Intolerance of uncertainty as a contributor to fear and avoidance symptoms

of panic attacks

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Abstract

Panic disorder symptoms are persistent for 50% to 80% of cases even after treatment, resulting in experiences of disability and dissatisfaction in life. Previous research has focused on anxiety sensitivity (AS) and its dimensions as contributing to symptoms of panic disorder; however, recent research has suggested that intolerance of uncertainty (IU) – the tendency for a person to consider the possibility of a negative event occurring as threatening, irrespective of the actual probability of its occurrence – may also play a critical role. The current study was designed to assess the specific relationships between dimensions of IU (i.e., prospective IU and inhibitory IU) and the fear and avoidance symptoms associated with panic disorder. Participants included 122 community members (81% women) with a history of at least one panic attack who participated in a larger study on fear. Participants completed measures of AS, IU, and panic disorder symptoms. Correlation and regression analyses supported a significant and substantial relationship between AS, inhibitory IU, and panic disorder symptoms. Inhibitory IU accounted for relatively more variance in avoidance symptoms related to panic disorder than did the fears of physical sensations dimension of AS. As such, further investigation of the role of IU in panic disorder symptoms appears warranted. Comprehensive results, implications, and directions for future research are discussed.

Introduction

Intolerance of uncertainty (IU) is a dispositional characteristic resulting from negative beliefs about uncertainty and its implications (Dugas & Robichaud, 2007) wherein the possibility of a negative event occurring is considered unacceptable and threatening irrespective of the probability of its occurrence (Carleton, Sharpe et al., 2007). Researchers have increasingly agreed that the IU construct also includes prospective (i.e., cognitive perceptions of threat pertaining to future uncertainty) and inhibitory (i.e., behavioural symptoms indicating apprehension due to uncertainty) dimensions (Birrell, Meares, Wilkinson, & Freeston, 2011; Carleton, 2012; Carleton, Norton, & Asmundson, 2007; McEvoy & Mahoney, 2011). Substantial evidence has related IU to generalized anxiety disorder (Buhr & Dugas, 2006; Koerner & Dugas, 2008; Dugas, Marchand, & Ladouceur, 2005), with early research evidence suggesting a specific relationship (Dugas, Schwartz, & Francis, 2004). More recent research has indicated IU may be important for the development and maintenance of all anxiety disorders (Carleton, 2012; Carleton, Mulvogue, et al., 2012; Mahoney & McEvoy, 2012-a; 2012-b; McEvoy & Mahoney, 2012). Most of the research to date investigating the relationships between IU and various anxiety disorder symptoms has focused on generalized anxiety disorder (e.g., Dugas et al., 2005; Dugas et al., 2004), obsessive compulsive disorder (e.g., Holaway, Heimberg, & Coles, 2006; Tolin, Abramowitz, Brigidi, & Foa, 2003), and social anxiety disorder (e.g., Boelen & Reijntjes, 2009; Carleton, Collimore, & Asmundson, 2010); however, there is also reason to expect a relationship between IU, panic attacks, and symptoms of panic disorder.

Contemporary models of panic disorder suggest that generalized biological and psychological vulnerabilities to the development of anxiety, along with a diminished sense of control, contribute to the development of panic attacks (Meuret, White, Ritz, Roth, Hofmann, &

Brown, 2006; Suarez, Bennett, Goldstein, & Barlow, 2009). Specifically, situational (e.g., state anxiety) and subjective (e.g., interpretation of bodily sensations) factors interact with predisposing fears of bodily sensations and sensitivity to somatic changes to allow for catastrophic misinterpretations of symptoms. These catastrophic misinterpretations culminate in physical, emotional, and behavioral responses, which further increase during stress, resulting in a self-perpetuating cycle of recurrent and seemingly uncued panic attacks.

Imbedded in this etiological understanding of panic disorder is anxiety sensitivity – the fear of sensations related to anxiety resulting from expectations of catastrophic consequences (Reiss & McNally, 1985). People with high levels of anxiety sensitivity are more likely to misinterpret bodily sensations as indications of impending threat, which facilitates vulnerability to subsequent panic attacks and maintenance of panic disorder (McNally, 2002). Cross sectional research has provided indications that people with panic disorder report elevated levels of anxiety sensitivity (Taylor, Koch, & McNally, 1992) and prospective naturalistic studies have demonstrated that elevated levels of anxiety sensitivity predict the development of panic attacks (Maller & Reiss, 1992; Schmidt et al., 1997); moreover, longitudinal research has demonstrated that marked reductions in anxiety sensitivity are associated with reductions in panic disorder symptoms (Smits, Power, Cho, & Telch, 2004). Accordingly, anxiety sensitivity has received considerable attention in panic disorder research (e.g., Barlow, 1993, 2008; Manfro et al., 2008; Reiss & McNally, 1985; Sexton et al., 2003; Starcevic & Berle, 2006). Researchers have recently suggested that the relationship between anxiety sensitivity and catastrophic misinterpretations of bodily sensations may be partially explained by difficulties with the inherent uncertainty associated with such sensations (Boelen & Carleton, 2012; Carleton, Sharpe,

& Asmundson, 2007). As such, IU may represent an important factor involved in the development and maintenance of panic disorder symptoms.

The IU construct may contribute to the development and maintenance of panic disorder symptoms as a function of fearing the unknown (Carleton, 2012) in at least two ways. First, IU may influence the interpretation of physical sensations. For example, heart palpitations are not inherently threatening and in some cases are actually sought after (e.g., during exhibition rides or as indications of romantic interest); however, if the cause and meaning of the palpitations are uncertain, individual capacity to tolerate that uncertainty without catastrophizing becomes critical. Second, several elements of the uncued panic attacks that serve as the hallmark for panic disorder (America Psychiatric Association, 2000) are by definition uncertain (e.g., when the attack might occur, how long it would last) and, as such, increasing IU can be expected to facilitate the anxiety and avoidance associated with panic disorder. For example, concerns about having a panic attack suggests elements of prospective IU, whereas changes in behavior relating to panic attacks may be related to inhibitory IU.

Despite the aforementioned theoretical rationale, research exploring the relationship between IU and panic disorder remains relatively scant. The available research indicates that patients with a diagnosis of panic disorder (with or without agoraphobia) report IU levels generally comparable to patients with other anxiety disorders and significantly higher than undergraduate and community samples (Carleton, Mulvogue, et al., 2012; Mahoney & McEvoy, 2012-a; McEvoy & Mahoney, 2011; 2012). Beyond that, only two studies (McEvoy & Mahoney, 2012; Sexton et al., 2003) have explored the specific relationship between IU and symptoms of panic disorder. Sexton and colleagues (2003) examined the relationship between neuroticism, anxiety sensitivity, and symptoms of four anxiety disorders including panic. Results

suggested no significant relationship between IU and symptoms of panic; however, the measure employed to assess panic symptoms (i.e., Beck Anxiety Inventory; Beck & Steer, 1993) was not designed to assess panic per se, and IU was assessed with the original 27-item Intolerance of Uncertainty Scale (Freeston et al., 1994), which researchers have found evidence may have a worry-specific focus (Gentes & Ruscio, 2011). McEvoy and Mahoney (2012-a) have provided initial evidence that the inhibitory dimension of IU partially mediates the relationship between neuroticism and panic disorder symptoms in a sample of anxiety disorder patients. The same researchers have suggested there may be an important relationship between IU, anxiety sensitivity, and panic symptoms, particularly when IU is measured specifically with respect to panic symptoms rather than as a trait (Mahoney & McEvoy, 2012-c). One limitation of both studies by McEvoy and Mahoney (2012-a) and Mahoney and McEvoy (2012-c) is that they did not include measures of anxiety sensitivity so that the relationship between IU, anxiety sensitivity, and panic symptoms could be explored.

