

CONTRAST AVOIDANCE MODEL: RELATIONSHIP TO INTOLERANCE OF  
UNCERTAINTY AND FEAR OF CHANGE

By

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## CONTRAST AVOIDANCE MODEL: RELATIONSHIP TO IU AND FEAR OF CHANGE

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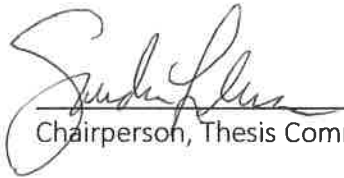
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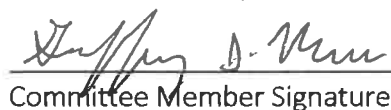
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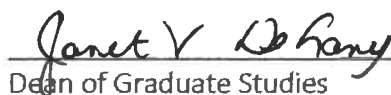
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### **Abstract**

The current study aimed to examine the relationship between, Intolerance of Uncertainty (IU) model (Dugas, Gagnon, Ladouceur, & Freeston, 1998b) and the Contrast Avoidance model (CAM) (Newman & Llera, 2011), two theories that have been developed and support as underlying mechanisms of GAD. In addition, it aimed to establish the new concept of fear of change (FoC), such that it posited that those who are intolerant of uncertainty, engage in contrast avoidance tendencies, and show symptoms of GAD are more likely to fear change no matter the valance. Data was gathered from 152 undergraduate students that were recruited from Introductory Psychology courses, ages ranging from 18 to 33 years old. The study assessed a range of variables, including: worry (Penn State Worry Questionnaire [PSWQ]), GAD symptoms (Generalized Anxiety Disorder Questionnaire IV [GAD-Q-IV]), contrast avoidance tendencies (Contrast Avoidance Questionnaires [CAQs]), intolerance of uncertainty (Intolerance of Uncertainty Scale [IUS]) and people's perceptions of change (Fear of Change scale [FOC]). Several path models were run, indicating that: 1) CAQ predicted scores on the GAD-Q-IV, IUS, and PSWQ; 2) IUS partially mediates the relationship between CAQ and GAD-Q-IV; and 3) IUS mediated the relationship between CAQ and FoC. The present research furthers our understanding of underlying mechanisms of GAD while developing a base to understand the relationship between the CAM and IU. Additionally, it established the ground work for the new concept FoC.

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## **Introduction**

Anxiety disorders are the most common type of mental disorders, with generalized anxiety disorder (GAD) being the most prevalent among them, with a 12-month prevalence rate of 3.1% of the adult population, and a lifetime prevalence rate of 5.7%, in the United States (Kessler, Chiu, Demler, & Walters, 2005b; Kessler et al., 2005a). GAD is distinguished by excessive anxiety and worry about various different activities or events (American Psychiatric Association, 2013). These feelings of anxiety and worry are difficult to control and are often associated with various different physiological symptoms and arousal. Furthermore, those with GAD report being a burden to others, having poorer health, poor sleep habits, and higher perceptions of stress (Kertz & Woodruff-Borden, 2011). Despite being the most prevalent anxiety disorder, GAD has been relatively underdiagnosed and undertreated (Osman-Hicks, Potokar, & Nutt, 2012), and for those that do receive treatment for GAD, studies have found that treatment response is lower when compared to other anxiety disorders (Borkovec, & Ruscio, 2001).

To address this problem, a significant amount of research on GAD has been focused on uncovering the underlying mechanisms that cause and maintain this disorder, including its prominent component, worry. Two major theories that have been developed to identify these underlying mechanisms are the Intolerance of Uncertainty model (IUM; Dugas, Gagnon, Ladouceur, & Freeston, 1998b) and the Contrast Avoidance model (CAM; Newman & Llera, 2011). The IUM posits that those who have GAD are likely to perceive uncertain situations as highly anxiety provoking and worrisome (Dugas et al., 1998b). The CAM theorizes that those who have GAD experience heightened emotion dysregulation and fear the emotional shifts that follow negative events; therefore they

maintain an ongoing state of emotional negativity (through chronic worry) to lessen the impact of such shifts (Newman & Llera, 2011). Newman and Llera (2011) theorized a link between these models, positing that those with GAD may find uncertain situations anxiety-provoking due to the potential for negative emotional shifts. While both theories have been empirically supported individually, there has never been a study that examined the relationship between these two ideas, despite this potential link.

An additional and related area of concern for individuals with GAD is the fear of change. Given the above mentioned conceptual theories regarding the mechanisms of GAD, it follows that individuals who experience emotional dysregulation and are uncomfortable in uncertain circumstances may also perceive life changes as inherently stressful and anxiety provoking. This could potentially exacerbate existing functional difficulties if these individuals are avoiding making important life changes. However, this concept has yet to be tested experimentally in the context of GAD.

The purpose of the present study is to explore the link between the IUM and CAM in relation to GAD, and to fill the gap in research on fear of change. This paper will present and discuss the research on IU and CA models of GAD, arguing for conceptual links between the two theories. It will then seek to explore a new topic in the GAD literature called fear of change. This paper will then present a research procedure which will not only study how the CAM, IUM, and GAD all relate to one another, but will also examine for the first time their relationship with the new topic, fear of change.

### **Intolerance of Uncertainty and GAD**

An important theory to emerge from the literature on GAD is that of IU. The theory of IU posits that uncertainty is highly anxiety provoking for those who have GAD

(Dugas et al., 1998b). Situations with high levels of uncertainty are those in which the outcome is hard to predict, but could potentially be negative. An example would be receiving a note from your boss saying he or she needs to speak with you urgently. It may be difficult to predict what your boss will want to discuss, but there is the potential for it to be something negative. Being high on IU (that is, fearing uncertain situations) influences how a person perceives and responds to these situations, playing a role on an emotional, cognitive, and behavioral level (Dugas et al., 2005; Dugas et al., 1998b). Emotionally, those who are high in IU find uncertain situations to be stressful and upsetting, causing them to experience negative emotions (Buhr & Dugas 2002, Dugas et al., 2005). Cognitively, they perceive the situations that are uncertain as negative and unfair, believing it is unfair that they cannot control nor accurately predict the outcome of such situations (Sexton & Dugas, 2009). This in turn causes a variety of maladaptive behaviors such as avoidance of uncertain situations, worrying in response to the unknown, and engaging in catastrophizing of unknown outcomes (Carleton et al., 2012, Dugas et al., 2005).

As uncertainty is present to some extent in most, if not all, situations pertaining to the future, it is an aspect of everyday life (Carleton et al., 2012). This means that those who are high in IU will have negative reactions to their environment on a frequent basis (Buhr & Dugas 2006). Research suggests that being high in IU can inhibit performance, both due to the experience of excessive anxiety in relation to the uncertainty of the outcome, as well as the uncertainty of how one is being perceived (Robinson, & Freeston, 2015; Thibodeau, Carleton, Gómez-Pérez, & Asmundson, 2013). Research supported a relationship between IU and performance anxiety in a sport setting (Robinson, &

Freeston, 2015); though it did not look at actual performance. However, a different research study did find a relationship between IU and impaired performance (Thibodeau et al., 2013). To examine this link, the study looked at the effects of IU on behavior by assessing typing speed. The researchers found that those high in IU, independent of other physiological or psychological factors, showed slower typing speeds. The researchers posit that this is due to either catastrophic thinking or belief in negative appraisals relating to typing errors (Thibodeau et al., 2013). It is possible that such findings may extend to other kinds of functioning as well, but research in this area is minimal thus far.

Importantly, studies supporting the IUM have shown that IU plays a fundamental role in GAD (Carleton, Sharpe, & Asmundson, 2007; Carleton et al., 2012; Koerner, Mejia, & Kusec, 2017; Miranda, Fontes, & Marroquín, 2008), such that those who reported GAD symptoms, particularly worry, also reported high IU. In both clinical and natural settings, IU has been shown to discriminate between those with GAD symptoms and those who show no symptoms (Dugas et al., 1998b; Khawaja, McMahon, & Strodl, 2011; Koerner et al., 2017), as well as between groups of high and low worriers (Kirschner, Hilbert, Hoyer, Lueken, & Beesdo-Baum, 2016).

Due to the strong relationship between IU and GAD, and particularly in regards to worry, it would stand to reason that IU would have a similar relationship with the physiological arousal that is also associated with GAD and worry. One such physiological response is heart rate variability (HRV), which is the oscillations in the variations between consecutive heart beats, and is purported to be a marker of parasympathetic nervous system (PNS) activity levels. It has been found that those with

elevated levels of worry, as well as those diagnosed with GAD, typically have a decreased frequency in HRV, suggesting lower PNS activity and correspondingly higher levels of resting arousal (e.g., Appelhans & Luecken, 2006; Brosschot, Gerin, & Thayer, 2006; Levine et al., 2016; Verkuil et al., 2016). Similarly, research has shown that IU is also related to reduced frequency in HRV (Deschênes, Dugas, & Gouin, 2016). The presence of this physiological state of high resting arousal in both IU and GAD further supports IU as a fundamental mechanism in GAD.

### **Intolerance of Uncertainty and Ambiguity**

Another important and theoretically related concept that must be identified is ambiguity. An ambiguous situation has been defined as an event that is novel, complex, unpredictable, and uncertain (Bhushan & Amal, 1986). This definition of ambiguity was developed from the concept of tolerance of ambiguity established by Frenkel-Brunswik (1949). Since then, intolerance of ambiguity (IA) has been defined by the notion that some individuals interpret ambiguous situations as being threatening and a source of discomfort (Budner, 1962). These situations illicit worry, increased anxiety, and on occasion avoidance of the ambiguous situation (Bhushan & Amal, 1986).

It is important to note that uncertainty and ambiguity, while conceptually similar, are in fact considered to be different ideas. The key difference between these concepts is that ambiguity is in reference to the ambiguous elements of a *present* situation or moment, whereas uncertainty is concerned more with the uncertainty of the *future* (Grenier, Barrette, & Ladouceur 2005; Rosen, Ivanova, & Knauper, 2014). To put it simply, the main aspect of an ambiguous situation is that the person cannot determine how to interpret the situation due to the novel, vague, or complex nature of what is taking

place in the moment. Therefore, they cannot determine how to respond appropriately to such a situation. In contrast, an uncertain situation is a *future* event or situation where the person can neither predict nor control the outcome of said situation.

Although it is important to recognize the distinctions between uncertainty and ambiguity as concepts, researchers have also found substantial overlap and similarities in terms of how individuals respond to both types of situations (Buhr & Dugas, 2006). For instance, research found that those who were high in IU were more likely to perceive both uncertain and ambiguous situations as threatening (Chen & Lovibond, 2016). Interestingly, the same research found that those who were high on IU perceived the ambiguous situations as significantly more threatening than the uncertain situation (Chen & Lovibond, 2016). This implies that those who are high in IU are intolerant of both uncertainty and ambiguity due to their closely related nature, but that perhaps ambiguity is more threatening due to its immediacy.

Similar to IU, IA also shares a relationship with GAD symptoms and anxiety (Grey & Mathews, 2000; Hartley & Phelps, 2012). For example, a study found that those who were high on IU were more likely to experience high levels of worry in ambiguous situations when compared to both situations that were unambiguously positive and situations that were unpredictable but positive, or in other words, situations that would be a positive surprise (Byrne, Hunt, & Chang, 2015). They were also likely to experience higher anxiety in unpredictable positive situations, when compared to certain positive situations (Byrne et al., 2015). Further, when differentiating between those with and without GAD symptoms, research has shown that there is a relationship with IU,

ambiguity, and worry (Kirschner et al., 2016). It was demonstrated that those in a high worry group perceived ambiguous stimuli as more threatening than the low worry group.

One way to understand both IU and IA is through overgeneralization of threat, which is a highly-studied area in the anxiety literature (Lissek et al., 2014).

Overgeneralization is an important area of research that has been found to play a role in how those with GAD perceive situations that are similar to previously experienced threatening situations (Lissek et al., 2014). For example, a person with GAD will perceive certain situations and stimuli as threatening if the situation holds even minimal similarities to previously experienced threatening situations, and in turn this may cause them to avoid the situations (van Meurs, Wiggert, Wicker, & Lissek, 2014). This avoidance behavior has been shown to occur in GAD populations as well as those low on anxiety; however, researchers theorize that those who are anxious will be more likely to continue to overgeneralize and enact avoidance behaviors over time (van Meurs, Wiggert et al., 2014). In support of this idea, treatment that should otherwise work to remove a conditioned response was less likely to work with those who had high anxiety and GAD. In fact, it was shown that instead of removing the conditioned response, the response generalized to a new conditioned stimulus (Boddez et al., 2012). This suggests that those who have GAD are more likely to have their fears become nonspecific and overgeneralize, as compared to those with low levels of anxiety.

