# The Role of Intolerance of Uncertainty in Social Anxiety: Implications for the Interpretation of Ambiguous Social Information

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A thesis submitted to the Department of Psychology in partial fulfillment of the requirements for the degree of Master of Arts in Clinical Psychology

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August 5th, 2018

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Abstract

The existence of intolerance of uncertainty (IU) about ambiguous social information in individuals with social anxiety has only recently begun to be explored by researchers, whereas the cognitive mechanisms whereby IU might *contribute to* social anxiety have thus far not been empirically investigated. The purpose of this study was threefold: to examine whether IU contributes significant variance in social anxiety severity above and beyond that accounted for by fear of negative evaluation, anxiety sensitivity, and depression; to investigate whether social anxiety severity is associated with greater levels of IU *and* a greater tendency to interpret ambiguous social events negatively; and to examine whether fear of negative evaluation and negative interpretation bias mediate the relationship between IU and social anxiety. Two-hundred and ten undergraduate students from Lakehead University completed part 1 (online) of the study and 66 participants from the initial sample completed part 2 (in-lab). Results indicated a significant relationship between IU and social anxiety independent of all other variables. IU was found to have an additive and specific effect on social anxiety severity, with increasing levels of uncertainty intolerance corresponding with more intensified symptoms of social anxiety. However, irrespective of anxiety severity level, participants with social anxiety made more negative interpretations of ambiguous social events than controls, entailing that this negative interpretation bias is a core cognitive appraisal process among these individuals. As expected, fear of negative evaluation mediated the association between IU and social interaction anxiety, as well as the relationship between IU and performance anxiety. Negative interpretations of ambiguous social information, however, only mediated the relationship between IU and social interaction anxiety. Limitations and implications of study findings are discussed from a theoretical, methodological, and clinical perspective.

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# The Role of Intolerance of Uncertainty in Social Anxiety: Implications for the Interpretation of Ambiguous Social Information

The enduring nature of social anxiety, which is characterized by a persistent anxiety and apprehension related to scrutiny by others in interpersonal or performance situations, continues to puzzle researchers (Antony & Rowa, 2008). Individuals with high social anxiety exhibit a combination of cognitions (e.g., unrealistically high personal standards for social performance), physiological symptoms (e.g., sweating), and behaviors (e.g., avoidance of social situations), the interaction of which facilitates self-perpetuating cycles of debilitating fear and anxiety (American Psychological Association, 2013). Avoidance of feared interactions and performance situations has long been proposed as a possible explanation for the persisting nature of social anxiety (Boelen & Reijntjes, 2009). That is, avoidance of exposure to a particular type of social interaction precludes an individual from discovering that their fears are unfounded and that their performance would be more acceptable than they anticipated. However, this explanation is not entirely adequate because most individuals with social anxiety are regularly exposed to at least some of the situations they are apprehensive of without gaining any insight that might disconfirm their fears. Indeed, this point is highlighted in the Diagnostic and Statistical Manual of Mental Disorders V (DSM-V; APA, 2013), which specifies that social anxiety-inducing situations are "avoided or endured with intense fear or anxiety" (p. 202). An additional maintaining factor in the form of biased information processing has therefore been proposed by several cognitive theorists (Clark & Wells, 1995; Mellings & Alden, 2000).

The following literature review will begin by examining the dominant cognitive model of social anxiety, including its hallmark features of negative interpretation bias—particularly with respect to ambiguous events—and fear of negative evaluation. Anxiety sensitivity, a fear of

anxiety-related bodily sensations, will then be briefly discussed in terms of its association with negative evaluation and its overall role in the maintenance of social anxiety. The construct of intolerance of uncertainty will then be examined, and its contributory role in specific anxiety disorders will be reviewed. Finally, a novel cognitive pathway hypothesizing *how* intolerance of uncertainty engenders anxiety-maintaining negative interpretations of ambiguous information will be proposed. As an aside, it is worthwhile to note that, although the studies described in the literature review do not explicitly address issues related to the classification of social anxiety, most of the recent evidence appears to support a dimensional understanding of the condition as a phenomenon that exists on a continuum with normal behaviour rather than a categorically distinct manifestation of psychopathology (Huppert, Foa, Furr, Filip, & Mathews, 2003; Ruscio, 2010).

**A Cognitive Model of Information Processing in Social Anxiety**

The Clark and Wells cognitive model was specifically developed to explain the underlying mechanisms of social anxiety and its persistence, with a focus on both the cognitive processing that occurs when an individual enters a feared social situation and processing occurring prior to and after leaving the social event (Clark, 2001). According to this model, individuals with social anxiety develop a set of distinct assumptions about themselves and their social environment on the basis of innate behavioral predispositions interacting with previous experiences. These assumptions are composed of excessively high standards for social performance (e.g., “I must always sound intelligent and fluent”), conditional beliefs concerning the consequences of performing in a certain way (e.g., “If I am quiet, people will think I am boring”), and unconditional negative beliefs about the self (e.g., “I’m unlikeable/unacceptable”) (Clark 2001, p. 406). Upon entering a feared social situation, the activation of these assumptions

leads the individual to interpret the situation as dangerous, to expect a failure to meet their desired standards of performance, and to appraise innocuous or ambiguous social information as indicative of an unfavorable evaluation by others. Once this occurs, attention is shifted to thorough self-monitoring of interoceptive information, such as bodily sensations, distorted mental imagery detailing how the individual is viewed from an observer's perspective, and a "felt sense" of appearing different or deficient to others (Mellings & Alden, 2000). The internal information obtained through self-monitoring is then used to generate a negative self-impression (Clark & McManus, 2002).

An additional outcome of perceiving social situations as dangerous is engagement in safety behaviours, many of which are internal cognitive processes such as rehearsing extensively for a speech or memorizing a statement to be made during an upcoming social interaction (Clark, 2001). A vast variety of other safety behaviors may be displayed in feared situations, including avoiding eye contact and pretending to take notes during a meeting in an attempt to look professional, wearing cosmetics to conceal blushing, or keeping topics of conversation away from "challenging" issues to prevent others from thinking one is stupid or incompetent (Clark & Wells, 1995). Such safety behaviours consequently increase self-focused attention and self-monitoring while reducing attention to and processing of others' objective behaviour, which in turn serves to maintain one's negative self-image. Negative beliefs about safety behaviors are moreover reinforced because the non-occurrence of a feared situation is attributed to engagement in the respective behaviors (Clark & McManus, 2002). An unintended consequence of safety behaviors is that they may draw others' attention to the individual with social anxiety and influence others' behaviour in a way that confirms the fears and assumptions held by the socially anxious person (Clark & McManus, 2002). For instance, an individual whose attention is

devoted to self-monitoring and memorizing can appear preoccupied and unreceptive, provoking in others an unfriendly or critical response that seemingly corroborates the negative assumptions. Entrance into the feared social situation is additionally accompanied by marked cognitive and somatic symptoms, such as sweating, shaking, trembling, blushing, mental blanks, and heart palpitations (Clark, 2001). The fact that these symptoms are interpreted as forecasting an impending catastrophe contributes to the individual's hypervigilance for the symptoms, further increasing the subjective intensity of the arousal. Rather than serving any useful function, this constellation of cognitive, somatic, affective, and behavioural responses becomes a further source of perceived danger and contributes to a series of interlinked cycles that maintain or exacerbate social anxiety while precluding disconfirmation of negative assumptions and appraisals (Clark & Wells, 1995).

Although considerable anxiety and negative self-processing occur during a feared social event, anticipatory anxiety and negative cognitions can be experienced well before entering the social situation as individuals conduct a detailed review of what they expect will happen (Mellings & Alden, 2000). As the dread and foreboding associated with the forthcoming event increases, individuals with social anxiety selectively retrieve recollections of past failures to fulfill their desired levels of performance, experience negative images of their social behavior during the event, and make predictions about deficient performance, negative evaluation, and social rejection. The result of these ruminations is that, upon ultimately participating in the event, the individual is already in a processing mode defined by heightened self-monitoring and evaluation, expectations of failure, and a reduced capacity to notice disconfirmatory evidence such as signs of approval from others (Clark, 2001).

While post-event anxiety symptoms rapidly subside as the perceived social danger is removed, distorted information processing continues past the termination of the event (Clark, 2001). Given that social situations are inherently ambiguous and it is unlikely for an individual with social anxiety to have received entirely unambiguous indications of social acceptance, thorough scrutiny of the interaction often follows the event. The salience of negative appraisals and somatic and cognitive symptoms during the social situation entails that these factors have been firmly encoded in memory and become the paramount focus of the individual's examination (Mellings & Alden, 2000). Since the review is dominated by the individual's negative self-impression and erroneous inferences about how they appear to others, they are likely to appraise their performance as much more negative than it truly was and to interpret social cues that are benign or neutral from an outside observer's perspective as evidence of disapproval from others (Clark & Wells, 1995). The recent interaction and perceived social failure generated through this post-event processing is then added to the archive of past failures and serves to reinforce the individual's belief in their social ineptitude.

**Interpretation of Ambiguous Social Information**

One of the central tenets of the model proposed by Clark and Wells is that people with social phobia display a tendency to interpret ambiguous social cues in a negative fashion. A growing body of literature has indeed provided support for this notion. Constans, Penn, Ihen, and Hope (1999) developed a vignette depicting a 'blind' date between two college-aged students in order to examine whether socially-anxious individuals display a negative interpretation bias towards ambiguous social information. The vignette, which contained a number of ambiguous statements and behaviours concerning both interpersonal evaluation and evaluation of non-personal stimuli, was administered to socially anxious and nonanxious undergraduate students

who were subsequently asked to complete a questionnaire designed to assess their interpretation of events that transpired in the story. Although the two groups did not differ on items measuring interpretations of non-personal events (e.g., Upon entering the restaurant, Lisa said "This is an unusual place."), socially anxious participants generated significantly more negative interpretations of ambiguous, interpersonal events (e.g., When meeting her date, Lisa said "You're certainly not what I expected.").