The purpose of the current study was to examine the proportion of variance in specific fear and avoidance panic disorder symptoms accounted for by dimensions of IU (i.e., prospective IU, inhibitory IU) relative to dimensions of anxiety sensitivity (i.e., fear of physical, cognitive, socially observable symptoms). Given increasing evidence supporting IU as a critical component of all anxiety disorders (Carleton, 2012), prospective IU and inhibitory IU were expected to independently account for a statistically significant proportion of fear and avoidance symptoms for panic disorder, above and beyond the relationship with anxiety sensitivity. Inhibitory IU was expected to account for more variance in panic disorder symptoms than prospective IU, as was the case with previous research (McEvoy & Mahoney, 2012).

Methods

Participants

A total of 115 participants (83% women) who endorsed having experienced at least one panic attack were recruited from across North America through online social media advertising to complete a battery of measures online as part of a larger ongoing study. A power analysis of the current results ($f^2 = .20$, $\alpha = .05$, number of predictors = 4) suggested that the available sample size of 115 is sufficient to provide 95% power to detect real effects in the proposed analyses (Erdfelder, Faul, & Buchner, 1996). The mean age of the current sample was 34 years ($SD = 13.9$ years), and the majority of participants were Caucasian (83%), single/never married (49%), had either graduated high school or equivalent (25%) or partial college/university education (30%), and were employed full-time (33%). Potential participants were only excluded from the current study if they did not meet age requirements (i.e., 18 to 65 years old) or if they had not completed the included measures.

Procedure

Participants were recruited from across North America through online social media advertising and asked to voluntarily and anonymously complete an Internet-based survey as part of a larger ongoing study investigating risk factors and symptoms of anxiety disorders conducted between January and August of 2011. Permission to conduct the present study was obtained from the local University research ethics board. A total of 1075 participants logged on to complete the survey and were presented with measures assessing anxiety disorder risk factors (including AS and IU); 357 participants (33%) chose to answer additional questions and were randomized to respond to different sets of questions assessing specific anxiety disorder symptoms. Questionnaires prior to randomization explored transdiagnostic risk factors for anxiety disorders; thereafter, participants were randomized to complete disorder-specific measures to guard against

systematic bias and ensure a normal distribution of responses from those with and without salient symptoms of that anxiety disorder. Only 125 participants (35%) were randomized to receive questionnaires assessing the presence and severity of panic disorder symptoms; 78 of those participants (62%) completed the necessary study measure items. The remaining 37 participants completed measures assessing other anxiety disorders and then chose to complete measures assessing the presence and severity of panic disorder symptoms. Response validity was assessed using two check questions placed randomly within study measures ("I can vividly remember my own birth", "My favorite singer is Marty Bumble"). Participants who responded to the check questions with anything other than "not at all" would have been excluded; however, no such participants were identified.

Measures

Anxiety Sensitivity Index-3 (ASI-3; Taylor et al., 2007). The ASI-3 is an 18-item self-report measure assessing the tendency to fear anxiety-related sensations based on the belief that they may have harmful or even catastrophic consequences (e.g., "It scares me when I feel faint"). Items are rated on a 5-point Likert scale ranging from 0 (very little) to 4 (very much). Anxiety sensitivity includes a physiological, cognitive, and social component, which correspond to fear of physical sensations, fear of cognitive dyscontrol, and fear of socially observable reactions, respectively. The ASI-3 has better factorial validity and internal consistency relative to the original Anxiety Sensitivity Index (Peterson & Reiss, 1992) and has demonstrated evidence for good convergent, discriminate, and criterion-related validity (Taylor et al., 2007). The internal consistency for the total score of the current sample was $\alpha = .88$. Internal consistencies for subscale scores were $\alpha = .82$ (physical), $\alpha = .91$ (cognitive) and $\alpha = .79$ (social).

Intolerance of Uncertainty Scale, Short Form (IUS-12; Carleton, Norton, & Asmundson, 2007). The IUS-12 is a 12-item short-form of the original 27-item Intolerance of Uncertainty Scale (Freeston et al., 1994) that measures reactions to uncertainty, ambiguous situations, and the future (e.g., "Unforeseen events upset me greatly"). Items are scored on a 5-point Likert scale ranging from 1 (not at all characteristic of me) to 5 (entirely characteristic of me). The IUS-12 has a strong correlation with the original scale, *r*'s = .94 to .96 (Carleton, Norton et al., 2007; Khawaja & Yu, 2010). The IUS-12 has been shown to have two distinct factors (Carleton, Norton, et al., 2007; Khawaja & Yu, 2010), prospective IU and inhibitory IU, which can be assessed as subscales and possess identically high internal consistencies, α = .85 (Carleton, Norton et al., 2007). The psychometric properties of the IUS-12 have all been replicated and reified in clinical and nonclinical samples (Carleton, Sharpe et al., 2007; Khawaja & Yu, 2010; McEvoy & Mahoney, 2011) with evidence that it is psychometrically comparable to the longer original (Khawaja & Yu, 2010). The internal consistency for the total score of the current sample was α = .93. Internal consistencies for subscale scores were α = .89 (prospective IU) and α = .88 (inhibitory IU).

Panic Disorder Severity Scale (PDSS; Shear et al., 1997). The panic disorder severity scale (PDSS) is a 7-item self-report measure designed to assess symptoms of panic disorder (e.g., "During the past week, were there any activities that you avoided or felt afraid of, because they caused physical sensations like those you feel during panic attacks?"). Items are rated on a 5-point Likert scale ranging from 0 (none) to 4 (extreme). Four items from the PDSS which correspond with symptoms of fear and avoidance were chosen as specific areas of interest for the current study. Panic disorder symptoms examined in the current study included fear of symptoms during a panic attack (PDSS-2), fear of future panic attacks (PDSS-3), avoidance of

situations for fear of panic attacks (PDSS-4), and avoidance of activities (e.g., physical exertion, sexual relations, taking a hot shower or bath, drinking coffee, watching an exciting or scary movie) for fear of panic-like symptoms (PDSS-5). The three items assessing frequency (”How many panic and limited symptom attacks did you have during the past week?”) and interference (“During the past week, how much did [panic symptoms] interfere with your ability to work or carry out your responsibility at home?”; “During the past week, how much did panic and limited symptom attacks, worry about attacks, and fear of situations and activities because of attacks, interfere with your social life?”) of panic disorder symptoms focus more on consequences rather than symptoms, and as such were excluded.

