, 2004; Ladouceur, Gosselin, & Dugas, 2000; Rosen & Knäuper, 2009), temporal antecedence with respect to changes in worry (Donegan, 2010; Dugas & Ladouceur, 2000; Laugesen, Dugas, & Bukowski, 2011), stability (Buhr & Dugas, 2002; Dugas, Freeston, & Ladouceur, 1997), and evidence of construct validity (Berenbaum, Bredemeier, & Thompson, 2008; Buhr &

Dugas, 2006; DeBruin et al., 2006; Dugas, Hedayati, et al., 2005; Koerner & Dugas, 2008; Ladouceur, Talbot, & Dugas, 1997). Thus, the relevance of the intolerance of uncertainty construct to the phenomenology of worry has been well established. However, while numerous examples of maladaptive coping among individuals high in trait intolerance of uncertainty have been demonstrated, the reasons for this intolerance towards uncertainty are not well understood.

Construct validity of intolerance of uncertainty. While support for its conceptualization and utility has accumulated, the definition of intolerance of uncertainty has evolved since its introduction, from the initial concept that individuals high in this trait view certain negative outcomes as being preferable to uncertain ones, to the proposal that enduring beliefs may underlie this attitude toward uncertainty. Most recently, Dugas and Robichaud (2007) have defined intolerance of uncertainty as a “dispositional characteristic that results from a set of negative beliefs about uncertainty and its implications” (p. 24). This latest definition extends our conceptualization of what intolerant of uncertainty entails, but highlights what is still missing in the establishment of its construct validity, namely the identification of these distinct negative beliefs about uncertainty that result in uncertainty intolerance.

Thus, the origins of individual differences in the demand for certainty need to be further explored. In other words, what leads some individuals to be more prone than others to experience uncertainty as aversive? The answer to this question is likely to lie in the beliefs these individuals hold regarding the nature of uncertainty and its implications, as suggested by the most recent definition of this construct (see Dugas & Robichaud, 2007). This poses the question of what “enduring core beliefs” (Clark &

Beck, 2010, p. 36) result in inflexible coping responses and the tendency to experience certainty as aversive in both highly uncertain and moderately uncertain situations.

Discerning the Specific Negative Beliefs About Uncertainty Relevant to Excessive Worry and Maladaptive Coping in Uncertain Situations

What are the beliefs about uncertainty that lead some individuals to be more intolerant of uncertainty than others? Two studies were designed to answer this question. In the first study discussed here, a factor analytic approach was employed to discern the composite core beliefs about uncertainty that result in uncertainty intolerance. Intolerance of uncertainty was found to be comprised of two negative beliefs, labelled “Uncertainty has Negative Behavioural and Self-Referent Implications” and “Uncertainty is Unfair and Spoils Everything”, which demonstrated construct validity and stability in independent factor analyses, showed criterion-related validity with respect to worry, and evidenced some degree of specificity with respect to their associations with GAD diagnostic status and concomitant symptoms such as anxiety and depressed mood.

The goals of the second study were to further explore the validity and utility of these proposed core uncertainty intolerant beliefs. Both negative beliefs about uncertainty were expected to show criterion-related validity with threatening appraisals of specific ambiguous situations. In addition, consistent with the conceptualization of these two negative beliefs about uncertainty, the belief that uncertainty has negative personal implications was expected to show criterion-related validity and specificity with behavioural impairments and perceived personal implications of these impairments in specific ambiguous situations. Conversely, the belief that uncertainty is unfair and spoils events was hypothesized to evidence criterion-related validity and specificity with the

tendency to interpret specific ambiguous situations as unfair and unnecessarily disruptive. In addition, both negative beliefs about uncertainty were expected to evidence convergent validity and specificity with relevant behavioural and cognitive constructs. It was therefore anticipated that the belief that uncertainty has negative implications would be associated with a tendency toward indecision, procrastination, and the personalization of negative outcomes, whereas the belief that uncertainty is unfair was expected to relate to perfectionism, a need for closure, and monitoring. These constructs are discussed below.

Putative Moderating and Mediated Impacts of Intolerance of Uncertainty on Worry and Anxiety

According to cognitive theory, enduring core beliefs are hypothesized to act as *moderators*, affecting “the direction and/or strength of association between stress and symptom onset, whereas more proximal cognitive variables are *mediators* (i.e., they account for the relationship between vulnerability, stress, and disorder onset) (see Baron & Kenny, 1986; Riskind & Alloy, 2006)” (Clark & Beck, 2010, p. 103). Partially consistent with this view, Laugesen and colleagues (2011) have demonstrated that, developmentally, intolerance of uncertainty is a partial mediator of changes in worry levels over time in an adolescent sample. Similarly, Donegan (2010) found that changes in GAD symptoms over the course of cognitive-behavioural treatment are partially mediated by changes in intolerance of uncertainty. Thus, intolerance of uncertainty has direct effects on changes in worry over time. However, is it also the case that intolerance of uncertainty has indirect effects on the development or reduction of worry and GAD symptoms through its impact on other processes? More recent findings suggest that intolerance of uncertainty may either moderate or its effects may be partially mediated by

the impact of other maladaptive responses in uncertain situations, responses which contribute to the tendency to worry excessively and uncontrollably.

The role of cognitive vulnerabilities in the perception of threat. Clark and Beck (2010) have also proposed that cognitive vulnerability factors, such as intolerance of uncertainty, contribute to the development and maintenance of anxiety disorders through their impact on information processing. Following this theory, beliefs about uncertainty might be expected to result in a predilection to more readily attend to, negatively appraise, preferentially encode, and respond with maladaptive defensive strategies to perceived threats in ambiguous situations (Clark & Beck, 2010). Consistent with this prediction, individuals high in intolerance of uncertainty have demonstrated biased attention towards ambiguous situations (Heinecke, Koerner, & Dugas, 2006), a tendency to interpret ambiguous situations as threatening (Dugas, Hedayati, et al., 2005; Koerner & Dugas, 2007a, 2008) and in particular to overestimate the probability and cost of perceived threats (Bredemeier & Berenbaum, 2008), as well as preliminary evidence of biased recall for uncertain stimuli (Dugas, Hedayati, et al., 2005). As such, intolerance of uncertainty has been demonstrated to contribute to biases in information processing.

Consistent with the predictions of cognitive theory, these biases in information processing have been shown to contribute to worry. Further, Koerner and Dugas (2008) demonstrated that the association between worry and intolerance of uncertainty was partially mediated by information processing (interpretive) biases, even when controlling for gender, GAD somatic symptoms, anxiety, and depression. In other words, a tendency to be high in intolerance of uncertainty, as opposed to low in intolerance of uncertainty, predicted negative appraisals of ambiguous situations, and this association accounted for

a significant portion of the variance in worry. These findings are consistent with the proposed role of intolerance of uncertainty as a cognitive vulnerability factor for worry and GAD. However, intolerance of uncertainty has also been shown to maladaptively impact cognition and behaviour in other ways.

Intolerance of uncertainty may lead to impaired decision-making. Previous research on indecisiveness suggests it is associated with worry (Cantor, Gervais, & Dugas, 2008; Rassin & Muris, 2005; Rassin, Muris, Franken, Smit, & Wong, 2007) and contributes to threatening interpretations of ambiguous situations (Rassin & Muris, 2005). Indecision has been defined as “the experience of decision problems (i.e., lack of information, valuation difficulty, and outcome uncertainty) resulting in overt choice-related behaviours such as delay, tunnel vision, and post-decision dysfunctional behaviour (e.g., worry)” (Rassin, 2007, p. 11). Rassin has proposed that several different motivations may result in indecisiveness, via different pathways. Further, he suggests that intolerance of uncertainty may be one contributor. In support of this proposed pathway, indecisiveness has been shown to correlate highly with intolerance of uncertainty (Rassin & Muris, 2005). Further, Orellana-Damacela, Tindale, and Suarez-Balcazar (2000) have noted that self-discrepancies, or perceived deficiencies in how individuals perform compared to how they believe they *ought* to, predict indecision and decisional procrastination. As such, one hypothesis is that discrepancies between how individuals high in intolerance of uncertainty expect they *should* respond in uncertain situations and the behavioural difficulties that they *do* experience may result in indecision or decisional procrastination in ambiguous situations. This has yet to be tested.

Intolerance of uncertainty may lead to maladaptive delays, or

procrastination, when pursuing uncertain tasks. Procrastination, or the tendency to “voluntarily delay an intended course of action despite expecting to be worse off for the delay” (Steel, 2007), is one form of avoidance that can result from elevated levels of anxiety or worry. Its association with anxiety has been previously demonstrated (e.g., Stainton, Lay, & Flett, 2000), and it has similarly been shown to relate to higher levels of nonclinical worry (Stoeber & Joormann, 2001), though not pathological worry (Spada, Hiou, & Nikcevic, 2006; Stoeber & Joormann, 2001). Procrastination has also been linked to depression (Spada, Hiou, & Nikcevic, 2006), and on occasion contributes to a depressed mood (see Steel, 2007, for a review), perhaps due to the negative consequences to self-esteem that arise from having failed to complete important tasks. Consistent with this view, self-esteem has been shown to negatively correlate with procrastination (Steel, 2007), and as a group procrastinators show relatively low self-esteem (e.g., Ferrari, 1991). Alternatively, self-esteem may play a causal role, as low perceived self-efficacy to complete a task has been associated with more frequent procrastination (e.g., see Steel, 2007, for a review). McKean (1994), for instance, noted that individuals with greater perceived self-helplessness and with global and stable *internalized* attributions for negative events reported higher levels of procrastination.

There is also reason to suppose that intolerance of uncertainty plays a role in this association. Notably, intolerance of uncertainty has been proposed by several researchers to include or result in a tendency to delay or inhibit action in order to reduce anxiety (e.g., Berenbaum et al., 2008; Carleton, Norton, & Asmundson, 2007; Dugas & Robichaud, 2007). While no research to date has directly examined the contribution of intolerance of uncertainty to procrastination, it has been associated with low motivation to engage in

goal-directed actions (Aldao et al., 2010). However, the possibility that procrastination may be one pathway by which intolerance of uncertainty contributes to worry has not been tested. In addition, the direct association between specific negative beliefs about uncertainty and procrastination merits closer examination.

Intolerance of uncertainty may result in a low sense of mastery, self-doubt, and negative personal attributions for event outcomes. The association between low self-confidence and symptoms of worry or anxiety has also been explored previously. Worry has shown associations with low self-esteem (Boelen & Reijntjes, 2009; Meyer, Miller, Metzger, & Borkovec, 1990) and self-doubt (Davey & Levy, 1998, 1999). In addition, worry and GAD symptoms have been associated with low perceptions of controllability, including a low sense of self-mastery (Zalta & Chambless, 2008), greater perceived external constraints (Buhr & Dugas, 2006), and depressive predictive certainty (Miranda, Fontes, & Marroquin, 2008).

The recent findings by Zalta and Chambless (2008) further suggest that a low sense of mastery contributes to, rather than resulting from, excessive and uncontrollable worry. These authors found support for a proposed structural equation model in which low mastery and high stress contribute to interpretive biases in ambiguous situations and partially mediate their effects on worry, as well as contributing to worry and ruminative thinking directly. Low perceived mastery also showed deleterious effects on coping.

Low perceived personal mastery has also been found to relate to intolerance of uncertainty. For instance, intolerance of uncertainty has shown positive correlations with a low perceived sense of control over external events (Buhr & Dugas, 2006), with greater perceived constraints in the environment (Buhr & Dugas, 2006), with depressive

predictive certainty (Miranda et al., 2008), and with dysfunctional depressogenic attitudes more broadly (Dugas, Schwartz, & Francis, 2004). Thus, intolerance of uncertainty has demonstrated associations with several markers of low perceived self-efficacy.

Collectively, these findings suggest that one way in which intolerance of uncertainty may contribute to worry and maladaptive coping in threatening (e.g., uncertain) situations is through its effects on an individual's sense of self-efficacy and control. Both perceived controllability and perceived self-efficacy have been shown to have substantial effects on coping effectiveness and distress in threatening situations, particularly among individuals high in anxiety (e.g., Ender, Speer, Johnson, & Flett, 2000). Consistent with this view, Davey and Levy (1998, 1999) have suggested that doubts about self-efficacy may contribute to worry frequency or increase the length of a worry bout, by decreasing perceived ability to cope with a threat and by increasing the perceived negative valence of the threat. As intolerance of uncertainty is associated with these constructs, one possibility is that it may have a moderating impact on worry by fostering a low perceived ability to cope with negative outcomes. In other words, individuals high in intolerance of uncertainty may experience a low sense of self-efficacy about their ability to cope with uncertain threats, which may increase the perceived likelihood and severity of the threat and thereby lead to more worry. Thus, intolerance of uncertainty may render individuals vulnerable to excessive and uncontrollable worry by increasing their perceived vulnerability to uncontrollable stressors. However, it remains to be explored what role specific negative beliefs about uncertainty may have in these pathways to worry.

Intolerance of uncertainty may be associated with unattainable standards for

one's self and others: Evidence of its association with perfectionism. Perfectionism has been examined in relation to both symptoms of anxiety (e.g., Antony, Purdon, Huta, & Swinson, 1998; Kawamura, Hunt, Frost, & DiBartolo, 2001) and depression (e.g., Enns & Cox, 1999; Kawamura et al., 2001). Self-oriented perfectionism has also been found to correlate positively with worry (Blankstein & Lumley, 2008; Buhr & Dugas, 2006; Slaney, Rice, Mobley, Trippi, & Ashby, 2001; Stoeber, Feast, & Hayward, 2009) as have other measures of heightened self-exigent standards (e.g., Berenbaum, Thompson, Bredemeier, 2007; Pomerantz, Saxon, Oishi, 2000) and maladaptive perfectionism (Kawamura, 2001), particularly concerns over mistakes and doubts (Santanello & Gardner, 2006; Stoeber & Joormann, 2001). The association between other-oriented perfectionism and worry, however, is less clear, with some studies showing no relationship (Blankstein & Lumley, 2008; Buhr & Dugas, 2006) and some showing a small positive correlation (Slaney, Rice, Mobley, Trippi, & Ashby, 2001).

Intolerance of uncertainty also appears to be associated with these heightened self-exigent standards and with other expressions of elevated conscientiousness. For instance, intolerance of uncertainty has been associated with perceived responsibility to continue thinking (Sugiura, 2007) and to prevent harm to others (Dugas, Gosselin, & Ladouceur, 2001), as well as with elevated standards for personal behaviour (e.g., Buhr & Dugas, 2006). Yet while perfectionism and intolerance of uncertainty have sometimes been considered to be highly overlapping constructs (e.g., Myers, Fisher, & Wells, 2008; Obsessive Compulsive Cognitions Working Group, 2005; Wu & Carter, 2008), correlations between these measures are small to moderate. For instance, intolerance of uncertainty has shown small positive associations with self-oriented perfectionism ($r =$

.33; Buhr & Dugas, 2006) and moderate associations with concerns over mistakes ($r = .53$; Boelen & Reijntjes, 2009) and doubts ($r = .55$; Boelen & Reijntjes, 2009). However, it has not as a whole evidenced a significant association with other-oriented perfectionism ($r = .13$; Buhr & Dugas, 2006). Nonetheless, the extent to which specific negative beliefs about uncertainty may be associated, perhaps differentially, with facets of perfectionism merits further investigation.

Intolerance of uncertainty may result in unrealistic situational expectations:

Its association with a need for closure. A construct initially proposed in the epistemic literature, a need for closure has been defined as “a dimension of individual differences related to persons’ motivation with respect to information processing and judgment” (Webster & Kruglanski, 1994, pp.1049 - 1050). The most recent measure of this construct includes several related dimensions of a need for closure, including a preference for order, for predictability, and for decisiveness, a discomfort with ambiguity, and closed-mindedness (Webster & Kruglanski, 1994). Previous research on a need for closure, and on prior conceptualizations of this construct such as a need for structure, have shown it to be positively associated with worry (e.g., Cavazos & Campbell, 2008). Under certain conditions, a need for closure has also evidenced positive associations with other worry-related processes. These include low self-esteem (Cavazos & Campbell, 2008), more global personal attributions for negative events (Bar-Tal, Kishon-Rabin, & Tabak, 1997), indecisiveness or difficulties making decisions (Bar-Tal, 1994a; Cavazos & Campbell, 2008), and heightened information-seeking (Bar-Tal, Raviv, & Spitzer, 1999). Further, Ciarrcochi, Said, and Deane (2005) found that individuals high in a need for structure exhibited greater anxiety, depression, hopelessness, and stress following

stressful life events. Thus, strict expectations for the environment, in the form of a need for structure or closure, appear to amplify the negative impacts of stress.

The construct of intolerance of uncertainty has been suggested to share similarities with this need for closure as well as with other measures of strong situational expectations. For instance, Grenier, Barrette, and Ladouceur (2005) have described the overlap between intolerance uncertainty and an intolerance of ambiguity. More recently, Berenbaum and colleagues (2008) have demonstrated that various facets of intolerance of uncertainty are associated with diverse dimensions of a need for closure, as they evidence moderate positive associations with a preference for predictability, a need for order, and a discomfort with ambiguity, small positive correlations with close-mindedness, and moderate negative correlations with a preference for decisiveness. It remains to be seen whether the newly proposed distinct beliefs about uncertainty contribute differentially to these inflexible situational expectations, or moderate their impact on worry.

Intolerance of uncertainty leads to excessive and maladaptive information-seeking: Evidence for its association with avoidant and monitoring dispositional coping styles. Previous research on the association between anxiety and information-seeking or its counterpart, an avoidant coping style, suggests that the relationship between anxiety-related processes and the use of these coping strategies is not straightforward. GAD has been characterized as resulting from an approach-avoidance conflict (e.g., Dugas & Koerner, 2005; Dugas & Ladouceur, 1998; Koerner & Dugas, 2006), and its related symptoms and processes might therefore be expected to show complex relationships with avoidant and vigilant information processing styles. As such, correlations between worry or GAD symptomatology and both avoidant (Sexton &

Dugas, 2008, 2009a; Dugas et al., 2007; Robichaud, Dugas, & Conway, 2003) and monitoring (Muris, van Zuuren, de Jong, de Beurs, Hanewald, 1994; Rosen & Knäuper, 2009; Sexton & Dugas, 2008) behavioural coping responses have been documented.

In regard to information-gathering responses, intolerance of uncertainty has been associated with greater information-seeking (e.g., Rosen & Knäuper, 2009; Rosen, Knäuper, & Sammut, 2007). It has also been shown to predict heightened evidence requirements in decision-making tasks (Ladouceur, Talbot, & Dugas, 1997), which have been observed among high worriers (Tallis, Eysenck & Mathews, 1991). These findings suggest that individuals high in intolerance of uncertainty seek safety by attempting to reduce the uncertainty in decisions, and need more information before they will accept that a reasonable level of certainty has been reached.

Intolerance of uncertainty has also been associated with avoidant coping, including the use of thought suppression (Robichaud et al., 2003), other cognitive avoidance strategies (Dugas et al., 2007), and experiential avoidance more broadly (Lee, Orsillo, Roemer, & Allen, 2010). Thus, consistent with cognitive theory, intolerance of uncertainty is associated with other maladaptive coping responses, which may in turn function as more proximal influences on the tendency to worry excessively.

Intolerance of uncertainty may indeed moderate the effects of these maladaptive responses on worry. Rosen and Knäuper (2009) have shown that manipulation of both dispositional (trait) intolerance of uncertainty and state-induced discomfort in uncertain situations interacts to increase maladaptive information-seeking in response to a possible threat. This heightened information-seeking was also associated with more worry about the perceived threat, suggesting that the additional information acquired had not

facilitated appropriate coping or re-evaluation of the manageability of the threat. Instead, the additional information-seeking appeared to exacerbate individuals' concerns, perhaps by heightening the sense of urgency to prevent future negative outcomes from occurring, and increased further maladaptive efforts to prepare for these outcomes. These findings thus suggest that intolerance of uncertainty contributes to excessive information-seeking and in so doing, may moderate the impact of this maladaptive coping on future worry.

The relevance and scope of intolerance of uncertainty. Thus, consistent with cognitive theory, there is evidence to suggest that intolerance of uncertainty may function as a moderating cognitive vulnerability factor for worry, as it is associated with other proximal processes that influence the tendency to worry excessively. The effects of these other relevant constructs, however, afford an incomplete picture of cognitive vulnerabilities to worry, as a significant proportion of the variance in worry is still predicted by intolerance of uncertainty after controlling for many of these processes. For instance, intolerance of uncertainty has been shown to be a robust predictor of worry or GAD symptoms after accounting for negatively biased interpretations of ambiguous situations (Dugas, Hedayati et al., 2005; Koerner & Dugas, 2008), difficulties with goal-directed behaviour (Aldao et al., 2010), cognitive avoidance (Dugas et al., 1998), low perceived sense of control over situations (Buhr & Dugas, 2006) or depressive predictive certainty (Miranda et al., 2008) as well as other meta-cognitive fears about losing control of cognitions and emotions (DeBruin et al., 2007; Dugas et al., 2001; Stapinski, Abbott, & Rapee, 2010), personality variables such as perfectionism (Buhr & Dugas, 2006), and other related processes such as perceived responsibility (Dugas et al., 2001). As such, intolerance of uncertainty repeatedly shows either unique or stronger associations with

worry and GAD symptoms than do other related constructs, suggesting it may either be more comprehensive, or possibly more precise, in its conceptualization of the relevant vulnerabilities that predispose individuals to worry. However, it remains unclear to what extent specific negative beliefs about uncertainty contribute to worry and to these associated worry-related processes.

Goals of the Current Research

In sum, intolerance of uncertainty can be conceptualized as resulting from a generalized negative attitude towards uncertainty, which contributes to the development of worry, anxiety, and symptoms of depressed mood. As we have seen, intolerance of uncertainty also has diverse negative behavioural and cognitive consequences, among these the tendency to perceive uncertain situations as threatening, the development of inflexible personal and situational expectations, and the maladaptive use of coping responses. Each of these associated processes has the potential to contribute to significant impairments in functioning. However, it is not known to what extent specific negative beliefs about uncertainty contribute to these worry- or anxiety-related impairments, or to the information processing biases that partially mediate intolerance of uncertainty's association with worry.

As a whole, then, the purpose of these studies was to identify and validate a set of distinct negative beliefs about uncertainty. These underlying core beliefs were expected to be consistently differentiable, and hence replicable in independent samples. Further, they were expected to correlate meaningfully with the relevant symptom clusters for which they are proposed to confer vulnerability. Finally, they were hypothesized to show convergent, discriminant, and criterion-related validity, as well as specificity, with

behavioural and cognitive consequences of intolerance of uncertainty, and with biased appraisals of threat in ambiguous situations. This research thus sought to further establish the construct validity of intolerance of uncertainty by answering this question: what are the negative beliefs about uncertainty that lead to uncertainty intolerance, and what are their correlates?

Chapter 2

Abstract

This study examined the factor structure of the English version of the Intolerance of Uncertainty Scale (IUS; Freeston, Rhéaume, Letarte, Dugas, & Ladouceur, 1994; English version: Buhr & Dugas, 2002) using a substantially larger sample than has been used in previous studies. Nonclinical undergraduate students and adults from the community (mean age = 23.83 years, $SD = 6.44$; 72.4% female) who participated in 16 studies in the Anxiety Disorders Laboratory at Concordia University in Montreal, Canada, were randomly assigned to two datasets. Exploratory factor analysis with the first sample ($n = 1230$) identified two factors: the beliefs that “uncertainty has negative behavioural and self-referent implications” and that “uncertainty is unfair and spoils everything.” This two-factor structure provided a good fit to the data (NNFI = .96, CFI = .97, SRMR = .05, RMSEA = .07) upon confirmatory factor analysis with the second sample ($n = 1221$). Both factors showed similarly high correlations with pathological worry, and Factor 1 showed stronger correlations with generalized anxiety disorder analogue status, trait anxiety, somatic anxiety, and depressive symptomatology.

Defining Distinct Negative Beliefs About Uncertainty: Validating the Factor Structure of the Intolerance of Uncertainty Scale

Intolerance of uncertainty has been defined as a “dispositional characteristic that results from a set of negative beliefs about uncertainty and its implications” (Dugas & Robichaud, 2007, p. 24). Given the wealth of evidence on its relevance to worry, intolerance of uncertainty has been proposed as a cognitive vulnerability factor for worry and generalized anxiety disorder (GAD; Koerner & Dugas, 2008).

Although intolerance of uncertainty is present across the anxiety disorders (Ladouceur et al., 1999), it has primarily been investigated in GAD. The specificity of this association has been demonstrated in two ways. First, higher levels of intolerance of uncertainty have been found in GAD populations as compared to nonclinical (Dugas, Gagnon, Ladouceur, & Freeston, 1998; Ladouceur et al., 1999) and other anxiety disorder populations (Dugas, Marchand, & Ladouceur, 2005; Ladouceur et al., 1999), with the possible exception of obsessive-compulsive disorder (OCD) samples (Holaway, Heimberg, & Coles, 2006). Similarly, when controlling for neuroticism/negative affect – a global vulnerability for anxiety and mood disorders (see Clark, Watson, & Mineka, 1994; Zinbarg & Barlow, 1996) – intolerance of uncertainty was specifically related to worry but not to symptoms of panic disorder, OCD, or health anxiety (Norton, Sexton, Walker, & Norton, 2005; Sexton, Norton, Walker, & Norton, 2003). Second, intolerance of uncertainty continues to be associated with worry when controlling for anxiety and depression (Buhr & Dugas, 2002), perfectionism and perceived sense of control (Buhr & Dugas, 2006), anxiety sensitivity and perceived responsibility (Dugas, Gosselin, & Ladouceur, 2001), dysfunctional attitudes (Dugas, Schwartz, & Francis, 2004), positive

beliefs about worry, negative problem orientation, and cognitive avoidance (Dugas et al., 1998). In addition, intolerance of uncertainty distinguishes mild vs. moderate to severe GAD in clinical populations (Dugas et al., 2007).

Based on these findings, intolerance of uncertainty was proposed as a cognitive vulnerability factor for worry and GAD (Koerner & Dugas, 2008). Consistent with proposed criteria for establishing cognitive vulnerability (see Garber & Hollon, 1991; Ingram, 2003; Kraemer, Kazdin, & Offord, 1997; Riskind & Alloy, 2006), intolerance of uncertainty has shown preliminary evidence of manipulability (Ladouceur, Gosselin, & Dugas, 2000), temporal antecedence with respect to worry (Dugas & Ladouceur, 2000), stability (Buhr & Dugas, 2002; Freeston, Rhéaume, Letarte, Dugas, & Ladouceur, 1994), and construct validity (see Koerner & Dugas, 2008; Koerner & Dugas, 2006, for a review). Nevertheless, the specific negative beliefs about uncertainty and its implications that comprise this dispositional characteristic remain to be consistently discerned.

One promising means by which to identify these beliefs would be to more closely examine measures of the intolerance of uncertainty construct to distinguish the composite factors. Intolerance of uncertainty has most commonly been assessed using the Intolerance of Uncertainty Scale (IUS; Buhr & Dugas, 2002; Freeston et al., 1994). Although it is employed as a unifactorial assessment tool, previous studies have pointed to an underlying multifactorial structure for the IUS (e.g., Berenbaum, Bredemeier, & Thompson, 2008; Buhr & Dugas, 2002; Carleton, Norton, & Asmundson, 2007; Freeston et al., 1994; Norton, 2005). As such, closer examination of the factors which comprise the IUS may elucidate the specific negative beliefs about uncertainty that result in intolerance of uncertainty.

Previous factor analyses of the IUS have identified several potential distinct negative beliefs about uncertainty, or factors. Exploratory factor analysis of the original French version of the IUS identified five negative beliefs about uncertainty: 1) uncertainty is unacceptable and should be avoided; 2) being uncertain reflects badly on a person; 3) uncertainty is frustrating; 4) uncertainty causes stress; and 5) uncertainty prevents action (Freeston et al., 1994). Subsequent exploratory factor analysis with the English translation found a four-factor structure instead, comprising the beliefs that: 1) uncertainty leads to the inability to act; 2) uncertainty is stressful and upsetting; 3) unexpected events are negative and should be avoided; and 4) being uncertain about the future is unfair (Buhr & Dugas, 2002). Neither set of factors were proposed as subscales, but rather were intended to provide evidence of the content validity of the IUS.

Despite these initial findings, the specific beliefs about uncertainty identified in the Freeston et al. (1994) and Buhr and Dugas (2002) exploratory factor analyses have not been consistently derived or confirmed. For instance, in a series of exploratory analyses in various ethnic groups, Norton (2005) was unable to replicate the item composition of either the four or five-factor solutions. Similarly, Berenbaum and colleagues (2008) arrived at a four-factor structure (Desire for Predictability, Uncertainty Paralysis, Uncertainty Distress, and Inflexible Uncertainty Beliefs) for the English version using exploratory factor analysis, but only two factors overlapped substantially with those identified by Buhr and Dugas (2002). Finally, Carleton and colleagues (2007) found that neither the original four factors nor the five factors provided an adequate fit to the data upon confirmatory factor analysis. Yet despite the poor support for either multifactorial solution, a unitary structure provided a similarly poor fit. Given this

finding, and the inconsistencies in previous studies, further analysis of the specific negative beliefs about uncertainty assessed by the IUS is warranted.

An alternative approach was employed by Carleton and colleagues (2007) who proposed a 2-factor structure for a shortened version of the IUS composed of 12 of the original 27 items. To this end, two non-overlapping factors, one from each of the previously-identified five- and four-factor solutions, were selected and refined. The two ensuing subscales were labeled “prospective anxiety” and “inhibitory anxiety” and were comprised of 7 items from the “Uncertainty is unacceptable and should be avoided” Factor (Freeston et al., 1994) and 5 items from the “Uncertainty leads to the inability to act” Factor (Buhr & Dugas, 2002), respectively. Confirmatory factor analyses found that these two refined factors provided a superior fit to the data than did a single-factor solution or the originally-proposed four- and five-factor solutions. Carleton and colleagues, however, did not explore alternative full-scale factor solutions. Further, Carleton and colleagues’ two factors were not selected on the basis of content but rather were chosen with the aim of establishing non-overlapping factors, and much of the subsequent refinement of the two factors was based on the apparent face validity of the items rather than on theoretical grounds. Given these considerations, a more content-driven analysis of the underlying factors of the IUS, and a re-examination of the full scale factor structure, are warranted in order to identify the set of negative beliefs about uncertainty that comprise the construct.

The present study sought first to explore alternative factor solutions for the IUS full scale using exploratory factor analysis, and secondly to assess the goodness of fit of these newly-derived solutions using confirmatory factor analysis. To conduct these

analyses, a large nonclinical sample was extracted from archival IUS data. Specifically, data from 16 previous studies conducted in the Anxiety Disorders Laboratory at Concordia University and employing the English translation of the IUS, were compiled and subjected to a series of factor analyses. A secondary aim of this investigation was to assess the validity of the derived subscales, or specific beliefs about uncertainty, by examining their relative associations with symptoms of worry, anxiety, and depression, and with analogue GAD diagnostic status.