Amir, Foa, and Coles (1998) investigated interpretive bias in patients with generalized social phobia (GSP) by examining whether these individuals have a tendency to select a negative interpretation of scenarios even when they are presented with an alternative positive explanation. Although not currently recognized in the DSM-V (APA; 2013), GSP was formerly acknowledged as a subtype of social phobia characterized by a chronic pattern of social fears that extends to most social situations and is more incapacitating than social phobia (APA, 1994; Hook & Valentiner, 2002). In order to assess the specificity of the interpretation bias for social scenarios, patients were presented with both self-relevant and other-relevant (i.e., related to a 'typical person') social and non-social scenarios. Two comparison groups, namely non-anxious controls and individuals with obsessive compulsive disorder, were also included for this purpose. All participants were presented with ambiguous social events (e.g., Someone you are interested in dating says "Hello" to you.) and ambiguous non-social events (e.g., You receive a phone call from a clerk at your bank regarding your loan application.). Immediately after reading each scenario, patients were presented with a negative, a neutral, and a positive interpretation, and asked to rank order them with respect to their likelihood of coming into one's own mind or the mind of a "typical person" in similar situations. The results revealed that, in comparison to patients with obsessive compulsive disorder and nonanxious controls, individuals with social

phobia were more likely to make negative interpretations of ambiguous social events despite the availability of alternative positive interpretations. Moreover, the interpretive bias only occurred when they were presented with self-relevant social scenarios.

Facial expression is an extremely important medium for conveying social evaluative information, entailing that the utilization of pictures depicting human faces may also be useful in research on disambiguation bias in social anxiety. Yoon and Zinbarg (2007) employed pictorial stimuli to examine whether high socially anxious undergraduate students have a tendency to interpret neutral facial expressions in a more threatening manner than students exhibiting low social anxiety. Participants were presented with stimulus picture sets of cue and target pictures depicting happy, angry, disgust, and neutral faces, and were instructed to press a response button as soon as they determined what facial expression was depicted in the picture. It was expected that targets consistent with the interpretation given to the preceding cue would be more primed and would consequently generate a faster response time than targets that were inconsistent with the previous cue. In other words, the participants' responses were not used to determine the content of their interpretation but rather served as an index of their latency to establish an interpretation. The authors used neutral pictures as ambiguous social cues obtained from a previous investigation wherein the neutral pictures were interpreted in a variety of ways by different people, thereby warranting their classification as ambiguous. Following each target, a "Story" or "No Story" message was displayed that indicated whether the participant was required to compose a story linking together the two pictures in the preceding trial and describing how the people in the pictures were feeling. The story content and references to the affect portrayed in the pictures were then coded and analyzed for interpretation bias.

The results revealed that high socially anxious participants interpreted the neutral pictures as threatening whereas participants with low levels of social anxiety tended to interpret the neutral pictures as neutral. These findings were corroborated by both the coded self-report stories and reaction time analyses indicating that socially anxious participants showed a relative speeding of processing angry targets following neutral cues. Yoon and Zinbarg (2008) confirmed and extended these findings in a subsequent study wherein they used an incidental learning paradigm to demonstrate that high socially anxious individuals interpret neutral social interaction cues in a threatening manner even in the absence of threat, whereas nonanxious persons make negative interpretations only when they are exposed to a threat manipulation. In sum, these results confirm the existence of an interpretation bias for ambiguous facial expressions in high socially anxious persons and extend the findings of previous investigations using verbal stimuli.

While these studies provide compelling support for a negative interpretation bias in social anxiety, it is also important to employ more ecologically valid study designs that utilize ambiguous stimuli in the form of non-verbal, behavioral social cues in real life interactions rather than written vignettes or questionnaires. As such, an investigation was carried out to determine whether individuals with high levels of anxiety are more likely to make negative and threatening interpretations of other people's ambiguous behavior than low socially anxious individuals. In this study, high and low socially anxious undergraduate students were asked to give a four minute anxiety-provoking speech to a confederate of the opposite sex who performed the following five ambiguous behaviors at various intervals: running fingers through hair, scratching head, crossing legs, propping chin in hand, and clearing throat (Kanai, Sasagawa, Chen, Shimada, & Sakano, 2009). Following the speech, participants were asked open-ended questions regarding their interpretations of the confederate's behaviour, and each interpretation was

independently categorized by two researchers as either negative, neutral, or unclassifiable. Furthermore, each negative interpretation was classified according to external threat, with threat being defined as "indicators of possible negative evaluation such as frowns, signs of boredom, etc." (Kanai et al., p. 234). It was found that individuals with high social anxiety interpreted the ambiguous behaviours of other people in a more negative and threatening manner and in a less neutral manner than did nonanxious participants. Even after controlling for depression levels, high socially anxious participants were found to make more threatening interpretations of ambiguous behaviour than their nonanxious counterparts (Kanai et al., 2009).

Event-related brain potentials (ERPs) have also helped to advance understanding of interpretation bias in social anxiety and have proven to be a superior "online" methodology for detecting the exact nature and time course of interpretive bias in view of their excellent temporal resolution (Moser, Huppert, Foa, & Simons, 2012). One of the more promising ERP candidates in research on interpretation bias is the P600 component, a positive deflection in brain electrical activity that reaches maximum amplitude roughly 600ms after stimulus onset in sentence processing tasks (Moser, Huppert, Foa, Hajcak, & Simons, 2008). It has been established that the P600 reflects violations in expectancy and that an enhanced P600 to expectancy violations signifies neural processes underlying the evaluation and reinterpretation of an unexpected stimulus. With this in mind, Moser et al. (2008) sought to examine interpretation bias for ambiguous social scenarios by recording P600 data from low-anxious and high-anxious participants while presenting them with a grammar decision task containing sentence stems and accompanying sentence-terminal words. All sentence stems were ambiguous until the final terminal word that resolved the ambiguity in either a positive or negative manner. For example, the sentence stem "As you give a speech, you see a person in the crowd smiling, which means

that your speech is. . .” was resolved by either a negative (e.g., “stupid”) or a positive (e.g., “funny”) terminal word (p. 695).

The results indicated that individuals with low anxiety exhibited P600s with greater amplitudes to negative than to positive terminal words of ambiguous sentence stems. In other words, the negative terminal words were relatively unexpected for these individuals, who demonstrated the presence of an online positive interpretation bias. In contrast, ERP data from high socially anxious individuals revealed no difference in P600 amplitude between positive and negative terminal words, suggesting the absence of a positive interpretation bias. Using a similar grammar decision task, Moser et al. (2012) later replicated these findings in an ERP investigation with individuals meeting diagnostic criteria for social phobia. The negative N400 component, which also displays larger amplitudes to violations of expectancy, similarly revealed a lack of positive interpretation bias and some suggestion of negative bias across all patients.

Taken together, these findings provide strong evidence for the notion that individuals with social anxiety have a tendency to interpret ambiguous social events in a negative or threatening fashion. Although these studies have all established a relationship between negative interpretation bias and social anxiety, the mechanisms whereby this bias is evoked remain largely unknown. The construct of intolerance of uncertainty, which will be discussed later, may be particularly helpful in elucidating how this bias arises and leads to social anxiety.

**Fear of Negative Evaluation**

The core cognitive feature outlined by the cognitive model of social anxiety is a fear of negative evaluation that leads the individual to perceive social situations as inherently dangerous or threatening. Specifically, the interlinked cycles that maintain anxiety all commence with the individual’s assumption that the audience in a particular social situation is likely to evaluate them

negatively and that such an evaluation will result in dire consequences (Clark, 2001). Since socially anxious individuals are highly apprehensive of being viewed in this manner, high in need for approval, and more concerned about making good impressions on others, one would expect to evidence a strong relationship between measures of negative evaluation apprehension and social anxiety.

This hypothesis has been empirically confirmed time and time again over the years. In a study examining criteria for classification of phobias, Nichols (1974) discovered that the primary distinguishing characteristic of socially anxious individuals was sensitivity to and fearfulness of experiencing criticism, disapproval, and rejection. Similar results were found in an investigation of the psychometric properties of the original Fear of Negative Evaluation (FNE) scale, wherein fear of negative evaluation was defined as "apprehension about others' evaluations, distress over their negative evaluations, avoidance of evaluative situations, and the expectation that others would evaluate oneself negatively" (Watson & Friend, 1969, p. 449). Compared to subjects classified as low in fear of negative evaluation and social avoidance, individuals high on fear of negative evaluation and social avoidance worked harder on a boring letter-number substitution task either if disapproval by their group leader was threatened or when they believed they would receive approval for their hard work from the group leader. These findings suggest that individuals who are high in fear of negative evaluation place more effort into both gaining approval from others and avoiding disapproval and criticism.

Further support for this hypothesis was provided by a study assessing the effects of social anxiety on perception of and responses to negatively toned interpersonal feedback (Smith & Sarason, 1975). Two-hundred and eleven college students were divided into low, moderate, and high social anxiety groups based on their responses to the FNE scale, and were subsequently

asked to participate in an impression formation experiment wherein they interacted with another person who rated them on bipolar adjective scales (e.g., likable/unlikable). Participants in the high and moderate anxiety groups perceived the same feedback as being significantly more negative than individuals with low anxiety levels, and indicated that such feedback would evoke more negative personal feelings. Moreover, and importantly, highly anxious individuals reported a greater expectancy to receive such a negative evaluation than did subjects in the other groups.

Research has also shown that individuals exhibiting both high social anxiety and high fear of negative evaluation may present a bias towards detection of negative emotions in others. In a study investigating whether social anxiety is associated with enhanced processing of social threat cues, subjects scoring high and low on the FNE scale were asked to rate the type of emotion conveyed on slides and video clips both before and after a public speaking threat induction (Winton, Clark & Edelman, 1995). Subjects who scored high on fear of negative evaluation also scored higher than those with low fear of negative evaluation on measures of social anxiety and distress, and they were significantly more likely to rate the presented facial expressions as negative without having abstracted more affective information from the expressions. Thus, there appeared to be in these individuals an immediate bias towards interpretation of emotional expressions as negative in the absence of any enhanced ability to process and discriminate between different emotional states in others. Overall, the aforementioned findings unequivocally implicate fear of negative evaluation as a critical factor in social anxiety and provide further support the cognitive model proposed by Clark and Wells (1995).