Analyses

Descriptive statistics and correlation analyses were performed to characterize the data and initial interrelationships. To better characterize the current sample, the current data for each item were compared to published data for each item from a psychiatric outpatient sample (Shear, et al., 2001), diagnosed with current or lifetime Panic Disorder, using independent t-tests. The most recent psychometric research suggests that Likert scales with five or more linear options produce measurement results sufficiently comparable to continuous scales for successful use in structural equation modelling using individual five point Likert scales (Rhemtulla, Brosseau-Liard, & Savalei, 2012); as such, we have used hierarchical linear regression with bootstrapping for the current study. Hierarchical linear regressions were performed using each of the individual fear (PDSS-2 and 3) and avoidance (PDSS-4 and 5) symptoms of panic disorder as dependent variables. PDSS items were inputted as dependent variables individually in order to assess panic disorder symptom specific associations with IU and AS. Based on previous theory and research (Carleton, Norton et al., 2007; McEvoy & Mahoney, 2011), IUS-12 subscales

(prospective IU and inhibitory IU) were entered in step one of the model; thereafter, ASI-3 subscales (fear of physical sensations, cognitive dyscontrol, and socially observable symptoms) were entered in step two. The order of independent variable placement was based on notions that IU may be a necessary, yet distinct, component of AS (Carleton, 2012; Carleton, Norton et al., 2007) and that AS is a necessary component of panic symptoms (Barlow, 1993, 2008; Taylor, 1999). Nevertheless, the current study was designed to determine whether IU would account for statistically significant and substantial variance beyond that accounted for by other independent variables. As such, paralleling prior research (Carleton et al., 2010), analyses were also run with AS components in step one and IU subscales in step two in order to thoroughly assess the unique contributions of IU to panic disorder symptoms.

Results

Descriptive Statistics

Descriptive statistics for each dependent variable are presented in Table 1. None of the indices of univariate skewness and kurtosis in the community sample were sufficiently out of range (i.e., none had positive standardized skewness values that exceeded 2 or positive standardized kurtosis values that exceeded 7) to preclude the planned analyses (Curran, West, & Finch, 1996; Tabachnick & Fidell, 2013); nevertheless, bootstrapping was used to maximize the robustness of the null hypothesis significance tests within the regressions. Correlational analyses (Table 1) suggested statistically significant small to medium relationships between the inhibitory IU subscale and PDSS items, ranging from $r = .18$, $p < .01$ (PDSS-2) to $r = .44$, $p < .01$(PDSS-4). Correlation coefficients among the prospective IU subscale and PDSS items (i.e., PDSS-2, PDSS-3, PDSS-4, and PDSS-5) ranged from $r = .08$, $p = .43$ (PDSS-2 to $r = .26$, $p < .01$ (PDSS-3). Correlation coefficients among ASI-3 dimensions and PDSS items ranged from .08 (ASI-3

social and PDSS-2) to .40 (ASI-3 social and PDSS-4). The correlation coefficients between ASI-3 dimensions and PDSS items in the current study were similar to panic disorder symptom–AS correlations reported in the literature (e.g., Grant, Beck, & Davila, 2007; McLeish, Zvolensky, & Bucossi, 2007).

Participants in the current community sample reported lower scores than published scores from a psychiatric outpatient sample diagnosed with current or lifetime Panic Disorder (Shear, et al., 2001) on the PDSS-2, $t(218)=5.45$, $p<.05$, $r^2=.12$, and the PDSS-3, $t(218)=3.56$, $p<.05$, $r^2=.05$; however, the differences were not statistically significant for the PDSS-4, $t(218)=1.23$, $p>.05$, $r^2<.01$, or the PDSS-5, $t(218)<.01$, $p>.05$, $r^2<.01$. The differences and directions were in line with expectations for comparing a community sample to a clinical sample and suggest a possible low-end range restriction associated with data from a community sample on the PDSS-2 and the PDSS-3. The relatively lower scores on those two items, while statistically significant, were associated with relatively small effect sizes. Despite the relatively small difference, there may be a lower-end range restriction on these items in a non-clinical sample, contrasting the higher-end range restriction on these items that would be expected in a clinical sample. In contrast, the comparable scores on items PDSS-4 and PDSS-5 suggest that, in community and clinical samples, range restrictions may not be an important differentiating factor in assessing panic-related symptoms.

Hierarchal Linear Regression Analyses

Comprehensive results for the hierarchal linear regressions are presented in Table 2. When placed in step 1, the prospective IU subscale was found to account for non-significant amounts of unique variance in three ($p = .27$, PDSS-2; $p = .15$, PDSS-4, $p = .62$, PDSS-5) of four analyses. The exception was for the PDSS-3, wherein prospective IU accounted for statistically

significant variance ($p = .02$). When placed in step 2, prospective IU again accounted for statistically significant variance for the PDSS-3 ($p = .03$), but not for the other dependent variables (i.e., $p = .14$, PDSS-2; $p = .16$, PDSS-4; $p = .34$, PDSS-5).   The prospective IU subscale was identified as a suppressor variable because of the switch in relationship direction from the zero-order correlations to the part correlations (see Table 2); accordingly, subsequent regressions were performed a second time without the prospective IU subscale.

Comprehensive results for the hierarchal linear regressions without prospective IU as an independent variable are presented in Table 3. For PDSS-2 scores, the inhibitory IU subscale accounted for 2% of the variance when entered in step 1 and 1% when entered into step 2, and in both cases only trended towards statistical significance. The ASI-3 subscales also accounted for 2% of the variance whether entered in step 1 or step 2, most of which came from the fear of physical sensations subscale, but none of the subscales were statistically significant. For PDSS-3 scores, the inhibitory IU subscale accounted for a statistically significant 9% of the variance when entered in step 1, but a non-significant 1% when entered in step 2. In contrast, the ASI-3 subscales accounted for a statistically significant 21% of the variance when entered in step 1, most of which again came from the fear of physical sensations subscale, as well as a statistically significant 13% of the variance when entered in step 2.

For PDSS-4 scores, the inhibitory IU subscale accounted for a statistically significant 19% of the variance when entered in step 1, as well as a statistically significant 8% of the variance when entered in step 2. Similarly, the ASI-3 subscales accounted for a statistically significant 18% of the variance when entered in step 1, most of which again came from the fear of physical sensations subscale, as well as a statistically significant 7% of the variance when entered in step 2. For PDSS-5 scores, the inhibitory IU subscale accounted for a statistically

significant 8% of the variance when entered in step 1, but a non-significant 2% when entered in step 2. In contrast, the ASI-3 subscales accounted for a statistically significant 13% of the variance when entered in step 1, most of which came from the fear of cognitive dyscontrol subscale, as well as a statistically significant 7% of the variance when entered in step 2.