Method

Participants and Procedure

Archival data from 2451 individuals having participated in 16 studies conducted between 1998 and August 2006 in the Anxiety Disorders Laboratory at Concordia University in Montreal, Canada, which employed the Intolerance of Uncertainty Scale (English translation), were used for this study. Participants were recruited from undergraduate classes at Concordia University and from the surrounding community. This nonclinical sample was recruited through sign-up sheets circulated in undergraduate university classes as well as through advertisements posted on the university campus and in the surrounding neighborhood. All participants provided written informed consent. As would be expected given that common recruitment methods were employed across studies all within the same geographic area, a survey of the demographic composition (e.g., age, gender ratios, ethnic background) of the 16 samples showed them to be highly similar. Participants were therefore pooled across the 16 samples and then randomly allocated to one of two groups; an exploratory factor analysis was conducted with the first group of participants ($n = 1230$) and the second group was retained for follow-up

confirmatory factor analyses ($n = 1221$).

Participants in the exploratory sample ranged in age from 17 to 80 years. Approximately 72.4% of this sample ($n = 890$; one participant did not report gender) was female, and there was a significant albeit small gender difference in IUS scores ($M = 57.44$; $SD = 19.09$ for females, $M = 54.16$; $SD = 17.07$ for males; $F(1, 1227) = 7.674$, $p < .01$, $d = .18$). Similarly, in the confirmatory dataset, participants were aged 17 to 68 years and 73.6% ($n = 897$) were female (three participants did not report gender). Again, there was a significant gender difference in IUS scores, but the effect size was small ($M = 56.17$; $SD = 18.07$ for females, $M = 53.69$; $SD = 17.31$ for males; $F(1, 1216) = 4.573$, $p < .05$, $d = .14$). For participants who provided information on their ethnic background (self-reported ethnicity was collected in many but not all of the included studies), a comparison of ethnic frequencies across samples is reported in Table 2.1. No significant differences in age, gender, or ethnicity were found between the two datasets (see Table 2.1).

Measures

Intolerance of Uncertainty Scale (IUS; French version: Freeston et al., 1994; English translation: Buhr & Dugas, 2002). The IUS is comprised of 27 items assessing negative beliefs about uncertainty and its perceived consequences. Higher scores on the IUS indicate greater intolerance of uncertainty. Similar to the original French measure, the English translation has shown excellent internal consistency ($\alpha = .94$) and temporal stability ($r = .74$ over 5 weeks) and has demonstrated convergent, criterion, and discriminant validity (Buhr & Dugas, 2002, 2006) cross-culturally (Norton, 2005). In this study, the IUS showed excellent internal consistency ($\alpha = .95$ in both samples), and the

average inter-item correlation was $r = .40$ (95% C.I. = .38 - .42) in the exploratory dataset and $r = .39$ (95% C.I. = .37 - .41) in the confirmatory dataset.

Penn State Worry Questionnaire (PSWQ; Meyer, Miller, Metzger, & Borkovec, 1990). The PSWQ is composed of 16-items assessing the frequency and intensity of worry, with higher scores indicating higher levels of generalized worry. The PSWQ has evidenced excellent internal consistency in this ($\alpha = .94$ in the exploratory and .93 in the confirmatory samples) and other studies ($\alpha = .86$ to .95) as well as good stability ($r = .92$ for test-retest over 8 to 10 weeks, $r = .74$ to .93 over 4 weeks; Meyer et al., 1990; Molina & Borkovec, 1994). Average inter-item correlations in this study were very good ($r = .48$, 95% C.I. = .45 - .50 in the exploratory, $r = .47$, 95% C.I. = .45 - .49 in the confirmatory datasets). The convergent, divergent, and discriminant validity of the PSWQ is evident in both clinical and nonclinical populations (Brown, Antony, & Barlow, 1992; Meyer et al., 1990; Molina & Borkovec, 1994).

The Worry and Anxiety Questionnaire (WAQ; Dugas, Freeston, Provencher, Lachance, Ladouceur, & Gosselin, 2001). The WAQ is an 11-item screening questionnaire for GAD as defined in the fourth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV-TR; APA, 2000). Individuals are asked to rate the frequency, controllability, and excessiveness of their worries and report on the frequency of GAD somatic symptoms. The WAQ has shown both sensitivity and specificity as a screening tool for GAD in nonclinical samples (Dugas et al., 2001). In the current study, the WAQ was used as a dichotomous measure (i.e., presence/absence) of analogue GAD diagnostic status, with analogue GAD coded as 1 and absence of full diagnostic criteria coded as 0.

State Trait Anxiety Inventory (Form Y) – Trait (STAI-T; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1977). The STAI-T is a 20-item measure of the “relatively stable individual differences in anxiety proneness” (Spielberger et al., 1977, p. 5), or trait anxiety. Reviews of this construct suggest that there is considerable theoretical overlap between this construct and the constructs of neuroticism or negative affect (Barlow, 2002; Watson & Clark, 1984; Zinbarg & Barlow, 1996). Higher scores on the STAI-T indicate higher levels of trait anxiety, or neuroticism. The STAI-T has demonstrated stability ($r = .71$ to $.75$ over 30-days, $r = .65$ to $.68$ over 60 days in a student sample; Spielberger et al., 1977) and good internal consistency in student (e.g., $\alpha = .81$; Bernstein & Eveland, 1982) and anxiety disorder patient samples ($\alpha = .89$; Beiling, Antony, & Swinson, 1998). High correlations between the STAI-T and other measures of anxiety attest to its construct validity (Beiling et al., 1998; Creamer, Foran, & Bell, 1995). In this study, the STAI-T showed excellent internal consistency ($\alpha = .93$ in the exploratory sample; $\alpha = .92$ in the confirmatory sample) and good average inter-item correlations ($r = .38$, 95% C.I. = $.34 - .43$ in the exploratory sample; $r = .36$, 95% C.I. = $.32 - .41$ in the confirmatory sample).

Beck Anxiety Inventory (BAI; Beck, Epstein, Brown, & Steer, 1988). The BAI is a 21-item measure of anxiety symptomatology, designed to have minimal overlap with depressive symptoms (Beck et al., 1988). Higher scores are indicative of greater, mainly somatic anxiety (Cox, Cohen, Dorenfeld, & Swinson, 1996). The BAI has shown excellent internal consistency in anxiety disorder patient ($\alpha = .85$ to $.92$; Beck & Steer, 1993) and undergraduate student samples ($\alpha = .90$ -.91; Creamer et al., 1995) as well as good test-retest reliability ($r = .83$ in a panic disorder patient sample over 5-weeks; de

Beurs, Wilson, Chambless, Goldstein, & Feske, 1997). The BAI showed excellent internal consistency in this study ($\alpha = .90$ in the exploratory and $\alpha = .91$ in the confirmatory samples) and average inter-item correlations were adequate ($r = .31$, 95% C.I. = .27 - .34 in the exploratory sample; $r = .33$, 95% C.I. = .30 - .36 in the confirmatory sample). The BAI has shown convergent validity with anxiety measures (Beck et al., 1988) and, compared to the STAI-T, has evidenced superior discriminant validity with measures of depressive symptomatology (Creamer et al., 1995; Fydrich, Dowdall, & Chambless, 1992).

Centre for Epidemiologic Studies – Depression Scale (CES-D; Radloff, 1977).

The CES-D is a 20-item measure of depressive symptomatology intended for use in the general population. Higher scores indicate a higher frequency of depressive symptoms over the past week. The CES-D has shown very good to excellent internal consistency ($\alpha = .85$ in community samples, and $\alpha = .90$ in outpatient and inpatient samples) and test-retest reliability ($r = .51$ to $.67$ over 2 to 8 weeks, $r = .32$ to $.54$ over 3 to 12 months; Radloff, 1977). In this study, the CES-D showed excellent internal consistency ($\alpha = .91$ in both samples) and good average inter-item correlations ($r = .34$, 95% C.I. = .30 - .37 in the exploratory sample; $r = .33$, 95% C.I. = .29 - .36 in the confirmatory sample). The CES-D has shown convergent validity with other measures of depressive symptoms (Radloff et al., 1977; Weissman, Prusoff, & Newberry, 1975, as cited in Radloff, 1977), and has evidenced a highly stable (Shafer, 2006) 4-factor structure, which attests to its construct validity.

Results

Preliminary Analyses

Data screening and outlier analysis. Analysis of all study measures for multivariate outliers, univariate outliers, and distribution normality was performed in the exploratory factor analysis dataset and in the confirmatory factor analysis (CFA) dataset separately. First, to identify multivariate outliers, Mahalanobis distance was computed and a conservative chi-square cut-off of $p < .001$ was employed, given the narrow 5-point range of individual IUS items. Second, univariate outliers for the total scale scores were defined as data points ± 3.29 standard deviations from the mean ($p < .001$, two-tailed; Tabachnick & Fidell, 2001). For the exploratory factor analysis, 89 multivariate IUS-item outliers and 5 univariate outliers on the IUS total score were identified and excluded. For the CFA dataset, 91 IUS-item multivariate outliers and an additional 5 univariate outliers were identified and removed from the dataset.

All measures in both samples were then assessed for skewness and kurtosis in the distribution of total scale scores. The IUS was significantly positively skewed in both the exploratory and confirmatory factor analysis datasets (skew = .827 and .843, respectively). Significant kurtosis in the IUS was not observed in either dataset (kurtosis = .235 and .389, respectively). All remaining total scale scores were also within skew tolerances (i.e., $\text{skew}/SE < |5|$, given $N > 100$) and within kurtosis tolerances (i.e., $\text{kurtosis}/SE < |5|$, given $N > 100$). We opted not to correct for the observed skewness in the IUS due to the nature of the population sampled. Specifically, as this study employed primarily clinical assessment tools in a nonclinical sample, some degree of positive skew was expected and was presumed to reflect the characteristics of the sample rather than a bias in the observed scores.

For the IUS, normality of the distribution was also assessed at the item level.

Significant positive skewness was observed for most individual IUS items. In particular, all but three IUS items (1, 8, and 10) were significant positively skewed in the exploratory sample, and all items save Items 1, 6, and 8 showed significant positive skew in the confirmatory sample. Significant kurtosis was also observed in several IUS item distributions (Items 2, 8, 9, 13, 23, and 25 in the exploratory sample; Items 1, 2, 9, 13, 19, 23, 25, and 27 in the confirmatory sample). Rather than transforming items, which could reduce the ecological validity of our factor analytic findings, we opted to use polychoric correlations for the exploratory factor analysis, and employed an alternate method of extraction in the confirmatory factor analysis to adjust for the observed skewness and kurtosis in the IUS and guard against potential bias in the goodness-of-fit indices.

Psychometric Properties of the IUS

Exploratory factor analysis. Exploratory factor analysis was conducted using SPSS version 15 software. Principal Axis Factoring (PAF) was selected as the method of extraction. Polychoric correlations were computed using EQS version 6.1 software (Bentler, 1995; Bentler & Wu, 1995) and then imported into SPSS. Kaiser's (1970) measure of sampling adequacy (the Kaiser-Meyer-Olkin MSA) indicated that this intercorrelation matrix was appropriate for factor analysis (MSA = 0.97). The Kaiser rule (minimum eigenvalue = 1; Kaiser, 1970) suggested a 3-factor solution (the first ten eigenvalues were 13.47, 1.76, 1.20, 0.98, 0.90, 0.73, 0.70, 0.58, 0.55, and 0.54). In contrast, the scree test (Cattell, 1966) suggested that a 2-factor solution may be more appropriate. Velicer's Minimum Average Partial (MAP) test (Velicer, 1976) and Horn's parallel analysis (Horn, 1965) were also conducted to determine the number of factors to be extracted. Zwick and Velicer (1986) have suggested that these two tests are the most

reliable in determining the appropriate number of components to retain. These tests were conducted in SPSS using the command syntax proposed by O'Connor (2000). The MAP test suggested a 2-factor solution (as the minimum average partial correlation corresponded to 2 principle components). In addition, in a parallel analysis, only the first two eigenvalues (13.47 and 1.76, as reported above) were found to be larger than the eigenvalues in the 95th percentile (the first five randomly-generated eigenvalues derived from 1000 randomly-generated datasets with 27 variables and 1230 cases were 1.31, 1.27, 1.24, 1.21, 1.18). Given the convergence of the scree plot, MAP test, and parallel analysis, the 2-factor solution was selected as the most appropriate.

Because the factors assess facets of the same underlying intolerance of uncertainty construct, they were expected to correlate to some degree. Promax (oblique) rotation was therefore employed. The resulting 2-factor solution explained 52.9% of the variance (the two eigenvalues calculated after the re-scaling of factor coefficients following rotation were 11.94 and 11.40), and the factors showed a correlation of $r = .77$.

In examining the individual items, a cut-off of $> .40$ was employed to identify significant factor coefficients. Factor 1 was found to be composed of 15 items denoting the beliefs that uncertainty impairs performance and reflects poorly on an individual's character; this factor was labeled "Uncertainty has negative behavioural and self-referent implications." Factor 2 was composed of 12 items which assessed the belief that future events ought to be predictable, and that uncertainty about the future is unfair and therefore frustrating or upsetting; this factor was labeled "Uncertainty is unfair and spoils everything." There were no hyperplane and no complex items. Promax-rotated principal factor standardized regression coefficients from the pattern matrix are presented in Table

2.2.

Confirmatory factor analysis. Confirmatory factor analysis of the proposed 2-factor structure of the IUS was performed with the EQS structural equation program, version 6.1 (Bentler, 1995; Bentler & Wu, 1995). Given the high degree of skewness and kurtosis among the IUS items (Mardia's coefficient of multivariate kurtosis = 136.93, normalized estimate $Z = 60.45$), the elliptical (ERLS) method of estimation was employed. This method of extraction was chosen in preference to alternative approaches for non-normally distributed data as it has been suggested that elliptical estimation is less prone to error when employing small sample sizes or, as is more pertinent in this context, when testing complex models (Kline, 1998). As was done in the exploratory factor analysis, the two factors were allowed to covary, given that the proposed subscales comprise the same construct and were therefore expected to be highly correlated. Correlations between the observed variables, or IUS items, are presented in Table 2.3 along with IUS item means, standard deviations, and corrected item-total correlations.

All items loaded significantly on their respective factor, with the strength of association ranging from $r^2 = .22$ to $.66$ (see Table 2.4 for CFA factor loadings of the IUS), and the factors were correlated at $r = .87$. As the χ^2 measure of the goodness of fit can be unreliable, particularly in large samples (Brown, 2006; Tabachnick & Fidell, 2001), additional indices of model fit were assessed. The two-factor model generally met conventional standards for good model fit, though the model $\chi^2 = 2479.477$ for $df = 323$ was significant ($p < .001$). This model produced a Bentler-Bonnet Normed Fit Index (NNFI) of $.96$ (NNFI's $> .90$ are indicative of good model fit; Tabachnick & Fidell, 2001), a Comparative Fit Index (CFI) of $.97$ (CFI's $> .95$ indicate good fit; Hu & Bentler,

1999; Tabachnick & Fidell, 2001), and a standardized root mean-square residual (SRMR) of .05 (SRMR's < .08 are recommended; Hu & Bentler, 1999), although the root mean-square error of approximation (RMSEA) was .07 (whereas RMSEA's < .06 are recommended; Hu & Bentler, 1999). Thus, overall, the two factor model provided a good fit to the data.

For comparative purposes, given the high observed correlation between the factors which can indicate poor factor differentiation, a unitary factor solution was assessed. This one-factor solution provided an adequate fit to the data ($\chi^2 = 5390.164$ for $df = 324$, $p < .001$; NNFI = .93; CFI = .93; SRMR = .06; RMSEA = .11), though not all measures of goodness-of-fit (e.g., χ^2 , CFI, RMSEA) were above conventional criteria as specified by Hu and Bentler (1999). In contrast, the two-factor solution provided a superior fit to the data ($\Delta\chi^2 = 2910.687$ for $\Delta df = 1$, $p < .001$).

Internal consistency. The IUS subscales showed excellent internal consistency in the exploratory ($\alpha = .92$ for Factor 1, $\alpha = .91$ for Factor 2) and confirmatory ($\alpha = .92$ for Factor 1, $\alpha = .90$ for Factor 2) datasets.

Construct Validity of the IUS Items

Assessing the overlap between IUS items and a measure of worry. Given the high correlations between the IUS and PSWQ observed in previous research (e.g., correlations ranging from $r = .57$ to $r = .69$ have been observed; e.g., Dugas et al., 2004; Robichaud, Dugas, & Conway, 2003), we sought to ensure that all IUS items were assessing the construct of intolerance of uncertainty rather than the phenomenon of worry. To this end, correlations between individual IUS items and the PSWQ and IUS total scores were computed and compared using Fisher's Z test of non-independent

correlations (Meng, Rosenthal, & Rubin, 1992). All IUS items showed significantly stronger correlations with the IUS total score (jackknife correlations ranged from $r = .42$ to $r = .78$ in the exploratory dataset) than with the PSWQ (correlations ranged from $r = .20$ to $r = .60$; Fisher's Z ranged from $Z = 2.52$ to $Z = 14.93$, $n = 1102$, $p < .05$; similar correlations were observed in the confirmatory dataset). The effect size of this difference between correlations was moderate ($r^2_{\text{difference}}$ ranged from .06 to .33 in the exploratory sample).

Construct Validity of the IUS Subscales

Factor score correlations with worry, anxiety, and depression measures. As a preliminary examination of the construct validity of the two factors, correlations were computed between these factors and measures of excessive worry, analogue GAD status, trait anxiety (or neuroticism), somatic anxiety, and depressive symptomatology. For the analysis with GAD diagnostic status, biserial rather than point-biserial correlations were calculated (given that the symptoms of this disorder exist on a continuum, raising the potential that point-biserial correlations with this dichotomous variable may be attenuated; Fields, 2005). In the exploratory sample, factor scores were computed in SPSS as regression-based coefficients derived from PAF, so as to obtain a more "pure" measure of each factor. Factor score correlations were then compared using Fisher's Z test of non-independent correlation coefficients (Meng et al., 1992). Analogue GAD diagnostic status as assessed by the WAQ, trait anxiety/neuroticism as assessed by the STAI-T, and depressed mood as assessed by the CES-D were more strongly correlated with the belief that uncertainty has negative behavioural and self-referent implications (Factor 1). There were no significant differences between the two factors in their

correlation with the PSWQ or BAI (see Table 2.5 for factor score correlations with all study measures).

Subscale correlations with worry, anxiety, and depression measures. The IUS factors derived in this study are intended to be employed as subscales in future uses of this measure. A preliminary evaluation of the utility of these subscales, computed from the raw scores rather than weighted factor scores, was therefore conducted using the confirmatory factor analysis sample. Subscale scores were computed as the sum of the raw scores of all items comprising a subscale. Pearson correlations between the two subscales and the PSWQ, STAI-T, BAI, and CES-D, as well as biserial correlations with the WAQ, were subsequently computed (see Table 2.5) and compared using Fisher's Z test of non-independent correlation coefficients (Meng et al., 1992). Similar to the results with the factor scores, the WAQ, STAI-T, and the CES-D were more highly related to the belief that uncertainty has negative implications (Subscale 1). In addition, the BAI was found to be more highly correlated with Subscale 1 than with Subscale 2. In contrast, the PSWQ showed a similarly high correlation with both subscales.

Discussion

The purpose of this study was to identify and validate the set of negative beliefs about uncertainty that comprise the construct of intolerance of uncertainty, as assessed by the IUS. Two subscales were derived using exploratory factor analysis. Subsequent confirmatory factor analysis found that these two factors provide an adequate fit to the observed item inter-correlations on the IUS. A survey of the items which loaded on Factor 1 suggested that this factor encompasses the beliefs that being uncertain impairs behaviour and reflects badly on an individual's character; accordingly, this factor was

labeled “uncertainty has negative behavioural and self-referent implications.” The second set of items reflected the belief that the future should be predictable, and that unpredictability is unfair and therefore distressing; accordingly, Factor 2 was labeled “uncertainty is unfair and spoils everything.” Both factor labels therefore showed face validity for the items they comprise. Nonetheless, Tracy (1990) has recommended that additional methods be employed to assess the validity of factor labels.

As an initial step toward validating the two distinct IUS factors, this study found differential patterns of correlations for the subscales with measures of worry, analogue GAD diagnostic status, somatic anxiety, depression, and neuroticism. Factor 1 was more highly associated with measures of depression, trait anxiety/neuroticism, and analogue GAD diagnostic status in both samples, and with somatic anxiety in the confirmatory sample. Despite the high correlations of both subscales with all symptom measures, the effect sizes of the difference in these correlations were nonetheless moderate. Overall, these findings suggest that there is a meaningful distinction between the two subscales in their association with symptoms of emotional disorders. Worry, in contrast, showed a similar strength of association with both factors, providing support for the criterion-related validity of these subscales.

This study also found support for the validity of the proposed factor labels. The stronger association of Factor 1 with depression symptoms is consistent with the self-referent nature of the perceived implications of uncertainty reflected in the Factor 1 items (e.g., “Being uncertain means that I am not first rate” or “that I lack confidence”). These negative self-appraisals are similar to the negative thinking patterns described in the literature on cognitive vulnerabilities to depression (e.g., Ingram, 2003). In addition, the

perceived behavioural implications of Factor 1 (e.g., “When it’s time to act, uncertainty paralyses me”; “When I am uncertain, I can’t function very well”) may lead to reduced confidence in one’s ability to cope with threat. This reduced confidence may contribute to more somatic anxiety in threatening situations, as suggested by the stronger correlation between the BAI and Factor 1 in the confirmatory sample. This finding was not, however, observed with the factor scores in the exploratory sample. To the extent that factor scores may be a more “pure” measure of a construct, there remains the possibility that this is a spurious finding. Alternatively, the greater strength of association between somatic anxiety and Factor 1 may not be as consistent or robust as the relationship between Factor 1 and trait anxiety/neuroticism or depression, or may depend on other worry-related processes at play.

Finally, the stronger correlations of depression and anxiety with Factor 1 suggest this factor may be the more affectively-laden component of intolerance of uncertainty. This affectivity would account for the stronger correlation between the STAI-T and Factor 1 as compared to Factor 2. It may also be this same experience of distress or interference as a result of worrying, an integral part of DSM-IV-TR criteria (APA, 2000), which accounts for the higher correlation between Factor 1 and the WAQ. However, as this study’s subscale correlation analyses were exploratory in nature, further research examining correlates of these proposed subscales over time and in clinical contexts is needed to replicate and clarify these relationships. In addition, future studies should examine the incremental validity of the two IUS subscales to explore their relative utility in the prediction of these criterion variables.

The factor solution arrived at in this study offers several advantages over previous

factor analytic findings for the IUS. First, it is likely that the factors inherent in the IUS have been over-sampled in previous factor analyses (e.g., Buhr & Dugas, 2002; Freeston et al., 1994), given the high number of cross-loading items observed in these factor solutions and the use of a more liberal $>.30$ cut-off for factor coefficients. This study's use of a substantially larger sample than previous studies may increase the reliability of the results obtained and reduce the possibility of over-sampling factors. Second, the use of a more stringent cut-off to establish the significance of factors loadings (i.e., $>.40$) ensured that only meaningfully-related items were retained in the factor solution; that all items were nonetheless significantly and highly related to their respective factors argues against the exclusion of individual items to shorten the IUS, which was the approach employed by Carleton and colleagues (2007). Third, the use of both exploratory and confirmatory factor analytic techniques employed on separate samples allowed for a more complete and nuanced re-examination of the factor structure of the IUS. Finally, the use of Principal Axis Factoring, which many have argued may more accurately derive the true latent factors (Brown, 2006; Conway & Huffcutt, 2003; Ford, MacCallum, & Tait, 1986), coupled with a more conceptually-driven approach to factor interpretation, afforded a more meaningful analysis of the component factors which underlie intolerance of uncertainty.

Despite these advantages, a substantial amount of variance was not accounted for by the two common factors derived in this study. Although the 52.9% of variance explained by the 2-factor PAF solution is comparable to previous factor analyses of the English version of the IUS (e.g., Buhr & Dugas, 2002; Berenbaum et al., 2008), a considerable proportion of variance remains unexplained. The use of PAF, which

analyses common variance, as opposed to PCA, which analyses both common and specific variance, may have contributed to the moderate proportion of variance explained by our 2-factor solution. Further research is needed to assess to what extent the residual variance represents measurement error as opposed to unique but reliable variability captured by individual IUS items; the existence of substantial item-specific variance may have important implications for our conceptualization of the IUS subscales and for any future revisions to this measure.

The results of this study are primarily limited by the use of a nonclinical sample of convenience. Although this nonclinical sample was necessary to obtain the required number of participants for the analyses conducted, it may limit the generalizability of the findings to the clinical populations in which the IUS is commonly employed. Previous research on the IUS employing the original French version has found comparable psychometric properties in clinical and nonclinical populations (Dugas & Robichaud, 2007). Nonetheless, the proposed subscales should be validated in a clinical sample of GAD participants. Of further interest is the question of whether, and to what extent, these IUS factors may be relevant in other, often comorbid, anxiety and mood disorders. For instance, it has been theorized that high levels of worry may lead to symptoms of depression and demoralization in GAD (e.g., Dugas et al., 1998). It is conceivable that beliefs about the negative behavioural and self-referent implications of uncertainty captured in Factor 1 of the IUS may be particularly relevant in GAD patients who present with comorbid mood disorders. The use of a nonclinical sample, however, did not enable us to examine these questions. Finally, the clinical utility of the proposed subscales in both the diagnosis and treatment of worry and anxiety remains to be established. Future

research is therefore needed to validate the proposed two-subscale structure of the IUS in alternate populations, including clinical GAD and other anxiety disorder patient samples.

Despite this limitation, a few tentative clinical implications may be drawn from this study. Given that Factor 1 was consistently more highly associated with neuroticism and depressive symptoms, individuals scoring high on this subscale may warrant assessment not only for GAD but for depression and other symptoms of negative affect. That Factor 2 was as highly predictive of worry, yet not more highly associated with any other criterion variable employed in this study, suggests that the role of this factor is not yet fully understood. Other clinical correlates of this belief about uncertainty, such as perhaps frustration, may not be captured by the symptom measures typically administered to GAD patients. The clinical presentation of these individuals therefore merits further research attention. Finally, an examination of the developmental trajectories of these beliefs may have important implications for prevention and treatment.

Tracy (1990) noted that factor labels should be regarded as hypotheses to be subjected to further testing and scrutiny. Although the current study provided preliminary evidence of the construct validity of these factors, first by confirming the 2-factor structure of the IUS in an independent sample and secondly by assessing the factors' correlations with symptom measures, the construct validity of the proposed subscales remains to be firmly established using additional experimental methods. Closer examination of the two proposed IUS subscales and their factor labels will be needed to justify their use in clinical research and practice.

Table 2.1

Means, Standard Deviations, and Frequencies on Demographic Variables in the Exploratory (n = 1230) and Confirmatory (n = 1221) Samples

	Exploratory sample	Confirmatory sample	<i>df</i>	<i>F</i>	<i>d</i>	<i>p</i>
Measure	<i>M (SD)</i>	<i>M (SD)</i>				
Age	23.83 (6.44)	23.65 (6.28)	1, 2430	0.508	.03	.48
	Exploratory sample	Confirmatory sample	<i>df</i>	χ^2	ϕ	<i>p</i>
Gender	72.4% female	73.6% female	1, 2445	0.469	.01	.49
Ethnic origin ^a			7, 1856	4.726	.05	.69
White/European	67.2%	67.9%				
Black	9.9%	9.1%				
Asian	7.5%	7.4%				
Hispanic	2.7%	2.3%				
Middle Eastern	5.0%	3.8%				
Native American	0.7%	1.3%				
Multi-racial	4.1%	5.1%				
Other	2.8%	3.1%				

^a Frequencies are expressed as a percentage of participants who reported on their ethnic origin (*n* = 954 participants in the exploratory and *n* = 910 participants in the confirmatory sample).

Table 2.2

*Promax-Rotated Principal Factor Standardized Regression Coefficients and Final**Communality Estimates (h^2) of the IUS ($n = 1230$)*

No.	Item	I	II	h^2
12.	When it's time to act, uncertainty paralyzes me.	.84	-.03	.65
14.	When I am uncertain, I can't go forward.	.83	-.04	.64
22.	Being uncertain means that I lack confidence.	.83	-.13	.54
15.	When I am uncertain, I can't function very well.	.80	.04	.69
13.	Being uncertain means that I am not first rate.	.74	.07	.63
1.	Uncertainty stops me from having a strong opinion.	.72	-.22	.32
16.	Unlike me, others seem to know where they are going with their lives.	.70	-.05	.44
17.	Uncertainty makes me vulnerable, unhappy, or sad.	.65	.24	.72
2.	Being uncertain means that a person is disorganized.	.63	-.11	.31
20.	The smallest doubt can stop me from acting.	.63	.11	.51
25.	I must get away from all uncertain situations.	.51	.32	.61
9.	Uncertainty keeps me from living a full life.	.48	.40	.68
24.	Uncertainty keeps me from sleeping soundly.	.47	.20	.41
23.	I think it's unfair that other people seem to be sure about their future.	.46	.25	.46
3.	Uncertainty makes life intolerable.	.44	.26	.44
10.	One should always look ahead so as to avoid surprises.	-.25	.84	.45
18.	I always want to know what the future has in store for me.	-.18	.84	.50

5.	My mind can't be relaxed if I don't know what will happen tomorrow.	<-.01	.78	.60
19.	I can't stand being taken by surprise.	< .01	.74	.55
21.	I should be able to organize everything in advance.	-.09	.73	.43
8.	It frustrates me not having all the information I need.	< .01	.71	.51
7.	Unforeseen events upset me greatly.	.12	.69	.61
11.	A small unforeseen event can spoil everything even with the best planning.	.17	.53	.45
4.	It's unfair having no guarantees in life.	.20	.51	.45
6.	Uncertainty makes me uneasy, anxious or stressed.	.33	.51	.63
26.	The ambiguities in life stress me.	.37	.44	.59
27.	I can't stand being undecided about my future.	.31	.42	.47
Eigenvalues following rotation		11.94	11.40	

Note. Significant promax-rotated principal factor standardized regression coefficients from the pattern matrix are those > 0.40 and appear in boldface. The 2-factor rotated solution accounted for 52.9% of the variance. The two factors were correlated at $r = .77$. IUS = Intolerance of Uncertainty Scale; Factor I = Uncertainty has Negative Behavioural and Self-Referent Implications; Factor II = Uncertainty is Unfair and Spoils Everything.