**Anxiety Sensitivity**

As previously mentioned, socially anxious individuals experience marked arousal symptoms that they believe could be observed by others. The distress evoked by these somatic symptoms may be partly explained by the construct of anxiety sensitivity, which is operationalized as "a belief that beyond any immediate physical discomfort, anxiety and its accompanying symptoms may cause deleterious physical, psychological, or social consequences" (White & Barlow, 2002, p. 350). It may be surmised that individuals possessing greater anxiety sensitivity to physiological symptoms and publicly observable anxious symptoms may be more likely to experience the somatic symptomology (e.g., heart palpitations, tremors) accompanying anxiety in social evaluative and performance situations.

Support for this hypothesis was provided in an examination of the relationship between personality variables and social anxiety in a non-patient population of students (Norton, Cox, Hewitt, & McLeod, 1997). As part of this study, the authors administered the Anxiety Sensitivity Index (ASI; Peterson & Reiss, 1992), a dispositional measure of the degree to which a person is distressed by anxiety symptoms, and the Social Phobia Scale and Social Interaction Anxiety Scale (SPS & SIAS; Mattick & Clarke, 1989). It was found that the ASI predicted scores on both anxiety scales; however, the ASI was the most important predictor variable only for the SPS, which specifically focuses on fears related to being the centre of attention and being scrutinized in performance situations (Mattick & Clarke, 1998). These results suggest that individuals who score high on the SPS fear symptoms of anxiety due to the belief that the symptoms may have harmful consequences in performance situations (Norton et al., 1997). Indeed, this finding is in line with the cognitive processing model, which states that individuals' excessive concern with somatic symptoms is largely associated with their belief that these symptoms will be observed by

others and result in failure to meet their standards of performance. The heightened anxiety sensitivity experienced by individuals with social anxiety may therefore result from the fear of being negatively evaluated when displaying publicly observable anxiety reactions (Asmundson & Stein, 1994).

The importance of anxiety sensitivity as a dimension of symptomatology in social anxiety was further demonstrated in an examination of the convergent validity of the ASI's three lower order factors in adult patients diagnosed with panic disorder (PD), social phobia (SP), and generalized anxiety disorder (GAD) (Rector, Szacun-Shimizu, & Leybman, 2007). The three dimensions of interest were ASI-Physical (fear of physical symptoms), ASI-Social (fear of publicly observable anxiety symptoms), and ASI-Cognitive (fear of cognitive dyscontrol). Results revealed that ASI-Physical scores were most strongly associated with PD, whereas ASI-Cognitive scores were most strongly correlated with GAD. Patients with social phobia scored highest on the ASI-Social dimension. Anderson and Hope (2007) extended the investigation of anxiety sensitivity in social anxiety to a younger population, attempting to determine the role of objective physiological arousal (measured by heart rate and blood pressure), perceived physiological arousal, and anxiety sensitivity in adolescents diagnosed with SP and nonanxious youth. Excepting an increase in heart rate that was experienced by both groups during the first minute of the task from the baseline, there were no significant differences between the SP and nonanxious control groups on measures of objective physiological arousal during anxiety-provoking tasks. However, adolescents with social phobia reported greater *perceived* somatic arousal and exhibited higher levels of anxiety sensitivity in comparison to the nonanxious group, indicating a heightened awareness of increases in physiological arousal and a greater fear of experiencing such arousal relative to their counterparts. Therefore, and in keeping with the

cognitive model, these factors may lead adolescents to interpret their somatic arousal as a visible indication of their anxiety that will lead to social embarrassment and rejection, which likely serves to increase the subjective intensity of the somatic symptoms. Taken together, these findings provide strong empirical support for the importance of anxiety sensitivity in the pathogenesis and maintenance of both clinical and non-clinical social anxiety.

## Intolerance of Uncertainty

**Construct Operationalization and Measurement.** The construct of intolerance of uncertainty (IU) has been suggested to play a central role in the development and maintenance of GAD and, to a lesser extent, OCD (Boelen & Reijntjes, 2009). In its initial incarnation, the construct was operationalized as "the tendency to react negatively on an emotional, cognitive and behavioral level to uncertainty in everyday life situations" (Freeston, Rhéaume, Letarte, Dugas, & Ladouceur, 1994). Over the years, this definition has undergone a number of modifications, oftentimes in studies that aimed to determine the construct validity of intolerance of uncertainty (Birell, Meares, Wilkinson, & Freeston, 2011). Ladouceur, Blais, Freeston, and Dugas (1998) proposed a new definition of IU as "the way in which an individual perceives information in uncertain or ambiguous situations and responds to this information with a set of cognitive, emotional and behavioral reactions" (p. 141). In light of emerging evidence that IU may be a causal risk factor for clinical worry, the definition was further revised as "the excessive tendency of an individual to consider it unacceptable that a negative event may occur, however small the probability of its occurrence" (Dugas, Gosselin, & Ladouceur, 2001, p. 552). In an attempt to operationalize IU in terms of specific cognitive processes, the construct was then redefined as "a cognitive bias that affects how a person perceives, interprets, and responds to uncertain situations on a cognitive, emotional, and behavioral level" (Dugas, Schwarzt, & Francis, 2004, p. 835).

Following the discovery that individuals high in IU are more likely to interpret ambiguous situations as threatening, the definition of IU was once again revised as "a dispositional characteristic that reflects a set of negative beliefs about uncertainty and its implications" (Koerner & Dugas, 2006 in Koerner & Dugas, 2008. p. 620). The construct underwent a final revision and was defined as "a dispositional characteristic that arises from a set of negative beliefs about uncertainty and its connotations and consequences" (Koerner & Dugas, 2008, p. 631). Despite this abundance of operationalizations, it might be argued that the most all-encompassing definition of intolerance of uncertainty is that provided by Carleton, Sharpe, and Asmundson (2007), who defined the construct as "the tendency for a person to consider the possibility of a negative event occurring as unacceptable and threatening irrespective of the probability of its occurrence (p. 2308).

Excepting its shorter form, the Intolerance of Uncertainty Scale (IUS) developed by Freeston et al. (1994) is the sole measure of intolerance of uncertainty currently in use. The scale items were composed to correspond with six themes representative of different facets of intolerance of uncertainty, namely "the emotional and behavioral consequences of being uncertain," "how being uncertain reflects on a person's character," "expectations that the future be predictable," "frustration when it is not," "attempts to control the future," and "all-or-nothing responses in uncertain situations" (Freeston, 1994, p. 793). The scale has demonstrated very good psychometric properties, as will be discussed later.

**Contributory Role in Generalized Anxiety Disorder.** Despite the potential importance of intolerance of uncertainty as a transdiagnotic mechanism that may contribute specifically to social anxiety, empirical data on the construct has been relatively scant and focused largely on Generalized Anxiety Disorder (GAD). The intolerance of uncertainty construct, as applied to

GAD, posits that persons with this disorder possess a lower threshold of tolerance for uncertain or ambiguous situations that leads them to appraise such situations as threatening, stressful, or unacceptable regardless of the probability of their occurrence and associated consequences (Dugas, Gagnon, Ladouceur, & Freeston, 1998). Intolerance of uncertainty is believed to exacerbate initial "What if…?" questions and even generate them chronically in the absence of an immediate stimulus or trigger. It moreover precipitates the activation of positive beliefs about worry, such as "Worrying helps avoid disappointment," "Worrying protects loved ones," or "Worrying can stop bad things from happening" (Dugas et al., 1998, p. 216). The various types of worries engendered by IU fall under one of five categories of positive beliefs, namely the notions that worry facilitates more effective problem solving, increases one's motivation to effectuate results, dampens emotional reactions to future deleterious outcomes, alters the course of events, and reflects positive personality traits by showing that an individual is concerned and well-intentioned (Wells, 2004). These worries and their accompanying anxiety lead to compromised awareness and appraisal of everyday problems and one's problem-solving abilities. More specifically, individuals who experience intolerance of uncertainty and negative problem orientation lack confidence in their problem solving abilities, tend to define problems and events as threats, become easily distressed during problem solving attempts, and are pessimistic about the outcome of their problem-solving efforts (Behar et al., 2009). In addition to negative problem orientation, they implement negative cognitive strategies such as thought replacement, distraction, and suppression to avoid the invocation of threatening mental imagery and somatic arousal, thereby impeding emotional processing and negatively reinforcing worry and anxiety via short-term relief from aversive somatic arousal.

Ample evidence has accrued to confirm the contributory role of intolerance of uncertainty in worry and GAD. In a study exploring the specificity of the relationship between intolerance of uncertainty and worry, Dugas et al. (2001) found that IU was highly correlated with the tendency to worry, moderately correlated with obsessions and compulsions, and only weakly related to panic sensations, while IU accounted for a significant amount of the variance in worry scores beyond that explained by responsibility and anxiety sensitivity. Increases in intolerance of uncertainty also appear to elevate levels of worry, as demonstrated in an experimental gambling procedure wherein the levels of intolerance of uncertainty were increased for one group while being decreased for a second group (Ladouceur, Gosselin, & Dugas, 2000). Individuals with high levels of intolerance of uncertainty have been shown to require a greater number of certainty cues prior to responding to a moderately ambiguous task but not before responding to an unambiguous or highly ambiguous task, suggesting that intolerance of uncertainty is associated with a lower threshold of perception of ambiguity (Ladouceur, Talbot, & Dugas, 1997). This finding was replicated in a study demonstrating that the beliefs underlying intolerance of uncertainty (e.g., "Uncertainty is dangerous," "I can't deal with uncertainty") are more extensive and activated at a lower threshold in individuals with GAD than in persons diagnosed with other anxiety disorders (Dugas, Buhr, & Ladouceur, 2004). In fact, one investigation found that some individuals with GAD were so distressed by uncertainty that they would prefer a certain negative outcome to an unknown outcome and reported they would continue to worry that a feared outcome will occur unless the probability of its occurrence was reduced to zero (Koerner & Dugas, 2006). Further research revealed that individuals who were highly intolerant of uncertainty interpreted ambiguous information in a more threatening manner than those with low levels of intolerance, while the tendency to make threatening interpretations

of such information was more highly associated with intolerance of uncertainty than to worry, anxiety, or depression (Dugas et al., 2005).