Several studies have examined the relationship between overgeneralization and ambiguity specifically. For example, one study examined the effects of emotionally-valenced situations on the interpretations of ambiguous situations, using an emotional priming paradigm (Grey & Mathews, 2000). They found that those who were exposed to

negative scenarios prospectively overgeneralized the negativity to the subsequent ambiguous situations. This may have implications for GAD, in that GAD is associated with increased focus on negative options and the likelihood of interpreting an ambiguous situation as potentially negative (Hartley & Phelps, 2012). In such situations, the person is already primed for negative interpretations, and may therefore be generalizing a negative focus onto a situation that was initially neutral. This suggests that those with GAD perceive ambiguous situations as more threatening and anxiety provoking because they are overgeneralizing threat to the ambiguous situations.

In sum, these studies suggest that those who are high in IU tend to overgeneralize threat to both uncertain and ambiguous situations, which may lead to worrying in response to both types of situations. Furthermore, such research could explain the negative interpretation bias seen in GAD. This supports the idea that despite their conceptual differences, ambiguity and uncertainty are overlapping constructs that may present similar vulnerabilities for those with GAD.

### **The Nature of the Future**

Research has identified a relationship between negative future expectancy bias and anxiety (Cabeleira et al., 2014; Chan & Lovibond, 1996; Miranda et al., 2008; Miranda, & Mennin, 2007; Steinman, Smyth, Bucks, MacLeod, & Teachman, 2013). Similar to studies on overgeneralization, studies on expectancy bias have shown that those who are high in trait anxiety can be primed to have a negative emotional expectancy of a future situation. For example, those with high trait anxiety who were exposed to a negative situation were likely to have a negative expectancy bias about the future, meaning they perceived future events as negative due to negative priming

(Cabeleira et al., 2014). This was in contrast to those who had low trait anxiety, as they viewed all future outcomes as more positive, no matter the valence of the preceding situation. Additionally, those who are high on anxiety seem to have a more negative outlook on future events no matter the valence of prior presented information, as compared to those with lower anxiety (Steinman et al., 2013).

These findings on future expectancy bias extend into our understanding of GAD, as those with a primary GAD diagnosis clearly demonstrate this bias. For one, they are consistently shown to be more likely to worry about the future and its uncertainty (e.g., Dugas et al., 1998a). Further, GAD is associated with expectancy of negative outcomes for the future in general (Miranda, & Mennin, 2007). Specifically, worry was correlated with the likelihood of predicting a feared outcome occurring in the near future (Bredemeier, Berenbaum, & Spielberg, 2012).

These findings could be explained by the IUM of GAD, as several studies have demonstrated this connection. One such study found that those who were high on both IU and GAD symptomatology not only reported negative future expectations, but were also certain that there would be no positive future outcomes (Miranda et al., 2008). Similarly, it was found that biases in expectations were directly related to uncertainty, such that uncertainty amplified the expectation of aversive future outcomes (Grupe & Nitschke, 2011). In sum, research suggests that it is not only anxiety that is influencing perceptions of the future, but anxiety related to the uncertainty of future outcomes, and the inability to deal with the worry and distress that go along with it.

While examining the relationship between future expectancies and the IUM, it is important to address the concept of control. It is possible to decrease the ambiguity and

uncertainty of a situation through a person's perception of their control over current events or future outcomes (Buhr & Dugas, 2006). Conversely, being unable to control an event leaves the person with a more ambiguous and uncertain environment, thus increasing state anxiety. This idea might explain why those who perceive ambiguous and uncertain situations as negative would also have a negative future expectancy bias, as they would believe that they are unable to control the outcome. Hartley (2014) and colleagues demonstrated that negative or fearful situations that were not controllable tended to cause an increase in fear when reintroduced later, as well as a lack of fear extinction, when compared to situations that were controllable or escapable. Similarly, those who believe that uncertainty is unavoidable, and therefore uncontrollable, experience an increase in anxiety (Anderson, Deschênes, & Dugas, 2016). Further, perception of control has even been shown to have an effect on actual future outcomes, such that those who perceived a past failure as uncontrollable were likely to have worse performance on future tasks (Coffee, Rees, & Haslam, 2009). This could be a result of overgeneralizing a past threat caused by an uncontrollable situation onto later uncontrollable future outcomes.

The relationship between IU, control, and future expectations has been strengthened through research showing that control has a mediating effect on IU and its relationship to worry (Ruggiero et al., 2012). Those high in IU were more likely to have increased worry when they possessed negative beliefs about control over future outcomes.

### **Contrast Avoidance Model and GAD**

An important addition to the literature on mechanisms underlying GAD symptomatology is research on the unique emotional sensitivities associated with this disorder. Past research has supported the idea that not only do those with GAD fear the experience of their own emotions, particularly anxiety, but they predict more catastrophic outcomes from their emotions when compared to control groups (Roemer, Salters, Raffa, & Orsillo, 2005; Mennin, Heimberg, Turk, & Fresco, 2005). Further, research suggests that those with GAD not only perceive their emotions to be out of control (Roemer et al., 2005; Mennin et al., 2005), but actually do demonstrate stronger physiological responding to emotional stimuli (Llera & Newman, 2010). Thus, the experience of negative outcomes may be more aversive to those with GAD due to their tendency to over-respond emotionally, and to find such responses aversive (Newman et al., 2013).

Additionally, research suggests that those with GAD use worry as an emotional coping strategy (see Borkovec, Alcaine, & Behar, 2004), and thus report positive beliefs about their worry (Hebert, Dugas, Tulloch, & Holowka, 2014). The CAM was developed in an attempt to further understand the mechanisms of worry and emotion in GAD, as well as explain why those who seem to perceive emotion and anxiety as negative would endorse their worry as a positive coping strategy (Newman & Llera, 2011).

The CAM posits that a person with GAD maintains a state of consistent worry as a protective measure against potential negative shifts in emotions that occur due to negative events (Llera & Newman, 2010; Newman & Llera, 2011; Newman, Llera, Erickson, Przeworski, & Castonguay, 2013). This was based on a large body of research suggesting that worry creates a state of sustained intrapersonal negativity, which has been

demonstrated subjectively (Llera & Newman, 2010; 2014; Oathes et al., 2008; McLaughlin, Borkovec, & Sibrava, 2007), physiologically (Brosschot et al., 2006; Llera & Newman, 2010; Ottaviani et al., 2016a), and neurologically (Andreescu et al., 2015; Mohlman, Eldreth, Price, Staples, & Hanson, 2017; Ottaviani et al., 2016b). Further, the CAM proposes that individuals with GAD would prefer to experience a consistent state of negativity, because they feel this protects them from being surprised by a negative event and experiencing a sharp change in their emotional state (i.e., a negative emotional contrast). This allows them to feel more emotionally prepared for possible negative events, rather than being emotionally surprised and/or disappointed.

Based on experimental findings (Llera & Newman, 2010; 2014), the CAM states that worry leads to avoiding the emotional contrast in the following way. If a person is chronically engaged in worry and experiencing the accompanying negative emotional arousal and anxiety, then when a negative event occurs they will experience less of a sharp shift into negative emotions, because they were *already* in a negative emotional state. Therefore, they will have successfully avoided a negative emotional contrast, which negatively reinforces the worry. On the other hand, when something positive occurs there is momentary relief, allowing them to be pleasantly surprised. This outcome would be a positive reinforcement for worry. In sum, maintaining a continuous state of worry is reinforcing for those high in CA, no matter the outcome.

The research supporting this theory found that those with GAD who were manipulated to experience worry and arousal prior to a fearful exposure had no change in negative emotional experience or physiological arousal during the fear situation, and that the emotional experience was in fact sustained (Kim & Newman, 2016; Llera &

Newman, 2010; 2014). This suggests that the worry helped participants to avoid a sharp negative emotional contrast. In addition, the GAD group reported that prior worry was helpful in coping with the negative exposures, whereas those in the control group perceived the worry to be unhelpful. This supports the idea that those with GAD maintain a chronic state of worry in part to avoid a sharp contrast in negative emotion if something bad were to happen, but that worry would not be emotionally reinforcing in those without GAD.

Research conducted outside of the laboratory is in line with these findings. For example, a subclinical GAD group was examined using ecological momentary assessment (EMA) over an 8-week period (Crouch, Lewis, Erickson, & Newman, 2016). Supporting the CAM, it was shown that those who were high in GAD symptoms endorsed that situations high in negative emotional contrast were the worst and most stressful type of event experienced on a weekly basis. These high negative contrast situations predicted negative emotions, as well as increased arousal for those with GAD symptoms. This supports the idea that those with GAD are sensitive to contrast experiences in their daily lives. Further, data showed that worry moderated this relationship, leading to reduced negative emotion following contrast experiences (Crouch et al, 2016). Further, several clinical case studies were presented to identify how the CAM would help to understand GAD symptoms in a clinical setting (Newman, Llera, Erickson, & Przeworski, 2014). In these cases, it was demonstrated that clients were using their worry as a defensive strategy to protect them from the negative emotional contrast in their lives. Overall, findings suggest that maintaining a state of worry may be

a defensive mechanism used by those with GAD to halt the effects of aversive emotional shifts by preventing them from taking place.

Importantly, while research for the CAM to date has generally been supportive of the theory, it is still a relatively new concept that should continue to be explored. For example, despite the recent research that has been built on the CAM, it has not yet been examined in relation to the IUM, although links have been identified (Newman & Llera, 2011).

### **The Link Between Contrast Avoidance and Intolerance of Uncertainty**

As detailed earlier in this paper, those high in both IU and GAD symptoms tend to predict negative outcomes for situations that are uncertain or ambiguous. These situations then cause distress, worry, and anxiety. Newman and Llera (2011) posited that CA could be the reason for the stress and worry experienced in response to situations that are uncertain or ambiguous. This hypothesis is based on the fact that the uncertain situations leave room for a possible negative emotional shift, and those high in IU may engage in worry because they are attempting to protect themselves from the experience of a negative emotional contrast in the event that the outcome is negative. Specifically, those high in IU may hold themselves in a state of worry because they would rather maintain a constant negative state at all times rather than have to deal with a potential downward shift in their emotions (Newman & Llera, 2011).

Buhr and Dugas (2006) theorized that those with IU are constantly experiencing negative emotions due to the uncertainty that is found in most situations (Carleton et al., 2012). They believed this was due to the uncertainty of the situation; however, the CAM might be a better explanation for such a response. Specifically, if most situations hold a

level of uncertainty over their outcomes, and therefore also the possibility of an emotional shift, individuals with GAD may maintain a negative state of worry as protection against the distress caused by a potential shift. Further, it is likely that CA can more comprehensively elucidate the fact that those high in IU are more likely to overgeneralize negative expectations to ambiguous and uncertain situations (e.g., Chen & Lovibond, 2016; Kirschner et al., 2016). Specifically, those who engage in CA are preparing for a negative shift due to the expectation that a negative shift is the perceived most likely outcome.

The final conceptual link between these models is the idea of control. Those who are high in IU experience more anxiety in situations that they cannot control (Buhr & Dugas, 2006; Ruggiero et al., 2012). A negative outcome is neither fully controllable nor predictable; however, maintaining a chronic state of worry might be an effort to achieve some form of control amidst an uncontrollable situation. While creating a consistent state of worry, these individuals have at least gained some sense of control over whether or not they experience a negative emotional shift. Although the relationship between these ideas is still untested, there is substantial evidence to suggest that these ideas might in fact be related.

### **Fear of Change: A New Concept**

Despite the substantial body of literature on fear of uncertainty in GAD, the concept of fear of change has thus far been neglected in research on GAD. Although there are clear conceptual connections between uncertainty and change, no studies have yet examined this construct empirically in the literature on IU, GAD, or CA. This paper posits that a defining factor of all life changes, whether perceived as negative, positive, or

neutral, is that the outcome is inherently unpredictable and uncertain. Similarly, this paper suggests that change is also inherently ambiguous, such that in the present moment the potential change is novel, complex, or vague in nature. Further, it is posited that change holds a level of uncontrollability, implying that the outcome of the change might not be fully in a person's control despite their best efforts. Specifically, allowing change to take place necessitates a relinquishing of some amount of control over the outcome. Finally, this paper suggests that change might imply an inherent possibility of an emotional shift. Because change is uncertain, uncontrollable, and ambiguous, the direction of the emotional shift is unpredictable.

It is suggested that the act of making a specific change might in fact be highly anxiety provoking, and thus potentially inhibiting for those with GAD, even if said change is purportedly positive. This paper also suggests that due to the nature of change, those with GAD would have a hard time seeing positive change as positive due to the negative expectancy bias that is characteristic of GAD (Miranda et al., 2008). Furthermore, due to the fact that the nature of change is uncertain, ambiguous, uncontrollable, and elicits the potential for an emotional shift, it is posited that it will be a source of anxiety and worry for those who are a) high in GAD symptoms, b) high in IU, and c) high in CA tendencies.

### **Current Study**

There are two main purposes to this study. The first was to look for the first time at the relationship between IU and CA, and explore their combined association with GAD in a single study. The second purpose was to examine fear of change in relation to GAD, IU, and CA.