14	1.8	0.9	.68	.38	.35	.41	.34	.41	.50	.44	.37	.54	.28	.34	.62	.58	--													
15	1.9	0.9	.71	.36	.33	.43	.39	.48	.56	.48	.39	.58	.28	.33	.59	.57	.75	--												
16	2.1	1.2	.57	.33	.26	.30	.35	.31	.40	.32	.26	.38	.17	.29	.43	.42	.44	.46	--											
17	2.0	1.0	.78	.38	.35	.48	.44	.50	.61	.54	.43	.61	.34	.42	.57	.53	.60	.63	.56	--										
18	2.5	1.2	.61	.24	.20	.33	.42	.50	.47	.41	.40	.37	.45	.35	.35	.30	.36	.39	.36	.48	--									
19	1.8	0.9	.62	.20	.27	.35	.36	.48	.44	.57	.40	.44	.44	.40	.41	.39	.37	.41	.28	.46	.49	--								
20	2.0	1.0	.47	.41	.24	.31	.32	.38	.47	.42	.35	.44	.28	.36	.54	.42	.52	.50	.39	.53	.40	.45	--							
21	2.5	1.1	.36	.16	.15	.23	.25	.38	.33	.37	.41	.29	.44	.33	.28	.29	.27	.29	.20	.31	.42	.42	.35	--						
22	2.0	1.1	.46	.39	.40	.37	.33	.33	.46	.36	.31	.49	.21	.27	.48	.52	.50	.48	.43	.55	.30	.33	.43	.29	--					
23	1.7	1.0	.49	.25	.26	.32	.47	.36	.38	.34	.24	.37	.20	.30	.40	.41	.39	.40	.60	.48	.38	.31	.34	.24	.41	--				
24	1.9	1.1	.42	.24	.24	.35	.33	.48	.51	.44	.37	.45	.26	.30	.41	.37	.42	.45	.36	.53	.33	.39	.38	.27	.33	.38	--			
25	1.6	0.9	.53	.29	.32	.41	.44	.44	.47	.44	.33	.52	.33	.39	.52	.49	.49	.52	.40	.56	.43	.50	.48	.35	.46	.47	.48	--		
26	2.1	1.0	.59	.31	.27	.45	.45	.52	.63	.50	.44	.55	.33	.38	.48	.48	.52	.53	.43	.63	.47	.44	.46	.35	.48	.47	.54	.58	--	
27	2.4	1.2	.47	.26	.23	.35	.43	.43	.48	.40	.41	.41	.30	.35	.38	.35	.40	.44	.50	.51	.51	.43	.43	.35	.39	.47	.38	.45	.51	--

Note. IUS item intercorrelations are polychoric correlations computed using EQS version 6.1 software (Bentler, 1995; Bentler & Wu, 1995). IUS = Intolerance of Uncertainty Scale; r_{corr} = corrected item-total correlations. All correlations significant at $p < .001$.

Table 2.4

Factor Loadings for the Confirmatory Factor Analysis of the IUS (n = 1221)

No.	Item	I	II	<i>E</i>
17.	Uncertainty makes me vulnerable, unhappy, or sad.	.81		.81
15.	When I am uncertain, I can't function very well.	.78		.62
14.	When I am uncertain, I can't go forward.	.77		.64
9.	Uncertainty keeps me from living a full life.	.74		.68
12.	When it's time to act, uncertainty paralyzes me.	.74		.68
13.	Being uncertain means that I am not first rate.	.70		.71
25.	I must get away from all uncertain situations.	.70		.71
22.	Being uncertain means that I lack confidence.	.66		.75
20.	The smallest doubt can stop me from acting.	.65		.76
16.	Unlike me, others seem to know where they are going with their lives.	.61		.79
24.	Uncertainty keeps me from sleeping soundly.	.60		.80
3.	Uncertainty makes life intolerable.	.58		.81
23.	I think it's unfair that other people seem to be sure about their future.	.58		.81
1.	Uncertainty stops me from having a strong opinion.	.49		.87
2.	Being uncertain means that a person is disorganized.	.47		.88
6.	Uncertainty makes me uneasy, anxious or stressed.		.78	.62
26.	The ambiguities in life stress me.		.75	.66

5.	My mind can't be relaxed if I don't know what will happen tomorrow.	.73	.69
7.	Unforeseen events upset me greatly.	.72	.70
18.	I always want to know what the future has in store for me.	.66	.75
19.	I can't stand being taken by surprise.	.66	.75
27.	I can't stand being undecided about my future.	.65	.76
8.	It frustrates me not having all the information I need.	.63	.77
4.	It's unfair having no guarantees in life.	.59	.81
10.	One should always look ahead so as to avoid surprises.	.53	.85
11.	A small unforeseen event can spoil everything even with the best planning.	.54	.84
21.	I should be able to organize everything in advance.	.52	.85

Note. All factor loadings significant at $p < .05$. IUS = Intolerance of Uncertainty Scale; Factor I = Uncertainty has Negative Behavioural and Self-Referent Implications; Factor II = Uncertainty is Unfair and Spoils Everything; E = standardized error variance. Comparative Fit Index (CFI) = .97, Bentler-Bonnet Normed Fit Index (NNFI) = .96; Standardized Root Mean-square Residual (SRMR) = .05; Root Mean-square Error of Approximation (RMSEA) = .07.

Table 2.5

*Factor Score and Subscale Correlations With the Study Measures and Descriptive**Statistics for the Subscales of the IUS**Exploratory dataset (n = 1230): Factor score correlations^a*

	Uncertainty has Negative Behavioural and Self-Referent Implications	Uncertainty is Unfair and Spoils Everything	<i>n</i>	Fisher's <i>Z</i>	<i>r</i> ² _{difference}
PSWQ	.62	.65	469 ^b	-1.30	.04
WAQ ^c	.65	.55	559	4.90**	.12
STAI-T	.68	.58	264	3.69**	.13
BAI	.50	.47	426	1.00	.03
CES-D	.63	.56	431	2.84**	.08
Mean	28.89	27.62			
(SD)	(10.45)	(9.31)			

Confirmatory dataset (n = 1221): Subscale correlations^d

PSWQ	.59	.62	431 ^e	-1.31	.04
WAQ ^c	.65	.58	535	3.24**	.09
STAI-T	.66	.59	242	2.11*	.09
BAI	.58	.51	413	2.69**	.08
CES-D	.58	.48	426	3.95**	.11
Mean	28.23	27.27			
(SD)	(10.06)	(8.94)			

Note. IUS = Intolerance of Uncertainty Scale; PSWQ = Penn State Worry Questionnaire; WAQ = Worry and Anxiety Questionnaire; STAI-T = State Trait Anxiety Inventory – Trait version; BAI = Beck Anxiety Inventory; CES-D = Centre for Epidemiological Studies Depression Scale.

^a Factor scores were computed in SPSS from regression coefficients derived from PAF.

^b Participants were randomly selected from a sample of $n = 1102$ who completed the PSWQ.

^c Biserial correlation; analogue GAD diagnostic status coded as 1, absence of full GAD diagnostic criteria coded as 0.

^d Subscale scores were computed as the raw sum of the items loading on their respective factors.

^e Participants were randomly selected from a sample of $n = 1107$ who completed the PSWQ.

* $p < .05$, 2-tailed; ** $p < .01$, 2-tailed.

Chapter 3

Abstract

Intolerance of uncertainty has been identified as a cognitive vulnerability for generalized anxiety disorder (Dugas, Gagnon, Ladouceur, & Freeston, 1998; Koerner & Dugas, 2006, 2008). Sexton and Dugas (2009b) proposed that intolerance of uncertainty is characterized by two beliefs about uncertainty: 1) Uncertainty has Negative Behavioural and Self-Referent Implications; and 2) Uncertainty is Unfair and Spoils Everything. This study further explored the construct validity of these beliefs by examining their convergent and discriminant validity with conceptually overlapping cognitive and behavioural processes, and assessed their concurrent criterion-related validity in relation to negative interpretations of ambiguous situations as assessed by a new self-report measure, the Ambiguous Situations Questionnaire (ASQ). A non-clinical sample of 292 undergraduate students participated in this study conducted at Concordia University in Montreal and at Ryerson University in Toronto, Canada. The sample was 80.1% female and ranged in age from 18 to 59 years ($M = 22.4$, $SD = 6.1$). Consistent with its conceptualization, the belief that uncertainty has negative implications was more highly correlated with indecisiveness, procrastination, and the tendency to personalize negative situations, and showed criterion-related validity and specificity with perceptions of ambiguity as having negative personal implications. In contrast, the belief that uncertainty is unfair and spoils everything was more highly correlated with a preference for order and with self-oriented and other-oriented perfectionism. Further, this belief demonstrated criterion-related validity, but showed only partial evidence of a specific association, with perceptions of ambiguity as unfair and disruptive. These findings

support the construct and criterion-related validity of uncertainty intolerant beliefs.

Uncertainty has Negative Implications and is Unfair: Construct and Criterion-Related Validity of the Intolerance of Uncertainty Scale and Its Subscales

Intolerance of uncertainty has been identified as a cognitive vulnerability factor for worry and generalized anxiety disorder (GAD; Dugas, Gagnon, Ladouceur, & Freeston, 1998; Koerner & Dugas, 2006, 2008). The most recent definition of this construct describes intolerance of uncertainty as a “dispositional characteristic that results from a set of negative beliefs about uncertainty and its implications” (Dugas & Robichaud, 2007, p. 24). Following from this definition, there has been considerable interest of late in identifying the composite set of negative beliefs about uncertainty that comprise this construct (see, e.g., Berenbaum, Bredemeier, & Thompson, 2008; Boelen, Vrinssen, & van Tulder, 2010; Buhr & Dugas, 2002; Carleton, Norton, & Asmundson, 2007; Carleton, Sharpe, & Asmundson, 2007; DeBruin, Rassin, van der Heiden, & Muris, 2006; Freeston, Rhéaume, Letarte, Dugas, & Ladouceur, 1994; Norton, 2005). Recently, Sexton and Dugas (2009b) proposed that intolerance of uncertainty is characterized by two main beliefs about uncertainty: 1) the belief that uncertainty has negative behavioural and self-referent implications, and 2) the belief that uncertainty is unfair and spoils everything. The current study sought to further examine the construct validity, criterion-related validity, and specificity of these two beliefs about uncertainty. As such, this study assessed the convergent and discriminant associations of these beliefs about uncertainty with other cognitive and behavioural processes that have some conceptual overlap. Subsequently, this study explored the extent to which these beliefs predict threat appraisals and self-reports of how people respond when faced with ambiguous, uncertainty-inducing situations. Finally, this study aimed to evaluate the utility of

conceptualizing two distinct beliefs about uncertainty by exploring the specificity of these beliefs in predicting distinct behavioural, cognitive, and emotional responses to perceived threat in ambiguous situations.

The Search for Specific Negative Beliefs About Uncertainty That Result in Uncertainty Intolerance

The question of what specific beliefs contribute to intolerance of uncertainty has recently become a topic of interest. This line of research has the potential to be profitable for several reasons. To begin with, identification of the specific negative beliefs about uncertainty that contribute to the tendency to experience uncertain states as aversive is necessary to establish the validity of the intolerance of uncertainty construct. In addition, a more complete understanding of the negative beliefs that individuals high in intolerance of uncertainty hold would afford a closer examination of the mechanisms by which intolerance of uncertainty confers vulnerability for worry and the aforementioned associated maladaptive cognitive and behavioural responses to perceived threat. This in turn could enhance our ability to identify the processes contributing to the development of intolerance of uncertainty. As such, identifying and establishing the validity of intolerance of uncertainty's underlying beliefs may confer numerous benefits.

To answer this important question, an empirically-derived two-factor structure of the most commonly used measure of intolerance of uncertainty, the Intolerance of Uncertainty Scale (IUS; Freeston et al., 1994), was proposed by Sexton and Dugas (2009b). The two uncertainty intolerant beliefs identified were labeled “Uncertainty has Negative Behavioural and Self-Referent Implications” and “Uncertainty is Unfair and Spoils Everything” (Sexton & Dugas, 2009b). These findings thus suggest that

uncertainty is experienced as threatening because it threatens individuals' perceived ability to cope and contravenes their assumptions about how events should unfold. Both these negative beliefs about uncertainty demonstrated good reliability and showed promising utility by accounting for different portions of the variance in worry and other GAD-related symptomatology (Sexton & Dugas, 2009b).

It should be noted that several other studies to date have similarly examined the factor structure of intolerance of uncertainty, and the results of these independent investigations have converged to some extent. Similar item compositions to the two factors proposed by Sexton and Dugas (2009b) have been found in other investigations, though precise factor structures have differed somewhat across studies. Berenbaum and colleagues (2008), for instance, identified a four-factor structure incorporating most thought not all of the IUS items; two of these factors, "Uncertainty Paralysis" and "Desire for Predictability," correspond closely to the beliefs that "Uncertainty has Negative Behavioural and Self-Referent Implications" and "Uncertainty is Unfair and Spoils Everything," respectively. In addition, these factor solutions show similarities with the two factors identified in Carleton, Norton, and colleagues' (2007) short form of the IUS, which have been hypothesized to assess "inhibitory" anxiety generated by uncertainty (akin to the perceived negative behavioural implications of uncertainty assessed by Sexton & Dugas' factor, or the "Uncertainty Paralysis" factor proposed by Berenbaum and colleagues) and "prospective" anxiety about uncertainty (also not unlike a "Desire for Predictability" (Berenbaum et al., 2008) and a perception that uncertainty "spoils everything" (Sexton & Dugas, 2009b). Formal reviews of these factor analyses of the intolerance of uncertainty construct (e.g., Birrell, Meares, Wilkinson, & Freeston,

2011) have similarly noted that findings are converging on a two factor solution, which Birrell and colleagues have labeled “Uncertainty Paralysis” and “Desire for Predictability.” As such, it can be stated that the various proposed two-factor solutions for the intolerance of uncertainty construct have similarly identified perceived behavioural difficulties in the face of uncertainty, on the one hand, and a preference for a predictable, certain world on the other, as key component negative beliefs about uncertainty that comprise the intolerance of uncertainty construct.

Despite their similarities, these somewhat divergent factor solutions for intolerance of uncertainty have evidenced different levels of empirical support. Important differences in the methodological rigor of these studies may have contributed to the observed discrepancies in the factor structure of this construct. For instance, the small sample size in Berenbaum and colleagues’ (2008) investigation and in other previous studies (e.g., Buhr & Dugas, 2002; Freeston et al., 1994; Norton, 2005) may have contributed to the identification of a greater number of factors in these studies. This lack of methodological rigor is further suggested by discrepancies in the number and item composition of the factors derived across studies, and suggests that the number of factors was likely frequently oversampled in these exploratory factor analyses. Further, the strategies employed to ascertain the number of factors present in these studies, such as the scree plot (Cattell, 1966) and Kaiser rule (Kaiser, 1970), have been noted to frequently oversample factors (e.g., Zwick & Velicer, 1986). Alternative factor solutions, such as the short form two-factor structure proposed by Carleton, Norton, and colleagues (2007), did not employ exploratory factor analysis at all, but selected and refined previously identified factors from existing factor solutions (e.g., Buhr & Dugas, 2002;

Freeston et al., 1994), based primarily on the criteria that the selected factors not overlap. While the revised factors have evidenced good model fit (Carleton, Norton, et al, 2007; McEvoy & Mahoney, 2011), the content validity of these shorter subscales has yet to be demonstrated. Finally, few confirmatory factor analyses have been conducted on the full scale, and the vast majority of proposed factor structures for the 27-item Intolerance of Uncertainty Scale have yet to be replicated.

In contrast to previous IUS factor solutions, the proposed beliefs that “Uncertainty has Negative Behavioural and Self-Referent Implications” and “Uncertainty is Unfair and Spoils Everything” have evidenced good empirical support and consistency. Sexton and Dugas (2009b) employed separate large samples ($N > 1200$) to derive and confirm this proposed two-factor structure, and employed more rigorous statistical tests (such as Velicer’s Minimum Average Partial (MAP) test (Velicer, 1976) and Horn’s parallel analysis (Horn, 1965) to confirm the number of factors present. The excellent goodness of fit for this proposed two-factor structure of intolerance of uncertainty, as demonstrated in separate exploratory and confirmatory factor analyses, has provided preliminary evidence of the construct validity of these two beliefs. In addition, this more inclusive item composition for the two-factor structure of intolerance of uncertainty is currently the only empirically-derived full-scale factor solution of the IUS to be replicated and show acceptable model fit in confirmatory factor analyses, in both nonclinical (Sexton & Dugas, 2009b) and clinical (McEvoy & Mahoney, 2011; Donegan, Dugas, & Gosselin, 2011) samples. This solution also shows convergence with the commonalities identified in the other proposed factor solutions (e.g., Birrell et al., 2011).

In addition to differences in the statistical rigor of emerging factor solutions, there

remain some important differences in how variants of the two proposed intolerance of uncertainty factors have been conceptualized; these have yet to be examined empirically. Thus, questions remain as to the content validity of the different proposed factor solutions. Notably, the factor labels and item composition of the two factors proposed by Sexton and Dugas (2009b) represent a broader conceptualization of these uncertainty intolerant beliefs than those proposed by other two-factor structures (e.g., Berenbaum et al., 2008; Carleton, Norton et al., 2007). This broader conceptualization incorporates the aforementioned behavioural difficulties or preferences for predictability in uncertain situations identified in other factor solutions, but also considers meta-cognitive evaluations of these responses. For instance, the Uncertainty has Negative Behavioural and Self-Referent Implications factor includes not only the experience of behavioural paralysis in uncertain situations but also the tendency to personalize these difficulties (e.g., “Being uncertain means that I am not first rate”). Similarly, the broader conceptualization of the Uncertainty is Unfair and Spoils Everything factor incorporates not only a desire for predictability but also rigid expectations that this preference for certainty be met (e.g., “I can’t stand being taken by surprise”) and the perception that uncertainty in events is unfair (e.g., “It’s unfair having no guarantees in life”). While these two more broadly conceptualized factor labels thus possess face validity for their composite items (Sexton & Dugas, 2009b), validation by additional methods is nonetheless required in order to establish the validity of these factor conceptualizations (Tracy, 1990). To address this issue, further examination of the convergent and discriminant validity of these underlying uncertainty intolerant factors is required.

Previous Findings on the Criterion-Related and Construct Validity of the IUS

Subscales

Associations with worry and GAD-related symptomatology. Previous examinations of the set of specific negative beliefs about uncertainty proposed to result in intolerance of uncertainty have demonstrated preliminary evidence of criterion-related validity. In regard to symptomatology, the beliefs that Uncertainty has Negative Behavioural Self-Referent Implications and that Uncertainty is Unfair and Spoils Everything have demonstrated preliminary evidence of criterion-related validity and distinct associations with measures of anxious and depressive symptomatology. For instance, the belief that uncertainty has negative implications was shown to be more highly associated with analogue GAD diagnostic status, depressive symptoms, somatic anxiety, and trait anxiety (Sexton & Dugas, 2009b) than was the belief that Uncertainty is Unfair and Spoils Everything. Both uncertainty intolerant beliefs showed moderate correlations with the tendency to engage in frequent and excessive (pathological) worry (Sexton, Dugas, & Buhr, 2008; Sexton & Dugas, 2009b). As such, these two beliefs about uncertainty have demonstrated criterion-related validity with symptom measures as well as some evidence of specificity.

Construct validity of uncertainty intolerant beliefs with personality variables and cognitive constructs. Even more relevant to establishing the construct validity of the proposed uncertainty intolerant beliefs is evidence of their associations with other conceptually overlapping cognitive constructs. Though less research has been done in this area, some preliminary findings have provided support for the convergent and discriminant validity of these beliefs. In a re-analysis of previously published data (see Buhr & Dugas 2006), the belief that uncertainty has negative implications was found to

correlate with a low perceived sense of personal control (Sexton et al., 2008), thus providing support for its conceptualization as a measure of perceived self-referent implications of uncertainty. Some additional findings with the roughly comparable “Uncertainty Paralysis” factor of the IUS proposed by Berenbaum and colleagues (2008) have also been informative. This subscale was significantly more highly negatively correlated with extraversion and with decisiveness related to a need for closure than was these authors’ proposed “Desire for Predictability” IUS subscale. Thus, this negative belief about uncertainty has shown some preliminary evidence of criterion-related validity and specificity with measures of behavioural paralysis and perceived self-referent consequences.

In contrast, the belief that Uncertainty is Unfair and Spoils Everything has shown evidence of a specific association with more externalized cognitive constructs. For instance, consistent with the conceptualization of this IUS subscale as assessing uncertainty-related “shoulds,” this belief was more highly correlated with both self- and other-oriented perfectionistic standards than was the belief that uncertainty has negative implications (Sexton et al., 2008). This finding suggests that this uncertainty intolerant belief leads to demanding expectations that are pervasive and generalized to one’s own and others’ behaviours. These well-defined personal standards and other-oriented expectations may reflect a sense of urgency to counter the impacts of uncertainty that are deemed to be unfair. They may also reflect “shoulds” regarding how best to respond in uncertain situations in order to minimize the disruptive impact of uncertainty on the outcome of events. As such, the belief that uncertainty is unfair and disruptive has demonstrated convergent validity and specificity with measures of exigent performance

expectations for self and others.

The uncertainty-related “shoulds” reflected in the belief that uncertainty is unfair and spoils events may also result in more rigid expectations about how events should unfold. Individuals high in the belief that uncertainty should not be present may likewise expect and prefer that events in their surrounding environment proceed in an organized and predictable fashion. Consistent with this hypothesis, Berenbaum and colleagues (2008) found evidence for the specificity of their proposed “Desire for Predictability” IUS subscale with several facets of a need for closure including a desire for predictability, a preference for order and structure, and discomfort with ambiguity related to a need for closure. In addition, this IUS subscale showed higher correlations with the personality trait of conscientiousness than did their proposed “Uncertainty Paralysis” IUS subscale, suggesting that this factor is also associated with greater efforts to maintain consistency and accountability in personal behaviour. Thus, this similar IUS factor has evidenced convergent and specific relationships with expectations of orderliness, predictability, and conscientiousness.

While these preliminary findings are encouraging, important nuances in the more broadly proposed conceptualizations of the uncertainty intolerant beliefs remain to be examined. For instance, the construct validity of the belief that uncertainty has negative implications, conceptualized as incorporating beliefs about the behavioural implications of uncertainty and other perceived self-referent implications, has not been fully assessed. First, the association between this belief and additional *behavioural* implications of uncertainty has yet to be explored. Two behavioural consequences of being unable to “go forward” in the face of uncertainty might include a tendency to delay responding on

uncertain tasks and difficulty making decisions. As such, a propensity towards procrastination and indecisiveness might be expected to correlate with the belief that uncertainty has negative implications. Second, this IUS subscale is presumed to tap not only a perceived lack of personal control, as previously demonstrated (Sexton et al., 2008), but the perceived self-referent implications of this lack of control. This IUS subscale might therefore be expected to correlate with the tendency to commit the cognitive error of *personalizing* negative outcomes in stressful situations (i.e., of inferring that a negative behavioural outcome implies something bad about my ability to function). We therefore examined this IUS subscale's association with measures of indecisiveness, procrastination, and personalization.

This study also sought to replicate previous findings on the association between the belief that Uncertainty is Unfair and Spoils Everything and perfectionistic "shoulds", and extend previous findings on its possible relationship with "shoulds" related to a need for closure. In addition, we sought to further explore this uncertainty intolerant belief's association with other behavioural responses that could result from these "shoulds." One such behavioural response may be an exaggerated pervasive, or dispositional, tendency to monitor the environment for indications of how events are unfolding, so that threats or uncertainties may be dealt with more readily. Though previous research has also implicated intolerance of uncertainty in avoidance (e.g., Dugas et al., 2007; Robichaud, Dugas, & Conway, 2003) as well as in information-seeking (e.g., Rosen & Knäuper, 2009; Rosen, Knäuper, & Sammut, 2007), we did not have a reason to expect that either subscale of the IUS would show a discriminant relationship with measures of avoidance or blunting. Both negative beliefs about uncertainty concern reasons why an uncertain

state may be perceived as threatening or aversive, and as such both subscales might be expected to produce an avoidant response to this threat, consistent with past research on the broader construct. However, it has also been hypothesized that intolerance of uncertainty generally may also activate a more ardent search for certainty (e.g., Krohne, 1993). The more externally focused nature of the belief that Uncertainty is Unfair and Spoils Everything, which comprises expectations about the general predictability of events, was expected to show particularly strong correlations with a monitoring or information-seeking coping style. Thus, this study examined the relationships between this negative belief about uncertainty and a dispositional monitoring coping style, as well as with measures of self- and other-oriented perfectionism and a need for closure (as manifested by a preference for order and predictability).

Negative beliefs about uncertainty and information-processing: Further assessing the criterion-related validity and specificity of the IUS subscales.

Armstrong and Soelberg (1968) have recommended that one method of establishing the validity of hypothesized factor conceptualizations is to “specify at least one dependent variable which the factor analysis was designed to help explain or predict” (p. 364). Similarly, cognitive theory (see Clark & Beck, 2010) would predict that distinct beliefs should lead to different appraisals and behaviours in response to situational stressors. As such, distinct specific beliefs about uncertainty may therefore be expected to lead to different interpretations of ambiguous situations, albeit both negative ones, and to different coping responses in these situations. In order to establish their criterion-related validity and specificity, the association between the proposed negative beliefs about uncertainty that comprise intolerance of uncertainty and specific threatening

interpretations and maladaptive coping responses in uncertain situations would need to be assessed.

In order to further examine the criterion-related validity and specificity of uncertainty intolerant beliefs, a new questionnaire was developed to assess distinct cognitive interpretations and behavioural responses in ambiguous situations. These responses were hypothesized to be specific to the belief that Uncertainty has Negative Behavioural and Self-Referent Implications or the belief that Uncertainty is Unfair and Spoils Everything. In addition, this new questionnaire was designed to measure appraisal biases in ambiguous situations, for the purposes of exploring to what extent these specific beliefs about uncertainty contribute independently to negatively biased appraisals of ambiguity. For these purposes, we revised and extended an existing measure of appraisals in ambiguous situations (the Ambiguous / Unambiguous Situations Diary or AUSD; Davey, Hampton, Farrell, & Davidson, 1992; extended version: Koerner & Dugas, 2008) to include subscales assessing intolerance of uncertainty-related behavioural, cognitive, and emotional reactions to ambiguity. This new adapted measure, the Ambiguous Situations Questionnaire (ASQ), is thus comprised of three subscales assessing: 1) appraisals of ambiguous situations; 2) perceptions of the ambiguous situation as having negative personal implications, and; 3) perceptions of the ambiguous situation as unfair and disruptive. This study sought to explore the relationship between these newly developed ASQ subscales and the component uncertainty intolerant negative beliefs.

Study Goals and Hypotheses

The purpose of this study was three-fold. First, we sought to replicate Sexton and Dugas' (2009b) proposed factor solution for the Intolerance of Uncertainty Scale by re-

assessing its goodness of fit in a confirmatory factor analysis. Second, we further explored the construct validity of the two previously identified beliefs about uncertainty, namely the beliefs that: 1) Uncertainty has Negative Behavioural and Self-Referent Implications, and 2) Uncertainty is Unfair and Spoils Everything (Sexton & Dugas, 2009b), by examining their convergent and discriminant validity with measures of similar cognitive processes. Third, we further assessed the concurrent criterion-related validity and specificity of these proposed IUS subscales by examining their relationship with hypothesized specific manifestations of uncertainty intolerant beliefs in ambiguous situations, as assessed by the newly developed ASQ. As a whole, the aim of this study was therefore to further establish the validity and utility of conceptualizing distinct negative beliefs about uncertainty as components of the intolerance of uncertainty construct.

This study had several hypotheses regarding the construct validity of the IUS subscales (see Figure 3.1). First, we expected that the belief that Uncertainty has Negative Behavioural and Self-Referent Implications would correlate more highly than would the belief that Uncertainty is Unfair and Spoils Everything with measures of indecision, procrastination, and the tendency to personalize negative situations. Second, we expected that the belief that Uncertainty is Unfair and Spoils Everything would correlate more highly than would the belief that Uncertainty has Negative Implications with measures of self- and other-oriented perfectionism, need for closure (in particular a preference for order and predictability), and a monitoring coping style.

In addition, this study tested three hypotheses regarding the criterion-related validity and specificity of the IUS subscales in relation to appraisal biases as well as to

unique behavioural, cognitive, and emotional responses in ambiguous situations. First, we expected both beliefs about uncertainty to show moderate associations with negative appraisals of ambiguous situations as assessed by the ASQ. Given the lack of previous findings in this area, and the absence of theory-driven predictions regarding whether either of the IUS subscales would show stronger associations with the tendency to appraise ambiguous situations as generally “bad”, no *a priori* predictions were made regarding whether either of these beliefs would show unique associations with appraisals of ambiguous situations when controlling for the other specific negative belief about uncertainty.

Second, we expected that the belief that Uncertainty has Negative Behavioural and Self-Referent Implications would correlate significantly with perceptions of ambiguous situations as having negative personal implications. In addition, we expected this belief to correlate more highly with these perceptions of ambiguous situations as having negative personal implications than with perceptions of ambiguous situations as unfair and disruptive. Relatedly, we expected that the belief that uncertainty has negative implications would make a unique contribution to the prediction of perceptions of ambiguous situations as having negative personal implications, after controlling for the belief that Uncertainty is Unfair and Spoils Everything.

Third, we expected that the belief that Uncertainty is Unfair and Spoils Everything would correlate significantly with perceptions of specific ambiguous situations as unfair and disruptive. Further, we expected this belief to correlate more highly with perceptions of ambiguous situations as unfair and disruptive than with perceptions of ambiguity as having negative personal implications. Similarly, we

expected that the belief that Uncertainty is Unfair and Spoils Everything would demonstrate a unique association with the perception that ambiguity is unfair and disruptive, when controlling for the belief that uncertainty has negative implications.

Method

Participants and Procedure

A non-clinical sample of 292 undergraduate students participated in this study, which was conducted at Concordia University in Montreal, and at Ryerson University in Toronto. The combined sample was 80.1% female and 19.9% male and ranged in age from 18 to 59 years ($M = 22.4$, $SD = 6.1$). There were no significant differences in age or sex distribution between the samples (see Table 3.1). There were, however, small but significant differences across the two samples in the proportion of participants from various self-reported ethnic backgrounds (see Table 3.1). Pairwise comparisons found a higher proportion of White participants in the Concordia sample ($\chi^2 = 8.39$, $df = 1$, $p = .004$), and a higher proportion of Black and Asian participants in the Ryerson sample ($\chi^2 = 6.82$, $df = 1$, $p = .009$, and $\chi^2 = 22.51$, $df = 1$, $p < .001$). Across the two samples, there also were significant differences in the proportion of participants reporting English, French, or other first languages (see Table 3.1). Pairwise comparisons found a higher proportion of participants in the Concordia sample reporting French as their first language ($\chi^2 = 15.86$, $df = 1$, $p < .001$), and a higher proportion of English first language participants in the Ryerson sample ($\chi^2 = 4.24$, $df = 1$, $p = .040$). Demographic characteristics for each sample are presented in Table 3.1. Given that there were some differences in ethnic background and first spoken language between the two samples, means and correlations for the study measures in the Concordia University and Ryerson

University samples were compared in order to ascertain whether it would be appropriate to combine these samples. Significant mean differences were observed between the samples in the belief that uncertainty has negative implications, in overall negative appraisals of ambiguous situations, in perceptions of ambiguity as having negative implications, and in perceptions of ambiguity as unfair and disruptive, as well as in a tendency towards indecisiveness, a preference for predictability, self-oriented perfectionism, and a monitoring coping style, with the Ryerson sample scoring higher on all of these measures except for self-oriented perfectionism. However, an examination of the correlations between study measures, compared using Fisher's Z test of independent correlations, found few significant differences within the Concordia University and Ryerson University samples. Given the overall consistency in the associations between study measures across samples, the sole exceptions pertaining to self- and other-oriented perfectionism which showed stronger correlations in the Concordia University sample, the data was collapsed across the two samples for all subsequent analyses.