**Contributory Role in Obsessive Compulsive Disorder.** An inability to tolerate certainty has also been implicated in obsessive compulsive disorder, particularly among individuals who engage in compulsive checking rituals (Boelen & Reijntjes, 2009). Researchers have theorized that the pathological doubt and accompanying intolerance of uncertainty about whether they have completed some action is highly distressing to these individuals and leads them to carry out certain compulsive behaviors or rituals in order to restore a sense of certainty and reduce discomfort (Steketee, Frost, & Cohen, 1998). For example, an individual may experience persistent doubt about whether they locked the door or completely turned off the stove and may return to their home several times to check these things in order to reestablish a sense of control and certainty. In the first and one of the only studies to examine the relationship between intolerance of uncertainty and OCD, the Intolerance of Uncertainty Scale was administered to fifty-five patients with OCD and fourteen nonanxious control participants (Tolin, Abramowitz, Brigidi, & Foa, 2003). Results revealed that the proportion of individuals with OCD who were classified as "checkers" displayed significantly greater intolerance of uncertainty than noncheckers and nonanxious controls; however, OCD patients in general did not demonstrate greater intolerance of uncertainty than control participants, possibly due to the fact that non-checking compulsions are less driven by a sense of pathological doubt and uncertainty intolerance (Tolin et al., 2003).

In order to gain a better understanding of the specificity of the construct, Holaway, Heimberg, and Coles (2006) compared intolerance of uncertainty levels among individuals with analogue GAD, analogue OCD, nonanxious individuals, and individuals with elevated symptoms

of both GAD and OCD. It was found that participants in the GAD and OCD groups endorsed higher levels of intolerance of uncertainty than nonanxious individuals, although they did not significantly differ from one another in IUS scores. Individuals meeting criteria for both disorders reported a significantly greater degree of intolerance of uncertainty than participants in all other groups, suggesting that higher levels of intolerance of uncertainty are associated with more severe psychopathology. The relevance of the construct to both disorders was further corroborated by the finding that IUS scores were significantly correlated with measures of GAD, worry, OCD, and various compulsive behaviors, with no significant differences between the GAD and OCD groups and the strength of their association with intolerance of uncertainty. Additionally, checking and doubting compulsions demonstrated significantly greater correlations with intolerance of uncertainty than other compulsive behaviour subscales, lending support to the notion that such compulsions may function as an attempt to minimize uncertainty and associated distress (Holaway et al., 2006).

**Contributory Role in Social Anxiety.** Although intolerance of uncertainty has been studied extensively within the domain of worry and GAD, there is a paucity of research on this construct in the area of social anxiety. To the author's knowledge, only four studies to date have examined the relationship between intolerance of uncertainty and social anxiety. The first of these studies investigated the contribution of intolerance of uncertainty and other cognitive variables to the explained variance in social anxiety among Netherlandic adults who had suffered a recent loss (Boelen & Reijntjes, 2009). The results indicated that uncertainty intolerance accounted for a significant additional 4% of the variance in social anxiety severity when controlling for neuroticism, fear of negative evaluation, and anxiety sensitivity. The specificity of the relationship of intolerance of uncertainty with symptom levels of GAD, social anxiety,

OCD, and depression was also assessed, and it was found that GAD, social anxiety, and OCD but not depression were uniquely related with intolerance of uncertainty.

Carleton, Collimore, and Asmundson (2010) sought to replicate these results with data from a North American community sample and to extend the findings by incorporating measures of specific facets of social anxiety, namely social interaction and performance anxiety, social distress, and avoidance. The question of generality versus specificity was again explored by comparing levels of intolerance of uncertainty across participants reporting symptoms congruent with diagnoses of social anxiety disorder (SAD), GAD, comorbid SAD and GAD, or neither disorder. A strong relationship independent of all other variables was found between intolerance of uncertainty and social anxiety, with the inhibitory anxiety dimension of the IUS accounting for 51% of the variance in social interaction and performance anxiety scores. After performing a reverse order analysis, intolerance of uncertainty continued to explain a significant 4% of the variance in social anxiety above and beyond negative affect, positive affect, fear of negative evaluation, and the dimension of the ASI measuring fear of socially observable anxiety symptoms. It was also found that individuals who reported symptoms congruent with either SAD or GAD exhibited similar levels of intolerance of uncertainty, whereas individuals who reported symptoms consistent with a diagnosis of comorbid SAD and GAD displayed significantly higher levels of intolerance of uncertainty than all other groups. These results provide further support for the notion that intolerance of uncertainty may be a transdiagnostic cognitive feature that manifests itself in distinct ways across a number of anxiety disorders (Carleton et al., 2010).

The sole investigation of intolerance of uncertainty and social anxiety in adolescents to date aimed to examine associations of intolerance of uncertainty with worry, social anxiety, and depression; the specificity of intolerance of uncertainty to these symptoms after controlling for

levels of negative affectivity; and the mediational role of intolerance of uncertainty in the relationship between negative affect and worry, social anxiety, and depression. The adolescents involved in the study were between the ages of 14 and 18 and reported symptoms consistent with GAD, SAD, or depression. While it was found that intolerance of uncertainty was significantly correlated with worry, social anxiety, and depression, participants' score on the short version of the Intolerance of Uncertainty Scale (IUS-12; Carleton, Norton, & Asmundson, 2007) was uniquely related only to worry and social anxiety after adjusting for demographic variables, negative affect, and the shared variance between the three types of symptoms. Moreover, the Prospective Anxiety dimension of the IUS-12, the Inhibitory Anxiety dimension of the IUS-12, and the IUS-12 total score all served as partial mediators of the relationship between negative affectivity and worry and negative affectivity and social anxiety.

The most recent study of intolerance of uncertainty in social anxiety sought to replicate and extend the findings of Boelen and Reijntjes (2009) and Carleton et al. (2010) by examining the specificity of the construct to two distinct social anxiety subtypes, namely social interaction anxiety and performance anxiety (Whiting et al., 2014). The results indicated that intolerance of uncertainty accounted for a significant proportion of the variance in both anxiety subtypes above and beyond worry, perfectionism, and fear of negative evaluation, while IUS-12 Inhibitory Anxiety significantly contributed to both performance anxiety and social interaction anxiety scores. Interestingly, it was also found that individuals who exceeded the clinical cut-off scores for both subtypes experienced greater intolerance of uncertainty than individuals high in only one social anxiety subtype or neither, suggesting an additive effect of intolerance of uncertainty in the presence of both anxiety subtypes (Whiting et al., 2014).

**The Present Study**

Although the reviewed studies indicate that intolerance of uncertainty and social anxiety are highly related, the question of how intolerance of uncertainty might *contribute to* social anxiety is yet to be empirically examined. To the author's knowledge, there are no existing studies that have investigated a theoretical model which hypothesizes that the relationship between intolerance of uncertainty and social anxiety level is mediated by negative interpretations of ambiguous social information Testing this model will provide important information in understanding how social anxiety is developed and maintained. The first purpose of this study was to examine whether intolerance of uncertainty contributes any significant variance in social anxiety severity above and beyond that accounted for by fear of negative evaluation, anxiety sensitivity, and depression. The second aim of the study was to investigate whether social anxiety severity is associated with greater levels of intolerance of uncertainty *and* a greater tendency to interpret ambiguous social stimuli (lexical and pictorial) in a negative manner. The final purpose of the study was to examine whether fear of negative evaluation and negative interpretation bias mediate the relationship between intolerance of uncertainty and social anxiety. In keeping with Dugas et al. (2004), intolerance of uncertainty was operationalized as "a cognitive bias that affects how a person perceives, interprets, and responds to uncertain situations on a cognitive, emotional, and behavioral level" (p. 835). With these objectives in mind, the following hypotheses were proposed:

1) Intolerance of uncertainty will uniquely explain additional variance in social anxiety scores after controlling for fear of negative evaluation, anxiety sensitivity, and depression.

2) Participants who meet or exceed the clinical cut-off scores for *both* the Social Phobia Scale (SPS) and the Social Interaction Anxiety Scale (SIAS), and those who meet or

exceed the clinical cut-off scores for only SIAS *or* SPS, will report greater intolerance of uncertainty and fear of negative evaluation than will those who did not exceed any cut-offs. Further, those who meet or exceed the clinical cut-off scores for *both* the SPS and the SIAS will experience greater intolerance of uncertainty and fear of negative evaluation than those exceeding the cut-off scores for only SIAS or SPS.

Participants were assigned to the SIAS+SPS group, SIAS/SPS Only group, or CTRL group based on the levels of severity, avoidance, and impairment associated with their scores as outlined by Mattick and Clarke (1998). According to the authors of the scales, cut-offs of 34 or more out of a total score of 60 are indicative of specific situations of irrational fears with avoidance and impairment in social interaction *or* performance situations (depending on the scale), with higher scores indicative of more generalized irrational fears across numerous social interaction *or* performance situations with avoidance and impairment. Based on these guidelines, participants with a total score up to 33.99 were assigned to the CTRL group; participants with a score of 34 or higher on either measure were assigned to the SIAS/SPS Only group; and those with a score of 34 or higher on both measures were assigned to the SIAS+SPS group. 3. Participants who meet or exceed the clinical cut-off scores for both the SPS and the SIAS, and those who meet or exceed the clinical cut-off scores for only SIAS or SPS, will 1) rank negative interpretations of ambiguous social situations on the ASSIQ as more likely to come to mind quickly and 2) report greater belief in the accuracy of the negative interpretations than control participants. Moreover, those who meet or exceed the clinical cut-off scores for both measures of anxiety will 1) rank negative interpretations of ambiguous social situations as more likely to come to mind and 2) report greater belief in the accuracy of

those interpretations than those exceeding the cut-off scores for only one measure of social anxiety.