The current study used a within-subject design to explore these relationships. This study used vignettes designed to represent positive, negative, and neutral scenarios involving realistic life changes, expanding upon the design of Byrne and colleagues (2015). Further, this study looked at the interaction of IU, CA tendencies, and GAD symptoms in the context of these varied change scenarios.

### **Hypotheses**

There are four hypotheses for this study. The first is that CA tendencies will be a predictor of high IU and high GAD symptoms (e.g., excessive and uncontrollable worry). The second is that those participants who are high on CA, IU, trait worry, and GAD symptoms will be more likely to perceive positive and neutral change scenarios as more negative and anxiety provoking, when compared to those who are lower on these traits. The third hypothesis is that all participants will perceive negative change as emotionally negative and anxiety provoking, but those who are high on CA, IU, and GAD symptomatology will perceive it as significantly more negative and anxiety provoking than those who are low on these traits. Finally, the last hypothesis is that those subjects high on CA, IU, and GAD symptomatology will experience an increased in their levels of subjective distress across the duration of the study, following repeated exposure to hypothetical situations involving uncertainty and change.

## **Method**

### **Participants**

A total of 153 participants were recruited from the Towson University undergraduate population. Of those 153, one participant's data was dropped as they did not complete the experimental portion of the study. The final sample of 152 participants

was made up of 101 females (66.4%), 49 males (32.2%), and 2 who listed “other” or preferred not to respond (1.4%). The ages ranged from 18 to 33 years with a mean age of 20.06 (SD = 2.23). All participants were asked to indicate their year of college: 65 were Freshmen (42.8%), 37 were Sophomores (24.3%), 21 were Juniors (13.8%), and 29 were Seniors (19.2%). This relatively diverse sample was made up of 83 participants who identified as “white or Caucasian” (54.6%), 35 as “black or African American” (23.0%), 14 as “Asian or Pacific Islander” (9.2%), 11 as “Hispanic or Latino” (7.2%), and 9 who indicated “other” (5.9%).

### **Measures**

**Worry measure.** The Penn State Worry Questionnaire (PSWQ) is a 16 item self-report scale that assesses worry as it relates to its intensity and frequency. It utilizes a 5-pt-Likert scale, where 1 is “not at all” and 5 is “very typical” (Meyer, Miller, Metzger, & Borkovec, 1990). The PSWQ has been shown to have good internal consistency ( $\alpha = .83 - .93$ ) and has been shown to discriminate between GAD and other anxiety disorders (Brown, Antony, & Barlow, 1992). (Internal consistency [ $\alpha$ ] scores for all questionnaires in the current sample are provided in Table 1.)

**GAD symptoms.** Generalized Anxiety Disorder Questionnaire (GAD-Q-IV) is a nine item self-report scale that assesses DSM-IV diagnostic criteria for GAD (Newman et al., 2002). It displays good test-retest reliability ( $r = .78$ ), convergent and discriminant validity, and good internal consistency at  $\alpha = .83$  (Rodebaugh, Holaway, & Heimberg, 2008).

**Contrast avoidance measure.** The Contrast Avoidance Questionnaires (CAQs) are a set of two questionnaires that can be used either separately or in combination. The

CAQ-Worry (CAQ-W) focuses on measuring worry to avoid emotional contrast, and the CAQ-General Emotion (CAQ-GE) measures general emotional behaviors to avoid emotional contrast (Llera & Newman, 2017). Combined they total a set of 55 items rated on a 5-point-Likert scale where 1 is “Not at all true” and 5 is “Absolutely True”. The CAQs have excellent internal consistency ( $\rho = .98 - .99$ ) and good test re-test reliability ( $r = .90 - .93$ ). They demonstrate convergent and discriminant validity for worry and perceived threat from emotional experiences, and sensation seeking, respectively (Llera & Newman, 2017). In this study, a combined total score was used as a measure of CA.

**Intolerance of uncertainty measure.** Intolerance of Uncertainty Scale (IUS) is a 27-item self-report scale where participants answer a series of questions related to IU. Items are rated on a 5-point-Likert scale, where 1 is “not at all characteristic of me” and 5 is “entirely characteristic of me” (Buhr & Dugas, 2002). The questions assess ideas about uncertainty as it is related to stress, negative perceptions, and unfairness. The scale has excellent internal consistency ( $\alpha = .94$ ) and good test-retest reliability ( $r = .74$ ). The IUS also demonstrates criterion validity with the status of GAD (Buhr & Dugas, 2002).

**Distress measure.** Subjective Unit of Distress (SUDs; Wolpe & Lazarus, 1966) is a single item scale designed to measure levels of subjective distress at any given moment in time. Scores range from 0 to 100 in increments of ten, where zero is “totally relaxed” and 100 is “highest distress/fear/anxiety/discomfort you have ever felt”.

### **Study Stimuli**

A total of 15 vignettes had been previously piloted on 25 undergraduate students at Penn State, George Mason University, and Seattle Pacific University. Each vignette described a realistic situation in which an emotional life change event occurred. Vignettes

were varied based on their intended emotional valence: the life change was either a positive, neutral, or negative event. Pilot testing was used to determine if the vignettes were (a) depicting the intended valence (positive, neutral, or negative) and (b) relatable to undergraduate students. Guided by the analysis of the data, nine vignettes were selected based upon their relatability and level of emotional valence (3 vignettes for each valence type). (See Appendix A for the full set of vignettes.)

**Measuring fear of change (FoC).** After each vignette, participants were given a newly developed scale comprised of four questions related to their level of discomfort with imagined change scenarios (the FoC Scale). Items were: (1) How much did the event described worry you? (2) How likely do you think it is that something bad would come of this event? (3) Overall how do you perceive the entire event? (Very Negative – Very Positive) (4) How willing would you be to make this change? Participants were given a 5pt Likert scale to rate each item (e.g., 1 = “very willing”, 5 = “very unwilling”).

Because this is a new scale, Cronbach’s alphas were used to determine the internal consistency of the four change questions as one scale. Scenarios were divided by valence type: positive, negative, and neutral. Internal consistency alphas ranged from  $\alpha = 0.84-0.71$ ; therefore, it was determined appropriate to combine all four questions into one scale for each valence type. (All alphas are provided in Table 1).

## **Procedure**

The current study was a within-subjects design. All participants were brought into a computer lab and, after signing an electronic consent form, filled out a battery of assessments on the computer. These assessments included a demographics questionnaire, the PSWQ, CAQs, IUS, GAD-Q-IV, and SUDs.

Once completed, the participants were then asked to read the nine different vignettes described above (see Appendix A), that were administered in a random order to control for order effects. After each vignette, they were then asked a series of questions relating to the scenario that they just read. First, they were asked the 4 questions on the FoC scale. All participants were then asked the following open-ended question: “What outcomes would you expect if you were actually in this situation?”. Finally, they were asked to complete the SUDs. This was repeated until all vignettes have been presented. Participants were then fully debriefed, and received course credit for their participation.

### **Planned Analysis**

Before running the main analyses for this study, a manipulation check for the FoC questionnaire was conducted. This was done using a between-subject’s ANOVA such that responses on item 3 from the FoC scale (“Overall how do you perceive the entire event?” [Very Negative – Very Positive]) were compared across valence types (positive, negative, and neutral) to determine if each scenario was in fact portraying the correct valence type. All further analyses using the FoC scale were divided by valence type, such that each valence type was treated as a separate variable.

To test the first hypothesis, that CA tendencies can predict IU and GAD symptoms, three regression models were used. These models included scores from the CAQ predicting scores on the IUS, GAD-Q-IV, and PSWQ. Next, the second and third hypotheses, that those high in CA tendencies, GAD symptomology, and IU will perceive all change scenarios as more negative and anxiety provoking than those lower in these traits, was tested. First a Pearson’s  $r$  was run to determine that all variables correlated with each other in the expected directions. A multiple regression was then run with the

scores on the CAQ, GAD-Q-IV, PSWQ, and IUS used as predictors of scores on the FoC scale, separated by valance type. Once the data from the regression was determined, several path models were developed in order to further explore the relationship between the variables. Model fit was examined, such that low  $\chi^2$  scores, RMSEA scores below .10, scores of .95 or higher on the CFI and the TLI, and smaller scores for AIC, were used to indicate an adequate fit of the model to the data (Geiser, 2013).

The fourth and final hypothesis stated that for those high in CA tendencies, IU, and GAD symptomology, SUDs scores would increase over the course of the study, suggesting an overall increase in distress in response to imagining life changes. First, a variable of SUDs score change was calculated by subtracting baseline SUDs scores from final scores after imagining the last change scenario. Next, a multiple linear regression was run, with CA, IU, and GAD scores as the predictors, and change in SUDs as the outcome variable.

## **Results**

### **Manipulation Check**

Supporting that change scenarios portrayed the intended valance, and were distinct from the other valances, the between-subjects ANOVA found a significant effect of valance scenarios on participant report,  $F(2, 453) = 381.15, p < .001$ , partial  $\eta^2 = 0.627$ . Bonferroni post hoc tests showed that negative scenarios ( $M = 4.23, SD = 0.70$ ) were rated as significantly more negative than were positive scenarios ( $M = 2.20, SD = 0.69, p < .001$ ), and neutral scenarios ( $M = 2.94, SD = 0.55, p < .001$ ). It also showed that positive scenarios were rated as significantly more positive than were neutral scenarios ( $p$

< .001). Thus, it was determined that the scenarios were being interpreted with the correct valance by the participants.

### **First Hypothesis**

Three linear regressions were run to determine the ability of scores on the combined CAQ to predict scores on the GAD-Q-IV, the IUS, and the PSWQ (See Figure 1). Significant regression scores supported the viability of contrast avoidance as a predictor of all three of these outcomes. The analysis found that scores on the CAQ were a significant predictor of scores on the GAD-Q-IV ( $F[1, 149] = 85.76, p < .001$ ), the IUS ( $F[1, 150] = 74.57, p < .001$ ), and the PSWQ ( $F[1, 150] = 169.30, p < .001$ ). CA scores predicted 36% of the variance in the GAD-Q-IV, 33% of the variance in the PSWQ, and 53% of the variance in the IUS. Results confirmed the first study hypothesis, that the CAQ could predict both GAD symptoms and IU tendencies.

### **Second and Third Hypotheses**

Pearson's  $r$  correlations were run to determine the relationship between the variables measured in the study. As seen in Table 1, all variables demonstrated medium to high levels of inter-correlation. However, as a result of the very high correlation between the GAD-Q-IV and the PSWQ ( $r = 0.83$ ), the PSWQ was deemed redundant and was thus removed from future analyses. This was done because 1) the GAD-Q-IV more specifically targets DSM diagnostic criteria for GAD, which was more of a focus in the current study than were worry levels alone, and 2) if both measures were included in analyses, it would detract from the overall amount of variance that could be explained by the other variables.

Three multiple regressions were run to test if the CAQ, GAD-Q-IV, and IUS could determine scores on the FoC Scale, for each of the different valence types. The overall regression models were significant for the positive, negative, and neutral scenarios, accounting for 9.2%, 30.9%, and 20.9% of the variance respectively (see Table 2). However, the t-scores for the individual predictors were nonsignificant except for three instances: IUS in the negative scenarios ( $t = 3.04, p = .003$ ), GAD-Q-IV in the negative scenarios ( $t = 2.11, p = .037$ ), and GAD-Q-IV in the neutral scenarios ( $t = 2.21, p = .029$ ). This may be understood as too many predictor variables competing for variance, which suggested the need for a more sophisticated causal model, with fewer direct predictors.

This led to the development of more focused models to explain the relationship between the variables. Two path models were explored using Mplus 7.31 (See Figures 2 & 3) (Muthén & Muthén, 1998-2015). Parameter estimates were based on maximum likelihood (ML) estimates. In Model 2, CA predicted FoC, mediated through both IU and GAD, whereas in Model 3, CA predicted FoC mediated only through IU.

In Model 2, the CAQ significantly predicted scores on the GAD-Q-IV ( $\beta = 0.61, SE = 0.05, p < .001$ ) with a partial mediation through IUS ( $\beta = 0.32, SE = 0.06, p < .001$ ), accounting for 53% of the variance in IUS and 45.6% of the variance in the GAD-Q-IV (see Table 4 for direct, indirect, and total effects). Further, GAD-Q-IV was a significant predictor of fear of positive, negative, and neutral change (see Figure 2). However, this model did not lead to an acceptable fit to the data (see Table 3).

Model 3 proved to be a more viable fit for the data based upon the fit indices (see Table 3). Again, CA was a significant predictor of IU, and IU was a significant predictor

of fear of positive, negative, and neutral change (see Figure 3). The model was able to account for 53% of the variance in IU, 28.2% of the variance in fear of negative change, 8.2% of the variance in fear of positive change, and 15.3% of the variance in fear of neutral change.