Discussion

The current study was designed to assess the specific relationships between IU, AS, and the fear and avoidance symptoms of panic disorder in a community sample. Specifically, the variance accounted for by IU and AS in the fear of symptoms during a panic attack, the fear of future panic attacks, the situational avoidance stemming from fear of panic attacks, and the activity avoidance for fear of panic-like symptoms. In all cases, IU subscales were expected to account for significant variance in panic disorder symptoms beyond the variance accounted for by AS dimensions. The results supported complex associations between IU, AS, and panic disorder symptoms.

Inter-relationships – General

Inhibitory IU was primarily associated with situational avoidance for fear of panic attacks, and to a lesser degree with activity avoidance for fear of panic-like symptoms and fear of future panic attacks. Inhibitory IU demonstrated consistently stronger relationships with fear and avoidance symptoms of panic than did prospective IU. Among those relationships, the strongest was between inhibitory IU and avoidance of situations for fear of panic attacks. The relatively strong relationship is consistent with current research suggesting a relationship between IU and behaviour (e.g., reward-based decision making [Luhmann et al., 2011], anxiety-drive information seeking [Rosen & Knäuper, 2009]), but also theory suggesting a specific relationship between inhibitory IU and behavioural avoidance (Carleton, 2012). Beyond the behavioural relationship,

inhibitory IU and the fear of physical sensations were the only two variables to demonstrate a significant (but relatively small) relationship with fear of symptoms during a panic attack. The relationship between fear of physical sensations and fear of symptoms during a panic attack is congruent with established theory on panic and AS (Deacon & Abramowitz, 2007; Smits et al., 2004; Taylor, 1999); however, the relationship with inhibitory IU may be the result of overlap with the escape aspects (i.e., flight or fight) of fear during a panic attack (Carleton, 2012; Suárez et al., 2009).

As expected, the dimensions of AS were also associated with the fear and avoidance symptoms of panic disorder. The fear of cognitive dyscontrol demonstrated a consistently moderate relationship with the panic disorder symptoms, except fear of symptoms during a panic attack. The fear of socially observable reactions demonstrated a similar pattern of relationships with the panic disorder symptoms. Perhaps surprisingly, the fear of physical sensations demonstrated relationships with the panic disorder symptoms that were generally comparable to, though often smaller than, the other AS dimensions. As such, the pattern of relationships appears to suggest that AS, IU, and symptoms of panic have relatively complex associations that warrant additional research (Carleton, Sharpe et al., 2007; Deacon & Abramowitz, 2006; Smits et al., 2004; Taylor, 1999).

Inter-relationships – Specific

Assessing the inter-relationships of IU, AS, and panic disorder symptoms served to clarify some of the complexities in the pattern of responses. In all cases prospective IU acted as a suppression variable and, as such, was removed from the analyses. Given the relatively smaller relationships between prospective IU and the measured panic disorder symptoms, the suppression was most likely a simple function of the relationship between prospective and

inhibitory IU. Unlike prospective IU, inhibitory IU accounted for statistically significant and substantial amounts of variance in most of the measured panic disorder symptoms.

A significant relationship was identified between inhibitory IU and fears of symptoms during panic attacks when controlling for anxiety sensitivity, whereas none of the dimensions of AS demonstrated such relationships when controlling for IU. As such, during the panic attack itself the symptoms may not be the focus of fear; instead, the behavioral tendency towards *in*action in the face of uncertainty regarding the symptoms appears to be more prevalent. The relative importance of uncertainty during the panic attack is consistent with previous theory that for persons with panic disorder the symptoms are arousing, non-specific, and then interpreted catastrophically (Apfeldorf, Shear, Leon, & Portera, 1994; Carleton, Sharpe et al., 2007; Taylor, 1999); in other words, IU may interact with AS to facilitate panic symptoms by increasing distress arising from the non-specific and unknown nature of the physical symptoms.

The specific inter-relationships between IU, AS, and fears of future panic attacks were somewhat more complex. Inhibitory IU accounted for the largest single portion of variance; however, the fear of physical sensations and the fear of socially observable reactions dimensions of AS also accounted for significant and substantial variance. Based on previous theory suggesting that AS requires IU (Carleton 2012; Carleton, Sharpe et al., 2007), the current results support the potential importance of IU for fearing future panic attacks. In addition, the shared and unique relationships between inhibitory IU and each of the panic disorder symptoms are comparable to or larger than those identified between inhibitory IU and symptoms of social anxiety (Carleton et al., 2010).

Inhibitory IU also accounted for the largest single portion of variance in the situational avoidance stemming from fear of panic attacks and the activity avoidance for fear of panic-like

symptoms; however, contrasting the relationships with fearing future panic attacks and the intuitive expectations based on theories of panic disorder (Apfeldorf et al., 1994; Taylor, 1999), fears of physical sensations were not associated with significant variance in either aspect of avoidance. Instead, fears of socially observable reactions accounted for significant and substantial additional variance in situational avoidance and fears of cognitive dyscontrol accounted for significant, but small, variance in activity avoidance for fear of panic-like symptoms. The results regarding fears of socially observable reactions may be sample-specific (e.g., a preponderance of concurrent social anxiety), may reflect an epidemiological overlap between symptoms of social anxiety and panic (Kessler, Chiu, Jin, Ruscio, Shear, & Walters, 2006), or may reflect an inherent embarrassment associated with the experience of panic. The results regarding fears of cognitive dyscontrol may be similarly incidental. In any case, there appears to be evidence that inhibitory IU may play a relatively more important role than fears of physical sensations in avoidance related to panic disorder symptoms.

Limitations and Future Research Directions

The current study has several limitations that provide directions for future research. First, the data was gathered from an analogue community sample with a history of at least one panic attack and, as such, may not generalize to clinical populations. That said, range restrictions associated with exclusively clinical samples might obscure relationships between dimensional constructs such as IU (Carleton, Weeks et al., 2012), AS (Broman-Fulks et al., 2008), and panic disorder symptoms. Relatedly, assessing the different panic-related symptoms using individual items – even well-established items such as those on the PDSS – may have been insufficiently sensitive to demonstrate more complex relationships that may exist. In any case, the current research should be replicated and extended with a clinical population and using items with

relatively increased sensitivity. Second, it is noteworthy that Mahoney and McEvoy (2012-a) recently found that situation-specific IU, which was assessed with respect to diagnosis-specific concerns (e.g., physical sensations of anxiety for panic disorder) rather than as a trait, was more strongly related to panic disorder symptoms than trait IU. In contrast, trait IU was equally or more strongly associated with symptoms of other anxiety disorders and depression. Therefore, the associations between IU and panic disorder symptoms found in this study may have been stronger if IU had have been assessed specifically in relation to uncertain physical sensations. Third, the sample was primarily women, which suggests the results may not generalize to men. Future research should attempt to include a more demographically balanced sample and assess for possible sex differences.