4. The SIAS+SPS group and the SIAS/SPS Only group will 1) rate ambiguous interpersonal items on the Social Vignette and Judgment Questionnaire more negatively and 2) rate ambiguous pictures but *not* positive, negative, or neutral pictures on the APRT as less pleasant than the CTRL group. Further, the SIAS+SPS group will 1) rate ambiguous interpersonal items more negatively and 2) rate ambiguous pictures but *not* positive, negative, or neutral pictures as less pleasant than the SIAS/SPS Only group. No differences between groups were expected on items of the Social Vignette and Judgment Questionnaire requiring disambiguation of non-personal events.

5. Fear of negative evaluation and negative interpretations of ambiguous social information will mediate the relationship between intolerance of uncertainty and social anxiety (Figure 1). The following four mediators were tested: fear of negative evaluation scores, ASSIQ ranking scores, ASSIQ belief ratings in negative interpretations, and ratings on the Social Vignette/Judgment Questionnaire.

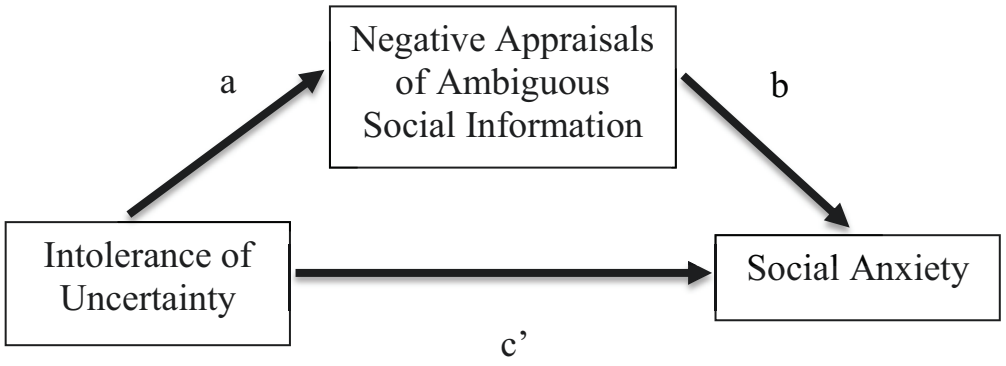


*Figure 1*. Model of the mediating effect of negative interpretations of ambiguous information on the relationship between intolerance of uncertainty and social anxiety.

## Method

### Participants – Pilot Session

Ten doctoral students recruited from amongst the Psychology graduate student body pilot tested the Affective Picture Rating Task. Graduate students were recruited through a mass email inviting them to participate in a brief pilot session testing a novel computerized measure of information processing in social anxiety (see Appendix A).

### Participants - Study

One-hundred sixty-four female and 46 male students enrolled in undergraduate courses at Lakehead University participated in part one (online) of the study. Of the initial 210 participants, 51 female and 15 male students completed part two (in-lab). They were recruited through the SONA online participant management system, a psychology research participant pool operating to recruit students who wish to participate in research studies. One classroom announcement was made and a mass email (Appendix D) with the details of the study was circulated to students to encourage participation in the study. The email contained a hyperlink to the online data gathering website SurveyMonkey, where participants completed a battery of self-report questionnaires that constituted the first part of the study. A poster (Appendix E) approved by the Lakehead University Student Union was also affixed throughout the university to facilitate recruitment. The poster contained a hyperlink to a webpage with the same information included in the email and the contact information of the research investigator. Participants were granted 1 bonus point for completing the battery of online questionnaires and 1.25 bonus points for completing the laboratory visit.

### Materials

**Demographic questionnaire.** A demographic questionnaire was used to collect information on variables such as age, sex, gender, educational level, year of study, occupational status, and marital status (Appendix J).

**Anxiety Sensitivity Index - 3** (ASI-3; Taylor et al., 2007; Appendix K). This measure contains 18 items intended to assess the tendency to fear anxiety-related bodily sensations based on the belief that they may have harmful consequences. Items are rated on a 5-point Likert-type scale ranging from 0 (*very little*) to 4 (*very much*). Factor analytic studies have demonstrated a 3-factor structure corresponding to the three dimensions of the scale, namely fear of somatic sensations (somatic) fear of cognitive dyscontrol (cognitive), and fear of socially observable symptoms of anxiety (social) (Taylor, Koch, Woody, & McLean, 1996; Zinbarg, Barlow, & Brown, 1997). The ASI-3 has shown high internal consistency for the total score ($\alpha = .92$), the somatic subscale score ($\alpha = .86$), the cognitive subscale score ($\alpha = .89$), and the social subscale score ($\alpha = .84$) (Peterson & Reiss, 1992). The average inter-item correlation of .40 was within the acceptable range. This measure has also demonstrated evidence for convergent, discriminant, and criterion validity (Taylor et al., 2007).

**Social Interaction Anxiety Scale and Social Phobia Scale** (SIAS & SPS; Mattick and Clarke, 1998; Appendix L & M). The SIAS and SPS were developed concurrently as companion measures that assess two dimensions of social anxiety. Items on the SIAS assess an individual's cognitive, behavioral, or affective responses to anxiety related to social interaction in dyads or groups, whereas items on the SPS assess fear of being scrutinized in specific performance situations. Each instrument contains 20 items that are rated on a 5-point Likert-type scale ranging from 0 (*not at all a characteristic or true of me*) to 4 (*extremely characteristic or true of me*). Both scales have demonstrated strong internal consistency and test-retest reliability. Across five

patient and control groups, Cronbach's α values ranged from .88 to .94, while test-retest reliability coefficients ranged from .91 to .93 for both scales after intervals of one month and three months (Mattick & Clarke, 1998). In terms of validity, Mattick and Clarke (1998) found that SIAS and SPS scores were positively correlated with a number of other standard measures of social anxiety ($r$ = .54-.69) as well as with each other ($r$ = .72). Peters (2000) moreover found that both scales correlated highly with the Social Phobia and Anxiety Inventory (SPAI; Turner, Beidel, Dancu, & Stanley, 1989). The SIAS and SPS have also evidenced good discriminant validity, being able to differentiate patients with social phobia from patients with other anxiety disorders and community volunteers (Mattick & Clarke, 1998).

**Intolerance of Uncertainty Scale** (IUS; Freeston, Rhéaume, Letarte, Dugas, & Ladouceur, 1994; Appendix N). This instrument contains 27 items pertaining to the notion that uncertainty is unacceptable, reflects badly on a person, and leads to frustration, distress, and an inability to take action. Each item is rated on a 5-point Likert-type scale ranging from 1 (*not at all characteristic of me*) to 5 (*entirely characteristic of me*). The obtained Cronbach's alpha of .91 in Freeston et al.'s (1994) original study indicates strong internal reliability of the Intolerance of Uncertainty Scale. Buhr and Dugas (2002) further examined the scale and reported excellent internal consistency (α = 0.94) as well as a reliability coefficient of 0.74 derived from participants who were re-tested after five weeks. The Dutch version of the IUS yielded alphas of 0.88 in a sample of students and 0.94 in a sample of anxiety-disordered patients (de Bruin, Rassin, van der Heiden & Muris, 2006). A subsample of students was retested four weeks after the initial assessment, and the test-retest reliability coefficient was 0.79. In the only empirical study aiming to conduct a cross-cultural examination of the IUS, Norton (2006) examined the psychometric characteristics of the scale in a sample of undergraduate students of African,

Caucasian, Hispanic, and Southeast Asian descent. Internal consistency across the entire sample was excellent (α = 0.95), while coefficient alpha values were similarly high across African American participants (α = .95), Caucasian participants (α = .94), Hispanic participants (α = .93), and Southeast Asian participants (α = .95).

Confirmatory factor analyses have yielded two factors labeled prospective anxiety and inhibitory anxiety, with the former involving fear of uncertainty related to future events and the latter pertaining to uncertainty inhibiting action or experience (McEvoy & Mahoney, 2010). The subscales based on these two factors and the total scale exhibited excellent internal reliability with corresponding Cronbach alphas of .88, .88, and .93, respectively. The scale has likewise demonstrated good convergent validity. More specifically, it has yielded a coefficient of .57 with the Beck Anxiety Inventory (BAI; Beck, Epstein, Brown, & Steer, 1988) and of .50 with the State-Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, & Lushene, 1970). Norton's (2005) previously mentioned cross-cultural investigation yielded correlation coefficients between the IUS and the Generalized Anxiety Disorder Questionnaire-IV (GADQ-IV; Newman et al., 2002) of .69, .63, .69, and .52 for the African American, Caucasian, Hispanic, and Southeast Asian groups, respectively.

**Brief Fear of Negative Evaluation Scale - 2** (BFNE-II; Carleton, Collimore, & Asmundson, 2007; Appendix O). The BFNE-II is a 12-item revised version of the Brief Fear of Negative Evaluation scale (BFNE; Leary, 1983) used to assess apprehension or distress as a result of others' evaluations. Items are rated on a 5-point Likert scale ranging from 0 (*not at all characteristic of me*) to 4 (*extremely characteristic of me*). The instrument has demonstrated excellent internal consistency (α = .98), a reliability coefficient of .75 after a four week interval, and an average inter-item correlation of .76. It has been shown to correlate highly with the

original BFNE (*r* = .96), while factor analyses confirmed the construct validity of the scale as a unitary measure of fear of negative evaluation (Carleton et al., 2007; Carleton, McCreary, Norton, & Asmundson, 2006).