Measures

The Intolerance of Uncertainty Scale (IUS; Freeston et al., 1994; English translation: Buhr & Dugas, 2002). Intolerance of uncertainty was assessed using the 27-item IUS, which assesses the tendency to experience uncertain situations as aversive as a result of negative beliefs about uncertainty and its implications. Recently, two subscales, or beliefs about uncertainty, have been identified for the IUS: 1) the belief that uncertainty has negative behavioural and self-referent implications; and 2) the belief that uncertainty is unfair and spoils everything (Sexton & Dugas, 2009b). Examples of items on the IUS include "When I am uncertain, I can't go forward" (Subscale 1) and "A small

unforeseen event can spoil everything even with the best planning” (Subscale 2). Items are rated on a 5-point Likert scale which ranges from 1 = “*not at all characteristic of me*” to 5 = “*entirely characteristic of me*”. While initially developed in French, both the original French version and the English translation have shown excellent internal consistency and temporal stability as well as evidence of criterion, convergent, and discriminant validity (Buhr & Dugas, 2002; Dugas, Freeston, & Ladouceur, 1997; Freeston et al., 1994). The IUS has also demonstrated comparably strong reliability and validity across Caucasian, African American, Hispanic/Latino, and Southeast Asian ethnic samples in a student population (Norton, 2005). In addition, the subscales of the IUS have shown excellent internal consistency ($\alpha = .92$ for Subscale 1, $\alpha = .90 - .91$ for Subscale 2; Sexton & Dugas, 2009b), and stability across diverse ethnic samples (Sexton & Dugas, 2007). Confirmatory factor analysis of the IUS has attested to the construct validity of these two subscales (Sexton & Dugas, 2009b). Both IUS subscales have also evidenced criterion-related validity with measures of worry and GAD symptoms (Sexton & Dugas, 2009b). In this study, the two subscales of the IUS also showed very good to excellent internal consistency (for IUS-NI, $\alpha = .89$; for IUS-US, $\alpha = .90$) and high average inter-item correlations ($r = .35$, 95% C.I. = .31 - .40 for IUS-NI, and $r = .42$, 95% C.I. = .37 - .46 for IUS-US).

The Ambiguous Situations Questionnaire (ASQ). The ASQ was developed for the purposes of the present study, and was partially based on an existing measure, the Ambiguous/Unambiguous Situations Diary (AUSD; Davey et al., 1992) and its extended version (Koerner & Dugas, 2008). Incorporating 22 of the 33 ambiguous situations from the extended AUSD, in revised form, the ASQ presents a set of vignettes describing

ambiguous scenarios across a broad range of common worry themes. These themes include relationships with parents/family, friendships, romantic relationships, academic performance, work competence, finances, threat of physical harm/danger, one's own health, the health of loved ones, the future, and one's confidence/self-concept. Questions assess respondents' appraisal of the potential threat posed by each ambiguous situation. Additional questions were added to assess respondents' tendency to elaborate upon possible negative behavioural and self-referent implications of each situation, and their tendency to perceive these situations as unfair and disruptive. As such, the ASQ comprises three subscales: 1) appraisals of ambiguous situations (Appraisal of Ambiguity subscale; ASQ-A); 2) perceptions of ambiguous situations as having negative personal implications (Ambiguity has Negative Implications subscale; ASQ-NI); and 3) perceptions of ambiguous situations as unfair and disruptive (Ambiguity is Unfair and Disruptive subscale; ASQ-UD).

For the ASQ-A subscale, changes were made to the rating scale and response options initially employed by the AUSD. First, in order to more narrowly assess appraisals of the threat rather than worry, appraisals of ambiguous situations were assessed by asking participants to rate the perceived aversiveness (or "badness") of each situation, as opposed to rating their "concern" about the outcome. This alternative form of rating scale has been commonly employed in previous studies assessing negative interpretative biases in worry and GAD (e.g., Berenbaum, Thompson, & Bredemeier, 2007; Berenbaum, Thompson, & Pomerantz, 2007; Butler & Mathews, 1983). Second, the rating scale was altered from a 5-point to a 9-point Likert scale, in order to increase variability. Finally, some changes were made to the nature of the situational vignettes

being appraised. Several of the original scenarios were ambiguous due to information that was lacking but that would ordinarily be available, therefore rendering it potentially difficult for participants to imagine themselves being faced with such situations and responding to them as described. As such, particularly problematic items from the original 33 scenarios were not retained, and additional ambiguous situations were generated as necessary. Several of the remaining scenarios were also revised so that the ambiguity was a result of uncertainty inherent in the meaning of the situation and its potential outcomes.

Subsequent additions to the measure consisted of the development of the ASQ-NI and ASQ-UD subscales. Following the assessment of threat appraisals (ASQ-A subscale) for each ambiguous situation, hypothetical situation-specific behavioural, cognitive, or emotional responses, hypothesized to be consistent with the two negative beliefs about uncertainty assessed by the IUS, were then presented for each vignette. Subsequent questions then assessed the typicality of these responses for the respondent.

To develop these additional questions for each vignette, the first author generated potential responses to the scenarios that could be consistent with either the tendency to perceive negative behavioural or self-referent implications of these ambiguous situations, or the tendency to perceive the situational ambiguity as unfair, avoidable, and unnecessarily disruptive. These potential items were then reviewed by research colleagues with expertise in intolerance of uncertainty who provided additional suggestions and comments; the items were subsequently revised by the first and second author based on this feedback. A proposed set of items was then pilot-tested with additional research colleagues and other graduate students in psychology, in order to

assess the accessibility and credibility of these items; revisions were made accordingly by the primary and secondary author. Subsequently, the final set of items comprising the two newly-generated subscales were reviewed by five experts on anxiety disorders (including the third author), blind to the development of these items, who were asked to categorize the items according to descriptions of their respective IUS subscale. Ninety-nine percent of the responses were correctly categorized. The items of the ASQ-NI and ASQ-UD were therefore shown to possess face validity for the negative beliefs about uncertainty whose consequences they were intended to assess.

The following is an example of a vignette presented on the ASQ, assessing concerns related to the personal health worry theme. Participants were asked to imagine: “After my check-up, the doctor told me he/she would call if there was a problem. It's a week later and I have not heard anything.”. Appraisals of ambiguous situations were assessed by asking participants to rate “*How good or bad does this situation seem to you?*”. Ratings ranged from 0 = *very good* to 8 = *very bad*. Subsequently, to assess perceived negative behavioural and self-reference implications (on the ASQ-NI subscale), participants were asked, “*In this situation, how likely would you be to react in the following way?*”: “I am disappointed with myself for being distracted while waiting to see if my doctor might phone”. Ratings ranged from 0 = *not at all likely* to 8 = *very likely*. To assess the belief that ambiguity is unfair and disruptive, and the expectation that the world should therefore be less uncertain and that others should make efforts to provide clarity and predictability in ambiguous situations (ASQ-UD subscale), participants were asked, “*To what extent do you agree with the following statement?*”: “Doctors’ offices should call you one way or another; it’s too much to expect that I should go about my life

as usual while dealing with this suspense.”. Ratings ranged from 0 = *completely disagree* to 8 = *completely agree*. For all subscales, higher scores are reflective of more negative interpretations of the ambiguous situations and their implications.

The ASQ-Appraisals subscale showed acceptable internal consistency ($\alpha = .70$), and the ASQ-NI and ASQ-UD subscales both demonstrated very good internal consistency ($\alpha = .86$ and $\alpha = .81$, respectively). In addition, average inter-item correlations for the three subscales showed small but acceptable effect sizes. The average inter-item correlations were $r = .10$ (95% C.I. = .08 - .12) for the ASQ-A, $r = .22$ (95% C.I. = .19 - .26) for ASQ-NI, and $r = .16$ (95% C.I. = .14 - .19) for ASQ-UD.

Frost’s Indecisiveness Scale (FIS, Frost & Shows, 1993). The tendency to be indecisive or to delay decisions was assessed using the FIS, which is comprised of 15 items. A sample item is: “It seems that deciding on the most trivial thing takes me a long time.” Respondents rate the extent to which they disagree or agree on a 5-point Likert scale where 1 = *strongly disagree* and 5 = *strongly agree*; several items are reverse scored. This measure has shown excellent internal consistency ($\alpha = .87 - .90$; Frost & Shows, 1993), as well as evidence of convergent and criterion-related validity (Frost & Shows, 1993; Gayton, Clavin, Clavin, & Broida, 1994). In this study, $\alpha = .87$ and the average inter-item correlation was $r = .31$ (95% C.I. = .27 - .35).

Lay’s General Procrastination Scale (LGP; Lay, 1986). Procrastination, or “the tendency to postpone that which is necessary to reach some goal” (p. 475), was assessed using the 20-item scale developed by Lay (1986). The LGP measures procrastination across a wide variety of situations, including work, leisure activities, daily tasks, communications, event planning, and other deadlines. A sample item is: “I often find

myself performing tasks that I had intended to do days before”. Statements are rated on a 5-point Likert scale ranging from 1 = *false of me* to 5 = *true of me*; 10 items are reversed scored. The LGP has demonstrated very good internal consistency (ranging from $\alpha = .82$ -.83; Lay, 1986), test-retest reliability ($r = .80$ over a 1 month period; Ferrari, 1989), and evidence of convergent, discriminant (Ferrari, 1992; Lay, 1986), and criterion-related validity (Ferrari, 1992; Lay, 1986; Stainton, Lay, & Flett (2000). In this study, $\alpha = .86$ and the average inter-item correlation was $r = .23$ (95% C.I. = .20 - .27).

The Cognitive Error Questionnaire - General version, Personalization subscale (CEQ-P; Lefebvre, 1981). The CEQ was designed to measure the tendency to make cognitive errors when processing information in either back pain related or general situations (at work, at home or with family, or when engaging in leisure activities). The CEQ is comprised of four subscales which assess the tendency to make biased interpretations when appraising situations, consistent with any of four cognitive errors including the tendencies: 1) to catastrophize when anticipating the situation’s outcome; 2) to overgeneralize the implications of the situation; 3) to personalize or take responsibility for the situation; and 4) to selectively abstract negative information. In the General version of the CEQ, 24 vignettes are presented, each followed by a negative interpretation of the situation. Respondents are asked to rate the extent to which the dysphoric cognition is typical of the way they might appraise the situation, on a 5-point Likert scale ranging from 0 = “*almost exactly like I would think*” to 4 = “*not at all like I would think*”. These ratings are summed and the total scores are then inverted, such that higher scores reflect a greater tendency to personalize implications of negative events. Overall, the CEQ has shown excellent internal consistency ($\alpha = .89$ to .92 for General and

Low Back Pain versions) and very good test-retest reliability ($r = .80$ to $.85$; Lefebvre, 1981). The subscales of the CEQ have also shown good to excellent internal consistency ($\alpha = .62$ to $.94$) and acceptable alternate forms reliability ($r = .55$ to $.79$). Further, as a whole this measure of cognitive errors has demonstrated evidence of convergent and discriminant validity (Neimeyer & Feixas, 1992) and distinguishes depressed or anxious and non-clinical groups (Muran & Motta, 1993; Neimeyer & Feixas, 1992). Only the General form Personalization subscale, composed of 6 items, was employed in the current study. This subscale has similarly demonstrated convergent and discriminant validity (Neimeyer & Feixas, 1992). In this study, $\alpha = .53$ and the average inter-item correlation was $r = .16$ (95% C.I. = $.11 - .20$) for the CEQ-P.

The Multidimensional Perfectionism Scale – Self-Oriented & Other-Oriented Perfectionism subscales (MPS; Hewitt & Flett, 1991). Perfectionist personal standards and expectations for others were assessed with two subscales from the MPS: Self-Oriented Perfectionism (MPS-SOP) and Other-Oriented Perfectionism (MPS-OOP). Sample items include: “I do not have very high standards for myself” (MPS-SOP, reverse scored) and “I cannot stand to see people close to me make mistakes” (MPS-OOP). These subscales each comprise 15 items rated on a 7-point Likert scale ranging from 1 = *strongly disagree* to 7 = *strongly agree*; several items are reverse scored. Both subscales have demonstrated very good internal consistency (ranging from $\alpha = .86$ to $.89$ for self-oriented perfectionism, and $\alpha = .72$ to $.82$ for other-oriented perfectionism; Hewitt & Flett, 1991) and test-retest reliability (ranging from $r = .69$ to $.88$ for self-oriented perfectionism, and $r = .66$ to $.85$ for other-oriented perfectionism, over a 3-month period, in clinical (Hewitt, Flett, Turnbull-Donovan, & Mikail, 1991) and non-clinical

populations (Hewitt & Flett, 1991), respectively). These two subscales have also shown evidence of convergent and discriminant validity in clinical (Hewitt & Flett, 1991; Hewitt et al., 1991) and nonclinical (Hewitt & Flett, 1991; Frost, Heimberg, Holt, Mattia, & Neubauer, 1993) samples. In this study, $\alpha = .88$ for MPS-SOP and $\alpha = .59$ for MPS-OOP, and average inter-item correlations for the two subscales were $r = .33$ (95% C.I. = .29 - .38) for MPS-SOP and $r = .09$ (95% C.I. = .07 - .11) for MPS-OOP.

The Need for Closure Scale – Preference for Order & Preference for Predictability subscales (NFCS; Kruglanski, Webster, & Klem, 1993). The NFCS assesses individual differences in the need for closure, which has been defined as the desire for “*an* answer on a given topic, *any* answer, compared to confusion and ambiguity” (Kruglanski, 1986, p. 337). The NFCS is composed of 42 items in total. Subscales were subsequently developed using exploratory factor analysis, and subsequent confirmatory factor analyses validated the 5-factor hierarchical structure (Webster & Kruglanski, 1994). Two of the five subscales were employed in the current study: a Preference for Order or Structure (NFCS-PO), composed of 10 items, and a Preference for Predictability (NFCS-PP) composed of 8 items. Sample items for these subscales include: “I enjoy having a clear and structured mode of life” (NFCS-PO) and “I dislike unpredictable situations” (NFCS-PP). These two subscales have demonstrated good to very good internal consistency (Preference for Order subscale $\alpha = .77$ to $.82$, Preference for Predictability subscale $\alpha = .72$ to $.79$; Webster & Kruglanski, 1994). Respondents are asked to rate the extent to which they identify with these descriptions of personal characteristics on a 6-point Likert scale ranging from 1 = *strongly disagree* to 6 = *strongly agree*; several items are reverse scored. In this study, $\alpha = .76$ for NFCS-PO and

$\alpha = .81$ for NFCS-PP, and average inter-item correlations for the two subscales were $r = .22$ (95% C.I. = .18 - .26) for NFCS-PO and $r = .35$ (95% C.I. = .30 - .40) for NFCS-PP. The NFCS has demonstrated evidence of convergent, discriminant, and criterion-related validity (Webster & Kruglanski, 1994).

The Miller Behavioral Style Scale – Monitoring subscale (MBSS-M; Miller, 1987). The MBSS is a 32-item self-report measure of information-seeking and avoidant behavioural and cognitive coping styles in uncontrollable threatening situations. For the purposes of this study, the Monitoring subscale was used. Four vignettes, asking participants to imagine themselves waiting to undergo a dental procedure despite being fearful, being held hostage by a group of armed terrorists, waiting for the announcement of company layoffs following an annual work performance review, and experiencing an abrupt change in altitude during a flight, are presented along with 16 items describing a range of possible information-seeking responses. Sample monitoring responses include: (at the dentist) “I would want the dentist to tell me when I would feel pain”; (in a hostage situation) “I would make sure I knew where every possible exit was”; (waiting for layoffs) “I would talk to my fellow workers to see if they knew anything about what the supervisor's evaluation of me said”; and (on a turbulent flight) “I would call for the flight attendant and ask her exactly what the problem was.” Van Zuuren and Wolfs (1991) noted that employing a 5-point Likert scale improved the reliability of this measure (e.g., $\alpha = .78$, compared to $\alpha = .66$ using the original dichotomous rating scale); as such, a 5-point Likert scale ranging from 1 = *not at all applicable* to 5 = *very much applicable* was used in the current study. In this study, $\alpha = .76$, and the average inter-item correlation was $r = .16$ (95% C.I. = .13 - .19).

Results

Preliminary Analyses

Data screening and outlier analysis. Questionnaire data were provided by 311 participants. Three participants were subsequently excluded due to missing data (e.g., more than one third of questions left incomplete) on at least one of the relevant measures. The data were also initially examined for multivariate and univariate outliers as well as distribution normality. To assess for multivariate outliers, Mahalanobis distance was calculated by entering all measures into a multiple regression with an arbitrary numerical subject code as the dependent variable. Sixteen multivariate outliers were identified ($p < .01$, two-tailed test) and excluded from subsequent analyses. All total scale and relevant subscale scores were then examined for univariate outliers (identified as data points falling either 3.29 standard deviations ($p < .001$, two-tailed test) above or below the mean; Tabachnick & Fidell, 2001). No univariate outliers remained after the multivariate outliers were removed from the dataset. Finally, the normality of the distribution was assessed for all study measures. All total scale and subscale scores were within skew tolerances (i.e., $\text{skew}/SE < |5|$, given $N > 100$) and within kurtosis tolerances (i.e., $\text{kurtosis}/SE < |5|$, given $N > 100$). The final sample thus consisted of 292 participants. Means and standard deviations for all study measures are presented in Table 3.2, along with inter-correlations for these measures and correlations with demographic variables.

For the confirmatory factor analysis (CFA) of the IUS, individual items were also screened for univariate and multivariate outliers and distribution normality. Of the 311 participants who provided data on the IUS, 10 were missing data on individual items and were excluded from the CFA. Subsequently, 11 multivariate outliers were identified and

excluded. One further univariate outlier was also excluded from the CFA. A final sample consisting of 289 participants was therefore employed. In this sample, seven of the individual IUS items evidenced significant distribution skew (IUS items #9, 12, 13, 19, 23, 24, and 25) and one item (IUS item # 25) showed significant kurtosis. Rather than transforming these variables, alternate methods of estimation, described below, were employed in the CFA to accommodate this non-normality in the distribution of individual items.

Confirmatory Factor Analysis of the IUS

In order to assess the replicability of previous findings on the factor structure of the IUS (Sexton & Dugas, 2009b), a confirmatory factor analysis of the proposed two-factor structure was performed with the EQS structural equation program, version 6.1 (Bentler, 1995; Bentler & Wu, 1995). Given the significant skewness evidenced by some of the individual IUS items and the presence of significant multivariate kurtosis among the IUS items (Mardia's coefficient of multivariate kurtosis = 68.82, normalized estimate $Z = 14.79$), and in order to be consistent with previous confirmatory factor analyses of the IUS (e.g., Sexton & Dugas, 2009b), the elliptical (ERLS) method of estimation was employed. This method of extraction has also been suggested to be less prone to error when testing complex models (Kline, 1998). As the two factors of the IUS comprise the same overarching construct, these factors were allowed to covary in the identified two-factor model. IUS item means, standard deviations, corrected item-total correlations, and the intercorrelations among these observed variables are presented in Table 3.3. CFA factor loadings and error estimates for the replicated two-factor model of the IUS are presented in Table 3.4. All IUS items were shown to load significantly on their respective

factor, and the strength of association ranged from small to large effect sizes ($r^2 = .13$ to $.64$). Also as expected, the two factors were found to correlate significantly ($r = .85$).

Though the two-factor model generally met conventional standards for good model fit, the model $\chi^2 = 868.53$ for $df = 323$ was significant ($p < .001$) and the χ^2/df ratio = 2.69, whereas χ^2/df ratios of less than 2 are recommended. Nonetheless, the Bentler-Bonnet Normed Fit Index (BBNFI) suggested good model fit (BBNFI = .94, $> .90$ as recommended; Tabachnick & Fidell, 2001), as did the Comparative Fit Index (CFI) (CFI = .96, $> .95$ as recommended; Hu & Bentler, 1999; Tabachnick & Fidell, 2001). Standardized root mean-square residuals (SRMR) were low and thus also indicative of good fit (SRMR = .06, $< .08$ as recommended; Hu & Bentler, 1999), although the root mean-square error of approximation (RMSEA) was .08 (90% C.I. = .07-.08) whereas RMSEA's $< .06$ are recommended (Hu & Bentler, 1999). Thus, overall the two factor model provided a good fit to the data, comparable to previous CFA's of the IUS factor structure (e.g., Carleton, Norton et al., 2007; Sexton & Dugas, 2009b). In addition, this two-factor model of the IUS was shown to provide a significantly better fit to the data than a one-factor model ($\Delta\chi^2 = 249.77$ for $\Delta df = 1$, $p < .001$). While providing an adequate fit to the data, this one-factor model did not meet the aforementioned criteria for goodness-of-fit on many indices, which were also comparatively poorer than those of the two-factor model ($\chi^2 = 1118.30$ for $df = 324$, $p < .001$; χ^2/df ratio = 3.45; BBNFI = .94; CFI = .94; SRMR = .07; RMSEA = .09, 90% C.I. = .09-.10).

Construct Validity of the IUS Subscales

Correlational analyses with the study measures. To assess the convergent and discriminant validity of the IUS subscales, correlations were computed between these

subscales and measures of overlapping cognitive constructs (see Table 3.5). Consistent with hypotheses, the IUS-NI was significantly more highly correlated with indecisiveness (FIS), procrastination (LGP), and the tendency to personalize negative situations (CEQ-P) than was the IUS-US. Further, the LGP and IUS-US did not show a significant association.

By comparison, and also consistent with hypotheses, the IUS-US was more highly correlated with a preference for order (NFCS-PO) and with self-oriented (MPS-SOP) and other-oriented (MPS-OOP) perfectionism, than was the IUS-NI. Contrary to expectations, however, a preference for predictability (NFCS-PP) and a monitoring copying style (MBSS-M) were significantly correlated with both IUS subscales to a comparable extent.

Criterion-Related Concurrent Validity and Specificity of the IUS Subscales

Correlational analyses with the ASQ. To further evaluate the criterion-related validity of the IUS subscales, correlations were computed between the IUS subscales and the ASQ subscales; these were then compared using Fisher's r to Z transformation for non-independent correlations (Meng, Rosenthal, & Rubin, 1992). First, correlations between the IUS subscales and the ASQ Appraisals of Ambiguity subscale (ASQ-A) were examined. The belief that uncertainty has negative self-referent and behavioural implications (IUS-NI) was significantly and positively correlated with the ASQ-A ($r = .46, p < .001$). The belief that uncertainty is unfair and spoils everything (IUS-US) similarly showed a significant positive correlation with the ASQ-A ($r = .43, p < .001$). There were no significant differences in the magnitude of these correlations ($Z = 0.90, p = .368, r^2_{\text{difference}} = .03$).

To further examine the criterion-related validity of the IUS subscales, and to

assess their specificity, correlations were computed between the IUS-NI and IUS-US and the ASQ-NI and ASQ-UD. Consistent with the conceptualization of the IUS subscales, the IUS-NI was significantly and positively correlated with both the ASQ-NI and ASQ-UD, but was more highly correlated with the ASQ-NI than with the ASQ-UD (see Table 3.6). Thus, the IUS-NI demonstrated both criterion-related validity and specificity. In contrast, the IUS-US did not show a significant difference in correlations between the ASQ-UD and ASQ-NI, and was significantly positively correlated with both subscales (see Table 3.6). As such, the IUS-US demonstrated criterion-related validity but not specificity.

Regression analyses predicting the ASQ subscales. Hierarchical multiple regressions were conducted predicting scores on the three ASQ subscales. Given the high observed correlation between the two IUS subscales ($r = .77$, $r^2 = .59$ or 59% of the variance overlapping, $p < .001$), collinearity diagnostics were examined. In these regressions, the variance inflation factor (VIF) and tolerance indices of multicollinearity were within acceptable limits (VIF = 2.46, tolerance = .41; see Cohen, Cohen, West, & Aiken, 2003).

To test the study hypotheses that both IUS subscales would be associated with appraisals of ambiguity, two regressions were computed predicting scores on the ASQ-A. In the first regression, the IUS-US was entered on the first step, followed by IUS-NI on the second step (see Table 3.7). In the second regression, this order was reversed (see the alternate Step 1 in Table 3.7). When entered in the first step of the regressions, each IUS subscale showed a moderate positive association with a tendency to appraise the ambiguous situations of the ASQ negatively (see Table 3.7). Further, both made a unique

contribution to the prediction of the ASQ-A with both IUS subscales in the equation. As such, both IUS subscales evidenced criterion-related validity.

Subsequently, two separate regressions were conducted to assess whether the IUS-NI would make a unique contribution to the prediction of ASQ-NI after accounting for the contribution of IUS-US, and similarly to assess whether the IUS-US would show a unique association with ASQ-UD after controlling for IUS-NI. In the first regression, consistent with the hypotheses, the IUS-NI was found to significantly predict scores on the ASQ-NI after controlling for IUS-US (see Table 3.8). In contrast, though the IUS-US was a significant predictor of ASQ-NI scores on the first step of the equation, it did not significantly contribute to the prediction of ASQ-NI when accounting for IUS-NI. As such, the IUS-NI demonstrated both criterion-related validity and specificity by predicting a significant unique proportion of the variance in appraisals of ambiguity as having negative implications.

In the second regression, and also consistent with expectations, the IUS-US significantly predicted scores on the ASQ-UD after controlling for the IUS-NI (see Table 3.9). In contrast, the IUS-NI significantly predicted ASQ-UD scores on the first step of the equation, but no longer contributed significantly to the prediction of the ASQ-UD when accounting for IUS-US. As such, the IUS-US demonstrated criterion-related validity and specificity in the prediction of appraisals of ambiguity as being unfair and disruptive.

Given that ethnic origin showed significant correlations with both the ASQ-A and ASQ-NI (see Table 3.2), and that the two samples differed significantly in the proportion of participants originating from different ethnic backgrounds (see Table 3.1), the

aforementioned hierarchical regressions for these two ASQ subscales were re-run controlling for ethnicity. While ethnic origin was a significant predictor of the ASQ-A and the ASQ-NI in these regressions (as both a Black or Asian origin was more highly positively associated with these interpretive biases than was a White ethnic background), there were no changes in the overall findings on the unique associations between the subscales of the IUS and ASQ.

Discussion

The purpose of this study was to further explore the construct validity of two negative beliefs about uncertainty, measured by subscales of the IUS, against measures of overlapping behavioural and cognitive constructs, and to explore the criterion-related validity of these negative beliefs about uncertainty in relation to self-reported responses to perceived threats in ambiguous situations. First, the belief that being in a state of uncertainty has negative personal implications, for both behavioural functioning and a person's self-concept, was expected to be associated with measures of behavioural paralysis (e.g., indecision and procrastination) and with a tendency to make personalized attributions about the causes of negative events. Second, this IUS subscale was expected to predict perceptions of specific ambiguous situations as more likely to have negative personal consequences. In contrast, the belief that uncertainty should not normally occur, and that its presence and unsettling impact on the unfolding of events is therefore unfair, was hypothesized to be related to more demanding or perfectionistic expectations for one's self and others, to a preference for an ordered, structured, and predictable environment, and to a tendency to engage in hypervigilant monitoring in threatening situations. Further, this belief was expected to result in more externalized attributions for

the difficulties encountered in ambiguous situations, and as such was predicted to relate to perceptions of ambiguous situations as unfair and disruptive. Therefore, as a whole this study sought to establish the validity of conceptualizing two distinct composite negative beliefs about uncertainty that result in intolerance to uncertainty, and to assess the utility of these separate beliefs when explaining differences in how individuals respond to perceived threats.

This study extended prior findings on the criterion-related validity and specificity of the IUS subscales. Previously, the IUS subscales have been examined in relation to the symptoms of GAD, including worry, trait anxiety, and concomitant somatic anxiety symptoms and depressed mood. Both negative beliefs about uncertainty have shown comparable moderate positive correlations with excessive, generalized worry in both non-clinical (Sexton & Dugas, 2009b) and clinical samples (Donegan, 2010), thereby demonstrating criterion-related validity. Further, the belief that uncertainty has negative implications has demonstrated specificity, as it evidenced stronger associations with depression symptoms, somatic anxiety, trait anxiety, and analogue GAD diagnostic status than has the belief that uncertainty is unfair and spoils everything (Sexton & Dugas, 2009b). This study sought to extend these findings by instead examining the IUS subscales' associations with cognitive and behavioural processes.

Construct Validity of the Belief That Uncertainty has Negative Behavioural and Self-Referent Implications

As evidence of the construct validity of the proposed IUS subscales, and consistent with expectations, the belief that Uncertainty has Negative Self-Referent Implications demonstrated convergent validity with measures of behavioural impairments

and with perceived negative self-referent consequences of these difficulties in functioning, as the subscale label describes. The belief that uncertainty has negative implications showed a high correlation with the propensity to be indecisive, a small but significant correlation with the tendency to procrastinate across a range of situations, and a moderate association with the inclination to perceive negative outcomes as attributable to personal failings. Further, this IUS subscale evidenced discriminant validity, as correlations with these measures of maladaptive behavioural tendencies and self-referent cognitive errors were significantly higher with this subscale than they were with the belief that Uncertainty is Unfair and Spoils Everything.

These findings confirm that the belief that uncertainty has negative implications is specifically associated with several behavioural difficulties observed among high worriers. Decision-making difficulties, such as self-reported indecisiveness (e.g., Cantor, Gervais, & Dugas, 2008; Rassin & Muris, 2005) and more information-seeking in order to meet heightened evidence requirements prior to making a decision (e.g., Ladouceur, Talbot, & Dugas, 1997; Tallis, Eysenck, & Mathews, 1991) have been reported among high worriers. In addition, worry has been associated with a tendency to delay action, or procrastinate (Stoeber & Joormann, 2001), albeit not consistently (Spada, Hiou, & Nikcevic, 2006). While no research had yet explored the association between intolerance of uncertainty and procrastination directly, difficulties implementing actions in order to engage successfully in goal-directed behaviour have previously been found to correlate with intolerance of uncertainty (Aldao et al., 2010). As this study shows, these behavioural difficulties (i.e., indecision and procrastination) are correlated with the tendency to believe uncertain situations pose a difficult challenge for moving forward. In

other words, the belief that Uncertainty has Negative Behavioural and Self-Referent implications is indeed associated with difficulties implementing actions.

