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The wonder and angst of exploring the unknown:
Introduction to the special issue on intolerance of uncertainty

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Abstract

Interest in the relationship between intolerance of uncertainty (IU) and emotional disorders has rapidly increased over the last decade. Early theory and research focused on the relationship between IU and generalized anxiety disorder in particular; but, the roles that IU and the underlying ‘fear of the unknown’ play in the development, maintenance, and treatment of a broad array of emotional disorders have been explored more recently. This introduction provides a brief overview of the contributions to the special issue, which (a) summarize our current state of knowledge, (b) describe innovative methods for assessing and increasing our understanding IU within the context of various emotions and emotional disorders, (c) investigate associations between IU and therapeutic change, and (d) propose future research directions.

Key Words: intolerance of uncertainty, special issue, fear of the unknown

“Exploring the unknown requires tolerating uncertainty.”

Brian Greene (2006)

Professor Brian Greene’s quote was his response to a rhetorical question about whether scientists will ever understand the deepest workings of the cosmos. Professor Greene (2006) described having to tolerate uncertainty about whether this goal can be achieved as both the “wonder and the angst of a life in science.” Science requires a deep curiosity about unknowns and provides a method for inferring causal explanations for natural phenomena. Paradoxically, however, the pursuit of answers invariably (and wonderfully) generates even more unknowns and, *ipso facto*, more questions. Science thus requires both continuity and change; continuity via replications that build confidence in established knowledge (knowns) as well as changing and novel methods to answer new questions (unknowns).

Tolerating uncertainty is fundamental to the human endeavor more broadly than whether or not string theory will ultimately provide a unified theory of everything. Arguably the largest existential threat that human beings face is uncertainty about whether their personal demise (a known) can be measured in decades, years, months, days, hours, minutes, or seconds (an unknown); however, uncertainty also pervades the more mundane but still highly valued aspects of human experience, including our ability to establish and maintain a career, a social network, a romantic relationship, and so on. The capacity to adaptively respond to uncertainties within all life domains is, therefore, likely to have pervasive impacts on well-being.

In a recent review and synthesis of existing models of emotion, attachment, and psychopathology, Carleton (2016) defined Intolerance of Uncertainty (IU) as “an individual’s dispositional incapacity to endure the aversive response triggered by the perceived absence of salient, key, or sufficient information, and sustained by the associated perception of uncertainty” (p. 31). Interest in the role that IU may play for emotional disorders has

exploded in the last decade. A Scopus search of ‘intolerance of uncertainty’ yielded 5 to 6 publications per year between 1999 and 2002, 15 to 18 between 2003 and 2006, 25 to 48 between 2007 to 2012, and 64 to 80 between 2013 and 2015; accordingly, it is timely that the *Journal of Anxiety Disorders* is publishing a special issue summarizing the current state of knowledge, reporting on established and novel methods for answering new questions about the role of IU in psychopathology, and laying a foundation for future research directions.

The special issue includes theoretical, psychometric, experimental, and clinical papers. We hope the issue will encourage theorists, researchers, and clinicians to consider incorporating IU into formulations of psychopathology, therein deepening our understanding of the unique role responses to unknowns play in the development, maintenance, and treatment of emotional disorders. Ultimately, we hope this knowledge will improve the potency of interventions for people experiencing debilitating emotional disorders.

The special issue begins with a theoretical paper positing that fear of the unknown, which leads to IU, meets eight necessary criteria for identification as a fundamental fear (Carleton, this issue). The review provided evidence that fear of the unknown is inherent, evolutionarily supported, continuously and normally distributed, a logical reduction of higher-order constructs, non-derivative (i.e., logically irreducible), accounts for variance in higher-order constructs, and is factorially distinct from other constructs. Carleton boldly concluded that fear of the unknown may in fact be “*the* fundamental fear – a fear that rules all other fears...” (p. 15).

Brosschot, Verkuil, and Thayer (this issue) provided an evolutionary-theoretical perspective on the role of IU in emotional disorders. The authors argued that stress is a default response to uncertainty in most, if not all, living organisms until safety is perceived. Intriguingly, Brosschot and colleagues suggested that uncertainty about *safety* is critical, rather than uncertainty about threat, such that the stress response can be activated in the

absence of threat if certainty regarding perceived safety is also absent. The authors drew on research evidence from broad domains of stress, anxiety, worry, attentional biases, interpretive biases, physiology, and neurology to formulate an increasingly integrative evolutionary theory. Their theory incorporated aspects of developmental, learning, and social research, and elaborates a well-supported evolutionary model founded on responses to interactions with unknowns. The authors concluded by underscoring the importance of IU, and by extension responses to unknowns, as crucial for all living organisms, which appears entirely consistent with Carleton's more recent reviews and syntheses (2016; this issue).