**Depression, Anxiety and Stress Scale -21** (DASS-21; Lovibond & Lovibond, 1995; Appendix P). This measure contains three subscales designed to measure dysphoric mood (Depression subscale, DASS-D), symptoms of fear and autonomic arousal (Anxiety subscale, DASS-A), and symptoms of general nervousness and agitation (Stress subscale, DASS-S). Items are rated on a 4-point Likert scale ranging from 0 (*did not apply to me at all*) to 3 (*applied to me very much*). Analyses of the scale's psychometric properties have yielded Cronbach's alphas of .94, .87, and .91 for the Depression, Anxiety, and Stress subscales, respectively (Antony, Bieling, Cox, Enns, & Swinson, 1998). Similar results were obtained by Mahmoud, Hall, and Staten (2010), who reported Cronbach's alphas of .90 for Depression, .83 for Anxiety, and .86 for Stress. Concerning validity, The DASS-21 Stress subscale demonstrated moderately high correlations (*r* = .68 -.70) with measures of depression and anxiety such as the BAI, STAI-T, and the Beck Depression Inventory (BDI; Beck, Rush, Shaw, & Emery, 1979; Antony et al., 1998). The Depression subscale was strongly correlated with the BDI (*r* = .79), while the Anxiety subscale displayed a strong correlation with the BAI (*r* = .85) and a moderate correlation with the STAI-T (*r* = .55). Additionally, Mahmoud et al. (2010) found that the DASS-21 was moderately associated with measures of maladaptive coping (*r* = .54 -.58) and negatively associated with measures of adaptive coping and life satisfaction (*r* = -.12 - -.35). Principal component analyses performed on data obtained from college students, a community sample, and a clinical sample moreover supported the 3-dimensional factor structure of the instrument and

the theoretical perspective of the tripartite model on which it is based (Antony et al., 1998; Henry & Crawford, 2005; Mahmoud et al., 2010).

**Affective Picture Rating Task**. The Affective Picture Rating Task is a computerized task developed to assess interpretation bias. The task commences with a set of instructions indicating that a number of pictures will be displayed on the computer monitor, one at a time. Following each presentation, the participant must indicate the pleasantness of the picture using the keyboard, where 1 = *very unpleasant* and 9 = *very pleasant*. After reading the instructions, participants initiate a block of 4 practice trials to ensure that the task is understood. Upon completion of the practice block, participants proceed with 60 experimental trials, all of which are preceded by the caption "Get ready to rate the next slide." Each warning slide is displayed for 5000ms. Following the warning slide, the to-be-rated picture is displayed on the computer monitor for 3000ms. The decision to display the pictorial stimuli for 3000ms is based on the hypothesis that this time interval will enable participants to attend to the picture without engaging in the potential elaboration and reprocessing of stimuli that can occur during prolonged exposure (Koerner, Hedayati, & Dugas, 2004). A fixed random order of presentation of the stimuli will be employed. The pictures included in the task have been selected from the International Affective Picture System (IAPS; Lang, Bradley& Cuthbert, 2008), which contains a set of standardized, emotionally-evocative color photographs depicting various persons and scenes. In order to increase the ecological validity of the task, care was taken to select pictures depicting facial expressions, pictures depicting non-verbal full-body behaviour, and pictures depicting ambiguous social interactions.

To determine the final set of positive, negative, neutral, and ambiguous pictures that would constitute the task, a group of 10 doctoral students who were blind to the goals of the

study pilot tested a number of photographs obtained from IAPS. The students were asked to rate the pleasantness of the pictures using the aforementioned scale and to classify each picture into one of the four categories. Pictures that demonstrated high inter-rater agreement (k = .90 or greater) were retained and included in the APRT (see Appendix V-Y for examples of positive, negative, neutral, and ambiguous pictures). The task, which was programmed using SuperLab 5 (Cedrus Corporation), was presented on a desktop computer. All pictures were displayed with dimensions of 10.67 X 8 inches at a resolution of 72 pixels per inch.

**Ambiguous Social Vignette I & II** (Constans, Penn, Ihen, & Hope, 1999; Appendix Q & R). The two vignettes depict a "blind" date between two college-aged students. The description of the date contains information pertaining to the couple's initial meeting, dining at a restaurant, and attendance at a party. Incorporated in the vignette are a number of ambiguous statements and behaviors concerning both interpersonal evaluation and evaluation of non-personal stimuli. The evaluations cannot be disambiguated on the basis of other contextual details in the story. In Constans et al.'s (1999) original study, males and females were administered separate versions of the vignette that differed solely in the gender of the protagonist and his or her date (vignette 1 = male protagonist, vignette 2 = female protagonist).

**Ambiguous Judgment Questionnaire I & II** (Constans, Penn, Ihen, & Hope, 1999; Appendix S & T). The 19-item questionnaires contain items designed to assess participants' interpretation of events that were described in the story. The items assess both interpretation of ambiguous statements related to interpersonal evaluation (5 interpersonal interpretation items) and interpretation of ambiguous non-personal evaluations (3 non-personal interpretation items). Each of these 8 items is rated on a 7-point Likert-type scale anchored at each end by the descriptors "Strongly disagree" and "Strongly agree," with "Neutral" at the midpoint. Seven

"memory items" assessing accuracy of recall for non-emotional details are included to ensure that participants have adequate comprehension of the study, and the remaining 3 items serve as filler queries. The ambiguous social vignette and judgment questionnaire were pilot tested with 22 undergraduate students to ensure that the ambiguous events depicted in the story were indeed perceived as ambiguous. It was expected that perceived ambiguity would be reflected in ratings of approximately 4 on the 7-point scale, as this midpoint value would demonstrate that participants neither agreed nor disagreed with the interpretation of the event described in the item. The obtained mean score for these items of 3.93 (*SD* = 1.07) confirmed that the events were perceived as ambiguous by the students.

**Ambiguous Social Situation Interpretation Questionnaire** (ASSIQ; Stopa & Clark, 2000; Appendix U). This measure was developed to assess negative interpretation bias in individuals with social phobia. It contains 14 ambiguous social situations (e.g., "You are talking to an acquaintance who briefly looks out of the window") and 10 control situations ("A letter marked 'urgent' arrives). Each situation is followed by the question "Why?," which prompts participants to write down the first explanation that comes to mind. Once they have written their response, participants turn the page and rank order three alternative explanations in terms of the extent to which "they would be most likely to come to your mind if you found yourself in a similar situation" (Stopa & Clark, 2000; p. 276). Each situation is accompanied by one negative alternative explanation, with the remaining two explanations being either both neutral in nature or one positive and one neutral. Scores for the ranking data were based on the rank order of the negative explanation/answer. A score of 3, 2, or 1 was given depending on whether the negative explanation/answer was ranked first, second, or third. Upon completing the questionnaire, participants read an additional instruction sheet asking them to return to the beginning of the

questionnaire and to rate each situation in terms of the extent to which they would believe each of the three alternative explanations if they were in that specific situation. The degree of belief in the alternative explanations is rated on an 8-point Likert-type scale anchored at each end by the descriptors "Not at all" and "Extremely," with "Moderately" at the midpoint.

**Procedure**

Upon visiting the SurveyMonkey website, participants viewed an information letter (Appendix G) and a participant consent agreement (Appendix H). Once they provided their consent to participate in the study, they proceeded to a battery of questionnaires comprising of the demographic questionnaire, the ASI, the SIAS, the SPS, the IUS, the BFNE-II, and the DASS-21. Following completion of the questionnaires, participants who wished to continue participation signed up for the laboratory session which constituted the second portion of the experiment. At the beginning of the scheduled laboratory visit, participants were explained the structure and content of the session and provided with detailed instruction on how to complete the Ambiguous Social Situation Interpretation Questionnaire. Next, they read the Ambiguous Social Vignette and completed the Ambiguous Judgment Questionnaire assessing their interpretation of events described in the story. Finally, they completed the Affective Picture Rating Task. At the end of the laboratory session, participants were provided with a debriefing form (Appendix I) and were given information about the true purpose of the study. The data obtained from the battery of online questionnaires, in-lab questionnaires, and the Affective Picture Rating Task were entered into the software Statistical Package for the Social Sciences (SPSS; version 23).

## Results

**Data Screening**

Data were first checked for accuracy of entry and missing values. Each item's minimum and maximum values were within the expected range. Reverse-scored items were double-checked to ensure that they were coded correctly. The range of missing data was from 0% to 1.9%. Two participants skipped two or more scales and were consequently excluded from data analysis. Little's MCAR test was computed to determine whether there was any pattern in the missing data. The MCAR test obtained for this study's data resulted in a chi-square = 4880.271 (df = 4665; $p$<.014), which indicated that the data was not missing completely at random. A dummy variable was then created (i.e., participants with/without missing data) and independent samples t-tests were computed on the dummy variable to test differences on key variables. The non-significant t-test results indicated a lack of pattern to the missing data, excepting the DASS where participants with missing data had higher scores compared to participants without missing data [$t(199) = 2.258$, $p < 0.05$)]. As there was a small amount of missing data overall, missing values were replaced with participants' variable mean.

The dataset was checked for both univariate and multivariate outliers. To identify univariate outliers, z-scores were created and cases with z-values greater than 3.3 were considered as outliers. Two participants had univariate outliers, and their scores were flagged for further analysis. Mahalanobis distance was computed and revealed two multivariate outliers, which were deleted from the data based on recommendations from Tabachnick and Fidell (2012). Skewness and kurtosis values were in the acceptable range for normal distribution of data, with the exception of the Negative category of the Affective Picture Rating Task. Closer inspection of the data identified the univariate outliers as likely causes for the violation of kurtosis. The outliers' scores were changed to a unit larger than the last case that fit in the distribution. Following this adjustment, the values of skewness and kurtosis were within normal

limits. The assumption of homoscedasticity was checked for all variables through visual analysis of bivariate scatterplots. All scatterplots displayed roughly the same width all over with some bulging toward the middle. The range for multicollinearity was examined through correlations among the variables and no concerns were identified.