Fourth, the cross-sectional nature of the data makes causality impossible to determine. Given the implicit premise that IU and AS function as vulnerability factors, longitudinal research – prospective or intervention-based – will eventually be necessary. Fifth, the frequency and number of panic attacks were not assessed; as such, participants included in the current analyses may have had varying opportunities to experience panic disorder symptoms. As a result, our sample data may be more indicative of panic attacks rather than panic disorder; moreover, in collecting only symptom data, assessing relationships between the constructs of interest and an aggregated PDSS was not possible. While this fit well with the intent of the current paper and avoided difficulties associated with the items not necessarily being truly additive, future research should explore both the aggregate and the individual symptoms. Sixth, the suppression effect noted when both inhibitory and prospective IU were assessed (i.e., prospective IU functioned as a suppression variable) warrants additional consideration. The effect was only statistically significant when fear of symptoms during a panic attack served as the dependent variable, and

even then the associated variance was relatively small; however, if the same effect is replicated in other samples – ideally samples with more variance – it may represent a complex inter-relationship with important ramifications for theory and practise. Finally, the current sample did report significantly lower scores relative to published scores from a psychiatric outpatient sample diagnoses with current or lifetime panic on some, but not all, of the panic disorder symptoms. Future research should consider using a mixed sample to further explore not only the construct interrelationships identified here, but also the specific relationship of each panic symptom to the experience of clinically-significant panic.

Summary Conclusions

Despite the aforementioned limitations, the current results extend prior theory and research (Carleton 2012; Carleton, Mulvogue, et al., 2012; Carleton, Sharpe et al., 2007; Dugas et al., 2001; McEvoy & Mahoney, 2011) with evidence that inhibitory IU is associated with symptoms of panic disorder; moreover, for some panic disorder symptoms inhibitory IU may be relatively more important than the fear of physical sensations dimension of AS. Although AS emerged as a strong contributor of variance in the current study, the independent contribution of inhibitory IU demonstrated in the current results suggests unique and novel associations not previously reported. The evidence indicates comparably-sized unique relationships between each of IU and the dimensions of AS with respect to each of the panic symptoms, with the inhibitory dimension of IU often demonstrating a larger unique relationship than even the physical (i.e., somatic) dimension of AS.

The current results make sense if, as argued previously (Carleton, 2012; Carleton, Sharpe, et al., 2007), it is the uncertainty regarding the meaning of the physical sensations that causes the associated anxiety; indeed, those same symptoms (e.g., heart palpitations) are often sought out

(e.g., rollercoasters, romantic encounters) and experienced as pleasant, so long as there is a relatively high level of certainty associated with what is causing the symptoms and what those symptoms might indicate. The fact that the unique relationship between IU and panic symptoms was often larger than the unique relationship between AS and panic symptoms suggests that increasing tolerance for uncertainty may be a very important clinical target for persons experiencing panic symptoms. Accordingly, treatments addressing both IU (e.g., Dugas & Ladouceur, 2000) and AS (e.g., interoceptive exposure) may maximally reduce symptoms of panic disorder. Existing treatments for panic disorder may already be exerting therapeutic effects through the incidental and implicit reduction of IU (e.g., engaging in behavioral experiments and exposure may expose individuals to situations where they are uncertain of the outcome); however, future research is needed to investigate the anxiolytic mechanisms associated with reductions in IU among existing treatments. Such therapeutic suppositions support evidence indicating that reductions in IU are associated with reductions in symptoms during cognitive behavior therapy for social anxiety disorder (Mahoney & McEvoy, 2012-b), indicating a parallel pattern may occur for panic disorder symptoms. Until the supposition is empirically tested, researchers and clinicians may still benefit from attending to IU in anxiety disorders.

References

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th Ed. Text Revision). Washington, DC: Author.

Apfeldorf, W. J., Shear, M. K., Leon, A. C., & Portera, L. (1994). A brief screen for panic disorder. *Journal of Anxiety Disorders, 10*, 71-78. DOI: 10.1016/0887-6185(94)90024-8

Barlow, D. H. (Ed.). (1993). *Clinical handbook of psychological disorders* (3rd Ed.). New York, NY: Guilford Press.

Barlow, D. H. (1988). *Anxiety and its disorders: The nature and treatment of anxiety and panic*. New York: Guilford Press.

Beck, A. T. & Steer, R. A. (1993). *Beck anxiety inventory manual*. San Antonio, TX: Psychological Association.

Birrell, J., Meares, K., Wilkinson, A., & Freeston, M. (2011).Toward a definition of intolerance of uncertainty: A review of factor analytical studies of the intolerance of uncertainty scale. *Clinical Psychology Review, 31*, 1198-1208. DOI: 10.1016/j.cpr.2011.07.009

Boelen, P.A., & Carleton, R. N. (2012). Intolerance of uncertainty, hypochondriacal concerns, OCD, and worry. *Journal of Nervous and Mental Disease, 200*, 208–213.

Boelen, P. A., & Reijntjes, A. (2009). Intolerance of uncertainty and social anxiety. *Journal of Anxiety Disorders*, *23*, 130-135. DOI: 10.1016/j.janxdis.2008.04.007

Broman-Fulks, J. J., Green, B. A., Olatunji, B. O., Berman, M. E., Arnau, R. C., Deacon, B. J., & Sawchuk, C. N. (2008). The latent structure of anxiety sensitivity-revisited. *Assessment, 15*, 188-203. DOI: 1073191107311284

Buhr, K., & Dugas, M. J. (2006). Investigating the construct validity of intolerance of uncertainty and its unique relationship with worry. *Journal of Anxiety Disorders, 20*, 222-236. DOI: S0887-6185(05)00022-8

Carleton, R. N. (2012). The intolerance of uncertainty construct in the context of anxiety disorders: Theoretical and practical perspectives. *Expert Review of Neurotherapeutics, 12*, 937-947. DOI: 10.1586/ern.12.82

Carleton, R. N., Collimore, K. C., & Asmundson, G. J. G. (2010). "It's not just the judgments - It's that I don't know": Intolerance of uncertainty as a predictor of social anxiety. *Journal of Anxiety Disorders*, *24*, 189-195. DOI: 10.1016/j.jankdis.2009.10.007

Carleton, R. N., Mulvogue, M. K., Thibodeau, M. A., McCabe, R. E., Antony, M. M., & Asmundson, G. J. G. (2012). Increasingly certain about uncertainty: Intolerance of uncertainty across anxiety and depression. *Journal of Anxiety Disorders*, *26*, 468-479. DOI: 10.1016/j.janxdis.2012.01.011

Carleton, R. N., Norton, P. J., & Asmundson, G. J. G. (2007). Fearing the unknown: A short version of the Intolerance of Uncertainty Scale. *Journal of Anxiety Disorders*, *21*, 105-117. DOI: 10.1016/j.janxdis.2006.03.014