It is also not surprising that low perceived self-efficacy is experienced in uncertain situations by individuals high in uncertainty intolerance, as is suggested by the observed correlation between the belief that uncertainty has negative implications and personalizing attributions of the causes of negative outcomes. Correlations between low self-esteem and worry have been previously noted in the literature (e.g. Boelen & Reijntjes, 2009; Meyer, Miller, Metzger, & Borkovec, 1990), and self-doubt has been shown to be particularly prominent in GAD as opposed to other anxiety disorders such as panic disorder (Breitholtz, Johansson, & Ost, 1999). Worry has also been associated with low sense of mastery (Zalta & Chambless, 2008) or personal control (Buhr & Dugas, 2006). Further, some researchers (e.g., Berenbaum, 2010; Davey & Levy, 1998, 1999; Kendall & Ingram, 1987) have postulated that low perceived self competence may play a causal role in initiating worry. These authors suggest that a low sense of personal adequacy to cope with problems or stressors may increase the potential for ambiguous situations to be perceived as threatening, which in turn may initiate worry about hypothetical negative outcomes. Consistent with this view, Davey and Levy have noted that the nature of the internal statements generated while worrying is frequently characterized by doubts about personal adequacy (1999). These authors further demonstrated that catastrophic worrying is indeed associated with these self-doubts (1998, 1999). The results of the current study provide support for the hypothesis that the belief that Uncertainty has Negative Behavioural and Self-Referent Implications taps some of this self-blame and doubt about personal abilities to cope with uncertain

situations, as this belief was correlated with a tendency to commit personalizing cognitive errors. Further, these doubts about self-efficacy were shown to contribute to a bias towards perceiving ambiguous situations as threatening. The significance of the self-blaming attributions for these perceived coping deficiencies in uncertain situations, made evident by this IUS subscale's correlation with personalizing tendencies, warrants further research attention. It should be noted, however, that this perceived self-referential implication of the behavioural difficulties experienced in uncertain situations is not explicitly included in the conceptualization of alternate factor solutions that have been proposed. Thus, these results support the broader conceptualization of this proposed IUS factor, and suggest that there are important aspects of intolerance of uncertainty that alternatively proposed factor solutions fail to capture.

Construct Validity of the Belief That Uncertainty is Unfair and Spoils Everything

This study also found partial support for hypotheses regarding the construct validity of the belief that Uncertainty is Unfair and Spoils Everything. Consistent with expectations and extending upon prior findings (e.g., Berenbaum et al., 2008; Sexton et al., 2008), this IUS subscale showed moderate correlations with a need for closure (both a preference for order and a preference for predictability), small to moderate correlations with self-oriented and other-oriented perfectionism, and a moderate correlation with a monitoring coping style. As such, the belief that Uncertainty is Unfair and Spoils Everything demonstrated convergent validity. Contrary to expectations, however, the magnitude of the correlations with a preference for predictability and a monitoring coping style did not differ between the two IUS subscales, as the belief that uncertainty has negative implications also showed small to moderate correlations with these measures.

Nonetheless, hypotheses regarding the discriminant validity of this belief about uncertainty were partially supported, as this IUS subscale demonstrated significantly higher correlations with a preference for order and with self- and other-oriented perfectionism than did the belief that uncertainty has negative implications.

The heightened personal standards and more rigid expectations for others that comprise the perfectionism measures employed in this study were hypothesized to be a reflection of pro-active efforts to preserve certainty, stemming from the belief that events should be predictable and that it is unfair and unnecessarily disorderly when they are not so. Consistent with this hypothesis, this belief about uncertainty was associated with the expectation, both self-imposed and other-directed, that individuals should not make mistakes (e.g., “The people who matter to me should never let me down”), but should instead take concrete steps to prevent situational disturbances and seek to maintain or re-establish certainty.

It also follows that the belief that uncertainty is unfair and spoils events would be associated with strong preferences for orderliness and predictability in the external environment. To the extent that it would be possible to satisfy a need for order and a desire for predictability, two components of a broader need for cognitive closure, uncertainty in events would conceivably be minimized. However, in this study the belief that Uncertainty is Unfair and Spoils Everything showed convergent validity but not discriminant validity with a preference for predictability in the external environment, only partially consistent with previous research on Berenbaum and colleagues’ (2008) similar “Desire for Predictability” factor. What was unexpected in the present study was the comparably strong correlation observed between a preference for predictability and

the belief that uncertainty has negative implications, as both negative beliefs about uncertainty were comparably associated with a preference for predictability. One reason for this discrepancy in findings may be that the Uncertainty has Negative and Self-Referent Implications subscale is a somewhat broader factor than Berenbaum and colleagues' "Uncertainty Paralysis" factor, comprising several additional items that in Berenbaum and colleagues' study loaded on an "Uncertainty Distress" factor, which did show a small to moderate correlation with a preference for predictability. These additional items assess perceived personal consequences of uncertainty (such as "Uncertainty makes me vulnerable, unhappy, or sad"), coping preferences in the face of uncertainty (e.g., "I must get away from all uncertain situations"), and items reflecting negative upward comparisons to others who are perceived as managing the uncertainty in their lives more effectively (e.g., "Unlike me, others seem to know where they are going with their lives"). Thus, it may be that both negative beliefs about the unfair and spoiling impact of uncertainty as well as self-referent doubts about the ability to cope with this uncertainty are associated with a preference for predictability.

Similarly, this study failed to support the hypothesis that the belief that the spoiling impact of uncertainty is unfair would be associated with a greater tendency to monitor the environment for perceived threats to certainty than would the belief that uncertainty has negative personal implications. Again, this lack of specificity was a result of both IUS subscales showing significant correlations with a monitoring copying style, as the belief that Uncertainty is Unfair and Spoils Everything nonetheless demonstrated convergent validity with the measure of information seeking. However, the fear of behavioural paralysis which characterizes the belief that uncertainty has negative

implications appears also to show a moderate but significant relationship with vigilance, though the nature of this association is unclear. As this study is cross-sectional in nature, the direction of this association cannot be directly inferred. The observed correlation might suggest that the belief that uncertainty has negative implications can lead to hypervigilant monitoring of the environment, or this belief might instead evolve as a consequence of it. For instance, it may be the case that this negative belief about uncertainty as likely to inhibit behaviour could potentially result from the previous use of inefficient information-seeking strategies in uncertain situations which may have delayed or “inhibited” an appropriate response. Krohne (1996) has noted that the stressful situations employed on the MBSS are generally uncontrollable in nature; this would render an information-seeking coping style likely ineffective and therefore maladaptive. As such, it is probable that information-seeking in these situations would not succeed in facilitating problem-solving efforts or successful resolution of the situation. Without successful resolution, but with the perpetual drive to attain certainty fostered by intolerance of uncertainty, information-seeking efforts would also likely be prolonged. Further, these ineffective and excessive efforts to increase preparedness in uncertain situations could lead either to frustration or to a loss of confidence about personal abilities to cope, or both, when attempts to achieve this certainty fail. Thus, over time uncertain situations may come to be viewed as “paralyzing”, and this behavioural paralysis may lead to further self-doubts. Such speculations would need to be examined in prospective studies to ascertain the directionality of these associations between information-seeking efforts and negative beliefs about uncertainty, and their interactions as events unfold over time. Nonetheless, though the precise mechanism is unclear, this

study suggests that both negative beliefs about uncertainty are associated with a disposition to employ a monitoring coping style in stressful situations.

Criterion-Related Validity of the IUS Subscales

The contribution of negative beliefs about uncertainty to the proclivity to readily perceive threat. This study also sought to explore the criterion-related validity of the IUS subscales with appraisals in ambiguous situations. A large body of research has established that worry and anxiety are associated with more threatening appraisals of ambiguous situations (see, e.g., Berenbaum, Thompson, & Bredemeier, 2007; Berenbaum, Thompson, & Pomerantz, 2007; Butler & Mathews, 1983). A smaller but consistent literature has also demonstrated that intolerance of uncertainty is predictive of these biased appraisals, even after controlling for worry as well as anxious and depressive symptomatology (Dugas, Hedayati, et al., 2005; Koerner & Dugas, 2008). However, the question of whether distinct negative beliefs about uncertainty result in specific negative interpretations of ambiguity and specific behavioural responses in these ambiguous situations had not yet been explored. This question was examined in the current study.

As expected, both IUS subscales were positively associated with negative appraisals of ambiguous situations as assessed by the ASQ. Further, both the belief that Uncertainty has Negative Behavioural and Self-Referent Implications and the belief that Uncertainty is Unfair and Spoils Everything predicted unique variance in appraisals when both subscales were in the equation. As such, both IUS subscales demonstrated criterion-related validity with negatively biased appraisals of ambiguity, and both appeared to be independent contributors to this heightened tendency to perceive threats in ambiguous situations.

Do uncertainty intolerant beliefs predict whether ambiguity is perceived as having negative implications? While the two IUS subscales have demonstrated evidence of their validity, questions remain as to the utility of conceptualizing distinct negative uncertainty intolerant beliefs. These questions are perhaps best addressed by examining the *specificity* of these negative beliefs about uncertainty. In this study, the specificity of the IUS subscales was assessed in two ways: first, by comparing their correlations with interpretations of ambiguity proposed to be specific to each uncertainty intolerant belief; and second, by evaluating the extent to which each IUS subscale predicted unique variance in these hypothesized manifestations of intolerance of uncertainty in ambiguous situations.

Consistent with this study's hypotheses, the belief that Uncertainty has Negative Behavioural and Self-Referent Implications showed strong evidence of specificity. This subscale was significantly more highly and positively correlated with perceptions of ambiguity as having negative personal implications than with perceptions of ambiguity as unfair and disruptive, and likewise showed a stronger association with perceptions of ambiguous situations as having negative personal implications than did the belief that Uncertainty is Unfair and Spoils Everything. Further, this belief predicted unique variance in perceived negative implications of ambiguous situations after controlling for the belief that Uncertainty is Unfair and Spoils Everything. As such, the belief that uncertainty has negative implications showed a specific relationship with the self-reported tendency to experience behavioural paralysis and to endorse negative personal attributions for perceived poor performance in hypothetical ambiguous situations.

Do uncertainty intolerant beliefs predict whether ambiguity is perceived as

unfair and disruptive? The belief that Uncertainty is Unfair and Spoils Everything demonstrated only partial but nonetheless substantial evidence of specificity in relation to the hypothesized behavioural manifestations of this belief in ambiguous situations. Despite the observed moderate to large correlation between the belief that Uncertainty is Unfair and Spoils Everything and perceptions of ambiguity as unfair and disruptive, no significant difference in correlations was observed between this correlation and the observed association of this IUS subscale and the ASQ subscale assessing perceptions of ambiguity as having negative personal implications. In other words, this IUS subscale was associated with both perceptions of ambiguity as unfair and disruptive, and with perceptions of ambiguity as having negative personal implications, to a comparable extent. Nonetheless, the belief that Uncertainty is Unfair and Spoils Everything was more specifically related to perceptions of ambiguity as unfair and disruptive than was the belief that uncertainty has negative implications. Also consistent with hypotheses, the belief that uncertainty is unfair and spoils everything predicted a unique proportion of the variance in perceptions of ambiguity as unfair and disruptive after controlling for the belief that uncertainty has negative implications, thereby demonstrating some degree of specificity relative to the other IUS subscale.

The reason for this discrepancy in the observed specificity of the belief that Uncertainty is Unfair and Spoils Everything is unclear. One reason for this discrepancy may be that we have not fully conceptualized this negative belief about uncertainty's unique ramifications in ambiguous situations and have therefore not entirely described its behavioural correlates. This subscale of the ASQ may thus not adequately capture the full range of consequences of this negative belief about uncertainty. This could explain the

finding that the IUS subscale assessing the belief that Uncertainty is Unfair and Spoils Everything predicted unique variance in the ASQ Ambiguity is Unfair and Disruptive subscale not predicted by the other IUS subscale, yet showed similarly strong correlations with both ASQ subscales. While this IUS subscale is tapping unique interpretations of ambiguous situations not accounted for by the belief that uncertainty has negative implications, its association with the two ASQ subscales could conceivably not be notably different if the ASQ subscale assessing perceptions of ambiguity as unfair and disruptive is missing some additional relevant implications specific to this negative belief about uncertainty in ambiguous situations. The causes and consequences of the belief that Uncertainty is Unfair and Spoils Everything may therefore require further research attention, particularly as it may be that this belief captures more novel aspects of intolerance of uncertainty and its association with worry.

Historically, research and clinical interventions have focused on maladaptive self-oriented expectations and evaluative judgments, as well as on maladaptive personal and behavioural consequences associated with the anxiety or worry. For instance, personalizing cognitive errors (i.e., the attribution of negative events to stable and global perceived internal failings) and their depressogenic consequences (such as perceived helplessness, reduced motivation, behavioural avoidance, or depressed affect) are well documented (e.g., Abramson, Metalsky, & Alloy, 1989; Abramson, Seligman, & Teasdale, 1978; Seligman, Abramson, Semmel, & Baeyer, 1979) and are frequently the focus of cognitive interventions. In addition, behavioural difficulties such as avoidance or difficulties with decision-making have previously been identified as likely consequences of intolerance of uncertainty, and are better understood. Further, these behavioural

consequences and are often the focus of exposure exercises designed to target intolerance of uncertainty (see Dugas & Robichaud, 2007). In contrast, a worldview that demands certainty and leads to unrealistic expectations for self and others can be potentially more difficult to address. Further, the emotional consequences of the failure to meet these expectations, such as perhaps self-directed frustration or other-oriented anger, have been less frequently studied and are often not the direct targets of our intervention strategies. More research into the origins of this strict need for certainty or structure may offer new insights into how to render the belief that uncertainty is unfair and unnecessary more flexible and responsive to external feedback that the world does not necessarily function in this manner. This negative belief about uncertainty may therefore have the potential to make an important and novel contribution to our understanding of intolerance of uncertainty and its role as a cognitive vulnerability factor for worry/GAD.

Taken together, these results suggest that the two proposed negative beliefs about uncertainty are associated with negative interpretations of ambiguity, yet contribute to different behavioural, cognitive, and emotional reactions in these situations. The beliefs that uncertainty has negative implications and that uncertainty is unfair and spoils everything have thus demonstrated construct and criterion-related validity, and have also shown evidence of specificity.

Limitations

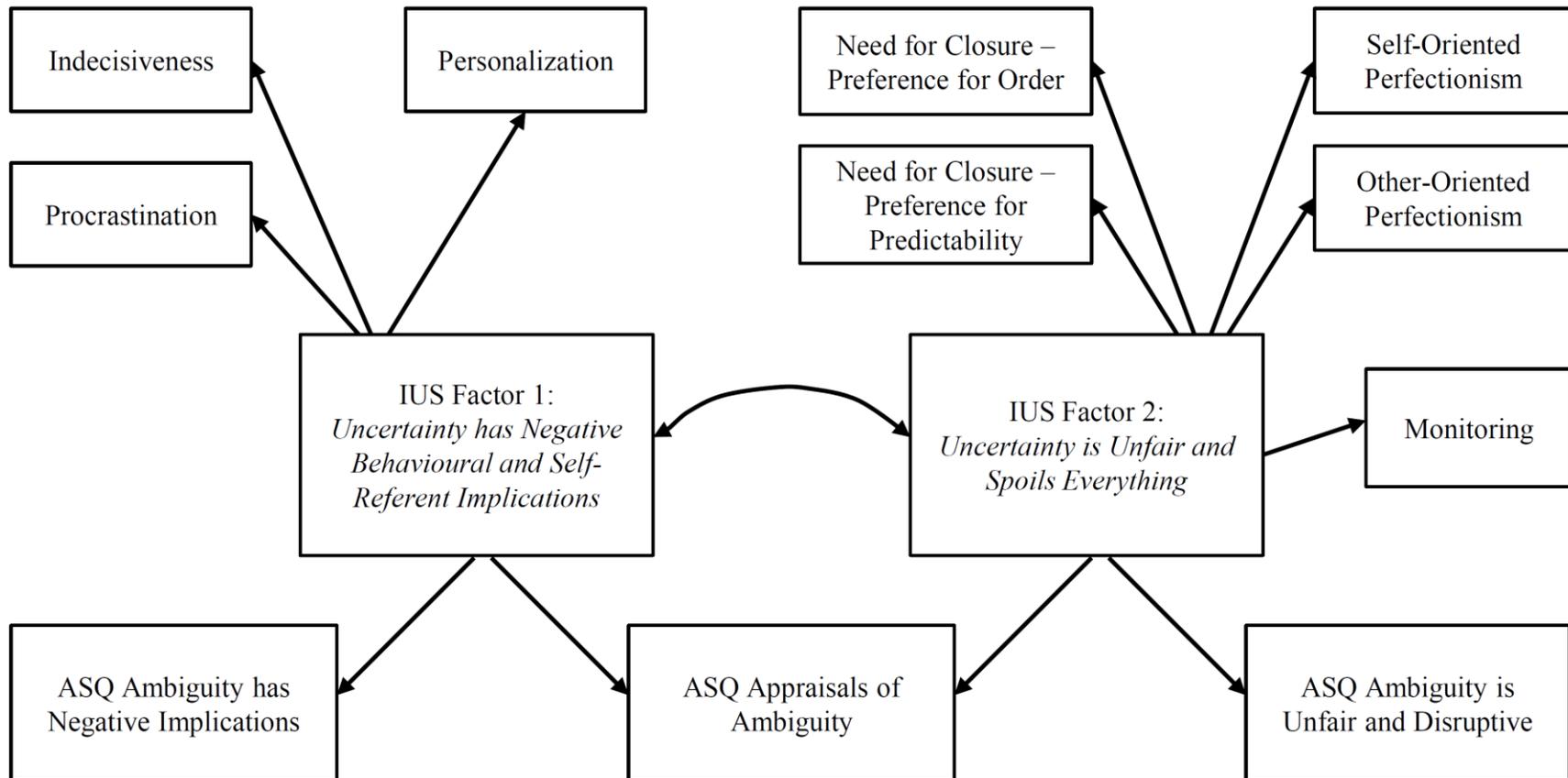
This study nonetheless had several limitations which should be considered when evaluating the validity and generalizability of its findings. To begin with, this study made use of a non-clinical sample of convenience. These results therefore require replication in samples of individuals with GAD and other anxiety disorders. However, existing

evidence suggests that worry is a dimensional construct, rather than a discrete taxon at high levels of worry, and that it evidences similar relationships with worry-related processes such as intolerance of uncertainty, as well as related symptomatology such as depression and anxiety symptoms, at all levels of worry (Olatunji, Broman-Fulks, Bergman, Green, & Zlomke, 2010). Thus, there is good reason to expect that the associations between worry-related processes observed in this study will be informative in GAD patient samples as well as in samples of individuals with non-clinical levels of worry. Nonetheless, this hypothesis requires validation in a clinical sample.

Secondly, this study required the development of a new measure for the assessment of appraisal biases and responses to perceived threats in ambiguous situations. The development of this new measure may provide a new tool for the assessment of the consequences of intolerance of uncertainty in clinical populations. However, as this is the first study to use the ASQ, and as a non-clinical sample was employed, there are limited inferences to be drawn about the ASQ's potential utility in the assessment and treatment of anxiety in clinical samples. While the ASQ subscales demonstrated acceptable levels of reliability for the purposes of this study, as well as specificity to the distinct implications of the uncertainty intolerant beliefs they were designed to expand upon, their stability and construct validity remain to be assessed more fully. As such, further validation of the ASQ is required. Future research should also examine the clinical utility of the ASQ subscales for the assessment and treatment of GAD and other anxiety disorders in clinical practice.

In sum, it is hoped that the more precise understanding of the composite negative beliefs about uncertainty that result in uncertainty tolerance, as well as the manifestations

of these specific beliefs in ambiguous situations, may facilitate future research into these characteristics of GAD-related cognitions and affect. Further, a better understanding of the possible mechanisms by which these negative beliefs about uncertainty and their consequences contribute to the etiology or maintenance of worry/GAD could enable prevention efforts to curb the development of these symptoms. Finally, these findings may facilitate the development of interventions to directly target the consequences of intolerance of uncertainty as well as the specific negative beliefs about uncertainty that engender these consequences.



Note. IUS = Intolerance of Uncertainty Scale; ASQ = Ambiguous Situations Questionnaire.

Figure 3.1. Hypothesized relationships among the IUS factors and the proposed convergent, discriminant, and concurrent criterion-related constructs.

Table 3.1

Means, Standard Deviations, and Frequencies on Demographic Variables in the

Concordia University (n = 142) and Ryerson University (n = 150) Samples

	Concordia sample	Ryerson sample	<i>df</i>	<i>F</i>	<i>d</i>	<i>p</i>
Measure	<i>M (SD)</i>	<i>M (SD)</i>				
Age ^a	23.01 (6.37)	21.89 (5.89)	1, 288	2.40	.18	.12
	Concordia sample	Ryerson sample	<i>df</i>	χ^2	ϕ	<i>p</i>
Sex ^b	81.7% female	78.5% female	1, 289	0.46	.04	.50
Ethnic origin ^c			7, 280	45.51	.40	<.001
White/European	67.4%	42.2%				
Black	3.5%	12.2%				
Asian	7.8%	33.3%				
Hispanic	3.5%	0.7%				
Middle Eastern	5.0%	5.4%				
Native American	1.4%	0.0%				
Multi-racial	7.1%	4.8%				
Other	4.3%	1.4%				
First language ^d			2, 287	23.62	.29	<.001
English	63.1%	83.9%				
French	10.6%	0.0%				
Other	26.2%	16.1%				

^a $n = 142$ in Concordia sample, $n = 148$ in Ryerson sample. ^b Frequencies are expressed as a percentage of participants who reported on their sex ($n = 142$ in the Concordia sample, $n = 149$ in the Ryerson sample). ^c Frequencies are expressed as a percentage of participants who reported on their ethnic origin ($n = 141$ participants in the Concordia University sample and $n = 147$ participants in the Ryerson University sample). ^d Frequencies are expressed as a percentage of participants who reported on their first language ($n = 141$ in the Concordia sample, $n = 149$ in the Ryerson sample).

Table 3.2

Inter-Correlations and Univariate Summary Statistics for Study Measures (N = 292).

	IUS	ASQ-A	ASQ-NI	ASQ-US	FIS	LGP	CEQ-P	NFCS-PO	NFCS-PP	MPS-SOP	MPS-OOP	MBSS-M
IUS	--											
ASQ-A	.47***	--										
ASQ-NI	.57***	.61***	--									
ASQ-UD	.53***	.50***	.68***	--								
FIS	.50***	.38***	.53***	.37***	--							
LGP	.09	.13*	.16**	.08	.51***	--						
CEQ-P	.38***	.30***	.45***	.30***	.30***	.17**	--					
NFCS-PO	.34***	.25***	.23***	.28***	<-.01	-.35***	.08	--				
NFCS-PP	.54***	.46***	.47***	.41***	.30***	-.03	.17**	.53***	--			
MPS-SOP	.27***	.13*	.15*	.19**	-.03	-.13*	.21***	.28***	.11	--		
MPS-OOP	.26***	.11	.19**	.18*	.05	<.01	.28***	.11	.06	.50***	--	
MBSS-M	.31***	.21***	.28***	.35***	.22***	.05	.25***	.17**	.21***	.11	.15*	--

Age ^a	-.13*	-.07	-.18**	-.17**	-.14*	-.09	-.25***	-.03	-.04	<-.01	-.08	-.20**
Sex ^b	-.01	-.05	-.10	-.05	-.09	.02	.01	-.12*	-.13*	-.06	.05	-.08
Ethnicity ^c	.21	.26**	.25*	.19	.19	.18	.20	.12	.22	.13	.14	.16
Language ^d	-.09	-.08	-.06	-.06	-.11	-.05	-.09	.07	-.03	.05	.01	-.11
<i>M</i>	64.34	111.52	91.74	129.99	41.24	57.31	4.76	39.77	25.83	71.23	58.40	61.08
<i>(SD)</i>	(18.10)	(13.12)	(26.21)	(21.79)	(10.38)	(11.15)	(3.08)	(6.90)	(6.72)	(14.38)	(8.47)	(8.66)

Note. IUS = Intolerance of Uncertainty Scale; ASQ = Ambiguous Situations Questionnaire; FIS = Frost's Indecisiveness Scale; LGP = Lay's General Procrastination Scale; CEQ-P = Cognitive Error Questionnaire - General version, Personalization subscale; NFCS-PO = Need for Closure Scale – Preference for Order subscale; NFCS-PP = Need for Closure Scale – Preference for Predictability subscale; MPS-SOP = Multidimensional Perfectionism Scale – Self-Oriented Perfectionism subscale; MPS-OOP = Multidimensional Perfectionism Scale – Other-Oriented Perfectionism subscale; MBSS-M = Miller Behavioral Style Scale – Monitoring subscale.

^a $n = 290$. ^b $n = 291$; Female sex coded as 0, male sex coded as 1. ^c $n = 288$; correlation computed as the composite R of seven ethnic origin dummy codes regressed on each study variable, with White/European ethnic origin coded as the reference group (see Cohen, Cohen, West, & Aiken, 2003) for comparison with Black, Asian, Hispanic, Middle Eastern, Native American/Canadian, Multi-racial ethnic origin, and Other ethnic origin groups. ^d $n = 290$; correlation computed as the composite R of two ethnic origin dummy codes

regressed on each study variable, with English first language coded as the reference group (see Cohen et al., 2003) for comparison with French as first language and Other first language groups.

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

Table 3.3

Univariate Summary Statistics, Inter-Item and Item-Total Correlations of the IUS (n = 289)

Item	<i>M</i>	<i>SD</i>	<i>r_{corr}</i>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	
1	3.1	1.1	.33	--																											
2	2.1	1.0	.41	.30	--																										
3	2.1	1.1	.60	.22	.44	--																									
4	2.4	1.2	.53	.06	.21	.48	--																								
5	2.2	1.2	.71	.27	.28	.44	.49	--																							
6	2.9	1.2	.74	.26	.21	.46	.38	.63	--																						
7	2.4	1.1	.68	.24	.33	.50	.43	.62	.65	--																					
8	3.3	1.1	.63	.19	.19	.39	.45	.56	.58	.55	--																				
9	1.9	1.0	.65	.19	.33	.49	.26	.48	.50	.48	.42	--																			
10	2.8	1.1	.45	.14	.17	.31	.19	.39	.39	.37	.45	.38	--																		
11	2.4	1.1	.59	.19	.24	.34	.43	.45	.47	.45	.44	.39	.30	--																	
12	2.0	1.0	.58	.31	.28	.32	.31	.38	.44	.39	.30	.39	.10 ^{ns}	.36	--																
13	1.7	0.9	.56	.22	.39	.47	.31	.37	.35	.41	.28	.44	.23	.33	.49	--															

Table 3.4

Factor Loadings for the Confirmatory Factor Analysis of the IUS (n = 289)

No.	Item	I	II	E
17.	Uncertainty makes me vulnerable, unhappy, or sad.	.79		.61
15.	When I am uncertain, I can't function very well.	.78		.62
14.	When I am uncertain, I can't go forward.	.75		.67
9.	Uncertainty keeps me from living a full life.	.67		.74
12.	When it's time to act, uncertainty paralyzes me.	.64		.77
25.	I must get away from all uncertain situations.	.63		.78
3.	Uncertainty makes life intolerable.	.62		.79
13.	Being uncertain means that I am not first rate.	.62		.79
22.	Being uncertain means that I lack confidence.	.62		.78
20.	The smallest doubt can stop me from acting.	.59		.81
24.	Uncertainty keeps me from sleeping soundly.	.59		.81
23.	I think it's unfair that other people seem to be sure about their future.	.51		.86
16.	Unlike me, others seem to know where they are going with their lives.	.49		.87
2.	Being uncertain means that a person is disorganized.	.45		.89
1.	Uncertainty stops me from having a strong opinion.	.36		.93
6.	Uncertainty makes me uneasy, anxious or stressed.		.80	.60
5.	My mind can't be relaxed if I don't know what will happen tomorrow.		.77	.64

26.	The ambiguities in life stress me.	.74	.68
7.	Unforeseen events upset me greatly.	.74	.67
8.	It frustrates me not having all the information I need.	.71	.70
27.	I can't stand being undecided about my future.	.64	.77
18.	I always want to know what the future has in store for me.	.63	.78
11.	A small unforeseen event can spoil everything even with the best planning.	.62	.79
19.	I can't stand being taken by surprise.	.62	.78
4.	It's unfair having no guarantees in life.	.56	.83
21.	I should be able to organize everything in advance.	.53	.85
10.	One should always look ahead so as to avoid surprises.	.51	.86

Note. All factor loadings significant at $p < .05$. IUS = Intolerance of Uncertainty Scale; Factor I = Uncertainty has Negative Behavioural and Self-Referent Implications; Factor II = Uncertainty is Unfair and Spoils Everything; E = standardized error variance. Comparative Fit Index (CFI) = .96, Bentler-Bonnet Normed Fit Index (NNFI) = .94; Standardized Root Mean-square Residual (SRMR) = .06; Root Mean-square Error of Approximation (RMSEA) = .08, 90% C.I. = .07-.08.

Table 3.5

IUS Subscale Correlations With Study Measures (N = 292)

	IUS-NI	IUS-US	Fisher's <i>Z</i>	<i>r</i> ² difference
FIS	.56***	.37***	5.49***	.18
LGP	.18**	-.02	4.75***	.03
CEQ-P	.39***	.32**	1.95*	.05
NFCS-PO	.23***	.40***	-4.55***	.11
NFCS-PP	.48***	.53***	-1.38	.05
MPS-SOP	.17**	.33***	-4.20***	.08
MPS-OOP	.19***	.23***	-1.78*	.03
MBSS-M	.28***	.30***	-0.34	.01
<i>M</i>	32.60	31.74		
<i>(SD)</i>	(10.04)	(9.22)		

Note. IUS-NI = Intolerance of Uncertainty Scale - Uncertainty has Negative Behavioural and Self-Referent Implications subscale; IUS-US = Intolerance of Uncertainty Scale - Uncertainty is Unfair and Spoils Everything subscale; FIS = Frost's Indecisiveness Scale; LGP = Lay's General Procrastination Scale; CEQ-P = Cognitive Error Questionnaire - General version, Personalization subscale; NFCS-PO = Need for Closure Scale – Preference for Order subscale; NFCS-PP = Need for Closure Scale – Preference for Predictability subscale; MPS-SOP = Multidimensional Perfectionism Scale – Self-Oriented Perfectionism subscale; MPS-OOP = Multidimensional Perfectionism Scale – Other-Oriented Perfectionism subscale; MBSS-M = Miller Behavioral Style Scale – Monitoring subscale.

* $p < .05$, 1-tailed test; ** $p < .01$, 1-tailed test; *** $p < .001$, 1-tailed test.

Table 3.6

IUS Subscale Correlations With the ASQ Subscales (N = 292)

	ASQ Ambiguity has Negative Implications	ASQ Ambiguity is Unfair and Disruptive	Fisher's Z	r^2 _{difference}
IUS-NI	.60*** _†	.46*** _†	3.43 [#] _≠	.14
IUS-US	.48*** _{††}	.53*** _{††}	-1.26	.05

Note. IUS = Intolerance of Uncertainty Scale; IUS-NI = Uncertainty has Negative Behavioural and Self-Referent Implications subscale; IUS-US = Uncertainty is Unfair and Spoils Everything subscale; ASQ = Ambiguous Situations Questionnaire.

Correlations in the same column with different subscripts (_† and _{††}) differ significantly at $p < .05$, 1-tailed test, by Fisher's Z test of correlated correlation coefficients (see Meng, Rosenthal, & Rubin, 1992).

[#] $p < .05$, 1-tailed test; *** $p < .001$, 2-tailed test.

Table 3.7

Summary of Hierarchical Regression Analysis for Variables Predicting Scores on the ASQ Appraisals of Ambiguity Subscale (N = 292).