The indirect relationship of CA to FoC was fully mediated by IU. This was true for positive, negative, and neutral change scenarios (see Table 4). These findings suggest that the second and third hypotheses are partially supported, in that whereas CA, IU and GAD symptoms can all predict fear of change, there is a stronger fit to the data when CA is mediated through IU alone.

To verify that the current conceptualization of the relationships among variables was the most valid, with CA acting as the primary causal variable, two rival models were examined (see Figures 4 & 5). Both of these models used IU as the primary causal variable, such that IU and CA were reversed from their positions in the original models. The fit indices from these two rival models revealed a substantially worse fit for the data (see Table 3). Thus, it was determined that the original position of variables within the models was the best way to conceptualize the data.

#### **Fourth Hypothesis**

A multiple regression was run to test if the CAQ, GAD-IV-Q, and IUS were able to predict a change in SUDs scores, such that individuals scoring higher on these measures would experience an overall increase in their distress scores over the course of the experiment. The overall regression model was not significant, ( $F[3, 138] = 0.67, p = .571$ ) accounting for only 1.5% of the variance. Thus, the fourth hypothesis was not supportable by the data collected in this study.

## Discussion

The present study attempted to expand the current literature in support of the CAM (Llera & Newman, 2010; 2014; Newman & Llera, 2011). This was the first study to explore the relationship of CA to IU, and their combined ability to predict GAD. It also aimed to test these variables in the context of fear of change, which had yet to be explored empirically. The study held four hypotheses. The first hypothesis, that CA would predict IU and GAD symptoms, was supported via regression analyses. Results showed that CAQ scores significantly predicted scores on the IUS, the GAD-Q-IV, and the PSWQ, in a positive direction. That is, higher scores on the CAQ predicted higher scores on the other three measures, explaining a substantial amount of variance in these factors (ranging from 0.33 – 0.53).

The second and third hypotheses stated that higher levels of CA, IU, and GAD symptomology would predict perceiving a range of differently-valenced life changes as more fearful or threatening. These hypotheses were partially supported via path modeling. Whereas CA was able to significantly predict FoC for positive, negative, and neutral scenarios, results indicated that using GAD symptomatology as a mediator did not lead to an acceptable model fit. Instead, fit indices demonstrated a superior fit for the model in which CA predicted FoC mediated only by IU, with all paths being significant. This suggests that IU, in comparison to GAD, was a better direct predictor of FoC.

The fourth hypothesis stated that those who were high in CA, IU, and GAD symptoms would show an increase in subjective levels of distress over the course of the study. However, this hypothesis was not supported, as none of the variables were able to significantly predict changes in levels of distress.

As mentioned earlier, Newman and Llera (2011) originally proposed that the CAM could explain why those who are high in IU tend to engage in worry when faced with an uncertain situation. They hypothesized that the discomfort and anxiety surrounding uncertain situations for those high in IU might be driven by the underlying fear of a potential negative emotional shift if the outcome were to be negative. Thus, for individuals already anxious about emotional shifts, situations with an unpredictable outcome would trigger a CA response; that is, such individuals would shift into a negative emotional state (e.g., start worrying) in order to avoid experiencing a sudden increase in negative affect if the outcome was indeed negative.

Results from this study provide the first empirical support for this hypothesis, showing that, indeed, CA tendencies have a substantive ability to predict IU tendencies. More specifically, these results provide initial evidence for CA as an emotional self-regulatory pattern that acts as a *precursor* to IU. That is, IU may arise in an individual who already has established CA tendencies, as uncertainty would act as a cue for potential emotional shifts, thus triggering anxiety and subsequent maladaptive coping response. Although data from the current study are cross-sectional as opposed to longitudinal, and therefore cannot speak directly to temporal precedence, the best model fit to the dataset was achieved when CA was entered as the primary causal variable.

Further, although IU significantly mediated the relationship between CA and GAD, the data also point to a unique role of CA in explaining the variance in GAD symptoms outside of a pathway through IU. Specifically, there was still a significant direct effect of CA on GAD symptoms when controlling for IU levels (see Model 2). This finding indicates that CA has the ability to contribute to our understanding of GAD

beyond merely being a pathway to IU, suggesting that although the CAM is strongly related to the IUM, it also stands on its own in its ability to predict psychopathology. As the CAM is a relatively new concept, the findings from this study go a long way in establishing this model by displaying its solid relationship to IU, a well-established and studied area in anxiety research, as well as independently to the GAD literature (e.g. Carleton et al., 2007; Carleton et al., 2012; Dugas et al., 1998b). The ability of this study to demonstrate a relationship of CA to both GAD symptomatology, as well as IU, may have substantive meaning for how we conceptualize this anxiety disorder.

Moreover, because this study identified CA as the best starting point for the models, this suggests that CA may represent a broader, more basic pathological self-regulation tendency that predisposes an individual to a range of transdiagnostic outcomes (i.e., psychopathological multifinality). While IU has also been shown to have transdiagnostic properties, it displays a particularly strong relationship to GAD over other anxiety disorders and depression (Jensen, Cohen, Mennin, Fresco, & Heimberg, 2016; Mahoney, & McEvoy, 2012; Shihata, McEvoy, & Mullan, 2017); whereas CA has demonstrated some initial ability to strongly predict pathology beyond GAD. For example, a link has been identified between CA and both PTSD and obsessive-compulsive disorder (OCD) symptomatology (Tarter & Llera, 2015). Further, Llera and Newman (2017) outlined results that showed an emerging connection between CA and depression. Specifically, CA was initially posited as an explanation for the use of rumination as a maladaptive coping technique (Newman et al., 2013), and the results from a recent study indicated that the relationship between CA and depression was in fact mediated by rumination (Llera et al., 2016). These results suggest that CA tendencies can

result in the avoidance of a negative shift by using rumination as a strategy to maintain negative affect, potentially leading to the development of depression. While the findings of these studies are preliminary and require replication, they suggest that CA might be a broader pathological risk factor for a variety of negative outcomes.

In further support of conceptualizing CA tendencies as a basic pathological self-regulation tendency, two additional lines of research have theorized the origins of CA tendencies. The first theory stemmed from the established relationship between personality traits and pathology, most specifically neuroticism. Neuroticism has been shown to predict functional difficulties, worry, and rumination, while also being strongly related to a heightened risk of developing depression and anxiety symptoms (Aldinger et al., 2014; Hong, 2010; Muris et al., 2005; Vall et al., 2015). Stemming from the past research on neuroticism, and CA's relationship to anxiety and worry, it was hypothesized that CA tendencies are driven by personality traits, particularly neuroticism, and preliminary research has supported a strong relationship between the two (Cordial & Llera, in preparation). It could thus be suggested that those who show high neuroticism and high trait negative affect, might be more likely to develop CA tendencies. This could then result in the development of maladaptive coping strategies (e.g. worry or rumination) that then maintain various psychopathological outcomes (e.g. depression or anxiety).

Further, it was theorized that CA stems from basic emotion regulation tendencies. Because people learn and develop emotion regulation strategies at a young age, contrast avoidance regulation patterns may have their origin within the attachment process (Newman et al., 2013). Preliminary findings also support this hypothesis, in that CA

tendencies acted as a mediator between both anxious and avoidant attachment style and anxious and depressive symptoms (Jamil & Llera, 2015; Llera et al., 2016). The findings support the idea that if a person has a number of negative experiences early in life, and fails to develop sufficient emotional coping strategies, they may develop a strong negative association with unanticipated emotional shifts.

Adding these lines of thought to findings from the current study, it can be further posited that a person with these personality and attachment-based emotional vulnerabilities may then link their fear of emotional shifts to a fear of uncertain future outcomes. Thus, the detection of an uncertain future outcome would feel threatening, triggering the activation of a CA response (i.e., begin to worry, ruminate, or possibly engage in other symptomatic attempts at coping via the generation of interpersonal negativity). As these preliminary findings and the current study suggest, CA may be a basic building block which could have clinical multifinality based in numerous maladaptive coping strategies, including IU.

Further, it was found in this study that CA predicted FoC, a relationship which was fully mediated through IU (see Model 3). These results indicate a clear relationship between FoC and IU, which supports a main hypothesis of this study that uncertainty plays a key role across a broad spectrum of life changes. Specifically, higher levels of IU were predictive of more fear of positive, negative, and neutral life changes. As such, those who fear and avoid negative emotional contrasts might in turn develop an intolerance for uncertain situations as they pose a potential emotional shift. Given this, those high in CA and subsequently high in IU might be predisposed to develop a fear of change, as life changes embody both uncertainty and a potential negative emotional shift.

Stemming from the relationship explained above, it could be anticipated that FoC would therefore have a strong relationship to GAD stemming from the connection between IU, CA, and GAD (Jensen et al., 2016; Mahoney, & McEvoy, 2012; Shihata et al., 2017). However, this is not what was found in the current study. The model in which GAD directly predicted FoC did not provide an adequate fit to the data, suggesting that GAD itself is not a good direct predictor of FoC. These results could imply that, because IU and FoC are closely related, FoC may be better able to predict GAD, rather than the other way around. Additionally, as the research has found that IU has a predictive relationship across various anxiety disorders (e.g. GAD, social anxiety disorder, panic disorder, and OCD) (Shihata et al., 2017), it is also possible that the relationship between FoC and anxiety would be stronger in these other disorders over GAD. These potential explanations foster the need for further research to determine the extent of the relationship between anxiety, IU, and FoC, and how this might relate back to CA tendencies.

Finally, this study showed that change in distress levels across the study was not predicted using the other variables. That is, regardless of participants' initial CA, IU, or GAD levels, this had no effect on their likelihood to report increases in stress levels after reading through the various change scenarios. It is believed, however, that this failure to find a significant change might be due to the setup of the study and in what order the valanced scenarios were first introduced. In addition, it is possible that the different change scenarios may have been interpreted as less distressing than anticipated. Perhaps having a sample of participants with clinical levels of GAD would have led to stronger experiences of distress in response to hypothetical change. The various explanations

above call for more research in this area, as the current results might not accurately explain the relationship between FoC and distress.

As this was the first study to have examined the relationship of IU and CA, new questions have arisen about the relationship between these variables based on the current findings. Further research should be done to determine the extent to which CA is a potential basic self-regulatory tendency, and therefore a precursor to a range of psychological disorders. Additionally, research should be conducted to compare both IU and CA in terms of temporal precedence, in order to further explore the idea of CA as a more basic pathological tendency and potential precursor to IU. This would help establish more thoroughly the relationship between IU and CA, and solidify what unique information the CAM can provide us in our understanding of the development and maintenance of various pathological outcomes.

Further, as a result of the current dearth in the literature of studies exploring fear of change, this study provides a promising new area for future research in the realm of anxiety as well as emotional sensitivities related to change (i.e., contrast, uncertainty). Specifically, future research could focus on the topics of change and control. For example, all scenarios presented were situations in which the participant did not have the ability to avoid making the presented change. Past research shows that those with anxiety and worry have a tendency to engage in behaviors that allow them to avoid anxiety provoking situations (Lebowitz et al., 2015; Mahoney et al., 2016; Reiss, 1991; Reiss, Peterson, Gursky, & McNally, 1986). As such, one might hypothesize that those who fear change, if given the choice, would not make the change, driven by the desire to avoid the anxiety that comes with it. Additionally, as FoC is a new concept, and given that this

study was unable to provide support for a strong relationship with GAD, it would be prudent to look at the relationship between FoC and other anxiety disorders and symptoms. Further, it might be pertinent to examine change in relation to depression symptomology, particularly as this study showed a relationship from FoC to CA and IU, both of which have been shown, at least preliminarily, to predict depression and rumination.

In summary, this study aimed to further the literature on CAM and explore its relationship to other theories, such as IU. Furthermore, it sought to introduce and support the new idea of fear of change and identify how it relates to the anxiety literature. This study, for the first time, established a link between the CAM and IUM, and suggests that CA is in fact a precursor to IU. Beyond this, it solidified the CAM's ability to contribute uniquely to both GAD symptomology and IU, independent from one another. Finally, the current study has also established, for the first time in the literature, a relationship between CA, IU, and the novel idea of FoC, which has opened the door and laid the ground work for further research into this concept.

**Table 1.** *Correlations, alphas, means, and standard deviations for measures.*

|                    | 1            | 2            | 3            | 4            | 5            | 6            | 7            |
|--------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| 1. GAD-Q-IV        | <b>0.860</b> |              |              |              |              |              |              |
| 2. PSWQ            | 0.828**      | <b>0.934</b> |              |              |              |              |              |
| 3. CAQ             | 0.604**      | 0.576**      | <b>0.968</b> |              |              |              |              |
| 4. IUS             | 0.647**      | 0.711**      | 0.728**      | <b>0.955</b> |              |              |              |
| 5. Positive Change | 0.252*       | 0.261*       | 0.249*       | 0.286**      | <b>0.844</b> |              |              |
| 6. Negative Change | 0.461**      | 0.470**      | 0.426**      | 0.531**      | 0.304**      | <b>0.706</b> |              |
| 7. Neutral Change  | 0.405**      | 0.390**      | 0.402**      | 0.391**      | 0.483**      | 0.374**      | <b>0.769</b> |
| Means              | 5.26         | 51.59        | 122.94       | 66.03        | 2.52         | 3.73         | 2.10         |
| Standard Deviation | 3.58         | 13.45        | 37.63        | 23.05        | 0.66         | 0.60         | 0.56         |

Note. \* =  $p < .01$ ; \*\* =  $p < .001$ .