Carleton, R. N., Sharpe, D., & Asmundson, G. J. G. (2007). Anxiety sensitivity and intolerance of uncertainty: Requisites of the fundamental fears? *Behaviour Research and Therapy*, *45*, 2307-2316. DOI: 10.1016/j.brat.2007.04.006

Carleton, R. N., Weeks, J. W., Howell, A. N., Asmundson, G. J. G., Antony, M. M., & McCabe, R. E. (2012). Assessing the latent structure of the intolerance of uncertainty construct: An initial taxometric analysis. *Journal of Anxiety Disorders, 26*, 150-157. DOI: 10.1016/j.janxdis.2011.10.006

Curran, P. J., West, S. G., & Finch, J. F. (1996). The robustness of test statistics to

nonnormality and specification error in confirmatory factor analysis. *Psychological

Methods, 1*, 16-29. DOI: 10.1037/1082-989X.1.1.16

Deacon, B. & Abramowitz, J. (2006). Anxiety sensitivity and its dimensions across the anxiety

disorders. *Journal of Anxiety Disorders, 20*, 837-857. DOI:

/10.1016/j.janxdis.2006.01.003

Dugas, M. J., Gosselin, P., & Ladouceur, R. (2001). Intolerance of uncertainty and worry:

Investigating specificity in a nonclinical sample. *Cognitive Therapy and Research*, *25*,

551-558. DOI: 0147-5916/01/1000-0551

Dugas, M.J., & Ladouceur, R. (2000). Treatment of GAD. Targeting intolerance of uncertainty

in two types of worry. *Behavior Modification, 24*, 635–657.

Dugas, M. J., Marchand, A., & Ladouceur, R. (2005). Further validation of a cognitive-

behavioral model of generalized anxiety disorder: Diagnostic and symptom specificity.

Journal of Anxiety Disorders, 19, 329-343. DOI: 10.1016/j.janxdis.2004.02.002

Dugas & Robichaud (2007). *Cognitive-behavioural treatment for generalized anxiety disorder:

From science to practice.* New York: Routledge.

Dugas, M. J., Schwartz, A., & Francis, K. (2004). Intolerance of uncertainty, worry, and

depression. *Cognitive Therapy and Research, 28*, 835-842. DOI: 10.1007/s10608-004-

0669-0

Erdfelder, E., Faul, F., & Buchner, A. (1996). GPOWER: A general power analysis program.

Behavior Research Methods, Instruments, & Computers, *28*, 1-11.

Freeston, M. H., Rhéaume, J., Letarte, H., Dugas, M. H., & Ladouceur, R. (1994). Why do

people worry? *Personality and Individual Differences, 17,* 791-802. DOI: 10.1016/0191-

8869(94)90048-5

Gentes, E. L., & Ruscio, A. M. (2011). A meta-analysis of the relation of intolerance of

uncertainty to symptoms of generalized anxiety disorder, major depressive disorder, and

obsessive-compulsive disorder. *Clinical Psychology Review, 31*, 923-933. DOI:

10.1016/j.cpr.2011.05.001

Grant, D. M., Beck, J. G., & Davila, J. (2007). Does anxiety sensitivity predict symptoms of

panic, depression, and social anxiety. *Behaviour research and Therapy, 45*, 2247-2255.

doi:10.1016/j.brat.2007.02.008

Holaway, R. M., Heimberg, R. G., & Coles, M. E. (2006). A comparison of intolerance of

uncertainty in analogue obsessive-compulsive disorder and generalized anxiety disorder.

Journal of Anxiety Disorders, 20, 158-174. DOI: 10.1016/j.janxdis.2005.01.002

Kessler, R. C., Chiu, W. T., Jin, R. J., Ruscio, A. M., Shear, K., & Walters, E. E. (2006). The

epidemiology of panic attacks, panic disorder, and agoraphobia in the National

Comorbidity Survey Replication. *Archives of General Psychiatry*, *63*(4), 415-424.

Khawaja, N. G., & Yu, L. N. H. (2010). A comparison of the 27-item and 12-item intolerance of

uncertainty scales. *Clinical psychologist*, *14*, 97-106. DOI:

10.1080/13284207.2010.502542

Koerner, N., & Dugas, M. J. (2008). An Investigation of Appraisals in Individuals Vulnerable to

Excessive Worry: The Role of Intolerance of Uncertainty. *Cognitive Therapy and

Research*, 32, 619-638. DOI: 10.1007/s10608-007-9125-2

Luhmann, C. C., Ishida, K., & Hajcak, G. (2011) Intolerance of uncertainty and decisions about

delayed, probabilistic rewards. *Behaviour Therapy, 42*, 378-386. DOI:

10.1016/j.beth.2010.09.002

Maller, R. G., & Reiss, S. (1992). Anxiety sensitivity in 1984 and panic attacks in 1987. *Journal of Anxiety Disorders, 6*, 241-247. DOI: 10.1016/0887-6185(92)90036-7

Mahoney, A. E., & McEvoy, P. M. (2012-a). A transdiagnostic examination of intolerance of uncertainty across anxiety and depressive disorders. *Cognitive Behaviour Therapy, 41*, 212-222. DOI: 10.1080/16506073.2011.622130

Mahoney, A.E., & McEvoy, P. M. (2012-b). Changes in intolerance of uncertainty during cognitive behavior group therapy for social phobia. *Journal of Behavior Therapy and Experimental Psychiatry, 43*, 849-854. DOI: 10.1016/j.jbtep.2011.12.004

Mahoney, A. E., & McEvoy, P. M. (2012-c). Trait versus situation-specific intolerance of uncertainty: A transdiagnostic examination across internalising disorders. *Cognitive Behaviour Therapy, 41*, 26-39. DOI: 10.1080/16506073.2011.622131

Manfro, G. G., Heldt, E., Cordioli, A. V., & Otto, M. W. (2008). Cognitive behavioural therapy in panic disorder. *Revista Brasileira de Psiquiatria*, *30*, s81-s87.

McEvoy, P. M., & Mahoney, A. E. J. (2011). Achieving certainty about the structure of intolerance of uncertainty in a treatment-seeking sample with anxiety and depression. *Journal of Anxiety Disorders, 25*, 112-122. doi: 10.1016/j.janxdis.2010.08.010

McEvoy, P. M., & Mahoney, A. E. J. (2012). To be sure, to be sure: Intolerance of uncertainty mediates symptoms of various anxiety disorders and depression. *Behavior Therapy, 43*, 533-545. DOI: 10.1016/j.beth.2011.02.007

McLeish, A. C., Zvolensky, M. J., & Bucossi, M. M. (2007). Interaction between smoking rate and anxiety sensitivity: Relation to anticipatory anxiety and panic-relevant avoidance among daily smokers. *Journal of Anxiety Disorders, 21*, 849-859. doi:10.1016/j.janxdis.2006.11.003

McNally, R. J. (2002). Anxiety sensitivity and panic disorder. *Biological Psychiatry, 52*, 938-946. DOI: 10.1016/S0006-3223(02)01475-0

Meuret, A. E., White, K. S., Ritz, T., Roth, W. T., Hofmann, S. G., & Brown, T. A. (2006). Panic attack symptom dimensions and their relationship to illness characteristics in panic disorder. *Journal of Psychiatric Research, 40*, 520-527. DOI: 10.1016/j.jpsychires.2005.09.006

Peterson, R. A., & Reiss, S. (1992). *Anxiety sensitivity index manual* (2nd ed.). Worthington, OH: International Diagnostic Systems.