Variables	ΔR^2	ΔF	<i>B</i>	SE <i>B</i>	β	<i>pr</i>
Step 1	.18	64.41***				
IUS-US			0.61	0.08	.43***	.43
Step 1	.21	76.97***				
IUS-NI			0.60	0.07	.46***	.46
Step 2						
IUS-US	.01	5.16*	0.26	0.12	.18*	.13 †
IUS-NI	.04	15.58***	0.42	0.11	.32***	.23 ††

Note. Results for two separate hierarchical regressions predicting ASQ-A, with first IUS-US entered on the first step (first regression) and subsequently IUS-NI entered on the first step (second regression), are presented in each alternate Step 1, respectively. Step 2 summarizes the final beta-coefficients with both predictors in the equation, for both regressions. ΔR^2 and ΔF for the two separate regressions are presented next to each added variable in Step2. ASQ = Ambiguous Situations Questionnaire; IUS-US = Intolerance of Uncertainty Scale - Uncertainty is Unfair and Spoils Everything subscale; IUS-NI = Intolerance of Uncertainty Scale - Uncertainty has Negative Behavioural and Self-Referent Implications subscale. Correlations in the same column with different subscripts († and ††) differ significantly at $p < .05$, 2-tailed test, by Fisher's Z test of correlated correlation coefficients ($Z = 2.13$, $pr^2_{difference} = .03$; see Meng, Rosenthal, & Rubin, 1992; Steiger, 1980; Steiger & Browne, 1984).

* $p < .05$; *** $p < .001$.

Table 3.8

Summary of Hierarchical Regression Analysis for Variables Predicting Scores on the ASQ Ambiguity has Negative Implications Subscale (N = 292).

Variables	ΔR^2	ΔF	<i>B</i>	SE <i>B</i>	β	<i>pr</i>
Step 1	.23	85.95***				
IUS-US			1.36	0.15	.48***	.48
Step 2	.13	57.61***				
IUS-US			0.15	0.21	.05	.04 †
IUS-NI			1.45	0.19	.56***	.41 ††

Note. ASQ = Ambiguous Situations Questionnaire; IUS-US = Intolerance of Uncertainty Scale - Uncertainty is Unfair and Spoils Everything subscale; IUS-NI = Intolerance of Uncertainty Scale - Uncertainty has Negative Behavioural and Self-Referent Implications subscale. Correlations in the same column with different subscripts († and ††) differ significantly at $p < .001$, 1-tailed test, by Fisher's *Z* test of correlated correlation coefficients ($Z = 8.03$; $pr^2_{\text{difference}} = .16$; see Meng, Rosenthal, & Rubin, 1992; Steiger, 1980; Steiger & Browne, 1984).

*** $p < .001$.

Table 3.9

Summary of Hierarchical Regression Analysis for Variables Predicting Scores on the ASQ Ambiguity is Unfair and Disruptive Subscale (N = 292).

Variables	ΔR^2	ΔF	<i>B</i>	SE <i>B</i>	β	<i>pr</i>
Step 1	.21	78.94***				
IUS-NI			1.00	0.11	.46***	.46
Step 2	.07	29.49***				
IUS-NI			0.31	0.17	.14	.11 †
IUS-US			0.99	0.18	.42***	.30 ††

Note. ASQ = Ambiguous Situations Questionnaire; IUS-NI = Intolerance of Uncertainty Scale - Uncertainty has Negative Behavioural and Self-Referent Implications subscale; IUS-US = Intolerance of Uncertainty Scale - Uncertainty is Unfair and Spoils Everything subscale. Partial correlations in the same column with the same subscripts († and ††) differ significantly at $p < .001$, 1-tailed test, by Fisher's *Z* test of correlated correlation coefficients ($Z = -4.37$; $pr^2_{\text{difference}} = .08$; see Meng, Rosenthal, & Rubin, 1992; Steiger, 1980; Steiger & Browne, 1984).

*** $p < .001$.

Chapter 4

Discussion

The results of this set of studies suggest that uncertainty is experienced as intolerable largely for two reasons: it follows from the belief that the occurrence of uncertainty in events spoils everything and is unfair, and it arises from the belief that personal abilities to cope are diminished by uncertainty. Consistent with the current definition, these two enduring negative beliefs about uncertainty, proposed to result in the “dispositional characteristic” of intolerance of uncertainty (Dugas & Robichaud, 2007), showed replicability and good fit upon confirmatory factor analysis in two independent samples, and hence evidenced both stability and construct validity. Support for the distinctiveness of these two negative beliefs was evident in their different convergent associations: while one belief showed specificity to perceived behavioural and personal implications of specific ambiguous situations, the other was associated with a sensitivity to experience specific ambiguous situations as disruptive and unacceptable. Specificity was also observed in the different cognitive and behavioural processes associated with these beliefs. In addition, evidence of criterion-related validity was observed in these core beliefs’ associations with worry, trait anxiety, somatic anxiety, depressed mood, and information-processing biases in specific ambiguous situations. These findings extend our conceptualization of intolerance of uncertainty, and provide support for its construct validity.

The factor analytic results obtained in these studies have some similarities to other recent findings. For instance, Berenbaum and colleagues (2008) have conceptualized the two central factors of intolerance of uncertainty as Uncertainty Paralysis and Desire for

Predictability. These concepts are notably similar to the proposed beliefs that Uncertainty has Negative Behavioural and Self-Referent Implications and that Uncertainty is Unfair and Spoils Everything, respectively. Further, many of the items comprising these two sets of factors are indeed overlapping. However, the current findings support a broader conceptualization of these factors. To being with, the convergent validity findings presented here suggest that the factor capturing behavioural paralysis in the face of uncertainty is also marked by self-criticism for this inability to move forward and function in the face of uncertainty. Similarly, the Desire for Predictability appears to be more than a preference as it also encapsulates an evaluative component, capturing the expectation that events *should* be certain and that it is unfair that they are not so. The observed pattern of correlations further suggests that this factor taps exigent expectations for one's self, for others, and for the environment. For personal expectations, this factor appears to be associated with high performance standards and low tolerance for mistakes. For others, this factor's correlation with other-oriented perfectionism suggests it includes the expectation that others in some manner accommodate this need for certainty, perhaps by not contributing to it with "mistakes" that contribute to disorder, or by helping to prevent or manage the impact of uncertainty. Finally, this factor also includes strong expectations for the surrounding environment, in the form of a need for structure and order in external circumstances. In addition, this study found that a preference for predictability does not distinguish between the two negative beliefs about uncertainty, further suggesting that a *preference* for predictability is not the distinctive characteristic of this factor. Thus, uncertainty intolerant beliefs are characterized by self-judgments about the behavioural difficulties experienced under uncertain circumstances, and by

rigid expectations or “shoulds” about the need for certainty and its fairness.

Criterion-Related Validity and Specificity of the Association Between Uncertainty Intolerant Beliefs and Worry/GAD Symptoms and Processes.

The above-mentioned findings are also consistent with the predictions of cognitive theory, which posits that “increased susceptibility to anxiety is a result of enduring core beliefs (schemas) about personal vulnerability or helplessness and the salience of threat” (Clark & Beck, 2010, p. 36). These findings confirm that individuals high in trait intolerance of uncertainty are primed to see uncertain threats as salient because they believe themselves to be vulnerable to uncertainty and view it as unacceptable. Further, both negative beliefs demonstrated common consequences for psychopathology as well as unique impacts on behaviour, cognition, and information-processing, in support of their criterion-related validity and utility.

Common correlates of intolerance of uncertainty. While the two negative beliefs about uncertainty evidenced notable distinct features, both nonetheless contributed to common impairments including deleterious effects on symptom frequency and severity, detrimental impacts on information-processing, and maladaptive coping. Both the belief that uncertainty has negative personal implications and the belief that uncertainty is spoiling and unfair showed strong correlations with pathological worry. Both beliefs predicted variance in the tendency to perceive uncertain situations as threatening. Finally, though contrary to our expectations, both negative beliefs about uncertainty were associated with higher levels of information-seeking, and maladaptively so since the situations presented in this measure are uncontrollable. Whether this association reflects the previously-established impact of state or trait intolerance of

uncertainty on information-seeking (e.g., Rosen & Knäuper, 2009; Rosen et al., 2007), or whether separate mechanisms driven by these distinct negative beliefs about uncertainty contribute independently to monitoring, will need to be explored further. Nonetheless, both negative beliefs about uncertainty evidenced criterion-related validity.

Criterion-related and convergent validity of the belief that Uncertainty has Negative Behavioural and Self-Referent Implications. In these studies, the belief that uncertainty holds negative personal implications demonstrated 1) criterion-related validity and specificity with symptomatology, 2) criterion-related validity and specificity with specific information-processing biases, and 3) convergent validity and specificity with relevant cognitive and behavioural constructs. In terms of symptomatology, this belief was differentially associated with anxious and depressive symptomatology. With respect to information-processing, it was predictive of distinct interpretations and responses in specific ambiguous situations. Finally, it was associated with altogether different cognitive and behavioural processes, such as indecision, procrastination, and personalization, than was the belief that uncertainty is unfair and spoils events. As such, this negative belief about uncertainty demonstrated not only strong evidence of convergent and criterion-related validity, in support of the validity of this construct, but also convincingly evidenced specificity. Importantly, this evidence of convergent validity and specificity provides support for the proposed conceptualization of this factor of the IUS as assessing both behavioural implications of uncertainty (e.g., being “stuck”, as evidenced by delayed responding in the form of either indecision or procrastination) and self-referent meaning attached to these behavioural difficulties (e.g., personalizing these failures to cope as attributable to stable personal weakness). Thus, the belief that

uncertainty impairs personal functioning and represents a personal shortcoming was associated with self-reported difficulties in decision-making and task adherence, and with self-blame for these coping difficulties. However, these findings raise questions about the nature of this uncertainty intolerant belief's relationship with impaired functioning.

An important question that arises concerns the direction of this association between perceived behavioural difficulties in uncertain situations and difficulties implementing actions. Stated differently, the origins and mechanism of this association are unknown. For instance, it is not clear if this belief about personal inadequacy in uncertain contexts is the cause of the observed behavioural difficulties, or a consequence of previous failure experiences in uncertain situations, or whether the behavioural difficulties and beliefs about personal inadequacies are bi-directionally related as part of a self-perpetuating cycle. It is conceivable that believing that uncertainty poses a threat to personal coping resources may lead to further behavioural difficulties when uncertain situations are encountered, perhaps by leading to high levels of anxiety that result in impaired coping efforts, perhaps by shifting the attentional focus away from the task or decision at hand and therefore interfering with appropriate responding, or perhaps by delaying the implementation of actions that would resolve a given situation. Thus, it is possible that individuals who hold the belief that Uncertainty has Negative Behavioural and Self-Referent Implications are not necessarily less capable of responding appropriately to uncertain situations, despite their difficulties implementing these responses effectively and in a timely fashion.

As such, it remains to be seen whether individuals endorsing this negative belief about their ability to perform in uncertain situations are accurately perceiving their own

competency in these situations, or merely lacking in confidence. While high worriers have demonstrated delays in their responses to decision-making or behavioural performance tasks when the level of ambiguity is elevated (e.g., Metzger, Miller, Cohen, Sofka, & Borkovec, 1990; Pratt, Tallis, & Eysenck, 1997), they do not demonstrate differences relative to non-worriers in performance accuracy on unambiguous tasks, regardless of task difficulty (e.g., Ladouceur et al., 1997). As such, high worriers may not necessarily be less capable in their coping responses.

Subjectively, however, they may experience uncertain situations as difficult and anxiety provoking and may as a result tend to perceive their performance as inadequate. Koerner and Dugas (2007b) found that emotional reasoning, for instance, was employed among individuals high in intolerance of uncertainty, regardless of the presence or absence of more objective information. As such, similar to previous findings on the problem solving abilities of high worriers, which do not differ from those of non-anxious individuals despite their greater tendency to hold negative perceptions of their own problem-solving capacity (e.g., Davey, 1994; Dugas, Letarte, Rhéaume, Freeston, & Ladouceur, 1995; Ladouceur, Blais, Freeston, & Dugas, 1998), individuals endorsing the belief that uncertainty has negative implications may in fact not possess diminished abilities to cope with uncertain situations. However, they may nonetheless view themselves as poorer at coping with uncertainty. This may in turn contribute to their tendency to perceive ambiguous situations as more of a threat. These possibilities remain to be investigated.

Thus, it may be that individuals high in intolerance of uncertainty are more likely to experience a low sense of personal mastery following a negative outcome, and to

exhibit behavioural difficulties in uncertain situations when their self-confidence is shaken. As such, behavioural difficulties may result from, rather than promote, a low sense of self-efficacy in uncertain situations. Consistent with this view, Steel (2007), in his meta-analytic review of the literature on procrastination, noted that several studies to date have shown that individuals experiencing a negative mood are more likely to report having engaged in more procrastination, regardless of the level of objectively observed procrastinatory behaviour. This is consistent with the demonstrated association between procrastination and a personalizing attributional style (e.g., McKean, 1994), and with the broader literature on perceived helplessness and self-handicapping behaviour as contributors to procrastination (see Steel, 2007, for a review). Similarly, Mikulincer, Yinon, and Kabili (1991) found that following failure feedback, performance deficits and low expectancies of control were experienced on subsequent tasks, but only among individuals high in the need for structure, not individuals low in the need for structure. As such, maladaptive responses may follow from, rather than precede, negative beliefs about personal efficacy. Further, given the above findings, it is also conceivable that the two negative beliefs about uncertainty may have interactive effects on individuals' response to stressors.

Finally, the close and potentially causal relationship between behavioural difficulties and low self-efficacy is also suggested by these studies' findings that perceived behavioural and self-referent implications of uncertainty load together on the same factor, rather than comprising distinct components of uncertainty intolerance. This further suggests that conceptualizing this factor as "Uncertainty Paralysis" does not afford a complete and nuanced understanding of this negative belief about uncertainty.

Rather, the perceived self-referent consequences of uncertainty and the personalization of these behavioural difficulties may play a particularly important role. Further examination of the direction of these associations, by other experimental or prospective methods, is therefore required.

What is clear from the current studies, however, is that this negative belief about uncertainty is associated with greater distress and internalizing symptoms, with behavioural difficulties related to delaying actions, and with a more negative self-concept as reflected by more frequent personalizing cognitive errors. In sum, individuals endorsing this belief feel more personally vulnerable in the face of uncertainty.

Criterion-related and convergent validity of the belief that Uncertainty is Unfair and Spoils Everything. In contrast to the more internally-focused nature of the belief that uncertainty has negative personal implications, the findings of the studies presented here suggest that the belief that uncertainty is unfair and spoiling is more externally-oriented. This belief was differentially associated with measures of demanding personal standards and with strong expectations for others and the environment. This was evident in its convergent associations with self- and other-oriented perfectionism and with a need for closure as manifested by a preference for order, though not a preference for predictability. As such, this negative belief about uncertainty suggests that orderliness, predictability, and controllability have come to be seen not just as a preferred state of the environment, but as an inflexible “must” or “should”. Thus, uncertainty has been deemed unfair. Further, this demand for certainty is likely too stringent to be accommodated without undue personal hardship or exigent demands on others. Thus, disappointment in the event of deviations from these unrealistic situational expectations,

and at one's own and others inevitable failures to conform to such demands, is likely to result.

While this negative belief about uncertainty showed criterion-related validity with appraisal biases and pathological worry, it did not evidence specificity, compared to the belief that uncertainty has negative implications, with the measures of symptomatology assessed in these studies. In addition, there were mixed findings on its specificity with those interpretations and responses hypothesized to be unique consequences of this belief about uncertainty in specific ambiguous situations. However, given that this negative belief about uncertainty nonetheless demonstrated construct validity and specificity with other overlapping measures, these mixed findings might not speak to the validity of this factor as much as they suggest that we have not yet precisely captured the consequences of this negative belief about uncertainty. The lack of specificity with symptom measures further suggests this interpretation. While this belief did not show stronger associations with any of the commonly-assessed internalizing symptoms of GAD assessed in this study, the externalized nature of this belief about uncertainty may instead have other affective consequences. For instance, recent findings (Deschenes, Dugas, Fracalanza, & Koerner, 2011) have identified anger as a prevalent but poorly studied emotional experience associated with worry and GAD, and found that internalized expressions of anger and hostility contribute to GAD symptom severity. The possibility that this negative belief about uncertainty may account for unique variance in anger has yet to be investigated. To facilitate the identification of these and other potentially unique consequences of this belief, future research may also benefit from controlling for common factors or global vulnerabilities for anxiety disorder symptoms, such as negative

affect, when comparing the contribution of the two negative beliefs about uncertainty to information-processing and symptom outcomes.

Preliminary findings in clinical samples of individuals undergoing treatment for GAD further suggest that changes in the belief that Uncertainty is Unfair and Spoils Everything does indeed play a specific role in reducing worry. For instance, Donegan (2010) observed significant decreases in the endorsement of this negative belief about uncertainty from pre- to mid-treatment and again from mid- to post-treatment, whereas the belief that uncertainty has negative implications changed following the mid-point of treatment. These changes in the belief that uncertainty is unfair partially mediated decreases in GAD symptoms over the course of treatment. Further, this mediational relationship between changes in the belief that Uncertainty is Unfair and Spoils Everything and decreases in GAD symptoms appeared to be present in both directions and at similar magnitudes, suggesting a strong bi-directional relationship. In contrast, a more substantial portion of changes in the belief that uncertainty has negative implications was mediated by decreases in GAD symptoms during treatment, rather than the reverse. As such, it may be the case that the negative belief about uncertainty as being unfair and disorderly has some unique and relevant contributions to make in furthering our understanding of GAD symptoms and processes, and how best to intervene.

Examining the Predictions of Cognitive Theory: Do the Distinct Negative Beliefs About Uncertainty Have a Moderating or Mediated Role When Interacting With Other Processes to Contribute to Worry/GAD Symptoms?

Clark & Beck (2010) hypothesized that individuals vulnerable to anxiety can be distinguished from non-vulnerable persons by preexisting maladaptive schemas (i.e.,

beliefs) about particular threats or dangers and associated personal vulnerability that remain inactive until triggered by relevant life experiences or stressors” (p. 116). Thus, these authors postulate a moderating role for the effects of cognitive vulnerabilities such as intolerance of uncertainty in the development of symptomatology and the perception of threat. Some recent findings support this view, and highlight the importance of identifying specific negative beliefs about uncertainty and deciphering the role each specific negative beliefs about uncertainty may play in filtering individuals’ experience and biasing their response to stressors.

Intolerance of uncertainty moderates the response to negative life events.

Consistent with the predictions of cognitive theory (Clark & Beck, 2010), intolerance of uncertainty has been shown to moderate the relationship between negative life events and subsequent increases in anxiety (Chen & Hong, 2010). Of particular interest, individuals high in the belief that Uncertainty has Negative Behavioural and Self-Referent Implications were shown to experience increased worry in response to negative life events, whereas those low in this negative belief about uncertainty do not (Chen & Hong, 2010). As these findings suggest, these distinct core negative beliefs about uncertainty may thus have unique moderating effects on individual responses to external events.

Heightened sensitivity to potential threats in ambiguous situations mediates the association between intolerance of uncertainty and worry. According to cognitive theory, more proximal cognitive processes are hypothesized to mediate the association between these distal cognitive vulnerabilities (beliefs), negative life events or stress, and the onset of symptoms (see Baron & Kenny, 1986; Clark & Beck, 2010; Riskind & Alloy, 2006). As previously mentioned, Koerner and Dugas (2008) have demonstrated

that more negative appraisals of ambiguous situations partially mediate the association between intolerance of uncertainty and worry. Extending these findings, Bredemeier and Berenbaum (2008) found that more negative estimates of the perceived probability and perceived cost of negative outcomes partially mediated the association between Uncertainty Paralysis and worry, when covarying Desire for Predictability. Similarly, more negative cost estimates of perceived threats partially mediated the association between Desire for Predictability and worry, when covarying Uncertainty Paralysis. Thus, consistent with cognitive theory, intolerance of uncertainty functions as a cognitive vulnerability factor for worry, as evidenced by its association with these more proximal influences that partially mediate its effects on the tendency to worry excessively. Further, these findings suggest that the two negative beliefs about uncertainty may lead to different biases in information processing, and therefore may lead to worry through different mediating pathways. Nonetheless, in both instances, intolerance of uncertainty remained a significant predictor of worry, indicating that there may be other mechanisms through which intolerance of uncertainty contributes to worry, directly or indirectly.

Implications for Transdiagnostic Conceptualizations of Vulnerability Across the Anxiety and Mood Disorders.

These findings on specific negative beliefs about uncertainty have the potential to inform current research and debate on the potential transdiagnostic utility of intolerance of uncertainty. While some researchers have suggested that intolerance of uncertainty is a common component of fear and anxiety (Carleton, Sharpe, et al., 2007) and intolerance of uncertainty has indeed repeatedly been shown to be elevated in anxiety disorders populations relative to non-anxious populations (Ladouceur et al., 1999), it has primarily

been demonstrated to confer risk for worry/GAD. The specificity of this association between intolerance of uncertainty and worry has been demonstrated in several clinical populations, as several studies have compared the levels of intolerance of uncertainty observed in GAD populations to those found in non-clinical and other anxiety disorder populations. GAD populations appear to be more intolerant of uncertainty than are nonclinical populations (Holaway, Heimberg, & Coles, 2006; Ladouceur et al., 1999), other anxiety disorder patients (Ladouceur et al., 1999), and panic disorder patients specifically (Dugas, Marchand, & Ladouceur, 2005). Further, when controlling for neuroticism/negative affect – a global vulnerability factor for anxiety and mood disorders (see Clark, Watson, & Mineka, 1994; Zinbarg & Barlow, 1996) – intolerance of uncertainty has been shown to be specifically related to worry but not to symptoms of panic disorder, obsessive-compulsive disorder (OCD), or health anxiety (Norton et al., 2005; Sexton et al.). Thus, intolerance of uncertainty has generally been shown to be more specifically related to worry than to other anxiety disorder symptoms.

Nonetheless, the prevalence of intolerance of uncertainty is now beginning to be investigated more broadly across anxiety and mood disorders. In contrast to the aforementioned findings, a few recent studies have suggested that intolerance of uncertainty may have an important role in OCD, though it remains to be seen what that role is and what overlap it may have with the mechanisms of intolerance of uncertainty's involvement in worry/GAD. The levels of intolerance of uncertainty observed in GAD populations may be comparably elevated in OCD populations and in patients with comorbid GAD and OCD (Holaway et al., 2006), though a study by Tolin, Abramowitz, Brigidi, and Foa (2003) suggests this may apply primarily to checking compulsions.

However, this observed prominence of intolerance of uncertainty in OCD stands in contrast to prior findings. For instance, previous studies that have controlled for shared global vulnerabilities (e.g., negative affect), along with shared symptom variance, have shown mixed results; some have found that intolerance of uncertainty no longer predicts unique variance in OCD symptoms, yet continues to contribute to worry (Norton et al., 2005; Sexton et al., 2003), while others have demonstrated unique contributions of intolerance of uncertainty to OCD symptoms (e.g., Norton & Mehta, 2007). Thus, the extent of intolerance of uncertainty's role in OCD symptomatology is unclear.

In a parallel line of investigation, some findings have suggested that intolerance of uncertainty may similarly be relevant to social anxiety, as it predicted unique variance in social anxiety symptoms after accounting for neuroticism and other social anxiety disorder processes such as anxiety sensitivity and fear of negative evaluation (Boelen & Reijntjes, 2009), and after accounting for global vulnerabilities such as negative and positive affect (Norton & Mehta, 2007). However, much of the research comparing the contribution of intolerance of uncertainty to GAD and to social anxiety disorder symptoms thus far has solely employed non-clinical samples (e.g., Boelen & Reijntjes, 2009; Carleton, Collimore, & Asmundson, 2010; Norton & Mehta, 2007). In addition, some studies (e.g., Carleton et al., 2010) have used the short 12-item version of the IUS, whose content validity has yet to be examined empirically. Notably, this short form does not include items assessing the *personalization* of the behavioural difficulties experienced under uncertainty, and does not conceptualize a need for structure in the environment or associated heightened performance standards as relevant consequences of expectations of certainty and predictability in prospective events. As such, this measure may not afford a

complete examination of the specificity of intolerance of uncertainty to worry or to social anxiety. Thus, the prevalence of intolerance of uncertainty in social anxiety disorder, as well as in OCD, remains to be explored further. Notwithstanding these possible exceptions, overall intolerance of uncertainty has shown evidence of being specific to worry and ubiquitous in GAD populations.

Similarly, a developing area of research has begun to investigate the possible relevance of intolerance of uncertainty in the context of mood disorders. While intolerance of uncertainty was initially suggested to be more specifically related to worry than to depressive symptomatology (Dugas et al., 2004), more recent studies suggest it may nonetheless be relevant to mood disorders symptoms. For instance, several studies to date have found that it predicts a unique and substantial portion of the variance in depression symptoms after accounting for global vulnerabilities such as negative and positive affect (Norton et al., 2005; Norton & Mehta, 2007; van der Heiden, et al., 2010). Thus, intolerance of uncertainty may be relevant to depressive symptomatology as well.

However, evidence of intolerance of uncertainty's bearing on OCD, social anxiety, or depression symptoms does not confirm its status as a cognitive vulnerability for the development of these symptoms, nor does evidence of its specificity to worry/GAD negate the possibility that intolerance of uncertainty plays a significant role in other anxiety and mood disorders. Indeed, findings on the prevalence and specificity of intolerance of uncertainty across the anxiety and mood disorders do not necessarily speak to the nature of its particular role in each disorder. As such, it should not be assumed that the mechanism by which intolerance of uncertainty confers vulnerability is necessarily the same for each set of symptoms. There is clearly a possibility that the distinct negative

beliefs about uncertainty convey risk by different mechanisms and to different extents across diverse anxiety and mood disorder symptoms.

For instance, in the context of mood disorders where the effects of intolerance of uncertainty have also recently been explored, preliminary findings suggest that the mechanism by which intolerance of uncertainty confers risk may not be the same as for anxiety disorders such as GAD. Several studies have now shown that intolerance of uncertainty's impact on depression symptoms is fully mediated by other depression-related cognitive processes such as rumination (e.g., De Jong-Meyer, Beck, & Riede, 2009; Yook, Kim, Suh, & Lee, 2010), and that it exerts its impact through other mechanisms altogether, such as depressive predictive certainty, a construct linked to hopelessness (Miranda et al., 2008). These findings stand in sharp contrast to parallel investigations with worry/GAD symptoms, in which intolerance of uncertainty continued to contribute directly to anxiety or worry and was only partially mediated by other processes (De Jong-Meyer et al., 2009; Miranda et al., 2008). As such, intolerance of uncertainty continues to play a unique and direct role in worry and anxiety, whereas in depression its role appears to be primarily indirect and mediated by different processes. Nonetheless, as we have seen, questions remain as to the specificity of this cognitive vulnerability across anxiety and mood disorders, and the precise role of intolerance of uncertainty within each disorder is largely still unexplained.

The identification of two distinct negative beliefs about uncertainty has the potential to clarify and inform further research into the mechanisms of action of intolerance of uncertainty within different anxiety and mood disorders. Some preliminary findings suggest that these beliefs may make unique contributions to different symptoms,

suggesting some degree of specificity in terms of the mechanisms by which risk is conferred. For instance, Sexton, Norton, Dugas, and Walker (2010) found that in a mixed clinical sample, the belief that Uncertainty has Negative Behavioural and Self-Referent Implications predicted unique variance in symptoms of anxiety and depression after accounting for negative affect, whereas the belief that Uncertainty is Unfair and Spoils Everything accounted for unique variance in worry. Khawaja and Lu (2010) have also demonstrated that both these negative beliefs about uncertainty distinguish between GAD and non-clinical populations in their own right. However, further research is needed to examine the impact of these negative beliefs on other associated processes that contribute to specific anxiety and mood disorder symptoms. Further, the strength of association of these symptoms with the negative beliefs about uncertainty has yet to be compared across clinical samples of individuals with different anxiety and mood disorders.

Alternatively, the association between intolerance of uncertainty and other anxiety and mood disorder symptoms may reflect or account for comorbidity, or it may suggest that these beliefs have a possible moderating influence through these other comorbid symptoms. For instance, another possible mechanism by which intolerance of uncertainty may contribute to worry/GAD symptomatology is through the comorbid symptoms it engenders, such as a negative mood. As noted in previous research (Sexton & Dugas, 2009b; Sexton et al., 2010), the belief that Uncertainty has Negative Behavioural and Self-Referent Implications appears to explain more of the variance in comorbid symptoms of depressed mood than does its counterpart IUS subscale. These depression symptoms are frequently comorbid with a tendency to worry excessively and uncontrollably (e.g., Brown, Campbell, Lehman, Grisham, & Mancill, 2001; Brown,

Chorpita, & Barlow, 1998; Hunt, Issakidis, & Andrews, 2002; Khan, Jacobson, Gardner, Prescott, & Kendler, 2005; Mineka, Watson, & Clark, 1998). Moreover, negative mood has been found to be exacerbated over the course of a worry bout (Davey, Eldridge, Drost, & MacDonald, 2007). This low mood has its own important implications for the frequency and severity of worry. For instance, several researchers have suggested that a diminished sense of personal competency, which frequently accompanies and contributes to depressed mood (e.g., Abramson, Metalsky, & Alloy, 1989; Abramson, Seligman, & Teasdale, 1978; Seligman, Abramson, Semmel, & Baeyer, 1979), may contribute directly to perceptions of threat, such that they become over-represented in cognitive structures and are thus perceived as more likely to occur (Berenbaum, 2010). Thus, a depressed mood may play a role in initiating bouts of catastrophic worry about these perceived threats (e.g., Berenbaum, 2010; Davey & Levy, 1998, 1999). Further, Startup and Davey (2001) have found that a depressed mood lengthens the duration of a worry bout by exacerbating the number of catastrophizing steps generated while worrying and by increasing perseverative processing of the threat, thus delaying termination of the worry bout and increasing efforts aimed at threat prevention or preparedness. Thus, the belief that uncertainty has negative implications and its association with negative mood states may have important contributions for both the initiation and termination of worry.

Directions for Future Research

The development of intolerance of uncertainty. These findings have potential implications for our understanding of the etiology of intolerance of uncertainty. Furthering our understanding of specific beliefs that lead to intolerance of uncertainty will allow for a closer examination of how these beliefs develop. To date, there has been

very limited research done in this area. Zlomke and Young (2009) conducted a preliminary retrospective investigation of the role of parental rearing behaviours on the development of intolerance of uncertainty, and found evidence of a mediating role of intolerance of uncertainty on the association between a perceived anxious parenting style and symptoms of worry and anxiety. Further prospective studies are needed. In addition, Zlomke and Young, among others (e.g., McLeod, Wood, & Weisz, 2007), have noted that the identification of *specific* childhood experiences and parental rearing behaviours has facilitated the identification of learning and modeling experiences in childhood that precipitate the later development of anxiety and worry. It is hoped that the current study's findings which speak to the validity of these specific beliefs about uncertainty, along with the identification of specific correlates of these distinct beliefs, may likewise facilitate research into the etiology of intolerance of uncertainty.