Cronbach's alphas are listed on the diagonal in bold.

GAD-Q-IV: Generalized Anxiety Disorder Questionnaire IV; PSWQ: Penn State Worry Questionnaire; CAQ: Contrast Avoidance Questionnaire; IUS: Intolerance of Uncertainty Scale.

**Table 2.** *Regression statistics for positive, negative, and neutral change predicted by the CAQ, the GAD-Q-IV, and the IUS.*

|                 | <i>F</i> | <i>df</i> | <i>p</i> | <i>R</i> <sup>2</sup> |
|-----------------|----------|-----------|----------|-----------------------|
| Positive Change | 4.87     | 3, 147    | .003     | 0.09                  |
| Negative Change | 21.66    | 3, 147    | < .001   | 0.31                  |
| Neutral Change  | 12.82    | 3, 147    | < .001   | 0.21                  |

Note. GAD-Q-IV: Generalized Anxiety Disorder Questionnaire IV; CAQ: Contrast Avoidance Questionnaire; IUS: Intolerance of Uncertainty Scale.

**Table 3.** *Fit indices for models*

| Model                     | $\chi^2$ | df | RMSEA  | CFI   | TLI   | AIC     |
|---------------------------|----------|----|--------|-------|-------|---------|
| Model 2: With GAD-Q-IV    | 24.57**  | 6  | 0.143* | 0.944 | 0.860 | 2743.20 |
| Rival Model 2             | 24.57**  | 6  | 0.143* | 0.944 | 0.860 | 2892.20 |
| Model 3: Without GAD-Q-IV | 5.61     | 3  | 0.078  | 0.989 | 0.983 | 2003.77 |
| Rival Model 3             | 22.09**  | 3  | 0.205* | 0.920 | 0.732 | 2169.24 |

Note. \* =  $p < .01$ ; \*\* =  $p < .001$

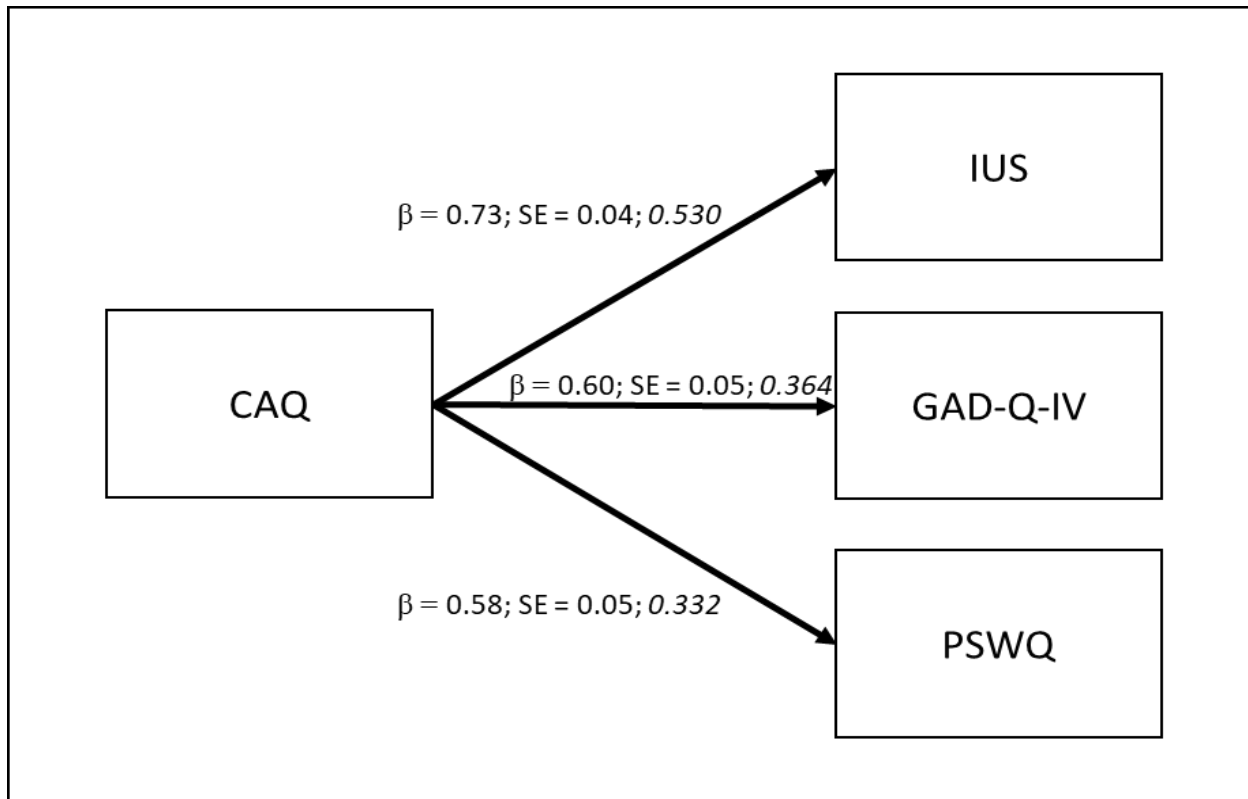
GAD-Q: Generalized Anxiety Disorder Questionnaire IV

**Table 4.** *Indirect and Direct Effects for Model 2 and Model 3*

| Variables    | Model 2          |              |      |                |              |      |
|--------------|------------------|--------------|------|----------------|--------------|------|
|              | Indirect $\beta$ | (95 % CI)    | S.E. | Direct $\beta$ | (95% CI)     | S.E. |
| GAD-Q-IV     | 0.32**           | (0.20, 0.45) | 5.00 | 0.28**         | (0.12, 0.45) | 3.31 |
|              | Model 2          |              |      | Model 3        |              |      |
|              | $\beta$          | (95 % CI)    | S.E. | $\beta$        | (95% CI)     | S.E. |
| Positive FoC | 0.11*            | (0.03, 0.19) | 2.79 | 0.21**         | (0.10, 0.32) | 3.69 |
| Negative FoC | 0.20**           | (0.11, 0.30) | 4.17 | 0.39**         | (0.29, 0.49) | 7.68 |
| Neutral FoC  | 0.18**           | (0.09, 0.27) | 3.88 | 0.28**         | (0.18, 0.39) | 5.25 |

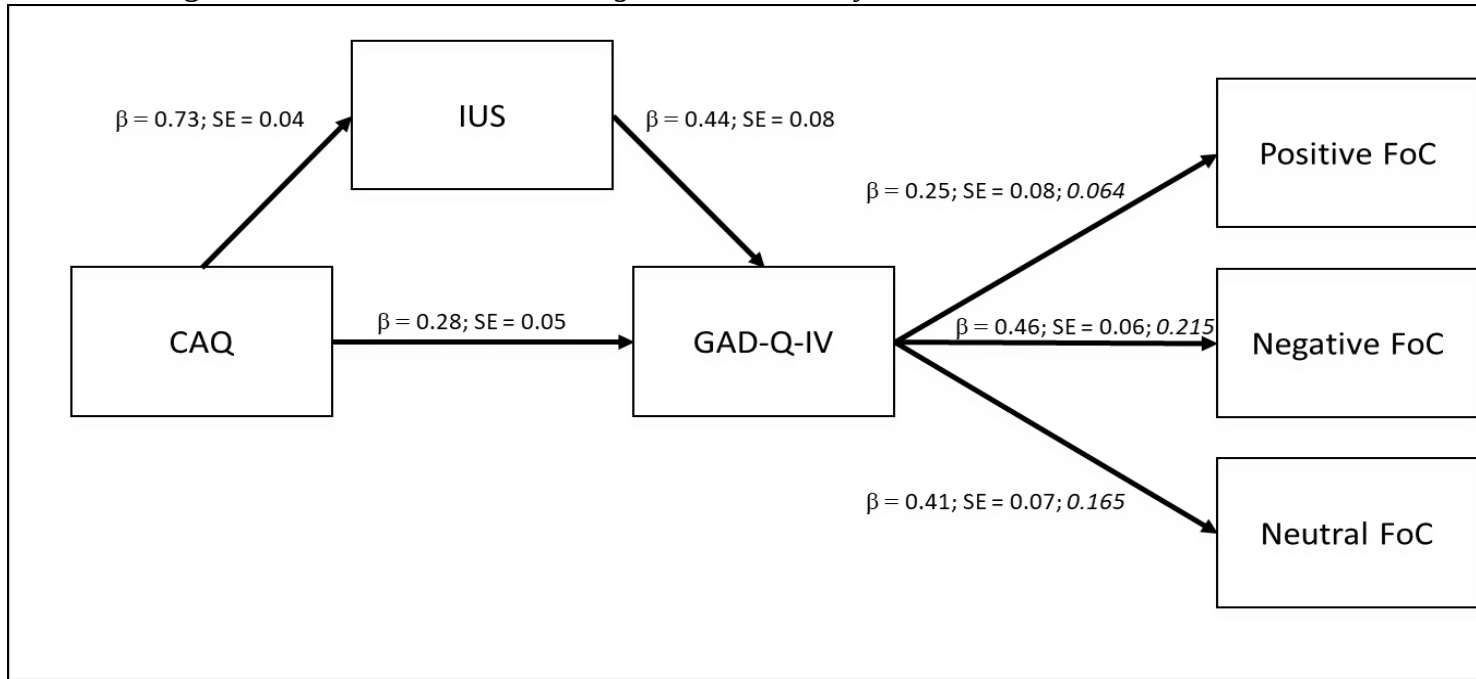
Note. \* =  $p < .01$  \*\* $p < .001$ ;

GAD-Q-IV: Generalized Anxiety Disorder Questionnaire IV; FoC: Fear of Change

**Figure 1.** *Model 1 –CAQ Predicting IUS, GAD-Q-IV and PSWQ*

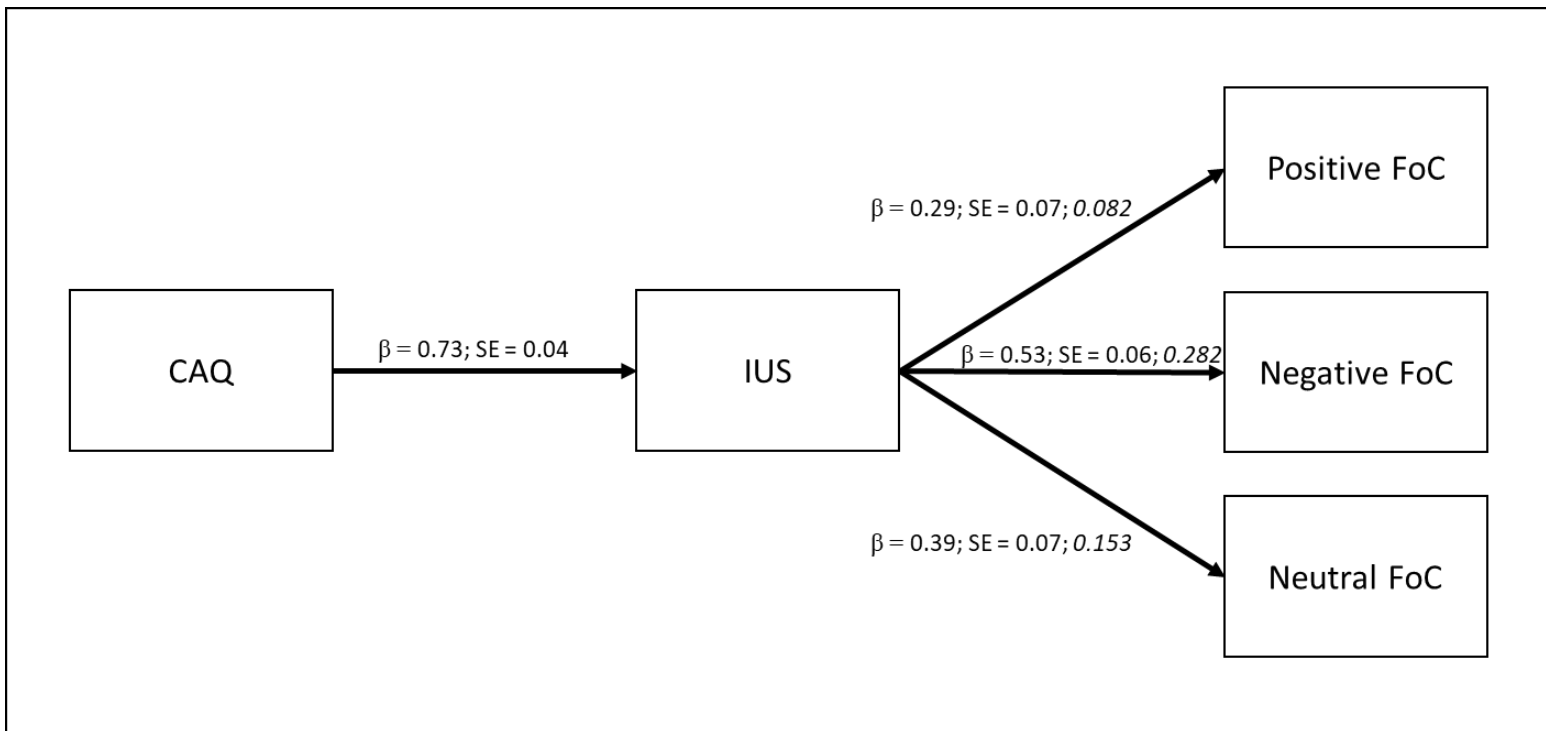
Note. Standardized betas significant at  $p < .01$ . Italics signify amount of variance explained.