Reiss, S., & McNally, R. J. (1985). The expectancy model of fear. In: S. Reiss & R. R. Bootzin (Eds.), *Theoretical issues in behaviour therapy* (pp. 107-121). New York, NY: Academic Press.

Rhemtulla, M., Brosseau-Liard, P. E., & Savalei, V. (2012). When can categorical variables be treated as continuous? A comparison of robust continuous and categorical SEM estimation methods under suboptimal conditions. *Psychological Methods, 17*, 354-373. DOI: 10.1037/a0029315

Rosen, N. O., & Knäuper, B. (2009). A little uncertainty goes a long way: State and trait differences in uncertainty interact to increase information seeking but also increase worry. *Health Communication, 24*, 228-238. DOI: 10.1080/10410230902804125

Schmidt, N. B., Lerew, D. R., & Jackson, R. J. (1997). The role of anxiety sensitivity in the pathogenesis of panic: Prospective evaluation of spontaneous panic attacks during acute stress. *Journal of Abnormal Psychology, 106*, 355-364. DOI: 10.1037/0021-843X.106.3.355

Sexton, K. A., Norton, P. J., Walker, J. R., & Norton, R. (2003). Hierarchical model of generalized and specific vulnerabilities in anxiety. *Cognitive Behavior Therapy*, *32*, 82-94. DOI: 10.1080/16506070302321

Shear, M.K., Brown, T.A., Barlow, D.H., Money, R., Sholomskas, D.E., Woods, S.W., Papp, L.A. (1997). Multicenter collaborative panic disorder severity scale. *American Journal of Psychiatry, 154*, 1571–1575.

Shear, M. K., Rucci, P., Williams, J., Frank, E., Grochocinski, V., Vander Bilt, J., . . . Wang, T. (2001). Reliability and validity of the panic disorder severity scale: Replication and extension. *Journal of Psychiatric Research, 35*, 293-296.

Smits, J. A. J., Powers, M. B., Cho, Y., & Telch, M. J. (2004). Mechanism of change in cognitive-behavioral treatment of panic disorder: Evidence for the fear of fear mediational hypothesis. *Journal of Consulting and Clinical Psychology, 72*(4), 646–652.

Starcevic, V., & Berle, D. (2006). Cognitive specificity of anxiety disorders: A review of selected key constructs. *Depression and Anxiety*, *23*, 51-61. DOI: 10.1002/da.20145

Suárez, L., Bennett, S., Goldstein, C., & Barlow, D. H. (2009). Understanding anxiety disorders from a "triple vulnerability" framework. In M. M. Antony & M. B. Stein (Eds.), *Oxford handbook of anxiety and related disorders* (pp. 153-172). New York, NY: Oxford University Press.

Tabachnick, B. G., & Fidell, L. S. (2013). Using multivariate statistics (6th ed.). Boston, MA: Allyn and Bacon.

Taylor, S. (Ed.). (1999). *Anxiety sensitivity: Theory, research, and treatment of the fear of anxiety.* Mahwah, NJ; Lawrence Erlbaum Associates, Inc.

Taylor, S., Koch, W. J., & McNally, R. J. (1992). How does anxiety sensitivity vary across the anxiety disorders? *Journal of Anxiety Disorders, 6*, 249-259. DOI: 10.1016/0887-6185(92)90037-8

Taylor, S., Zvolensky, M. J., Cox, B. J., Deacon, B., Heimberg, R. G., Ledley, D. R.,…Cardenas, S. J. (2007). Robust dimensions of anxiety sensitivity: Development and initial validation of the anxiety sensitivity index-3. *Psychological Assessment*, *19*(2), 176-188.

Tolin, D. F., Abramowitz, J. S., Brigidi, B. D., & Foa, E. B. (2003). Intolerance of uncertainty in obsessive-compulsive disorder. *Journal of Anxiety Disorders*, 17, 233-242. DOI: 10.1016/S0887-6185(02)00182-2

Table 1. *Descriptive statistics and Correlational Results*

Item	PDSS-2	PDSS-3	PDSS-4	PDSS-5	IUS-12 Pro	IUS-12 Inh	ASI-3 Cog	ASI-3 Soc	M	SD	S $(SE = .23)$	K $(SE = .45)$	Min, Max
1. PDSS-2	1.00	-	-	-	-	-	-	-	1.15	1.32	.65	-.84	0, 4
2. PDSS-3	.59**	-	-	-	-	-	-	-	.77	.97	1.46	1.99	0, 4
3. PDSS-4	.40**	.57**		-	-	-	-	-	1.12	1.22	.76	-.46	0, 4
4. PDSS-5	.58**	.63**	.67**	-	-	-	-	-	.86	1.13	1.21	.65	0, 4
5. IUS-12 Pro	.08	.16*	.26**	.19*	-	-	-	-	22.31	6.96	-.26	-.67	7, 35
6. IUS-12 Inh	.18*	.30**	.44**	.29**	.78**	-	-	-	14.81	5.41	-.11	-1.20	5, 25
7. ASI-3 Cog	.15	.34**	.30**	.32**	.33**	.33**	-	-	9.33	7.05	.37	-.97	0, 24
8. ASI-3 Soc	.08	.34**	.40**	.25**	.24**	.35**	.49**	-	12.74	5.77	-.12	-.65	0, 24
9. ASI-3 Phy	.19*	.37**	.22**	.26**	.36**	.31**	.37**	.32**	9.36	5.93	.23	-.98	0, 22

Notes. *$p < .05$, one-tailed; **$p < .01$, one-tailed; M = Mean; SD = Standard Deviation; K = Kurtosis; SE – Standard error; min – minimum score in current sample; max – maximum score in current sample; IUS-12 – Intolerance of Uncertainty Scale, Short Form; ASI-3 – Anxiety Sensitivity Index-3; PDSS – Panic Disorder Symptom Severity Scale; Pro – prospective IU subscale; Inh – inhibitory IU subscale; Cog – fear of cognitive dyscontrol subscale; Soc – fear of socially observable reactions subscale; Phy – fear of physical sensations subscale.