It is similarly hoped that the identification of specific uncertainty intolerant beliefs will refine future explorations of the mechanisms by which intolerance of uncertainty has an impact on other proximal contributors to worry and also on the mechanisms by which it contributes directly to the propensity to engage in excessive and uncontrollable worry about future events. Future research should investigate the mechanisms by which intolerance of uncertainty and its composite beliefs alter the information processing of challenging life experiences and result in excessive and uncontrollable worry as well as concomitant anxiety and depression symptoms.

Pathways to intolerance of uncertainty: Independent or interactive effects of the beliefs that uncertainty has negative personal implications and is unfair?

Further, the pathways to uncertainty intolerant beliefs, whether they are common or

idiosyncratic, remain to be identified. It may be the case that it is not consistently the same beliefs about uncertainty that operate to predict who will experience uncertainty as aversive. If, however, our interventions are to be effective in helping individuals who have become “stuck” in the use of maladaptive coping strategies, such as excessive worry, in response to uncertain situations, our treatments will need to address the specific beliefs that have contributed to this inflexibility in responding that results from intolerance of uncertainty. As it is not clear to what extent different developmental antecedents to intolerance of uncertainty exist, or to what extent these uncertainty intolerance beliefs may overlap, it will be important to determine which beliefs are necessary or sufficient to the development of intolerance of uncertainty, and which pathways interact to result in the inflexible or maladaptive responses to uncertain situations which have been observed among individuals high in intolerance of uncertainty.

It is conceivable that holding one of these negative beliefs about uncertainty may make an individual more susceptible to developing the other belief about uncertainty’s implications. This is strongly suggested by the high correlation observed between the two negative beliefs about uncertainty in both studies presented here. Van den Bos (2001) has noted that threats to perceived fairness are viewed as more threatening to an individual’s worldview when self-esteem is threatened than when it has been bolstered by self-affirming actions. This suggests one possible mechanism by which the two identified negative beliefs about uncertainty may interact, as they concern perceived vulnerabilities to self-esteem on the one hand and unfair threats to the expected reliable environmental structure on the other. For instance, since the belief that uncertainty has negative personal

implications is not self-affirming (the opposite in fact), it may render the perceived unfairness of uncertainty more salient. As such, individuals who hold the belief that uncertainty has negative personal implications may more readily form the expectation that the external world should be structured and that uncertainty is unfair. This may prove to be one means by which these two beliefs about uncertainty could interact.

Alternatively, a strong need for cognitive structure, in the form of a view of the world as reliable and certain, accompanied by higher personal standards that demand these expectations be met, may become particularly problematic when this need cannot be fulfilled. In these situations, it may lead to the perception that personal abilities to achieve and maintain this clear structure, or to cope with uncertain threats, are poor. In other words, individuals who expect more of themselves and of the situation are more likely to be disappointed. As such, another possible means by which beliefs about uncertainty may interact is as a result of repeated failed attempts to fulfill a strong need for cognitive structure, which may contribute to perceived helplessness in uncertain situations, particularly among individuals with a tendency to personalize such failures. Thus, individuals high in the belief that uncertainty is unfair and spoiling may be more prone to perceive uncertainty as also having negative personal implications.

Consistent with this hypothesis, Webster (1993) has demonstrated that individuals high in the need for closure will seize on the first most salient explanation for a given outcome and will be reluctant to re-evaluate this attribution, as to do so would require abandoning the sense of closure they have attained. Webster further noted that when personal failings are salient, a need for cognitive certainty can result in overestimation of the contribution of personal failings to a negative outcome, and underestimation of the

effects of situational contributors. Thus, beliefs about personal weakness, such as the belief that personal coping abilities are diminished by uncertainty, may be more readily formed in threatening (i.e., uncertain) situations, and may subsequently be particularly difficult to revise, among individuals who have a strong need for closure or certainty.

Alternatively, it may be that either negative belief about uncertainty has the necessary and sufficient capacity to foster vulnerability to excessive and uncontrollable worry. These studies' findings are consistent with this possibility, as information processing biases were predicted by both the belief that uncertainty has personal implications and the belief that uncertainty is unfair and spoiling, independently.

Potential treatment implications. With the identification of these distinct negative beliefs about uncertainty, several additional questions arise regarding the manifestations and implications of these different beliefs in a treatment context. For instance, it is conceivable that individuals who hold one or other of these beliefs more strongly may as a result present differently in a treatment context. Given past findings that have identified depression symptoms as a stronger correlate of the belief that uncertainty has negative implications (Sexton & Dugas, 2009b), a vulnerability to low mood may be a particular manifestation of individuals endorsing this particular belief about uncertainty. As we have noted, this low mood or the diminished sense of personal competency which can accompany depressed mood may itself further exacerbate existing worry symptoms (e.g., Berenbaum, 2010; Davey & Levy, 1998, 1999; Startup & Davey, 2001). The current findings are consistent with this proposed mechanism. In this study, the belief that uncertainty has negative implications, which was associated with a personalizing cognitive error bias, predicted more threatening appraisals of ambiguous

situations, and perceptions of these situations as having more negative personal implications. As such, GAD patients who present with strong beliefs about the personal implications of uncertainty may benefit additionally from interventions to address any concomitant depressive symptoms and to challenge negative views of the self regarding their personal ability to cope with uncertain situations. These may assist with interventions to address worry and associated information-processing biases.

In contrast, individuals presenting with particularly strong beliefs about the unfair and spoiling nature of uncertainty may be more prone to form externalized attributions for perceived difficulties in uncertain situations, which in turn may render them susceptible to different emotional responses. Some authors have speculated that frustration (Sexton & Dugas, 2009b) or anger (Donegan, 2010) may result as a consequence of this uncertainty intolerant belief. Though it has been understudied across the anxiety disorders, some preliminary evidence suggests that anger may be elevated relative to healthy populations in the context of some anxiety disorders (Moscovitch, McCabe, Antony, Rocca, & Swinson, 2008). In the context of GAD, Erden, Celik, Yelkin, and Ozgen (2008) found that trait anger and anger expression were elevated, and anger control was reduced, in a group of individuals diagnosed with GAD relative to a group of non-anxious participants. Further, preliminary findings have demonstrated that anger has effects similar to, and independent of, those of anxiety in fostering negative interpretive biases in ambiguous situations (Barazzone & Davey, 2009; Wenzel & Lystad, 2005). Further research is needed to assess whether the belief that Uncertainty is Unfair and Spoils Everything, and its association with appraisals of ambiguous situations as threatening and as being unfair and disruptive, may explain the more frequent

occurrence of anger in GAD.

Further research is also needed to assess whether this putative association with anger might perhaps account for the information processing biases observed among high worriers in ambiguous situations. The association between the belief that Uncertainty is Unfair and Spoils Everything and perfectionistic standards for other people, as observed in this study, may suggest one potential source of this anger, which may occur when others fail to reach these standards and uncertainty inevitably occurs. The possibility that anger may mediate the observed association between the belief that uncertainty is unfair and spoils everything and threat appraisal biases might also warrant investigation. Alternatively, the possibility that threat appraisal biases may mediate the observed association between the belief that uncertainty is unfair and spoils everything and anger should also be considered. In parallel fashion, Koerner and Dugas (2008) found that appraisal biases partially mediated the association between intolerance of uncertainty and worry, but that the reverse was also true and worry partially mediated the association between intolerance of uncertainty and appraisal biases, suggesting some degree of bidirectionality in the association between appraisal biases and worry; the same may be true of appraisal biases and anger.

Nonetheless, addressing unrealistic expectations about the level of certainty attainable in ambiguous situations, and relaxing demanding standards for the self and others that may result from this elevated need for certainty, would likely promote more realistic appraisals of threat. If anger is indeed present, altering these unrealistic expectations may reduce associated anger and its effects on appraisal biases as well. A preliminary investigation has demonstrated that negative beliefs about uncertainty can be

manipulated, with impacts on appraisal biases and the accessibility of threat schemata (Deschenes, Dugas, Radomsky, & Buhr, 2010); this type of intervention could prove to be of benefit in the treatment of GAD. There are also now promising interventions which directly target negative appraisal biases (e.g., Amir, Beard, Burns, & Bomyea, 2009) or related attentional biases toward perceived threats (e.g., Hayes, Hirsch, Krebs, & Mathews, 2010) in GAD, which may similarly be effective as adjuncts to existing treatments. These types of interventions might also, in turn, promote more realistic beliefs about the unfair and spoiling nature of the threat posed by uncertainty. Thus, it is hoped that the results of these to studies will better inform our interventions to address the underlying or core beliefs that contribute to excessive and uncontrollable worry as well as to anxiety and depression symptoms more broadly.

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Appendix A

Consent and Debriefing Forms for study participation

Standard Consent Form to Participate in Research

(Template for the consent forms used in the archival studies included in Study 1)

This is to state that I, _____, agree to participate in a program of research conducted by (*student's name*) in the Anxiety Disorders Laboratory under the supervision of Dr. Michel J. Dugas, both of whom may be reached at 848-2424 ext. 2246.

A. PURPOSE

I have been informed that the purpose of this research is to investigate _____ (*e.g.*, the cognitive and behavioural processes which contribute to worry and anxiety).

B. PROCEDURE

I have been informed that the study involves the following procedures: I will be asked to sign a consent form, and fill out a general information sheet. Then, I will be asked to complete # questionnaires: one measuring _____; another measuring _____, a third measuring _____, a fourth measuring _____, and a fifth measuring _____ (*etc.*). These questionnaires should take approximately minutes to complete. There is no deception in this experiment and I will not be required to do any task other than those described above. My name will only appear on the consent form, and code numbers alone will be used to identify the questionnaires. The signed consent form will be stored separately from my 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 I provide, are strictly confidential. (*If applicable*: As compensation for either participating in or observing this study, I will receive one course credit as outlined on the Psychology Department's Participant Pool website: <http://www-psychology.concordia.ca/Participants/index.html>.)

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 _____

If at any time you have questions about your rights as a research participant, please contact Adela Reid, Research Ethics and Compliance Officer, Concordia University, at 514-848-2424, ext. 7481, or by email at Adela.Reid@Concordia.ca.

Consent Form to Participate in Research

(Study 2)

This is to state that I, _____, agree to participate in a program of research conducted by Kathryn Sexton, M.A., in the Anxiety Disorders Laboratory under the supervision of Dr. Michel J. Dugas, Ph.D., both of whom may be reached at 848-2424 ext. 2246 (or by e-mail at kasexton@alcor.concordia.ca).

A. PURPOSE

I have been informed that the purpose of this research is to investigate attitudes, beliefs, and experiences people have in uncertain situations.

B. PROCEDURE

I have been informed that the study involves the following procedures: I will be asked to sign a consent form, and fill out a general information sheet. Then, I will be asked to complete 8 questionnaires: one measuring attitudes towards uncertain situations, another measuring behavioural reactions and beliefs in ambiguous situations, a third measuring behavioural responses when faced with decisions, a fourth measuring behavioural responses when faced with specific tasks, a fifth measuring ways of thinking when in ambiguous situations, a sixth measuring personal standards, a seventh measuring desire for closure, and an eighth measuring individual differences in the extent to which people seek out information. These questionnaires should take approximately 45 - 60 minutes to complete. There is no deception in this experiment and I will not be required to do any task other than those described above. My name will only appear on the consent form, and code numbers alone will be used to identify the questionnaires. The signed consent form will be stored separately from my 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 I provide, are strictly confidential.

C. RISKS AND BENEFITS

Participation in this study has no known risks and no costs other than the time it takes to complete the questionnaires. As compensation for either participating in or observing this study, I will receive one course credit as outlined on the Psychology Department's Participant Pool website: <http://www-psychology.concordia.ca/Participants/index.html>.)

D. 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 CAREFULLY STUDIED THE ABOVE AND UNDERSTAND THIS AGREEMENT. I FREELY CONSENT AND VOLUNTARILY AGREE TO PARTICIPATE IN THIS STUDY.

NAME (please print) _____

SIGNATURE _____

WITNESS SIGNATURE _____

DATE _____

If at any time you have questions about your rights as a research participant, please contact Adela Reid, Research Ethics and Compliance Officer, Concordia University, at 514-848-2424, ext. 7481, or by email at Adela.Reid@Concordia.ca.

Debriefing Form

(Study 2)

Uncertainty has negative implications and is unfair: Construct validity of the Intolerance of Uncertainty Scale and its factors

The purpose of this research was to investigate the attitudes, beliefs, and experiences people have in uncertain situations. This survey study included questionnaires and vignettes assessing attitudes towards uncertain and ambiguous situations, behavioural responses when faced with decisions, behavioural responses when faced with specific uncertain tasks, ways of thinking when in ambiguous situations, personal standards, desire for closure, and individual differences in the extent to which people seek out information. Using these measures, this study sought to refine our understanding of specific beliefs about uncertainty that are associated with high levels of worry, and to examine the behaviours, thoughts, and feelings that are associated with these beliefs. In other words, this study examined how specific beliefs about uncertainty that individuals hold may relate to how they react in actual situations that people face everyday, situations that are either ambiguous or unpredictable in terms of their outcome.

This study sought to validate two new measures of beliefs about uncertainty and reactions in uncertain situations, measures which will be used in future research and which will also be applied in clinical settings with individuals who suffer from worry and anxiety. The results of this study therefore have several possible advantages for the assessment and treatment of processes that contribute to worry and anxiety. First, by better understanding the nature of the beliefs regarding uncertainty that individuals hold, we may be better able to reduce intolerance of uncertainty, which is a risk factor for the development and maintenance of high levels of worry and anxiety. Second, by identifying the particular behaviours, thoughts, and feelings that these beliefs are thought to generate when individuals are faced with uncertainty, we will be better able to tailor our treatment strategies to address those reactions that are less helpful to individuals when they cope with uncertain situations.

This research was conducted by Kathryn Sexton from the Anxiety Disorders Laboratory, under the supervision of Dr. Michel Dugas. If you have any questions or concerns, we can be reached at:

The Anxiety Disorders Laboratory
Concordia University
Department of Psychology
L-SP-319.00
Phone: (514) 848-2424 extension 2246
E-mail: kasexton@alcor.concordia.ca
Website: <http://www-psychology.concordia.ca/fac/dugas/>

If you have any concerns regarding the way in which this study was conducted or if you have any questions regarding the ethics of this research, please contact the Psychology Department Ethics Committee, chaired by Dr. Virginia Penhune, whose office is located in L-SP-253-7.

If you have any further interest in this subject, we have provided the following reference for your information:

Dugas, M. J., & Robichaud, M. (2007). *Cognitive-behavioral treatment for generalized anxiety disorder: From science to practice*. New York: Routledge.

Appendix B

Study advertisement for the Department of Psychology's Participant Pool webpage

Study advertisement for the Department of Psychology's Participant Pool webpage

To be listed under "Surveys"

at <http://psychology.concordia.ca/Participants/index.html>

Title: How do you handle unpredictability?

Location: SP-319

Faculty supervisor: Dr. Michel J. Dugas

Duration of testing: 45-60 minutes.

Contact: 514-848-2424 ext: 2246; adlab@alcor.concordia.ca

Description: For this study, you will be asked to fill out a survey consisting of questionnaires and vignettes. This survey package can be completed in our lab in one sitting. The questionnaires are designed to examine different beliefs and attitudes that you might hold about the uncertain or ambiguous situations that each of us encounter everyday. Our aim is to gain a better understanding of how these beliefs are related to a variety of behavioural, cognitive, & emotional reactions in unpredictable situations.

Inclusion/Exclusion criteria: You must speak and read English.

Appendix C

Demographic Information questionnaire

General Information

Age: _____

Sex: Male _____ Female _____

Education:

University year: 1 _____ 2 _____ 3 _____ other _____

Field of study: Psychology _____

Other (Please specify) _____

Status: full-time _____ part-time _____

First Language: English _____

French _____

Other (please specify) _____

Race / Ethnicity: (check one)

African-American / Black / Caribbean Origin _____

Asian-American / Asian Origin / Pacific Islander _____

Latino-a / Hispanic _____

American Indian / Alaska Native / Aboriginal Canadian _____

European Origin / White _____

Bi-racial / Multi-racial _____

Middle Eastern _____

Other (Please Specify) _____

Appendix D

The Intolerance of Uncertainty Scale (IUS)

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 | | |

- | | Not at all
characteristic
of me | Somewhat
characteristic
of me | Entirely
characteristic
of me |
|-----|---|-------------------------------------|-------------------------------------|
| 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..... | | |
| 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..... | | |

- | | Not at all
characteristic
of me | Somewhat
characteristic
of me | Entirely
characteristic
of me |
|--|---------------------------------------|-------------------------------------|-------------------------------------|
| 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..... |
-

Original French Version: Freeston, M. H., Rhéaume, J., Letarte, H., Dugas, M.J., & Ladouceur, R. (1994). Why do people worry? *Personality and Individual Differences, 17*(6), 791-802.

English Version: Buhr, K., Dugas, M. J. (2002). The intolerance of uncertainty scale: psychometric properties of the English version. *Behaviour Research and Therapy, 40*, 931-945.

Appendix E

The Penn State Worry Questionnaire (PSWQ)

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 done.	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 Questionnaire. *Behaviour Research and Therapy*, 28, 487-495.

Appendix F

The Worry and Anxiety Questionnaire (WAQ)

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 (0-8).

2. Do your worries seem excessive or exaggerated?

- | | | | | | | | | | | |
|-------------------------|---|---|---|---|-------------------------|---|---|---|--|----------------------|
| Not at all
excessive | | | | | Moderately
excessive | | | | | Totally
excessive |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | |

3. Over the **past six months**, how many days have you been bothered by excessive worry?

- | | | | | | | | | | |
|-------|---|---|---|----------------|---|---|---|---|----------|
| Never | | | | 1 day out of 2 | | | | | Everyday |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | |

4. Do you have difficulty controlling your worries? For example, when you start worrying about something, do you have difficulty stopping?

- | | | | | | | | | |
|------------------|---|---|---|------------------------|---|---|---|-----------------------|
| No
difficulty | | | | Moderate
difficulty | | | | Extreme
difficulty |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |

5. Over the **past six months**, to what extent have you been disturbed by the following sensations when you were worried or anxious?

Not at all				Moderately				Very severely
0	1	2	3	4	5	6	7	8

a) Restlessness or feeling keyed up or on edge.

Not at all				Moderately				Very severely
0	1	2	3	4	5	6	7	8

b) Being easily fatigued.

Not at all				Moderately				Very severely
0	1	2	3	4	5	6	7	8

c) Difficulty concentrating or mind going blank.

Not at all				Moderately				Very severely
0	1	2	3	4	5	6	7	8

d) Irritability.

Not at all				Moderately				Very severely
0	1	2	3	4	5	6	7	8

e) Muscle tension.

Not at all				Moderately				Very severely
0	1	2	3	4	5	6	7	8

f) Sleep disturbance (difficulty falling or staying asleep, or restless unsatisfying sleep).

Not at all				Moderately				Very severely
0	1	2	3	4	5	6	7	8

6. To what extent does worry or anxiety interfere with your life, for example, your work, social activities, family life, etc.?

Not at all				Moderately				Very severely
0	1	2	3	4	5	6	7	8

Dugas, M. J., Freeston, M. H., Provencher, M. D., Lachance, S., Ladouceur, R., & Gosselin, P. (2001). *Journal de Thérapie Comportementale et Cognitive*, 11(1), 31-36.

Appendix G

The State Trait Anxiety Inventory (Form Y) – Trait (STAI-T)

State Trait Anxiety Inventory (Form Y) – Trait (STAI-T)

A number of statements which people have used to describe themselves are given below. Read each statement and then circle the appropriate number to the right of the statement to indicate how you generally feel. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe how you generally feel.

- | | Almost
Never | Sometimes | Often | Almost
Always |
|--|-----------------|-----------|--------|------------------|
| 1. I feel pleasant. | 1..... | 2..... | 3..... | 4..... |
| 2. I feel nervous and restless. | 1..... | 2..... | 3..... | 4..... |
| 3. I feel satisfied with myself. | 1..... | 2..... | 3..... | 4..... |
| 4. I wish I could be as happy
as others seem to be. | 1..... | 2..... | 3..... | 4..... |
| 5. I feel like a failure. | 1..... | 2..... | 3..... | 4..... |
| 6. I feel rested. | 1..... | 2..... | 3..... | 4..... |
| 7. I am "calm, cool, and collected". | 1..... | 2..... | 3..... | 4..... |
| 8. I feel that difficulties are piling
up so that I cannot overcome
them. | 1..... | 2..... | 3..... | 4..... |
| 9. I worry too much over something
that really doesn't matter. | 1..... | 2..... | 3..... | 4..... |

	Almost Never	Sometimes	Often	Almost Always
10. I am happy.	1.....	2.....	3.....	4....
11. I have disturbing thoughts.	1.....	2.....	3.....	4....
12. I lack self-confidence.	1.....	2.....	3.....	4....
13. I feel secure.	1.....	2.....	3.....	4....
14. I make decisions easily.	1.....	2.....	3.....	4....
15. I feel inadequate.	1.....	2.....	3.....	4....
16. I am content.	1.....	2.....	3.....	4....
17. Some unimportant thought runs through my mind and bothers me.	1.....	2.....	3.....	4....
18. I take disappointments so keenly that I can't put them out of my mind.	1.....	2.....	3.....	4....
19. I am a steady person.	1.....	2.....	3.....	4....
20. I get in a state of tension or turmoil as I think over my recent concerns and interests.	1.....	2.....	3.....	4....

Spielberger, C. D. Gorsuch, R. L., Lushene, R., Vagg, P. R., & Jacobs, G. A. (1977). *State-Trait Anxiety Inventory for Adults: Self-Evaluation Questionnaire (STAI Form Y-1 and Form Y-2)*. Redwood City, CA: Mind Garden.

Appendix H

The Beck Anxiety Inventory (BAI)

Beck Anxiety Inventory (BAI)

This questionnaire consists of a list of 21 symptoms associated with anxiety. Please read each symptom carefully. Then indicate, by circling a number (0, 1, 2, 3), to what degree you have been affected by each of these symptoms **over the past week, including today.**

	<u>Not at all</u>	<u>A little</u>	<u>Somewhat</u>	<u>A lot</u>
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 abdomen	0	1	2	3

	<u>Not at all</u>	<u>A little</u>	<u>Somewhat</u>	<u>A lot</u>
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 I

The Centre for Epidemiological Studies – Depression Scale (CES-D)

Centre for Epidemiological Studies – Depression Scale (CES-D)

Below is a list of the ways you might have felt or behaved. Please read each statement carefully and, using the scale below, circle a number (0 to 3) to indicate how often you have felt this way **during the past week**.

		Rarely or none of the time (Less than 1 day)	Some or a little of the time (1-2 days)	Occasionally or a moderate amount of the time (3-4 days)	Most or all of the time (5-7 days)
1.	I was bothered by things that usually don't bother me.	0.....	1.....	2.....	3.....
2.	I did not feel like eating; my appetite was poor.	.....0.....	.....1.....	.....2.....	.....3.....
3.	I felt that I could not shake off the blues even with help from my family or friends.	...0.....	.....1.....	.....2.....	.....3.....
4.	I felt that I was just as good as other people.	.....0.....	.....1.....	.....2.....	.....3.....
5.	I had trouble keeping my mind on what I was doing.	...0.....	.....1.....	.....2.....	.....3.....
6.	I felt depressed.	.....0.....	.....1.....	.....2.....	.....3.....
7.	I felt that everything I did was an effort.	.....0.....	.....1.....	.....2.....	.....3.....
8.	I felt hopeful about the future.	.....0.....	.....1.....	.....2.....	.....3.....
9.	I thought my life has been a failure.	.....0.....	.....1.....	.....2.....	.....3.....
10.	I felt fearful.	.....0.....	.....1.....	.....2.....	.....3.....
11.	My sleep was restless.	.....0.....	.....1.....	.....2.....	.....3.....
12.	I was happy.	.....0.....	.....1.....	.....2.....	.....3.....

		Rarely or none of the time (Less than 1 day)	Some or a little of the time (1-2 days)	Occasionally or a moderate amount of the time (3-4 days)	Most or all of the time (5-7 days)
13.	I talked less than usual.	.....0.....	1.....	2.....	3.....
14.	I felt lonely.	.....0.....	1.....	2.....	3.....
15.	People were unfriendly.	.....0.....	1.....	2.....	3.....
16.	I enjoyed life.	.....0.....	1.....	2.....	3.....
17.	I had crying spells.	.....0.....	1.....	2.....	3.....
18.	I felt sad.	.....0.....	1.....	2.....	3.....
19.	I felt that people dislike me.	.0.....	1.....	2.....	3.....
20.	I could not get going.	.....0.....	1.....	2.....	3.....

Radloff, L. S. (1977). The CES-D Scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement, 1*, 385-401.

Appendix J

The Ambiguous Situations Questionnaire (ASQ)

Ambiguous Situations Questionnaire (ASQ)

Please imagine that the following situations are happening to you. For each excerpt, first rate how good or bad the situation would seem to you. Then, rate how unlikely or likely you would be to respond to this situation in the following ways and how much you agree or disagree with the statements that follow. Please make only one rating on each scale. In other words, circle only one number (from 1 to 9) on each rating scale. There are no right or wrong answers; just decide how you would most likely react in each situation.

1. I was told by my colleagues that my boss made a comment about my work.

How good or bad does this situation seem to you?

Very Good	Somewhat good	Neither good nor bad	Somewhat bad	Very bad				
.....1.....2.....3.....4.....5.....6.....7.....8.....9.....

In this situation, how likely would you be to react in the following way?:

I can't bring myself to ask my colleagues if my boss was pleased with my work or not.

Not at all Likely	Somewhat Unlikely	Neither Unlikely nor Likely	Somewhat Likely	Very Likely				
.....1.....2.....3.....4.....5.....6.....7.....8.....9.....

To what extent do you agree with the following statement?:

I would appreciate it if my colleagues would come right out and tell me if the comments they heard were good or bad.

Completely Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Completely Agree				
.....1.....2.....3.....4.....5.....6.....7.....8.....9.....

2. I went out on a date with a colleague. I wrote him/her an e-mail to say that I enjoyed myself; I'm still waiting to hear back from him/her.

How good or bad does this situation seem to you?

Very Good	Somewhat good	Neither good nor bad	Somewhat bad	Very bad
.....1.....	.....2.....	.....3.....	.....4.....	.....5.....
.....6.....	.....7.....	.....8.....	.....9.....	.....

In this situation, how likely would you be to react in the following way?:

I can't decide whether or not I should contact him/her again.

Not at all Likely	Somewhat Unlikely	Neither Unlikely nor Likely	Somewhat Likely	Very Likely
.....1.....	.....2.....	.....3.....	.....4.....	.....5.....
.....6.....	.....7.....	.....8.....	.....9.....	.....

To what extent do you agree with the following statement?:

I am unimpressed that he/she is leaving me in the dark about whether he/she is interested in me.

Completely Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Completely Agree
.....1.....	.....2.....	.....3.....	.....4.....	.....5.....
.....6.....	.....7.....	.....8.....	.....9.....	.....

3. It is my first night as a chef in the restaurant, and I have been asked for at the diners' tables twice.

How good or bad does this situation seem to you?

Very Good	Somewhat good	Neither good nor bad	Somewhat bad	Very bad
.....1.....	.....2.....	.....3.....	.....4.....	.....5.....
.....6.....	.....7.....	.....8.....	.....9.....	.....

To what extent do you agree with the following statement?:

The host or hostess should tell me whether the diners are pleased or not before I go out there and face them.

Completely Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Completely Agree
.....1.....	.....2.....	.....3.....	.....4.....	.....5.....
.....6.....	.....7.....	.....8.....	.....9.....	.....

In this situation, how likely would you be to react in the following way?:

I don't know if I can bring myself to go out there and hear the diners' comments.

Not at all Likely	Somewhat Unlikely	Neither nor	Unlikely Likely	Somewhat Likely	Very Likely			
.....1.....2.....3.....4.....5.....6.....7.....8.....9.....

4. After my check-up, the doctor told me he/she would call if there was a problem. It's a week later and I have not heard anything.

How good or bad does this situation seem to you?

Very Good	Somewhat good	Neither good nor bad	Somewhat bad	Very bad				
.....1.....2.....3.....4.....5.....6.....7.....8.....9.....

To what extent do you agree with the following statement?:

Doctors' offices should call you one way or another; it's too much to expect that I should go about my life as usual while dealing with this suspense.

Completely Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Completely Agree				
.....1.....2.....3.....4.....5.....6.....7.....8.....9.....

In this situation, how likely would you be to react in the following way?:

I am disappointed with myself for being distracted while waiting to see if my doctor might phone.

Not at all Likely	Somewhat Unlikely	Neither nor	Unlikely Likely	Somewhat Likely	Very Likely			
.....1.....2.....3.....4.....5.....6.....7.....8.....9.....

5. I left my dog at the vet this morning and got a message this afternoon saying my dog's condition is as expected given his age and breed.

How good or bad does this situation seem to you?

Very Good	Somewhat good	Neither good nor bad	Somewhat bad	Very bad				
.....1.....2.....3.....4.....5.....6.....7.....8.....9.....

In this situation, how likely would you be to react in the following way?:

Thinking about this will keep me from being able to focus on everything I have to do today.

Not at all Likely	Somewhat Unlikely	Neither nor	Unlikely Likely	Somewhat Likely	Very Likely			
.....1.....2.....3.....4.....5.....6.....7.....8.....9.....

To what extent do you agree with the following statement?:

The vet should have been clear about my dog's current health.

Completely Disagree	Somewhat Disagree	Neither nor	Agree Disagree	Somewhat Agree	Completely Agree			
.....1.....2.....3.....4.....5.....6.....7.....8.....9.....

6. Since moving out on my own last year, I've noticed a significant change in the way my sister and I get along.

How good or bad does this situation seem to you?

Very Good	Somewhat good	Neither nor	good bad	Somewhat bad	Very bad			
.....1.....2.....3.....4.....5.....6.....7.....8.....9.....

To what extent do you agree with the following statement?:

My sister should just tell me how she feels about this change in our relationship.

Completely Disagree	Somewhat Disagree	Neither nor	Agree Disagree	Somewhat Agree	Completely Agree			
.....1.....2.....3.....4.....5.....6.....7.....8.....9.....

In this situation, how likely would you be to react in the following way?:

I find it difficult to interact with my sister given this situation.

Not at all Likely	Somewhat Unlikely	Neither nor	Unlikely Likely	Somewhat Likely	Very Likely			
.....1.....2.....3.....4.....5.....6.....7.....8.....9.....

7. Today, I was on the bus when I noticed some of my classmates sitting behind me, talking with each other in a low voice.

How good or bad does this situation seem to you?

Very Good	Somewhat good	Neither good nor bad	Somewhat bad	Very bad
.....1.....	.....2.....	.....3.....	.....4.....	.....5.....
.....6.....	.....7.....	.....8.....	.....9.....	.....

In this situation, how likely would you be to react in the following way?:

I wish I was able to join in the conversation, but I wouldn't feel comfortable speaking to them unless I could be sure they weren't talking about me.