There is a relative paucity of research investigating IU in children and adolescents. Wright, Adams Lebell, and Carleton (this issue) examined IU in adolescents and, in particular, the relationships between IU, health anxiety, anxiety sensitivity, and anxiety disorder symptoms. Their results indicated IU is significantly associated with several self-reported anxiety disorder symptom categories, including health anxiety, panic disorder/agoraphobia, separation anxiety, social phobia, physical injury fears, obsessive compulsive symptoms, and generalized anxiety symptoms. Evidence is presented for direct and indirect effects between IU and health anxiety symptoms via anxiety sensitivity. The results suggested that future research into developmental perspectives on IU and emotional disorders is warranted.

An important limitation of existing IU literature has been a heavy reliance on self-report measures, which can be vulnerable to a range of biases (e.g., social desirability). Jacoby, Abramowitz, Reuman, and Blakey (this issue) reported on a novel behavioral measure for assessing IU, the Beads Task. The Beads Task has been used previously, but the unique contributions from this study were that (a) limitations in ecological validity were addressed with a meaningful negative consequence for incorrect responses (cold pressor task), and (b) the researchers controlled for perfectionism and general psychological distress,

which could also adversely influence performance and distress. Distress during the Beads Task (but not task performance per se) was uniquely associated with one component of IU, inhibitory IU, which assessed behavioral inhibition in response to uncertainty. Distress during the Beads Task was not associated with prospective IU, which predominantly measured cognitive responses to future uncertainty. Distress during the Beads Task was also unrelated to perfectionism and general psychological distress. The value of this line of research was in providing an index of IU that is not reliant on self-report; furthermore, results indicated self-reported IU was not associated with task performance, which was intriguing and suggested important distinctions between cognitive, affective, and behavioral responses to uncertainty.

Anderson, Deschênes, and Dugas (this issue) postulated that beliefs about whether uncertainty was perceived to be avoidable or not may determine the nature of emotional responses to uncertainty. A state of uncertainty was first induced, the apparent need to endure continued uncertainty (i.e., 'avoidability') was manipulated, and emotional consequences were assessed. As predicted, avoidable uncertainty was associated with an increase in anger compared to unavoidable uncertainty. Studies like the one reported by Anderson and colleagues' improve our understanding of the relationships between IU and a range of emotional responses by identifying critical moderators, which have clear implications for clinical practice. Helpful strategies for managing anxiety in response to uncertainty perceived to be unavoidable may be quite different to those for managing anger in response to uncertainty perceived to be avoidable.

Fergus and Carleton (this issue) explore the relationships between IU and several information processing levels; specifically, alerting, orienting, and executive attention. The results supported a robust association between IU and alerting (i.e., bottom-up processing may have a substantial relationship with IU and hyper-vigilance). Evidencing a relationship between IU and alerting, but not executive attention, underscored the potential fundamental

transdiagnostic importance of the construct. The relationship was also congruent with postulates and evidence that responses to unknowns are near automatic cornerstones for emotional responding (see Carleton, 2016). The results also supported distinctions between prospective and inhibitory IU; specifically, both were related to alerting, but only prospective IU was robustly associated after controlling for state anxiety. Overall, the results implicated fear of the unknown and IU as being associated with heightened alertness and therein anxiety, offering potentially critical transdiagnostic treatment targets.

Three papers focus on the relationship between IU and post-traumatic stress disorder (PTSD) symptoms using varied and novel methodologies. In a sample of bereaved individuals, Boelen, Reijntjes, and Smid (this issue) investigated the relationships between prospective and inhibitory IU and symptoms of prolonged grief disorder, PTSD, and depression. Boelen and colleagues administered measures within 12 months of a loved one's death and again six months later, allowing examinations of cross-sectional and prospective relationships. Different aspects of IU predicted different symptoms cross-sectionally and prospectively; specifically, within one year of bereavement only inhibitory IU was associated with more severe PTSD and depression symptoms but not prolonged grief disorder, even after controlling for neuroticism, worry, and rumination. The prospective analyses indicated that only prospective IU predicted symptoms of prolonged grief disorder, but not PTSD or depression symptoms. Banducci, Bujarski, Bonn-Miller, Patel, and Connolly (this issue) examined the hypothesis that IU and low tolerance of emotional distress (TED) contributed to co-occurring PTSD and substance use disorders in veterans. Their results indicated low TED is associated with elevated PTSD symptoms and substance cravings in response to trauma cues when controlling for IU, whereas IU is not a unique predictor after controlling for TED. Interestingly, the researchers observed a significant interaction between IU and intolerance of distress, whereby higher IU increased the impact of low TED on PTSD symptoms. Together,

results from these studies suggested that IU may be an important treatment target for PTSD, grief, and depression symptoms, and that IU may influence other mechanisms directly and through interaction effects.