Table 2. *Hierarchical Linear Regression – Dependent Variables: Fear and Avoidance Symptoms*

PDSS Item	Model step	Predictor	Coefficient statistics				Model step statistics			
			β	t	one-tailed p	part r	R^2	adjusted R^2	ΔR^2	ΔF
2	1 (2)	IUS-12 Inh	.30 (.30)	2.07 (1.98)	.03 (.06)	.19 (.18)	.04(.08)	.03(.04)	.04(.03)	2.48(2.00)
		IUS-12 Pro	-.16 (-.23)	-1.09 (-1.54)	.27 (.14)	-.10 (-.14)				
	2 (1)	ASI-3 Cog	.10 (.02)	.91 (.91)	.38 (.38)	.08 (.08)	.08(.04)	.04(.02)	.03(.04)	1.36(1.68)
		ASI-3 Soc	-.08 (-.21)	-.69 (-.21)	.49 (.84)	-.06 (-.02)				
		ASI-3 Phy	.16 (.16)	1.58 (1.58)	.17 (.18)	.15 (.15)				
3	1 (2)	IUS-12 Inh	.46 (.35)	3.24 (2.56)	<.01 (<.01)	.29 (.21)	.11(.26)	.09(.22)	.11(.05)	6.76**(3.37**)
		IUS-12 Pro	-.20 (-.29)	-1.41 (-2.16)	.02 (.03)	-.13 (-.18)				
	2 (1)	ASI-3 Cog	.17 (.16)	1.64 (1.58)	.10 (.14)	.14 (.13)	.26(.21)	.22(.19)	.15(.21)	7.30**(9.90**)
		ASI-3 Soc	.12 (.18)	1.22 (1.85)	.16 (.04)	.10 (.16)				
		ASI-3 Phy	.27 (.26)	2.86 (2.77)	.03 (.03)	.24 (.23)				
4	1 (2)	IUS-12 Inh	.58 (.46)	4.32 (3.42)	<.01 (<.01)	.37 (.28)	.20(.28)	.19(.24)	.20(.10)	14.22**(7.27**)
		IUS-12 Pro	-.18 (-.19)	-1.37 (-1.40)	.15 (.16)	-.12 (-.11)				
	2 (1)	ASI-3 Cog	.08 (.11)	.77 (1.06)	.45 (.28)	.06 (.09)	.28(.18)	.24(.16)	.07(.18)	3.64*(8.03**)
		ASI-3 Soc	.23 (.32)	2.36 (3.21)	.02 (<.01)	.19 (.28)				
		ASI-3 Phy	.04 (.08)	.45 (.84)	.71 (.42)	.04 (.07)				
5	1 (2)	IUS-12 Inh	.35 (.27)	2.41 (1.89)	.03 (.08)	.22 (.17)	.09(.16)	.07(.13)	.09(.03)	5.22**(1.96)
		IUS-12 Pro	-.07 (-.14)	-.514 (-1.00)	.62 (.34)	-.05 (-.09)				
	2 (1)	ASI-3 Cog	.21 (.22)	1.94 (2.08)	.07 (.07)	.17 (.18)	.16(.13)	.13(.11)	.08(.13)	3.43*(5.74**)
		ASI-3 Soc	.05 (.10)	.45 (.96)	.61 (.32)	.04 (.09)				
		ASI-3 Phy	.13 (.15)	1.36 (1.53)	.33 (.19)	.12 (.14)				

Notes. *p < .05; **p < .01; PDSS – Panic Disorder Severity Scale; IUS-12 – Intolerance of Uncertainty Scale, Short Form; ASI-3 – Anxiety Sensitivity Index-3; Inh – inhibitory IU subscale; Pro – prospective IU subscale; Cog – fear of cognitive dyscontrol subscale; Soc – fear of socially observable reactions subscale; Phy – fear of physical sensations subscale.

Table 3. *Hierarchical Linear Regression, Inhibitory IU Only – Dependent Variables: Fear and Avoidance Symptoms*

PDSS Item	Model step	Predictor	Coefficient statistics				Model step statistics			
			β	t	*one-tailed p*	part r	R^2	*adjusted R^2*	ΔR^2	ΔF
2	1 (2)	IUS-12 Inh	.18 (.13)	1.94 (1.25)	.03 (.12)	.18 (.12)	.03(.06)	.02 (.02)	.03(.01)	3.76 (1.55)
	2 (1)	ASI-3 Cog	.08 (.10)	.73 (.91)	.25 (.20)	.07 (.08)	.06(.04)	.02 (.02)	.03(.04)	.96 (1.68)
		ASI-3 Soc	-.05 (-.02)	-.46 (-.21)	.32 (.42)	-.04 (-.02)				
		ASI-3 Phy	.14 (.16)	1.32 (1.58)	.12 (.08)	.12 (.15)				
3	1 (2)	IUS-12 Inh	.30 (.13)	3.38 (1.41)	<.01 (.11)	.30 (.12)	.09(.23)	.09 (.20)	.09(.01)	11.43** (1.99)
	2 (1)	ASI-3 Cog	.14 (.16)	1.37 (1.58)	.11 (.08)	.12 (.13)	.23(.21)	.20 (.19)	.13(.21)	6.30** (9.90**)
		ASI-3 Soc	.15 (.18)	1.54 (1.85)	.04 (.01)	.13 (.16)				
		ASI-3 Phy	.23 (.26)	2.47 (2.77)	.03 (.02)	.21 (.23)				
4	1 (2)	IUS-12 Inh	.44 (.32)	5.13 (3.53)	<.01 (<.01)	.44 (.29)	.19(.26)	.18 (.24)	.19(.08)	26.34** (12.47**)
	2 (1)	ASI-3 Cog	.06 (.11)	.60 (1.06)	.28 (.14)	.05 (.09)	.26(.18)	.24 (.16)	.07(.18)	3.63* (8.03**)
		ASI-3 Soc	.25 (.32)	2.59 (3.21)	<.01 (<.01)	.21 (.28)				
		ASI-3 Phy	.02 (.08)	.20 (.84)	.43 (.21)	.02 (.07)				
5	1 (2)	IUS-12 Inh	.30 (.17)	3.20 (1.71)	<.01 (.08)	.29 (.15)	.08(.16)	.08 (.13)	.08(.02)	10.23** (2.91)
	2 (1)	ASI-3 Cog	.19 (.22)	1.84 (2.08)	.05 (.03)	.16 (.18)	.16(.13)	.13 (.11)	.07(.13)	3.19* (5.74**)
		ASI-3 Soc	.06 (.10)	.61 (.96)	.26 (.16)	.05 (.09)				
		ASI-3 Phy	.12 (.15)	1.20 (1.53)	.18 (.11)	.11 (.14)				

Notes. $^{*}p < .05$; $^{**}p < .01$; PDSS – Panic Disorder Severity Scale; IUS-12 – Intolerance of Uncertainty Scale, Short Form; ASI-3 – Anxiety Sensitivity Index-3; Inh – inhibitory IU subscale; Cog – fear of cognitive dyscontrol subscale; Soc – fear of socially observable reactions subscale; Phy – fear of physical sensations subscale.