**Sample Characteristics**

The mean age of participants who completed only part one of the study ($n$ = 210) was 20.9 ($SD$ = 5.3) and the range was between 16 and 52 years of age. The sample included participants who self-identified as female (76.2%), male (21.4%), transgender (.5%), and gender variant/non-conforming (1.4%; see Table 1). The majority of respondents were of Caucasian descent (79.5%). Of the respondents, 51% were in their first year of university, 22.4% were in their second year, 15.7% were in their third year, 8.6% were in their fourth year, and 2.4% were in their fifth (or more) year. Thirty-six percent declared Psychology as their major, whereas 42% were neither majoring nor minoring in Psychology. Concerning occupational status, 94.8% of respondents reported being a full-time student, with nearly a third also reporting part-time employment. Lastly, 82.9% reported being single, 12.9% reported cohabitating, 2.9% percent reported being married, and a small fraction reported being divorced and widowed (.5% and .5%, respectively). Demographic characteristics of participants who completed both parts of the study ($n$ = 66) were similar (see Table 1).

**Psychometric Properties of Study Variables**

The psychometric properties of all study measures are displayed in Table 2. Excepting the Social Vignette & Judgment Questionnaire, all measures obtained Cronbach's alpha values of .90 or above. Nunnally and Bernstein (1996) suggested that a Cronbach's alpha of.70 is acceptable for new measures, indicating that the coefficient alpha of .74 obtained for the Social

Table 1

*Demographic Characteristics of Study Participants*

| Characteristic | *n* (Time 1 Online) | *n* (Time 2 In-lab) |
|---|---|---|
| Age, mean (*SD*) | 20.9 ± 5.3 | 22.5 ± 6.2 |
| Sex | | |
| Female | 164 (78.1%) | 51 (77.3%) |
| Male | 46 (21.9%) | 15 (22.7%) |
| Gender | | |
| Female | 160 (76.2%) | 49 (74.2%) |
| Male | 45 (21.4%) | 15 (22.7%) |
| Transgender | 1 ( .5%) | 1 ( 1.5%) |
| Gender variant/Non-conforming | 3 ( 1.4%) | 0 ( 0.0%) |
| Prefer not to answer | 1 ( .5%) | 1 ( 1.5%) |
| Ethnicity | | |
| White/Caucasian | 167 (79.5%) | 55 (83.3%) |
| Asian | 12 ( 5.7%) | 1 ( 1.5%) |
| Black/African Canadian | 9 ( 4.3%) | 4 ( 6.1%) |
| First Nations | 9 ( 4.3%) | 3 ( 4.5%) |
| Other | 13 ( 6.2%) | 3 ( 4.6%) |
| Education | | |
| University Year 1 | 107 (51.0%) | 25 (37.9%) |
| University Year 2 | 47 (22.4%) | 21 (31.8%) |
| University Year 3 | 33 (15.7%) | 11 (16.7%) |
| University Year 4 | 18 ( 8.6%) | 6 ( 9.1%) |
| University Year 5 (or more) | 5 ( 2.4%) | 3 ( 4.5%) |
| Psychology: | | |
| Major | 76 (36.2%) | 30 (45.5%) |
| Minor | 16 ( 7.6%) | 4 ( 6.1%) |
| Neither | 88 (41.9%) | 24 (36.4%) |
| Undecided | 30 (14.3%) | 8 (12.1%) |
| Occupational Status | | |
| Full-time student | 199 (94.8%) | 63 (95.5%) |
| Part-time student | 11 ( 5.2%) | 3 ( 4.5%) |
| Full-time employee | 7 ( 3.3%) | 3 ( 4.5%) |
| Part-time employee | 63 (30.0%) | 22 (33.3%) |
| Unemployed | 10 ( 4.8%) | 3 ( 4.5%) |
| Marital Status | | |
| Married | 6 ( 2.9%) | 5 ( 7.6%) |
| Cohabitating | 27 (12.9%) | 8 (12.1%) |
| Single | 174 (82.9%) | 53 (80.3%) |
| Divorced | 1 ( .5%) | 0 ( 0.0%) |
| Widowed | 1 ( .5%) | 0 ( 0.0%) |

Table 1 Continued

*Note*. The variation in sample size on some demographic variables is due to the variation in the number of participants who provided a response to the particular item.

Vignette & Judgment Questionnaire represents a modest degree of homogeneity among test items. **Intercorrelations Among Study Measures**

Intercorrelations between study measures completed online (part 1) and in-lab (part 2) are presented separately in Tables 3 and 4, with the remaining tables displaying correlations between all study measures completed by individuals who participated in both parts of the study. As can be seen in Table 3, all measures administered online were strongly correlated with each other and were in support of the hypothesis that participants with greater social anxiety severity will report higher levels of intolerance of uncertainty and fear of negative evaluation. Specifically, SIAS scores were strongly correlated with scores on the IUS, $r = .64$, $p < .01$, and BFNE-2, $r = .71$, $p < .01$, while SPS scores were similarly correlated with these two measures, $r = 65$, $p < .01$ and $r = .69$, $p < .01$. The two measures of social anxiety were strongly correlated with each other, $r = .81$, $p < .01$, reflecting the fact that they tap the same underlying constructs. Higher levels of intolerance of uncertainty were moreover significantly associated with greater anxiety sensitivity, $r = .65$, $p < .01$, and depression severity, $r = .69$, $p < .01$.

Table 4 illustrates a significant inverse relationship between ranking scores on the ASSIQ and ratings of ambiguous interpersonal events on the social vignette, $r = -.27$, $p < .05$, as well as between belief ratings in the accuracy of negative appraisals and ratings of ambiguous interpersonal events on the social vignette, $r = -.25$, $p < .05$. In other words, the higher the likelihood of having negative interpretations come to mind on the ASSIQ and believing in their accuracy, the less positive the appraisals of ambiguous interpersonal events on the social vignette.

The correlations between participants' scores on the IUS, SIAS, SPS, BFNE-2, ASI-3, DASS-21, and ASSIQ are displayed in Table 5. The direction and magnitude of associations between the six online measures in this subgroup of 66 participants are similar to those obtained in the entire sample of 210 participants. IUS, SIAS, SPS, BFNE-2, ASI-3, and DASS-21 scores were all significantly correlated with ranking scores on the ASSIQ and belief ratings for the negative explanations on the ASSIQ. This indicates that higher scores on these six measures correspond with a greater likelihood that the negative interpretation will come to mind quickly *and* a greater belief in the accuracy of the interpretation. Ranking scores for the negative (social) explanations on the ASSIQ were strongly correlated with belief ratings for the negative interpretations of ambiguous social scenarios, $r = .82$, $p < .01$. That is, the greater the likelihood of having a negative interpretation come to mind quickly, the greater the belief in the accuracy of that negative interpretation. It was also found that higher social interaction anxiety scores were associated with a lower likelihood of selecting a neutral explanation for ambiguous social scenarios, $r = -.32$, $p < .01$. Having a negative interpretation come to mind more quickly was moreover correlated with a lower likelihood of selecting a neutral explanation, $r = -.41$, $p < .01$.

Regarding the Ambiguous Social Vignette and Judgment Questionnaire, SIAS and BFNE-2 scores were inversely correlated with ratings on interpersonal interpretation items (see Table 6). Specifically, greater social interaction anxiety and fear of negative evaluation were associated with a less favorable interpretation of ambiguous interpersonal events. Scores on the IUS, SIAS, SPS, BFNE-2, ASI-3, DASS-21, and the Social Vignette and Judgment Questionnaire were not significantly correlated with pleasantness ratings of ambiguous, negative, neutral, or positive pictures from the APRT.

**Hypothesis 1 – Does intolerance of uncertainty predict social anxiety?**

To test the hypothesis that intolerance of uncertainty will uniquely explain additional variance in social anxiety scores after controlling for fear of negative evaluation, anxiety sensitivity, and depression, a hierarchical regression analysis was performed with each of the SIAS scores and SPS scores as dependent variables (two separate regressions). Scores on the FNE were entered in the first step, ASI-3 and DASS-21 scores were entered in the second step, and IUS scores were entered in the third step. Fear of negative evaluation accounted for 50.4% of the variability in SIAS scores, $F(1, 208) = 211.46$, $p < .001$, and it was a significant predictor, $\beta = .42$, $p < .001$. ASI-3 and DASS-21 scores explained an additional 6.8% of variability, $F(2, 206) = 91.70$, $p < .001$, however they were not significant predictors. Finally, IUS accounted for an additional 2.3% of variability, $F(1, 205) = 75.27$, $p < .001$, and it was a significant predictor of change in SIAS scores, $\beta = .23$, $p < .01$. The second regression (using SPS scores as the dependent variable) revealed that fear of negative evaluation accounted for 47.2% of the variability in SPS scores, $F(1, 208) = 185.94$, $p < .001$, and it was a significant predictor, $\beta = .27$, $p < .001$. ASI-3 and DASS-21 scores explained an additional 17.7% of variability, $F(2, 206) = 127.07$, $p < .001$, and they were likewise significant predictors [$\beta = .36$, $p < .001$ and $\beta = .17$, $p < .05$, respectively]. Finally, IUS accounted for a small additional .01% of variability, $F(1, 205) = 98.00$, $p < .001$, and it was a significant predictor of change in SPS scores, $\beta = .13$, $p < .05$.

**Hypothesis 2 – Do intolerance of uncertainty and fear of negative evaluation differ between clinical groups?**

It was hypothesized that participants who met or exceeded the clinical cut-off scores for *both* the SPS and the SIAS, and those who met or exceeded the clinical cut-off scores for only SIAS *or* SPS, will report greater IU and FNE than will those who did not exceed any cut-offs.