Not at all Likely	Somewhat Unlikely	Neither nor Likely	Unlikely Likely	Somewhat Likely	Very Likely
.....1.....	.....2.....	.....3.....	.....4.....	.....5.....	.....6.....
.....7.....	.....8.....	.....9.....	.....	.....	.....

To what extent do you agree with the following statement?:

If my classmates have an opinion about me, they should come right out and say it.

Completely Disagree	Somewhat Disagree	Neither nor Disagree	Agree Disagree	Somewhat Agree	Completely Agree
.....1.....	.....2.....	.....3.....	.....4.....	.....5.....	.....6.....
.....7.....	.....8.....	.....9.....	.....	.....	.....

8. One month ago, I submitted my university application and I was told that I would receive a response in about 2 months. Today, I sorted through my mail and found a letter from the university.

How good or bad does this situation seem to you?

Very Good	Somewhat good	Neither good nor bad	Somewhat bad	Very bad
.....1.....	.....2.....	.....3.....	.....4.....	.....5.....
.....6.....	.....7.....	.....8.....	.....9.....	.....

In this situation, how likely would you be to react in the following way?:

I can't bring myself to open the letter; I wasn't expecting it so soon.

Not at all Likely	Somewhat Unlikely	Neither nor Likely	Unlikely Likely	Somewhat Likely	Very Likely
.....1.....	.....2.....	.....3.....	.....4.....	.....5.....	.....6.....
.....7.....	.....8.....	.....9.....	.....	.....	.....

To what extent do you agree with the following statement?:

Why did they send the letter so soon? The surprise of receiving a letter earlier than expected makes this process even more difficult.

Completely Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Completely Agree				
.....1.....2.....3.....4.....5.....6.....7.....8.....9.....

9. While I was out, my friend called and left a message on my answering machine, saying that we need to talk about something important.

How good or bad does this situation seem to you?

Very Good	Somewhat good	Neither good nor bad	Somewhat bad	Very bad				
.....1.....2.....3.....4.....5.....6.....7.....8.....9.....

To what extent do you agree with the following statement?:

My friend should really have given me some idea of what it is we need to talk about so I don't have to wonder what's going on.

Completely Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Completely Agree				
.....1.....2.....3.....4.....5.....6.....7.....8.....9.....

In this situation, how likely would you be to react in the following way?:

I can't decide if I should call him/her back right away or not.

Not at all Likely	Somewhat Unlikely	Neither Unlikely nor Likely	Somewhat Likely	Very Likely				
.....1.....2.....3.....4.....5.....6.....7.....8.....9.....

10. In the middle of my flight, just when I was about to go the bathroom, the seat belt light went on without an explanation from the captain.

How good or bad does this situation seem to you?

Very Good	Somewhat good	Neither good nor bad	Somewhat bad	Very bad				
.....1.....2.....3.....4.....5.....6.....7.....8.....9.....

To what extent do you agree with the following statement?:

The captain or the flight attendants should really make an announcement whenever they put the seatbelt light on, so there's no confusion.

Completely Disagree 1.....2.....3.....4.....5.....6.....7.....8.....9.....
Somewhat Disagree
Neither Agree nor Disagree
Somewhat Agree
Completely Agree

In this situation, how likely would you be to react in the following way?:

I really have to go to the bathroom, but I can't decide what to do.

Not at all Likely 1.....2.....3.....4.....5.....6.....7.....8.....9.....
Somewhat Unlikely
Neither Unlikely nor Likely
Somewhat Likely
Very Likely

11. I'm going to a family reunion this summer; I haven't spoken to most of my cousins in 3 years.

How good or bad does this situation seem to you?

Very Good 1.....2.....3.....4.....5.....6.....7.....8.....9.....
Somewhat good
Neither good nor bad
Somewhat bad
Very bad

In this situation, how likely would you be to react in the following way?:

I am disappointed with myself for feeling apprehensive about this family reunion - why can't I look forward to it like everyone else?

Not at all Likely 1.....2.....3.....4.....5.....6.....7.....8.....9.....
Somewhat Unlikely
Neither Unlikely nor Likely
Somewhat Likely
Very Likely

To what extent do you agree with the following statement?:

I wish we had family reunions more often so I would have a better idea of what to expect.

Completely Disagree 1.....2.....3.....4.....5.....6.....7.....8.....9.....
Somewhat Disagree
Neither Agree nor Disagree
Somewhat Agree
Completely Agree

12. I got a term paper back from my professor today and wasn't sure I understood the comments, which don't seem to fit with the grade I received.

How good or bad does this situation seem to you?

Very Good	Somewhat good	Neither good nor bad	Somewhat bad	Very bad
.....1.....	.....2.....	.....3.....	.....4.....	.....5.....
.....6.....	.....7.....	.....8.....	.....9.....	.....

To what extent do you agree with the following statement?:

If the evaluations were more structured, I might be able to enjoy this course; as it is, this confusion takes all the fun out of it.

Completely Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Completely Agree
.....1.....	.....2.....	.....3.....	.....4.....	.....5.....
.....6.....	.....7.....	.....8.....	.....9.....	.....

In this situation, how likely would you be to react in the following way?:

I wish I wasn't so bothered by the professor's comments; other students don't seem to be having trouble understanding their feedback.

Not at all Likely	Somewhat Unlikely	Neither Unlikely nor Likely	Somewhat Likely	Very Likely
.....1.....	.....2.....	.....3.....	.....4.....	.....5.....
.....6.....	.....7.....	.....8.....	.....9.....	.....

13. I completed my tax returns today but I'm not sure that I interpreted the new guidelines correctly.

How good or bad does this situation seem to you?

Very Good	Somewhat good	Neither good nor bad	Somewhat bad	Very bad
.....1.....	.....2.....	.....3.....	.....4.....	.....5.....
.....6.....	.....7.....	.....8.....	.....9.....	.....

In this situation, how likely would you be to react in the following way?:

I can't bring myself to mail my tax return because I'm not sure I did it properly.

Not at all Likely	Somewhat Unlikely	Neither Unlikely nor Likely	Somewhat Likely	Very Likely
.....1.....	.....2.....	.....3.....	.....4.....	.....5.....
.....6.....	.....7.....	.....8.....	.....9.....	.....

To what extent do you agree with the following statement?:

It annoys me that the guidelines are so difficult to follow and that there is no way to check if I have applied them correctly.

Completely Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Completely Agree				
.....1.....2.....3.....4.....5.....6.....7.....8.....9.....

14. Two of my friends who graduated from my current program of study say they have spent the last year exploring their career options.

How good or bad does this situation seem to you?

Very Good	Somewhat good	Neither good nor bad	Somewhat bad	Very bad				
.....1.....2.....3.....4.....5.....6.....7.....8.....9.....

In this situation, how likely would you be to react in the following way?:

Not knowing the state of the job market makes it difficult for me to succeed in this program.

Not at all Likely	Somewhat Unlikely	Neither Unlikely nor Likely	Somewhat Likely	Very Likely				
.....1.....2.....3.....4.....5.....6.....7.....8.....9.....

To what extent do you agree with the following statement?:

They should give us more information about job prospects while we're in the program so we know what to prepare for.

Completely Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Completely Agree				
.....1.....2.....3.....4.....5.....6.....7.....8.....9.....

15. The teams for the volleyball competition were announced today, and I have been placed on a different team this season.

How good or bad does this situation seem to you?

Very Good	Somewhat good	Neither good nor bad	Somewhat bad	Very bad				
.....1.....2.....3.....4.....5.....6.....7.....8.....9.....

To what extent do you agree with the following statement?:

Having to adapt to a new style of play could ruin the fun for me this season.

Completely Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Completely Agree				
.....1.....2.....3.....4.....5.....6.....7.....8.....9.....

In this situation, how likely would you be to react in the following way?:

In situations like this when I don't know what to expect, I have difficulty playing well.

Not at all Likely	Somewhat Unlikely	Neither Unlikely nor Likely	Somewhat Likely	Very Likely				
.....1.....2.....3.....4.....5.....6.....7.....8.....9.....

16. Today, I was surprised to hear a co-worker's opinion on a controversial current event.

How good or bad does this situation seem to you?

Very Good	Somewhat good	Neither good nor bad	Somewhat bad	Very bad				
.....1.....2.....3.....4.....5.....6.....7.....8.....9.....

In this situation, how likely would you be to react in the following way?:

It bothers me that I'm so unsure of my own opinion that I don't know what to say.

Not at all Likely	Somewhat Unlikely	Neither Unlikely nor Likely	Somewhat Likely	Very Likely				
.....1.....2.....3.....4.....5.....6.....7.....8.....9.....

To what extent do you agree with the following statement?:

It frustrates me that there isn't enough clear information on this issue to have a firm opinion one way or the other.

Completely Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Completely Agree				
.....1.....2.....3.....4.....5.....6.....7.....8.....9.....

17. My life seems so unpredictable; I never quite know what is going to happen next, and I am often surprised by the way situations turn out for me.

How good or bad does this situation seem to you?

Very Good	Somewhat good	Neither good nor bad	Somewhat bad	Very bad
.....1.....	.....2.....	.....3.....	.....4.....	.....5.....
.....6.....	.....7.....	.....8.....	.....9.....	.....

To what extent do you agree with the following statement?:

If I could only know in advance how a situation would turn out, then I could plan things out properly and prevent unexpected outcomes.

Completely Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Completely Agree
.....1.....	.....2.....	.....3.....	.....4.....	.....5.....
.....6.....	.....7.....	.....8.....	.....9.....	.....

In this situation, how likely would you be to react in the following way?:

I find this unpredictability is discouraging and makes me indecisive.

Not at all Likely	Somewhat Unlikely	Neither Unlikely nor Likely	Somewhat Likely	Very Likely
.....1.....	.....2.....	.....3.....	.....4.....	.....5.....
.....6.....	.....7.....	.....8.....	.....9.....	.....

18. While I was on my way out this evening, a person stopped and looked right at me.

How good or bad does this situation seem to you?

Very Good	Somewhat good	Neither good nor bad	Somewhat bad	Very bad
.....1.....	.....2.....	.....3.....	.....4.....	.....5.....
.....6.....	.....7.....	.....8.....	.....9.....	.....

In this situation, how likely would you be to react in the following way?:

It makes me feel weak that I don't know what to do when I'm unsure about someone's intentions.

Not at all Likely	Somewhat Unlikely	Neither Unlikely nor Likely	Somewhat Likely	Very Likely
.....1.....	.....2.....	.....3.....	.....4.....	.....5.....
.....6.....	.....7.....	.....8.....	.....9.....	.....

To what extent do you agree with the following statement?:

People should greet you when they look at you on the street to make their intentions clear.

Completely Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Completely Agree				
.....1.....2.....3.....4.....5.....6.....7.....8.....9.....

19. I went jogging with my mother yesterday and I noticed she often had to stop to catch her breath.

How good or bad does this situation seem to you?

Very Good	Somewhat good	Neither good nor bad	Somewhat bad	Very bad				
.....1.....2.....3.....4.....5.....6.....7.....8.....9.....

To what extent do you agree with the following statement?:

I want my mom to tell me why she needed to catch her breath.

Completely Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Completely Agree				
.....1.....2.....3.....4.....5.....6.....7.....8.....9.....

In this situation, how likely would you be to react in the following way?:

I get so upset at the thought that something might be wrong with my mom that I'm afraid to ask her how she's doing.

Not at all Likely	Somewhat Unlikely	Neither Unlikely nor Likely	Somewhat Likely	Very Likely				
.....1.....2.....3.....4.....5.....6.....7.....8.....9.....

20. The new person I've been dating told me last night that our relationship is so different from ones they've had in the past.

How good or bad does this situation seem to you?

Very Good	Somewhat good	Neither good nor bad	Somewhat bad	Very bad				
.....1.....2.....3.....4.....5.....6.....7.....8.....9.....

To what extent do you agree with the following statement?:

My new date should be clear about whether this is a good or bad thing.

Completely Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Completely Agree				
.....1.....2.....3.....4.....5.....6.....7.....8.....9.....

In this situation, how likely would you be to react in the following way?:

I don't know how to respond to my date's statement because I don't know what he/she meant.

Not at all Likely	Somewhat Unlikely	Neither Unlikely nor Likely	Somewhat Likely	Very Likely				
.....1.....2.....3.....4.....5.....6.....7.....8.....9.....

21. Yesterday I received a message from the nurse at my clinic saying I should call her about having some tests done.

How good or bad does this situation seem to you?

Very Good	Somewhat good	Neither good nor bad	Somewhat bad	Very bad				
.....1.....2.....3.....4.....5.....6.....7.....8.....9.....

In this situation, how likely would you be to react in the following way?:

I can't bring myself to call back and find out what kind of tests need to be done.

Not at all Likely	Somewhat Unlikely	Neither Unlikely nor Likely	Somewhat Likely	Very Likely				
.....1.....2.....3.....4.....5.....6.....7.....8.....9.....

To what extent do you agree with the following statement?:

The nurse should have told me what tests I need. I shouldn't be left wondering whether this is a serious problem or not.

Completely Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Completely Agree				
.....1.....2.....3.....4.....5.....6.....7.....8.....9.....

22. My supervisor announced that we will be having a team meeting tomorrow to discuss major changes to the salary structure in our company.

How good or bad does this situation seem to you?

Very Good	Somewhat good	Neither good nor bad	Somewhat bad	Very bad
.....1.....	.....2.....	.....3.....	.....4.....	.....5.....
.....6.....	.....7.....	.....8.....	.....9.....	.....

To what extent do you agree with the following statement?:

I don't know how they can expect us to take our jobs seriously if they can't guarantee us some financial stability.

Completely Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Completely Agree
.....1.....	.....2.....	.....3.....	.....4.....	.....5.....
.....6.....	.....7.....	.....8.....	.....9.....	.....

In this situation, how likely would you be to react in the following way?:

I find it difficult to concentrate on my work not knowing what these changes are going to be.

Not at all Likely	Somewhat Unlikely	Neither Unlikely nor Likely	Somewhat Likely	Very Likely
.....1.....	.....2.....	.....3.....	.....4.....	.....5.....
.....6.....	.....7.....	.....8.....	.....9.....	.....

Appendix K

Frost's Indecisiveness Scale (FIS)

Frost's Indecisiveness Scale (FIS)

You will find below a series of statements which describe the tendency to be indecisive. 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.

- | | | Strongly
Disagree | Strongly
Agree |
|-----|---|----------------------|--------------------------|
| 1. | I try to put off making decisions. ... | 1..... | 2.....3.....4.....5..... |
| 2. | I always know exactly what I want. | 1..... | 2.....3.....4.....5..... |
| 3. | I find it easy to make decisions. | 1..... | 2.....3.....4.....5..... |
| 4. | I have a hard time planning my free time. | 1..... | 2.....3.....4.....5..... |
| 5. | I like to be in a position to make decisions. | 1..... | 2.....3.....4.....5..... |
| 6. | Once I make a decision, I feel fairly confident that it is a good one. | 1..... | 2.....3.....4.....5..... |
| 7. | When ordering from a menu, I find it difficult to decide what to get. | 1..... | 2.....3.....4.....5..... |
| 8. | I usually make decisions quickly. .. | 1..... | 2.....3.....4.....5..... |
| 9. | Once I make a decision, I stop worrying about it. | 1..... | 2.....3.....4.....5..... |
| 10. | I become anxious when making a decision. | 1..... | 2.....3.....4.....5..... |
| 11. | I often worry about making the wrong choice. | 1..... | 2.....3.....4.....5..... |

Strongly
Disagree

Strongly
Agree

12. After I have chosen or decided something, I often believe I've made the wrong choice or decision.1.....2.....3.....4.....5.....
13. I do not get assignments done on time because I can not decide what to do first.1.....2.....3.....4.....5.....
14. I have trouble completing assignments because I can't prioritize what is more important. .1.....2.....3.....4.....5.....
15. It seems that deciding on the most trivial thing takes me a long time. .1.....2.....3.....4.....5.....
-

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Appendix L

Lay's General Procrastination Scale (LGP)

Lay's General Procrastination Scale (LGP)

On a scale of 1 (LOW VALUE) to 5 (HIGH VALUE) please answer each of the following items. These statements are concerned with your opinions on different situations. No two statements are exactly alike, so please consider each statement carefully before responding. Answer as honestly as possible. Thank you.

- | | | False
of me | Not usually
true for me | Sometimes
false/true
for me | Mostly
true
for me | True
of me |
|----|--|----------------|----------------------------|-----------------------------------|--------------------------|---------------|
| 1. | I often find myself performing tasks that I had intended to do days before. | 1..... | 2..... | 3..... | 4..... | 5..... |
| 2. | I often miss concerts, sporting events, or the like, because I don't get around to buying tickets on time. | 1..... | 2..... | 3..... | 4..... | 5..... |
| 3. | When planning a party, I make the necessary arrangements well in advance. | 1..... | 2..... | 3..... | 4..... | 5..... |
| 4. | When it is time to get up in the morning I most often get right out of bed. | 1..... | 2..... | 3..... | 4..... | 5..... |
| 5. | A letter may sit for days after I write it before I mail it. | 1..... | 2..... | 3..... | 4..... | 5..... |
| 6. | I generally return phone calls promptly. | 1..... | 2..... | 3..... | 4..... | 5..... |
| 7. | Even with jobs that require little else except sitting down and doing them, I find they seldom get done for days. | 1..... | 2..... | 3..... | 4..... | 5..... |
| 8. | I usually make decisions as soon as possible. | 1..... | 2..... | 3..... | 4..... | 5..... |
| 9. | I generally delay before starting on work I have to do. | 1..... | 2..... | 3..... | 4..... | 5..... |

- | | False
of me | Not usually
true for me | Sometimes
false/true
for me | Mostly
true
for me | True
of me |
|-----|--|----------------------------|-----------------------------------|--------------------------|---------------|
| 10. | When traveling, I usually have to rush in preparing to arrive at the airport or station at the appropriate time. .1.....2.....3.....4.....5..... | | | | |
| 11. | When preparing to go out, I am seldom caught having to do something at the last minute. ....1.....2.....3.....4.....5..... | | | | |
| 12. | In preparing for some deadlines, I often waste time by doing other things.
.....1.....2.....3.....4.....5..... | | | | |
| 13. | If a bill for a small amount comes, I pay it right away. ....1.....2.....3.....4.....5..... | | | | |
| 14. | I usually return a "R.S.V.P." request very shortly after receiving it. ....1.....2.....3.....4.....5..... | | | | |
| 15. | I often have a task finished sooner than necessary. ....1.....2.....3.....4.....5..... | | | | |
| 16. | I always seem to end up shopping for birthday gifts at the last minute. ....1.....2.....3.....4.....5..... | | | | |
| 17. | I usually buy even an essential item at the last minute. ....1.....2.....3.....4.....5..... | | | | |
| 18. | I usually accomplish all the things I plan to do in a day. ....1.....2.....3.....4.....5..... | | | | |
| 19. | I am continually saying "I'll do it tomorrow". ....1.....2.....3.....4.....5..... | | | | |
| 20. | I usually take care of all the tasks I have to do before I settle down and relax for the evening. ....1.....2.....3.....4.....5..... | | | | |

Lay, C. H. (1991). At last, my research article on procrastination. *Journal of Research in Personality, 20*, 474-495.

Appendix M

The Cognitive Error Questionnaire - General version, Personalization subscale (CEQ-P)

Cognitive Error Questionnaire - General version, Personalization subscale (CEQ-P)

This questionnaire describes a number of situations that might occur in daily life, each followed by a thought in "quotations" that a person in the situation might have. Underneath this is a group of statements that describe how similar the thought is to how you would think in that situation.

Please read each statement and imagine that it is happening to you. Then, read the thought (which is in "quotations") following that situation. Circle the statement underneath each thought that best describes how similar that thought is to how you would think in that situation.

Because you may not have had the experiences described in some of the situations, it is important that you imagine that it is happening to you. Be sure that you don't rate the situation, just rate how much the thought (which is in "quotations") is like the way you would think.

- A. You have just come out of the store and notice a dent in your car that wasn't there before you went in. You think to yourself, "Oh no, the car is wrecked."

This thought is:

almost	exactly	a lot like	somewhat	a little like	not at all
like I would	like I would	I would	like I would	I would	like I would
think	think	think	think	think	think

If that thought ("Oh no, the car is wrecked.") was something like the way you would think in that situation, you would circle:

somewhat
like I would
think

Please start on the next page and rate every thought.

-
1. Your boss just told you that because of a general slowdown in the industry, he has to lay off all of the people who do your job including you. You think to yourself "I must be doing a lousy job or else he wouldn't have laid me off."

This thought is:

almost like I would think.....0.....	exactly I would think.....1.....	a lot like I would think.....2.....	somewhat like I would think.....3.....	a little like I would think.....4.....	not at all like I would think
--	--	---	--	--	--

2. You just finished spending three hours cleaning the basement. Your spouse however, doesn't say anything about it. You think to yourself, "(S)he must think I did a lousy job."

This thought is:

almost like I would think.....0.....	exactly I would think.....1.....	a lot like I would think.....2.....	somewhat like I would think.....3.....	a little like I would think.....4.....	not at all like I would think
--	--	---	--	--	--

3. You went fishing for the first time today with some of your friends who love fishing. Nobody got anything, and the group seemed to be discouraged. You thought to yourself on the way home, "I guess I made too much noise or did something that scared the fish off."

This thought is:

almost like I would think.....0.....	exactly I would think.....1.....	a lot like I would think.....2.....	somewhat like I would think.....3.....	a little like I would think.....4.....	not at all like I would think
--	--	---	--	--	--

-
4. You have three children who generally do quite well in school. One of your children came home today and told you that he had to stay after school because he got into a fight. You think to yourself, "He wouldn't have gotten that detention if I disciplined him more."

This thought is:

almost like I would think.....0.....	exactly I would think.....1.....	a lot like I would think.....2.....	somewhat like I would think.....3.....	a little like I would think.....4.....	not at all like I would think
--	--	---	--	--	--

5. You run a day care center. Today, the mother of a child you have been having difficulty with calls and notifies you that she has quit work and will be withdrawing her child from your program. You think, "She probably thinks I wasn't handling him as well as I should."

This thought is:

almost like I would think.....0.....	exactly I would think.....1.....	a lot like I would think.....2.....	somewhat like I would think.....3.....	a little like I would think.....4.....	not at all like I would think
--	--	---	--	--	--

6. You took your children to the neighborhood pool for the afternoon. Although your kids urged you to swim with them, you were enjoying lying in the sun. Later you look up and see them arguing over a float. You think to yourself, "If I had gone in the water, they probably wouldn't be fighting now."

This thought is:

almost like I would think0.....	exactly I would think1.....	a lot like I would think2.....	somewhat like I would think3.....	a little like I would think4.....	not at all like I would think
--	--	---	--	--	--

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Appendix N

The Multidimensional Perfectionism Scale – Self-Oriented & Other-Oriented

Perfectionism subscales (MPS)

Multidimensional Perfectionism Scale – Self-Oriented & Other-Oriented

Perfectionism subscales (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 feel neutral or undecided the midpoint is 4.

Strongly	Moderately	Slightly	Neutral	Slightly	Moderately	Strongly
Disagree	Disagree	Disagree		Agree	Agree	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. One of my goals is to be perfect in everything I do.
 ...1.....2.....3.....4.....5.....6.....7...

6. Everything that others do must be top-notch quality.
 ...1.....2.....3.....4.....5.....6.....7...

7. I never aim for perfectionism in my work.
 ...1.....2.....3.....4.....5.....6.....7...

8. It doesn't matter to me when someone close to me does not do their absolute best.
 ...1.....2.....3.....4.....5.....6.....7...

9. I seldom feel the need to be perfect.
 ...1.....2.....3.....4.....5.....6.....7...

Strongly Disagree Moderately Disagree Slightly Disagree Neutral Slightly Agree Moderately Agree Strongly Agree

- 10. I strive to be the best at everything I do.
 ...1.....2.....3.....4.....5.....6.....7...
- 11. It is very important that I am perfect in everything I attempt.
 ...1.....2.....3.....4.....5.....6.....7...
- 12. I have high expectations for the people who are important to me.
 ...1.....2.....3.....4.....5.....6.....7...
- 13. I strive to be the best at everything I attempt.
 ...1.....2.....3.....4.....5.....6.....7...
- 14. I do not have very high standards for those around me.
 ...1.....2.....3.....4.....5.....6.....7...
- 15. I demand nothing less than perfection for myself.
 ...1.....2.....3.....4.....5.....6.....7...
- 16. I can't be bothered with people who won't strive to better themselves.
 ...1.....2.....3.....4.....5.....6.....7...
- 17. It makes me uneasy to see error in my work.
 ...1.....2.....3.....4.....5.....6.....7...
- 18. I do not expect a lot from my friends.
 ...1.....2.....3.....4.....5.....6.....7...
- 19. If I ask someone to do something, I expect it to be done flawlessly.
 ...1.....2.....3.....4.....5.....6.....7...
- 20. I cannot stand to see people close to me make mistakes.
 ...1.....2.....3.....4.....5.....6.....7...

- | | Strongly
Disagree | Moderately
Disagree | Slightly
Disagree | Neutral | Slightly
Agree | Moderately
Agree | Strongly
Agree |
|-----|--|------------------------|----------------------|---------|-------------------|---------------------|-------------------|
| 21. | I am perfectionistic in setting my goals. | | | | | | |
| | ...1..... | 2..... | 3..... | 4..... | 5..... | 6..... | 7... |
| 22. | The people who matter to me should never let me down. | | | | | | |
| | ...1..... | 2..... | 3..... | 4..... | 5..... | 6..... | 7... |
| 23. | I must work to my full potential at all times. | | | | | | |
| | ...1..... | 2..... | 3..... | 4..... | 5..... | 6..... | 7... |
| 24. | I do not have to be the best at whatever I am doing. | | | | | | |
| | ...1..... | 2..... | 3..... | 4..... | 5..... | 6..... | 7... |
| 25. | I do not have very high standards for myself. | | | | | | |
| | ...1..... | 2..... | 3..... | 4..... | 5..... | 6..... | 7... |
| 26. | I respect people who are average. | | | | | | |
| | ...1..... | 2..... | 3..... | 4..... | 5..... | 6..... | 7... |
| 27. | I set very high standards for myself. | | | | | | |
| | ...1..... | 2..... | 3..... | 4..... | 5..... | 6..... | 7... |
| 28. | I must always be successful at school or work. | | | | | | |
| | ...1..... | 2..... | 3..... | 4..... | 5..... | 6..... | 7... |
| 29. | It does not matter to me when a close friend does not try their hardest. | | | | | | |
| | ...1..... | 2..... | 3..... | 4..... | 5..... | 6..... | 7... |
| 30. | 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 O

The Need for Closure Scale – Preference for Order & Preference for Predictability
subscales (NFCS)

Need for Closure Scale – Preference for Order & Preference for Predictability
subscales (NFCS)

Read each of the following statements and decide how much you agree with each according to your beliefs and experiences. Please respond according to the following scale.

...1.....2.....3.....4.....5.....6....
 Strongly Moderately Slightly Slightly Moderately Strongly
 Disagree Disagree Disagree Agree Agree Agree

1. I think that having clear rules and order at work is essential for success.
 ...1.....2.....3.....4.....5.....6....
2. I like to have friends who are unpredictable.
 ...1.....2.....3.....4.....5.....6....
3. I find that a well ordered life with regular hours suits my temperament..
 ...1.....2.....3.....4.....5.....6....
4. When dining out, I like to go to places where I have been before so that I know what to expect.
 ...1.....2.....3.....4.....5.....6....
5. I hate to change my plans at the last minute.
 ...1.....2.....3.....4.....5.....6....
6. I don't like to go into a situation without knowing what I can expect from it.
 ...1.....2.....3.....4.....5.....6....
7. I think it is fun to change my plans at the last moment.
 ...1.....2.....3.....4.....5.....6....
8. I enjoy the uncertainty of going into a new situation without knowing what might happen.
 ...1.....2.....3.....4.....5.....6....

9. My personal space is usually messy and disorganized.
 ...1.....2.....3.....4.....5.....6....
10. I believe that orderliness and organization are among the most important characteristics of a good student.
 ...1.....2.....3.....4.....5.....6....
11. I don't like to be with people who are capable of unexpected actions.
 ...1.....2.....3.....4.....5.....6....
12. I prefer to socialize with familiar friends because I know what to expect from them.
 ...1.....2.....3.....4.....5.....6....
13. I think that I would learn best in a class that lacks clearly stated objectives and requirements.
 ...1.....2.....3.....4.....5.....6....
14. I find that establishing a consistent routine enables me to enjoy life more.
 ...1.....2.....3.....4.....5.....6....
15. I enjoy having a clear and structured mode of life.
 ...1.....2.....3.....4.....5.....6....
16. I like to have a place for everything and everything in its place.
 ...1.....2.....3.....4.....5.....6....
17. I dislike unpredictable situations.
 ...1.....2.....3.....4.....5.....6....
18. I dislike the routine aspects of my work (studies).
 ...1.....2.....3.....4.....5.....6....

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Appendix P

The Miller Behavioral Style Scale – Monitoring subscale (MBSS-M)

Miller Behavioral Style Scale – Monitoring subscale (MBSS-M)

1. Vividly imagine that you are afraid of the dentist and have to get some dental work done. Which of the following would you do? Check **all** of the statements that might apply to you.

___ I would ask the dentist exactly what he/she was going to do.

___ I would want the dentist to tell me when I would feel pain.

___ I would watch all the dentist's movements and listen for the sound of the drill.

___ I would watch the flow of water from my mouth to see if it contained blood.

2. Vividly imagine that you are being held hostage by a group of armed terrorists in a public building. Which of the following would you do? Check **all** of the statements that might apply to you.

___ I would stay alert and try to keep myself from falling asleep.

___ If there was a radio present, I would stay near it and listen to the bulletins about what the police were doing.

___ I would watch every movement of my captors and keep an eye on their weapons.

___ I would make sure I knew where every possible exit was.

-
3. Vividly imagine that, due to a large drop in sales, it is rumored that several people in your department at work will be laid off. Your supervisor has turned in an evaluation of your work for the past year. The decision about lay-offs has been made and will be announced in several days. Check **all** of the statements that might apply to you.

- I would talk to my fellow workers to see if they knew anything about what the supervisor's evaluation of me said.
- I would review the list of duties for my present job and try to figure out if I had fulfilled them all.
- I would try to remember any arguments or disagreements I might have had with the supervisor that would have lowered the supervisor's opinion of me.
- I would try to think which employees in my department the supervisor might have thought had done the worst job.

-
4. Vividly imagine that you are on an airplane, thirty minutes from your destination, when the plane unexpectedly goes into a deep dive and then suddenly levels off. After a short time, the pilot announces that nothing is wrong, although the rest of the ride may be rough. You, however, are not convinced that all is well. Check **all** of the statements that might apply to you.

- I would carefully read the information provided about safety features in the plane and make sure I knew where the emergency exits were.
- I would call for the flight attendant and ask her exactly what the problem was.
- I would listen carefully to the engines for unusual noises and would watch the crew to see if their behavior was out of the ordinary.
- I would talk to the passenger beside me about what might be wrong.

Miller, S. M. (1987). Monitoring and blunting: Validation of a questionnaire to assess styles of information seeking under threat. *Journal of Personality and Social Psychology*, 52, 345-353.