CAQ = Contrast Avoidance Questionnaire; IUS = Intolerance of Uncertainty Scale; GAD-Q-IV = Generalized Anxiety Disorder Questionnaire IV.

**Figure 2.** *Model 2 – CAQ Predicting FoC, Mediated by IUS and GAD-Q-IV*

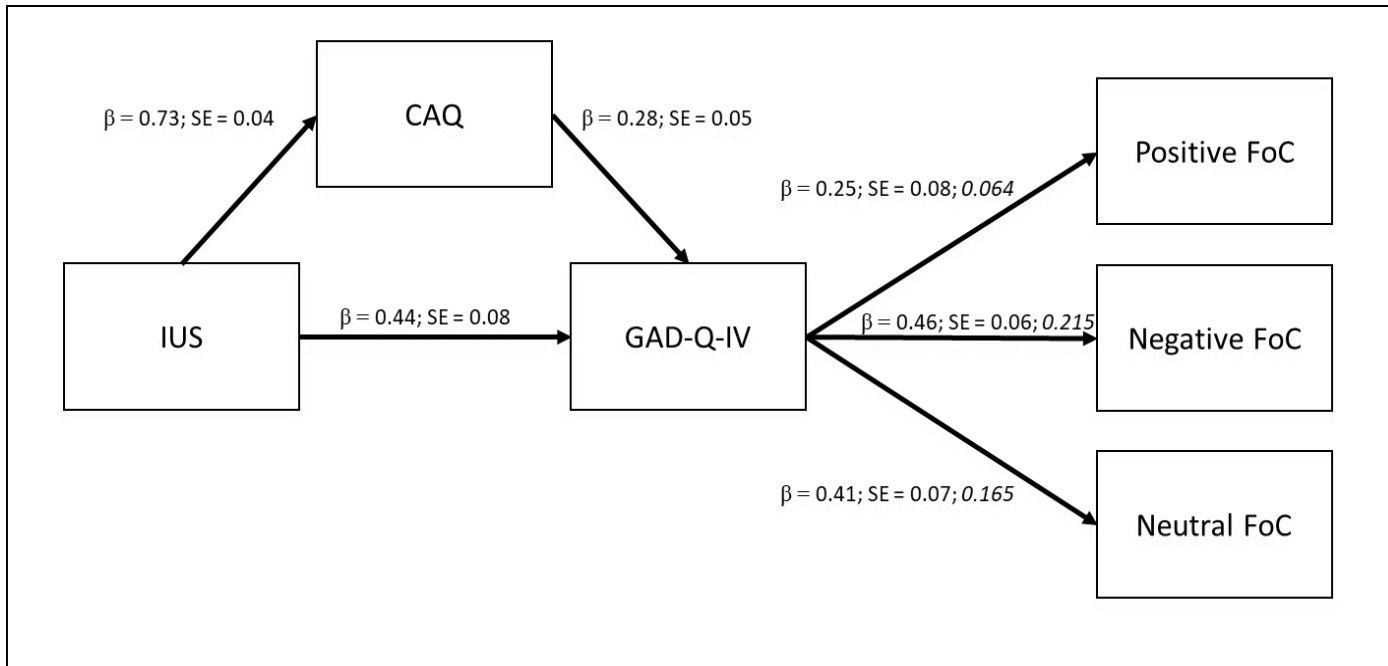
Note. Standardized betas significant at  $p < .01$ . Italics signify amount of variance explained.

CAQ = Contrast Avoidance Questionnaire; IUS = Intolerance of Uncertainty Scale; GAD-Q-IV = Generalized Anxiety Disorder Questionnaire IV; FoC = Fear of Change.

**Figure 3.** *Model 3 – CAQ Predicting FoC, Mediated by IUS*

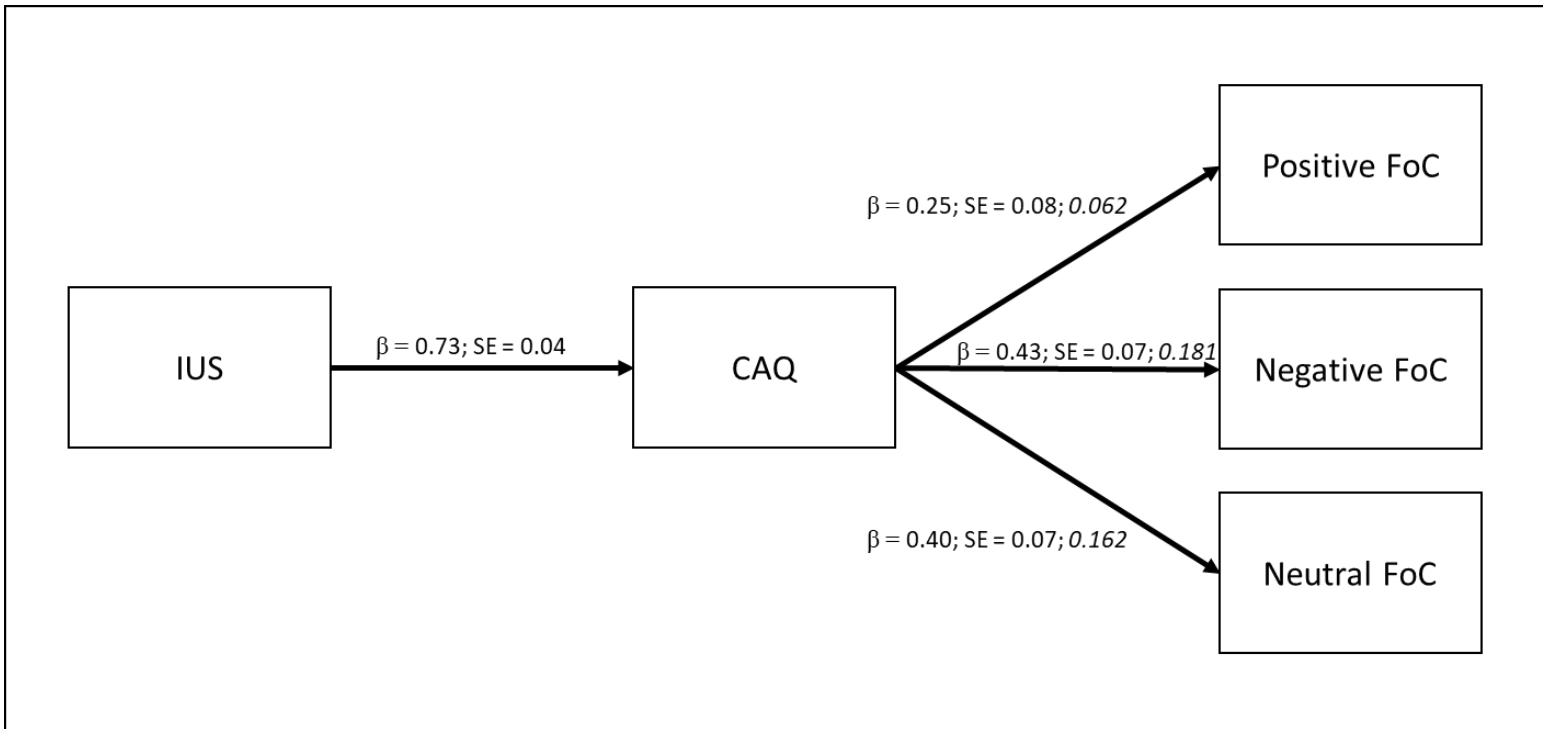
Note. Standardized betas significant at  $p < .01$ . Italics signify amount of variance explained.

CAQ = Contrast Avoidance Questionnaire; IUS = Intolerance of Uncertainty Scale; FoC = Fear of Change.

**Figure 4.** *Rival Model 2 – IUS Predicting FoC, Mediated by CAQ and GAD-Q-IV*

Note. Standardized betas significant at  $p < .01$ . Italics signify amount of variance explained.

CAQ = Contrast Avoidance Questionnaire; IUS = Intolerance of Uncertainty Scale; GAD-Q-IV = Generalized Anxiety Disorder Questionnaire IV; FoC = Fear of Change.

**Figure 5.** *Rival Model 3 – IUS Predicting FoC, Mediated by CAQ*

Note. Standardized betas significant at  $p < .01$ . Italics signify amount of variance explained.

CAQ = Contrast Avoidance Questionnaire; IUS = Intolerance of Uncertainty Scale; FoC = Fear of Change.

## Appendix A

### Change Vignettes

You have applied to your dream job and get the notice that you are being offered the position. But the position requires you to move over 100 miles away from where you currently live.

1) How much did the event described worry you?

1(Extremely) 2(Moderately) 3(Somewhat) 4(Slightly) 5(Not at All)

2) How likely do you think something bad would come of this event?

1(Very Likely) 2(Likely) 3(Neutral) 4(Unlikely) 5(Very Unlikely)

3) Overall how do you perceive the entire event?

1(Very Positive) 2(Somewhat Positive) 3(Neutral) 4(Somewhat Negative) 5(Very Negative)

4) How willing would you be to make this change?

1(Very Willing) 2(Somewhat Willing) 3(Undecided) 4(Somewhat Unwilling) 5(Very Unwilling)

5) What outcomes would you expect if you were actually in this situation?

You have been applying to various different graduate programs. You get into your number one school but the school is on the other side of the country.

1) How much did the event described worry you?

1(Extremely) 2(Moderately) 3(Somewhat) 4(Slightly) 5(Not at All)

2) How likely do you think something bad would come of this event?

1(Very Likely) 2(Likely) 3(Neutral) 4(Unlikely) 5(Very Unlikely)

3) Overall how do you perceive the entire event?

1(Very Positive) 2(Somewhat Positive) 3(Neutral) 4(Somewhat Negative) 5(Very Negative)

4) How willing would you be to make this change?

1(Very Willing) 2(Somewhat Willing) 3(Undecided) 4(Somewhat Unwilling) 5(Very Unwilling)

5) What outcomes would you expect if you were actually in this situation?

You have been applying for summer internships. You get the internship that you wanted the most but it clashes with other activities you were committed to do over the summer requiring you to change your schedule.

1) How much did the event described worry you?

1(Extremely) 2(Moderately) 3(Somewhat) 4(Slightly) 5(Not at All)

2) How likely do you think something bad would come of this event?

1(Very Likely) 2(Likely) 3(Neutral) 4(Unlikely) 5(Very Unlikely)

3) Overall how do you perceive the entire event?

1(Very Positive) 2(Somewhat Positive) 3(Neutral) 4(Somewhat Negative) 5(Very Negative)

4) How willing would you be to make this change?

1(Very Willing) 2(Somewhat Willing) 3(Undecided) 4(Somewhat Unwilling) 5(Very Unwilling)

5) What outcomes would you expect if you were actually in this situation?

You live in an apartment that you like that is close to campus and is the right price. However, you just found out that the landlord will not be renting out the apartment at the end of your lease in 4 months and you have to find a new apartment.

1) How much did the event described worry you?

1(Extremely) 2(Moderately) 3(Somewhat) 4(Slightly) 5(Not at All)

2) How likely do you think something bad would come of this event?

1(Very Likely) 2(Likely) 3(Neutral) 4(Unlikely) 5(Very Unlikely)

3) Overall how do you perceive the entire event?

1(Very Positive) 2(Somewhat Positive) 3(Neutral) 4(Somewhat Negative) 5(Very Negative)

4) How willing would you be to make this change?

1(Very Willing) 2(Somewhat Willing) 3(Undecided) 4(Somewhat Unwilling) 5(Very Unwilling)

5) What outcomes would you expect if you were actually in this situation?

It is in the middle of the semester and your computer suddenly won't turn on. You now have to not only buy a new computer but change over all your class work from your older computer.

1) How much did the event described worry you?