Oglesby, Boffa, Short, Raines, and Schmidt (this issue) reported on a unique and highly valuable dataset to answer the question of whether IU prospectively confers risk of PTSD symptoms following trauma. Exposing participants to genuine traumas for the purposes of identifying predictors of maladaptation is obviously highly unethical, so the scientific community has much to gain from seizing opportunities to investigate these relationships when individuals are exposed to these relatively rare and unpredictable events. Oglesby and colleagues administered a measure of IU to a student sample that was, by chance, subsequently exposed to a campus shooting. The researchers then administered a measure of PTSD symptoms to the same participants. Interestingly, pre-trauma IU predicted post-trauma PTSD symptom severity after controlling for anxiety sensitivity, suggesting that IU may indeed serve as a risk factor for PTSD symptoms.

Renjan, McEvoy, Handley, and Fursland (this issue) extended the study of IU to a clinical sample with eating disorders, investigating relationships between IU, eating disorder psychopathology, and comorbid emotional symptoms. The Intolerance of Uncertainty Scale-12 (IUS-12) was found to be unidimensional and highly internally consistent within this eating disorder sample. IU was also consistently and strongly associated with core features of eating disorders, namely, overvaluation of eating, weight, and shape and their control. Indirect effects models identified significant effects of IU on dietary restraint and purging via overvaluation. The results were consistent with notions that overvaluation of eating, weight, and shape provided a sense of certainty and control for individuals with high IU. IU was also directly and indirectly associated with comorbid symptoms of depression, anxiety, and stress,

which was consistent with previous research investigating these relationships in samples with other emotional disorders.

Two papers examined the transdiagnostic nature of IU within clinical practice. McEvoy and Erceg-Hurn (this issue) explored relationships between changes in IU, repetitive negative thinking, and symptoms of generalized anxiety disorder (GAD), social anxiety disorder (SAD), and major depressive disorder (MDD), across three distinct group cognitive behavioral interventions. The treatment protocols were metacognitive therapy for primary or nonprimary GAD, imagery-enhanced cognitive behavioral group therapy for SAD, and traditional cognitive behavior therapy (CBT) for primary MDD. Changes in IU were associated with changes in repetitive negative thinking across all three treatments, and with changes in symptoms of GAD and SAD, but not depression. McEvoy and Erceg-Hurn suggest the results were necessary although insufficient for demonstrating that IU is a universal change mechanism for emotional disorders and across different forms of CBT. Talkovsky and Norton (this issue) used a different approach to examining the relationship between IU and clinical outcomes by applying the same transdiagnostic intervention to individuals with SAD, panic disorder, or GAD. Consistent with McEvoy and Erceg-Hurn (this issue), Talkovsky and Norton found that IU decreased by a comparable proportion across all three disorder groups, and reductions in IU were associated with reductions in symptoms across all disorder groups. Together, these results converged to support the conclusion that changes in IU were consistently associated with symptom change across a range of cognitive behavioral interventions and disorders.

The final paper provided a brief overview of what is currently known and, more importantly, what remains unknown in the IU literature. Shihata, McEvoy, Mullan, and Carleton (this issue) offer a broad research agenda and outline a range of unanswered questions regarding IU in the areas of development, assessment, behavior, and relationships

to emotional disorder. Based on the papers appearing in this special issue, one likely certainty is that IU reflects a fundamental underlying fear of the unknown that is broadly associated with symptoms of emotional disorders, including anxiety, affective, eating, somatic symptom disorders; however, much remains unknown about our interactions with unknowns and our ability to tolerate uncertainty.

We hope this special issue inspires researchers and clinicians alike to consider the roles that IU and the underlying fear of the unknown may play in the development and maintenance of psychopathology. Misguided pursuits of certainty to reduce exposure to unknowns, as opposed to pursuing capacity to tolerate uncertainty or accept unknowns, may be at the heart of many and varied manifestations of distress and impairment. Questions remain about what determines why one individual is intolerant of social-evaluative uncertainty, whereas others are intolerant of uncertainty about contamination, physical threat, weight and shape, and so on. Nonetheless, formulating clinical problems within the context of IU may provide a useful heuristic for distilling critical treatment principles. Armed with a rationale for increasing tolerance of uncertainty rather than pursuing certainty, people seeking treatment for emotional disorders can learn to recognize maladaptive cognitive (e.g., excessive worry, planning, thought control strategies) or behavioral (e.g., avoidance, safety behaviors) attempts to achieve certainty of safety; therein, they can learn to abandon the pursuit of certainty and instead build their coping self-efficacy in the face of uncertainty. Tolerating uncertainty while exploring the unknown may indeed be a prerequisite for experiencing the wonder and angst of therapeutic change.

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