1(Extremely) 2(Moderately) 3(Somewhat) 4(Slightly) 5(Not at All)

2) How likely do you think something bad would come of this event?

1(Very Likely) 2(Likely) 3(Neutral) 4(Unlikely) 5(Very Unlikely)

3) Overall how do you perceive the entire event?

1(Very Positive) 2(Somewhat Positive) 3(Neutral) 4(Somewhat Negative) 5(Very Negative)

4) How willing would you be to make this change?

1(Very Willing) 2(Somewhat Willing) 3(Undecided) 4(Somewhat Unwilling) 5(Very Unwilling)

5) What outcomes would you expect if you were actually in this situation?

You rely on scholarships to pay for your college. You receive a letter in the mail and it tells you that the scholarship fund is shrinking and that it will no longer cover your full tuition. You will now need to find a way to cover part of it on your own.

1) How much did the event described worry you?

1(Extremely) 2(Moderately) 3(Somewhat) 4(Slightly) 5(Not at All)

2) How likely do you think something bad would come of this event?

1(Very Likely) 2(Likely) 3(Neutral) 4(Unlikely) 5(Very Unlikely)

3) Overall how do you perceive the entire event?

1(Very Positive) 2(Somewhat Positive) 3(Neutral) 4(Somewhat Negative) 5(Very Negative)

4) How willing would you be to make this change?

1(Very Willing) 2(Somewhat Willing) 3(Undecided) 4(Somewhat Unwilling) 5(Very Unwilling)

5) What outcomes would you expect if you were actually in this situation?

In your first class of the day you have a seat you usually sit. When you walk into class someone is already sitting into your usual spot. You now must sit somewhere else.

1) How much did the event described worry you?

1(Extremely) 2(Moderately) 3(Somewhat) 4(Slightly) 5(Not at All)

2) How likely do you think something bad would come of this event?

1(Very Likely) 2(Likely) 3(Neutral) 4(Unlikely) 5(Very Unlikely)

3) Overall how do you perceive the entire event?

1(Very Positive) 2(Somewhat Positive) 3(Neutral) 4(Somewhat Negative) 5(Very Negative)

4) How willing would you be to make this change?

1(Very Willing) 2(Somewhat Willing) 3(Undecided) 4(Somewhat Unwilling) 5(Very Unwilling)

5) What outcomes would you expect if you were actually in this situation?

You and your friends planned to go to a local bar tomorrow night. Three hours before you all planned to go out; you get a text changing the plans. You will all be going to a different bar instead.

1) How much did the event described worry you?

1(Extremely) 2(Moderately) 3(Somewhat) 4(Slightly) 5(Not at All)

2) How likely do you think something bad would come of this event?

1(Very Likely) 2(Likely) 3(Neutral) 4(Unlikely) 5(Very Unlikely)

3) Overall how do you perceive the entire event?

1(Very Positive) 2(Somewhat Positive) 3(Neutral) 4(Somewhat Negative) 5(Very Negative)

4) How willing would you be to make this change?

1(Very Willing) 2(Somewhat Willing) 3(Undecided) 4(Somewhat Unwilling) 5(Very Unwilling)

5) What outcomes would you expect if you were actually in this situation?

You are preparing for your start of the semester in two days and are looking at your schedule of classes again. Turns out that the location of one of your classes has changed. You will now have to go to a different building for the class.

1) How much did the event described worry you?

1(Extremely) 2(Moderately) 3(Somewhat) 4(Slightly) 5(Not at All)

2) How likely do you think something bad would come of this event?

1(Very Likely) 2(Likely) 3(Neutral) 4(Unlikely) 5(Very Unlikely)

3) Overall how do you perceive the entire event?

1(Very Positive) 2(Somewhat Positive) 3(Neutral) 4(Somewhat Negative) 5(Very Negative)

4) How willing would you be to make this change?

1(Very Willing) 2(Somewhat Willing) 3(Undecided) 4(Somewhat Unwilling) 5(Very Unwilling)

5) What outcomes would you expect if you were actually in this situation?

## Appendix B

### Contrast Avoidance Questionnaire

1. I don't let myself feel good, because at any time something bad could happen and take the good feeling away
2. Sometimes I would rather just feel bad now, instead of having to wait and see how things are going to turn out
3. I prefer to feel bad now so I don't have to endure losing my happiness later
4. I try to stay focused on the bad things that could happen, because it prevents me from feeling emotionally vulnerable
5. I feel bad now so that I can lessen the heartache later
6. Allowing myself to feel happy leaves me vulnerable to feeling terrible in the end
7. I would rather feel down than have to go through life experiencing ups and downs
8. I focus on the negative because at least I know not much can happen that could make me feel worse
9. I maintain a negative mood because it makes it easier to cope when bad things happen
10. When something bad happens, I try to look on the bright side so I can get back to feeling good
11. Despite the fact that bad things might happen, I would rather focus on the possibility of positive outcomes
12. It doesn't scare me if I lose my happy mood, because I know it will come back eventually
13. I make an effort to expect positive things, even if they might not happen
14. I don't mind being unprepared for life's ups and downs, because I just roll with the punches
15. I am comfortable with the fact that emotions will shift in response to life's events
16. I accept all of my emotional states as a normal part of life
17. I prefer to expect the worst and then be pleasantly surprised, rather than experience a drop in my emotions if something bad happens
18. I am more appreciative of the good things that come if I am pessimistic about the outcome beforehand
19. It is better to expect the worst and get the best than to expect the best all along
20. If I see the glass as half empty, I will appreciate it more when it's full
21. I enjoy success the most when I expected failure
22. I would rather anticipate the worst outcome than be blindsided
23. I would rather expect the worst than be unprepared
24. I predict and prepare for the worst possible outcome so I am less emotionally distraught when it actually happens
25. I find it most rewarding to expect the worst and have something good happen in the end
26. When my emotions fluctuate it makes me feel out of control
27. If I'm feeling good, I could really be thrown off by a negative event
28. I feel uneasy with emotional changes

- 29. I don't like it when external events control my ups and downs
- 30. It really throws me off when I suddenly feel very bad
- 31. I feel disoriented when I shift suddenly to a bad mood
- 32. When my emotions go up and down, it makes me uncomfortable
- 33. Strongly fluctuating emotions are particularly unpleasant for me

## Appendix C

### GAD-Q-IV

1. Do you experience excessive worry?

NO = A YES = B

2. Is your worry excessive in intensity, frequency, or amount of distress it causes?

NO = A YES = B

3. Do you find it difficult to control your worry (or stop worrying) once it starts?

NO = A YES = B

4. Do you worry excessively and uncontrollably about minor things such as

being late for an appointment, minor repairs, homework, etc.?

NO = A YES = B

Please list the most frequent topics about which you worry excessively and uncontrollably.

- |          |          |
|----------|----------|
| a) _____ | d) _____ |
| b) _____ | e) _____ |
| c) _____ | f) _____ |

5. Please indicate how many separate topics you worry about excessively and uncontrollably, as listed above.

- a. No topics of worry
- b. One topic
- c. Two topics
- d. Three topics
- e. Four topics
- f. Five topics
- g. Six or more topics

6. During the last six months, have you been bothered by excessive and

uncontrollable worries more days than not?

NO = A YES = B

7. During the past six months, have you been bothered by restlessness or

feeling keyed up or on edge more days than not?

NO = A YES = B

8. During the past six months, have you been bothered by difficulty

falling/staying asleep or restless/unsatisfying sleep more days than not?

NO = A YES = B

9. During the past six months, have you been bothered by difficulty

concentrating or your mind going blank more days than not?

NO = A YES = B

10. During the past six months, have you been bothered by irritability more

days than not?

NO = A YES = B

11. During the past six months, have you been bothered by being easily

fatigued more days than not?

NO = A YES = B

12. During the past six months, have you been bothered by muscle tension

more days than not?

NO = A YES = B

13. How much do worry and these physical symptoms interfere with your life, work, social activities, family, etc.?

0 – Not at all

1

2 – Mildly

3

4 – Moderately

5

6 – Severely

7

8 – Very Severely

14. How much are you bothered by worry and these physical symptoms (how much distress do they cause you)?

0 – Not at all

1

2 – Mild Distress

3

4 – Moderate Distress

5

6 – Severe Distress

7

8 – Very Severe Distress

## **Appendix D**

### **PSWQ**

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

## Appendix E

### IUS

1. Uncertainty stops me from having a firm opinion.
2. Being uncertain means that a person is disorganized.
3. Uncertainty makes life intolerable.
4. It's unfair not having any
5. My mind can't be relaxed if I don't know what will happen tomorrow.
6. Uncertainty makes me uneasy, anxious, or stressed.
7. Unforeseen events upset me greatly.
8. It frustrates me not having all the information I need.
9. Uncertainty keeps me from living a full life.
10. One should always look ahead so as to avoid surprises.
11. A small unforeseen event can spoil everything, even with the best of planning.
12. When it's time to act, uncertainty paralyses me.
13. Being uncertain means that I am not first rate.
14. When I am uncertain, I can't go forward.
15. When I am uncertain I can't function very well.
16. Unlike me, others always seem to know where they are going with their lives.
17. Uncertainty makes me vulnerable, unhappy, or sad.
18. I always want to know what the future has in store for me.
19. I can't stand being taken by surprise.
20. The smallest doubt can stop me from acting.
21. I should be able to organize everything in advance.
22. Being uncertain means that I lack confidence.
23. I think it's unfair that other people seem sure about their future.
24. Uncertainty keeps me from sleeping soundly.
25. I must get away from all uncertain situations.
26. The ambiguities in life stress me.
27. I can't stand being undecided about my future.

## **Appendix F**

### Research Questions

1. Does CA tendencies predict high IU and high GAD symptoms (e.g., excessive and uncontrollable worry)?
2. Are participants who are high on CA, IU, trait worry, and GAD symptoms more likely to perceive positive and neutral change scenarios as more negative and anxiety provoking, when compared to those who are lower on these traits?
3. Will those who are high on CA, IU, and GAD symptomatology perceive negative change as significantly more negative and anxiety provoking than those who are low on these traits?
4. Will those subjects high on CA, IU, and GAD symptomatology experience an increase in their levels of subjective distress across the duration of the study, following repeated exposure to hypothetical situations involving uncertainty and change?

**Appendix G**

## IRB Approval Letter

**APPROVAL NUMBER 1703017469**

Office of Sponsored  
Programs and Research

Towson University  
8000 York Road  
Towson, MD 21252-0001

t. 410 704-2236  
f. 410 704-4494

**MEMORANDUM**

**TO:** Mary Schadeegg

**FROM:** Institutional Review Board for the Protection of Human Participants, Elizabeth Katz, Chair

**DATE:** November 28th, 2017

**RE:** Approval of Research Involving the Use of Human Participants

Thank you for submitting an Application for Approval of Research Involving the Use of Human Participants to the Institutional Review Board for the Protection of Human Participants (IRB) at Towson University. The IRB hereby approves your proposal titled as exempt:

*Emotion Regulation, Worry, and Relationship to Uncertainty and Life Changes*

Please note that this approval is granted on the condition that you provide the IRB with the following information and/or documentation:

N/A

If you should encounter any new risks, reactions, or injuries while conducting your research, please notify the IRB. Should there be substantive changes in your research protocol, you will need to submit another application for approval at that time.

We wish you every success in your research project. If you have any questions, please call me at (410) 704-2236.

cc:

## Appendix H

Thesis and Dissertation Guidelines | 26

## Thesis Proposal Approval Form

TOWSON UNIVERSITY  
OFFICE OF GRADUATE STUDIES

## THESIS COMMITTEE APPROVAL FORM

Student's Name

Molly Schadeegg (MARY)

Chairperson, Thesis Committee

Sandra Llera  
SignatureSANDRA LLERA  
Typed name

Member

Matthew Michailyszyn  
SignatureMatthew Michailyszyn  
Typed name

Member

Geoffrey D. Munro  
SignatureGeoffrey D. Munro  
Typed name

Member

Signature

Typed name

Note: Please attach a description of the affiliation and credentials of any non-Towson University members of the Committee, and the members' *curriculum vita*.

Approved by

Graduate Program Director

[Signature]  
Signature2/6/17  
Date

Department Chairperson

Geoffrey D. Munro  
Signature2/8/17  
Date

Dean of Graduate Studies

Paul V. Kobany  
Signature2-8-17  
Date

**Note:** It is the responsibility of the student to obtain all signatures *before beginning the proposal*.

## Appendix I

### INFORMED CONSENT FORM

By clicking continue, I agree to participate in a study entitled "Emotion Regulation, Worry, and Life Changes" which is being conducted by Molly Schadegg, of the Psychology Department, Towson University. This research project is an online survey designed to examine anxiety, worry, stress, emotion regulation, and perceptions of uncertainty and change. The purpose of this study is to evaluate the relationship of these concepts. The researchers hope to use the information obtained from this study to further the understanding of these concepts, particularly anxiety.

I understand that I will be asked to complete a battery of assessments as well as answer questions relating to nine vignettes that will be presented to me. These assessments will measure my anxiety, worry, current level of distress, and thoughts about uncertainty. In addition, the vignettes I will be reading will involve a variety of scenarios where a life change is about to take place.

I have been informed that any information obtained in this study will be recorded with a random identification number that will allow the primary investigator to keep my identity anonymous. My name will not be associated with the data that is collected. Under this condition, I agree that any information obtained from this research may be used in any way thought best for publication or education.

I understand that while the primary investigator anticipates little risk or discomfort, there is a chance of emotional stress due to the nature of the vignettes. If I am to experience any psychological or emotional distress, I should seek services at the Towson University Counseling Center as soon as possible. I understand that my participation is voluntary, and that I am free to withdraw my consent and discontinue participation in this study at any time.

If I have any questions or problems that arise in connection with my participation in this study, I should contact the primary investigator, Molly Schadegg (240)-298-9150, the Faculty sponsor Dr. Sandra Llera (410)-704-5475 or the Chairperson of Towson University's Institutional Review Board for the Protection of Human Participants, Dr. Elizabeth Katz, at (410) 704-3207.

THIS PROJECT HAS BEEN REVIEWED BY THE INSTITUTIONAL REVIEW BOARD FOR THE PROTECTION OF HUMAN PARTICIPANTS AT TOWSON UNIVERSITY.

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- Shihata, S., McEvoy, P. M., & Mullan, B. A. (2017). Pathways from uncertainty to anxiety: An evaluation of a hierarchical model of trait and disorder-specific intolerance of uncertainty on anxiety disorder symptoms. *Journal of Anxiety Disorders*, 4572-79. doi:10.1016/j.janxdis.2016.12.001
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Tarter, N., & Llera, S. J. (Nov. 2015). *Trauma, Worry, and OCD: Does Obsessing Over Emotional Contrast Avoidance Lead to Increased PTSD Symptom Severity?*

Poster presented at the 49<sup>th</sup> annual convention of the Association for Behavioral and Cognitive Therapies, Chicago, IL.

Thibodeau, M. A., Carleton, R. N., Gómez-Pérez, L., & Asmundson, G. G. (2013). 'What if I make a mistake?' Intolerance of uncertainty is associated with poor behavioral performance. *Journal of Nervous and Mental Disease*, 201(9), 760-766.  
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Vall, G., Gutiérrez, F., Peri, J. M., Gárriz, M., Ferraz, L., Baillés, E., & Obiols, J. E. (2015). Seven basic dimensions of personality pathology and their clinical consequences: Are all personalities equally harmful? *British Journal of Clinical Psychology*, 54(4), 450-468. doi:10.1111/bjc.12091

van Meurs, B., Wiggert, N., Wicker, I., & Lissek, S. (2014). Maladaptive behavioral consequences of conditioned fear-generalization: A pronounced, yet sparsely studied, feature of anxiety pathology. *Behaviour Research and Therapy*, 57, 29-37. doi:10.1016/j.brat.2014.03.009

Verkuil, B., Brosschot, J. F., Tollenaar, M. S., Lane, R. D., & Thayer, J. F. (2016). Prolonged non-metabolic heart rate variability reduction as a physiological marker of psychological stress in daily life. *Annals of Behavioral Medicine*, 50(5), 704-714. doi:10.1007/s12160-016-9795-7

Wolpe, J., & Lazarus, A. A. (1966). *Behavior therapy techniques: A guide to the treatment of neuroses*. New York: Pergamon Press.

## Curriculum Vita

Mary (Molly) Schadegg

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**Education**

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**M.A. Clinical Psychology, Expected May 2018**

Towson University, Towson, MD

Thesis: *Contrast Avoidance Model: Relationship to Intolerance of Uncertainty and Fear of Change*

GPA: 3.9

**B.A. Psychology (with Distinction), Awarded 2014**

Pennsylvania State University, University Park, PA

GPA: 3.8

Psychology GPA: 3.9

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**Research Experience**

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**Graduate Research Assistant, Aug 2016-Present**

Towson University, Department of Psychology, Towson, MD

Lab: Llera's Lab on Emotion Regulation and Anxiety (LLERA)

Supervisor: Dr. Sandra Llera

- Helped troubleshoot research and run participants for Towson undergraduate student's research projects
- Submitted IRB application for both pilot study and thesis research
- Developed, and conducted original research for Master's thesis
- Analyzed data using path modeling with Mplus 7.3
- Prepared and submitted thesis research to annual Anxiety and Depression Conference

**Research Assistant, May 2016-Present**

Friends Research Institute (FRI), Baltimore, MD

Supervisor: Dr. Michael Gordon

*Continuing Care App for Probationers and Parolees with Substance Use Disorders* – Funded by the National Institute of Minority Health and Health Disparities (NIMHD) - 1R41 MD008848-01

- Designed interface for app created to provide after-care support for those leaving SUDs treatment
- Liaisoned with development team to guide subject material implementation
- Created, organized, and maintained study materials for baseline and post assessments

- Recruited, interviewed, and trained feasibility trial participants from inner city clinic who were currently on probation or parole
- Input study data and conducted analyses using SPSS
- Prepared manuscript for publication

*Mobile Mindfulness Based Smoking Cessation* – Funded by the National Cancer Institute (NCI) - 1R43 CA195849-01

- Gathered and located various assessments (Wisconsin smoking withdrawal scale (WSWS); Nicotine Dependence Syndrome Scale(NDSS))
- Organized, and managed study materials for baseline and post assessments
- Created recruitment advertisement for Baltimore city paper
- Recruited and trained 30 participants from Baltimore city for feasibility trial
- Conducted baseline and follow-up interviews
- Trained to use Micro Smokelyzer to test participants CO levels
- Managed and input research data
- Ran analyses using SPSS and created manuscript ready statistical tables

*Avatar Assisted Therapy for Probationers and Parolees with Substance Use Disorders* – Funded by the National Institute of Minority Health and Health Disparities (NIMHD) - 1R41 MD009540-01

- Liaisoned with inner city community clinic staff
- Created, organized, and maintained study materials
- Recruited for and ran demonstration sessions on how to use the AAT program with clinicians and patients
- Recruited and conducted baseline and follow-up interviews with feasibility trial participants from inner city clinic who were currently on probation and parole
- Assisted in training feasibility trial participants on the use of the AAT program
- Organized and input data, and ran analyses using SPSS
- Prepared manuscript for publication

*A Randomized Controlled Trial and Cohort Study of HIV Testing and Linkage to Care at Community Corrections* – Funded by the National Institute on Drug Abuse (NIDA) - 5R01 DA030771

- Input and organized data for the 3, 6,12,15, and 18-month follow-ups
- Located and conducted interviews with missing participants

*A Randomized Controlled Trial and Cohort Study of HIV Testing and Linkage to Care at Community Corrections-Administrative Supplement* – Funded by the National Institute on Drug Abuse (NIDA) - 3R01DA030771-05S1-Admin. Supp

- Recruited and interviewed 50 participants using battery of assessments
- Organized and managed study materials
- Input data and ran analyses using SPSS
- Helped create poster submission for the Academic and Health Policy Conference on Correctional Health

Other Projects:

- Created conference presentations and contributed to the creation of posters for various ongoing studies
- Created recruitment flyers to be used in prisons and community clinics
- Edited manuscripts, conducted and wrote literature reviews
- Prepared grant applications for Phase II randomized control trials
- Organized interview materials for variety of other NIDA funded studies

**Graduate Research Assistantship, Fall 2016**

Towson University, Department for Occupational Therapy and Occupational Sciences, Towson, MD

Supervisor: Dr. Regena Stevens-Ratchford

- Assisted in the writing of layman's article for ballroom dance in geriatric populations
- Organized data, developed statistical tables, and assisted in the writing and submission of manuscript on mixed methods ballroom dance
- Assisted in the creation of posters for presentation at the 2016 Maryland Occupational Therapy Association conference.

**Research Assistant, Aug 2014 – Aug 2016**

George Mason University, Fairfax, VA

Lab: Cognitive Vulnerability Lab

Supervisor: Dr. John Riskind

- Developed research study on looming reduction and social anxiety
- Collaborated on the development of research study on illusory correlation between looming and disgust
- Conducted research and ran participants for study on illusory correlation between looming and anger using Qualtrics Survey Software
- Trained on the conduction of the Self-Injurious Thoughts and Behavior Inventory (SITBI)

**Undergraduate Research Assistant, Aug 2012 – May 2014**

Pennsylvania State University, University Park, PA

Lab: Parent-Infant Interaction Lab

Supervisor: Dr. Ginger Moore

*Early Growth & Development Study (EGDS)* – Funded by the National Institute of Mental Health (NIMH)

- Coded research data using Mangold Interact Software
- Trained new undergraduate research assistants on coding methods and software

## Clinical Experience

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### **Clinical Intern (500 hours), Aug 2017 - present**

The ProBono Counseling Project (PBCP), Towson, MD

Supervisor: Sherri Bloom, LCSW-C

- Conducted and documented psychosocial intake interviews
- Presented cases to volunteer clinicians all over the state of MD
- Represented PBCP at Motivation Day 2017 at the Baltimore VA Hospital
- Engaged in supervised individual therapy for patients experiencing anxiety, depression, and other psychological distress, total direct clinical hours as of Nov 2017: 95.5

### **Summer Intern, 2012, 2013**

Summit Clinical Services, LLC, Leonardtown, MD

Supervisor: Sarah Mead, LCSW-C

- Organized and maintained patient files and assisted with clinical business operations.

## Teaching Experience

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### **Teaching Assistant, Fall 2011 – Spring 2012**

Pennsylvania State University, University Park, PA

Courses: Intro to Psychology

Professor: Dr. Andrew Peck

- Helped prepare students for exams and class assignments
- Assisted in creating exams and quizzes

## Work Experience

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### **Caretaker, Aug 2014 – Aug 2016**

Private Childcare, Chevy Chase, MD

- Provided childcare services for three children, one diagnosed with ADHD
- Implemented at home interventions from Clinical Psychologist for increasing child's productivity with homework and classwork.

### **Teacher's Assistant, Summer 2011**

Starmaker Learning Center, California, MD

- Instructed and organized classroom with children in age group from 3-6 years
- Developed educational materials to be implemented with children

## Publications

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Gordon, M. S., Carswell, S. B., **Schadegg, M.**, Mangen, K., Merkel, K., Tangires, S., & Vocci, F. J. (2017). Avatar-assisted therapy: a proof-of-concept pilot study of a novel technology-based intervention to treat substance use disorders. *American Journal of Drug & Alcohol Abuse*, 43(5), 518-524.

## Presentations/Posters

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**Schadegg, M. J.**, & Llera, S (2018, April). *Relationship between Contrast Avoidance Model and Intolerance of Uncertainty: A Path Analysis*. Poster to be presented at Anxiety and Depression Conference. Anxiety and Depression Association of America, Washington, DC

Blue, T. R., **Schadegg, M. J.**, Gordon, M., & Rich, J. D. (2018, March). *Long-term Follow-up of Individuals under Community Supervision Who Refused Rapid HIV Testing*. Poster to be presented at Academic and Health Policy Conference on Correctional Health. Academic Consortium on Criminal Justice Health, Houston, TX.

Gordon, M. S., Carswell, S. B., & **Schadegg, M. J.** (2017, September). *Technology Interventions for Individuals with Substance Use Disorders Under Community Supervision*. Paper presented at Leveraging Technology to Improve Treatment Outcomes for Justice-Involved Populations. National Institute on Drug Abuse, in partnership with the National Institute on Justice, North Bethesda, MD

## Awards, Honors, and Affiliations

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Dean's List, Pennsylvania State University, 2010 – 2014  
 Association of Psychological Science, Student Member, Nov 2016- Present  
 Research Assistantship, Towson University, Full tuition stipend, Fall 2016

## Research Qualifications and Clinical Skills

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**Computer Skills:** SPSS • GPower 3 • Familiar with MPlus 7.3 • Mangold Interact Software • Qualtrics Survey Software • Microsoft Office

**Assessments:** Wechsler Adult Intelligence Scale-IV (WAIS-IV) • The Wechsler Intelligence Scale for Children-5 (WISC-5) • Differential Ability Scales-II (DAS-II) • International Personality Disorders Evaluation (IPDE) • Minnesota Multiphasic Personality Inventory- 2 (MMPI-2) • NEO-Personality Inventory-3 (NEO-PI-3)

**Clinical Training:** Cognitive Behavioral Therapy (CBT) • Unified Protocol • Manualized Treatments • Bio-psycho-social Interview

## Activities

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Psychology Graduate Student Association (PGSA), Towson University, Marketing and Social Media Coordinator, *Aug 2017-Present*  
CLA Graduate Student Advisory Panel, Towson University, Member, *Aug 2016-Present*