Table 2

*Psychometric Properties of Study Variables*

| Scale | n | M | SD | α | Minimum | Maximum | Skew |
|---|---|---|---|---|---|---|---|
| IUS | 210 | 2.40 | .70 | .95 | 1.00 | 4.89 | .33 |
| SIAS | 210 | 1.60 | .77 | .94 | .00 | 3.40 | .30 |
| SPS | 210 | 1.19 | .80 | .95 | .00 | 3.70 | .79 |
| BFNE-2 | 210 | 2.99 | 1.00 | .96 | 1.00 | 5.00 | -.13 |
| ASI-3 | 210 | 1.03 | .78 | .93 | .00 | 3.47 | .89 |
| DASS-21 | 210 | .87 | .55 | .94 | .00 | 2.57 | .59 |
| ASSIQ | 66 | 4.00 | .82 | .90 | 1.00 | 7.89 | .19 |
| Social Vignette & Judgment Questionnaire | 66 | 4.32 | .75 | .74 | 1.97 | 6.14 | -.18 |
| APRT | 66 | 4.61 | .83 | .93 | 1.00 | 9.00 | -.59 |

*Note*. Part 1 online = 210 participants; part 2 in-lab = 66 of the initial 210 participants.

Table 3

*Intercorrelations Amongst Part 1 Study Variables (n = 210)*

| Measure | IUS | SIAS | SPS | BFNE-2 | ASI-3 | DASS-21 |
|---|---|---|---|---|---|---|
| IUS | 1 | | | | | |
| SIAS | .64** | 1 | | | | |
| SPS | .65** | .81** | 1 | | | |
| BFNE-2 | .61** | .71** | .69** | 1 | | |
| ASI-3 | .65** | .62** | .74** | .63** | 1 | |
| DASS-21 | .69** | .62** | .69** | .61** | .72** | 1 |

*Note.* IUS = Intolerance of Uncertainty Scale; SIAS = Social Interaction Anxiety Scale; SPS = Social Phobia Scale; BFNE-2 = Brief Fear of Negative Evaluation – 2; ASI-3 = Anxiety Sensitivity Scale – 3; DASS-21 = Depression, Anxiety, and Stress Scale – 21.
*. $p < .05$, **. $p < .01$

Table 4

*Intercorrelations Amongst Part 2 Study Variables (n = 66)*

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *ASSIQ Ranking Scores (1-3)* | | | | | | | | | | | | |
| 1. Social Situations | 1 | | | | | | | | | | | |
| 2. Control Situations | .67** | 1 | | | | | | | | | | |
| *ASSIQ Belief Ratings for Negative Explanation (0-8)* | | | | | | | | | | | | |
| 3. Interpersonal Situations | .82** | .63** | 1 | | | | | | | | | |
| 4. Non-personal Situations | .54** | .69** | .76** | 1 | | | | | | | | |
| *ASSIQ Belief Ratings for Neutral Explanation (0-8)* | | | | | | | | | | | | |
| 5. Social Situations | -.41* | -.26* | -.16 | -.03 | 1 | | | | | | | |
| 6. Control Situations | -.11 | -.26* | -.14 | .13 | .73** | 1 | | | | | | |
| *Ambiguous Social Vignette and Judgment questionnaire (1-7)* | | | | | | | | | | | | |
| 7. Interpersonal Situations | -.27* | -.14 | -.25* | -.27* | .18 | -.05 | 1 | | | | | |
| 8. Non-personal Situations | -.13 | -.14 | -.12 | -.19 | -.02 | -.06 | .36** | 1 | | | | |
| *Affective Picture Rating Task (0-9)* | | | | | | | | | | | | |
| 9. Ambiguous Pictures | .03 | .06 | .10 | .06 | .19 | .21 | -.14 | .08 | 1 | | | |
| 10. Negative Pictures | .14 | -.01 | .18 | .01 | .03 | .10 | .09 | .24 | .29* | 1 | | |
| 11. Neutral Pictures | .07 | .06 | .01 | -.02 | .01 | -.02 | -.06 | .07 | .29* | .34** | 1 | |
| 12. Positive Pictures | -.12 | .07 | .01 | -.03 | .26* | .16 | .12 | -.08 | .38** | -.24 | .11 | 1 |

*. $p < .05$,

**. $p < .01$

Table 5

*Intercorrelations for Scores on the IUS, SIAS, SPS, BFNE-2, ASI-3, DASS-21, and ASSIQ (Part 1 & 2)*

| Measure | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. IUS | 1 | | | | | | | | | | | |
| 2. SIAS | .71** | 1 | | | | | | | | | | |
| 3. SPS | .70** | .81** | 1 | | | | | | | | | |
| 4. BFNE-2 | .73** | .71** | .69** | 1 | | | | | | | | |
| 5. ASI-3 | .56** | .49** | .63** | .62** | 1 | | | | | | | |
| 6. DASS-21 | .70** | .64** | .75** | .62** | .71** | 1 | | | | | | |
| *ASSIQ Ranking Scores* | | | | | | | | | | | | |
| 7. Social Situations | .51** | .53** | .46** | .57** | .33** | .44** | 1 | | | | | |
| 8. Control Situations | .45** | .41** | .42** | .41** | .31* | .43** | .67** | 1 | | | | |
| *ASSIQ Belief Ratings for Negative Explanation* | | | | | | | | | | | | |
| 9. Social Situations | .50** | .42** | .40** | .54** | .36** | .42** | .82** | .63** | 1 | | | |
| 10. Control Situations | .42** | .30* | .34** | .36** | .31* | .33** | .54** | .70** | .76** | 1 | | |
| *ASSIQ Belief Ratings for Neutral Explanation* | | | | | | | | | | | | |
| 11. Social Situations | -.14 | -.32** | -.17 | -.10 | -.10 | -.15 | -.41** | -.26* | -.16 | -.03 | 1 | |
| 12. Control Situations | -.07 | -.15 | -.07 | -.05 | -.05 | -.06 | -.11 | -.26* | .14 | .13 | .73** | 1 |

*Note*: $n = 66$

*. $p < .05$

**. $p < .01$

Table 6

*Intercorrelations for Scores on the IUS, SIAS, SPS, BFNE-2, ASI-3, DASS-21, Ambiguous Social Vignette and Judgment Questionnaire, & APRT*

| Measure | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. IUS | 1 | | | | | | | | | | | |
| 2. SIAS | .71** | 1 | | | | | | | | | | |
| 3. SPS | .70** | .81** | 1 | | | | | | | | | |
| 4. BFNE-2 | .73** | .71** | .69** | 1 | | | | | | | | |
| 5. ASI-3 | .56** | .49** | .63** | .62** | 1 | | | | | | | |
| 6. DASS-21 | .70** | .64** | .75** | .62** | .71** | 1 | | | | | | |
| *Ambiguous Social Vignette and Judgment questionnaire* | | | | | | | | | | | | |
| 7. Interpersonal Situations | -.13 | -.26* | -.23 | -.30* | -.09 | -.22 | 1 | | | | | |
| 8. Non-personal Situations | -.16 | -.20 | -.22 | -.16 | -.00 | -.09 | .36** | 1 | | | | |
| *Affective Picture Rating Task* | | | | | | | | | | | | |
| 9. Ambiguous Pictures | .02 | -.02 | -.01 | .20 | .03 | -.15 | -.14 | .08 | 1 | | | |
| 10. Negative Pictures | .01 | -.01 | -.19 | .10 | -.07 | -.21 | .09 | .24 | .29* | 1 | | |
| 11. Neutral Pictures | .06 | .12 | .05 | .07 | -.12 | -.09 | -.06 | .07 | .29* | .34** | 1 | |
| 12. Positive Pictures | .07 | -.08 | .04 | .06 | -.01 | .01 | .12 | -.08 | .38** | -.24 | .11 | 1 |

*Note*: $n = 66$

*. $p < .05$

**. $p < .01$

Further, those who met or exceeded the clinical cut-off scores for *both* the SPS and the SIAS were hypothesized to experience greater IU and FNE than those exceeding the cut-off scores for only SIAS or SPS. In order to examine IU's relationship to the severity of social anxiety, a one-way ANOVA with group (SIAS+SPS, SIAS/SPS Only, CTRL) as the independent variable and IUS scores as the dependent variable was computed. The analysis produced a statistically significant result, $F(2,207) = 66.18$, $p < .001$. Scheffe´ post hoc analyses indicated that all three group means were significantly different from one another, $p < .001$. The SIAS+SPS group and the SIAS/SPS Only group scored significantly higher on the IUS than the CTRL group, while the SIAS+SPS group also scored significantly higher than the SIAS/SPS Only group. A similar ANOVA with FNE as the dependent variable revealed a statistically significant result, $F(2,207) = 54.52$, $p < .001$. Post hoc analyses indicated that SIAS+SPS group and the SIAS/SPS Only group reported significantly greater fear of negative evaluation on the BFNE-2 than the CTRL group, while the SIAS+SPS group also reported greater fear of negative evaluation than the SIAS/SPS Only group, $p < .001$.

Similar results were found among the subsample of participants. A one-way ANOVA with group (SIAS+SPS, SIAS/SPS Only, CTRL) as the independent variable and IUS scores as the dependent variable was conducted, and the analysis produced a statistically significant result, $F(2,63) = 27.82$, $p < .001$. Scheffe´ post hoc analyses indicated that all three group means were significantly different from one another, $p < .05$. The SIAS+SPS group and the SIAS/SPS Only group scored significantly higher on the IUS than the CTRL group, while the SIAS+SPS group also scored significantly higher than the SIAS/SPS Only group. A similar ANOVA with FNE as the dependent variable produced a statistically significant result, $F(2,63) = 21.08$, $p < .001$. Post hoc analyses showed that the SIAS+SPS group and the SIAS/SPS Only group scored

Table 7

*ANOVA Results and Descriptive Statistics for IUS and BFNE Scores by Type of Clinical Group*

| | IUS Scores | | | BFNE Scores | | |
|---|---|---|---|---|---|---|
| | *n* | *M* | *SD* | *n* | *M* | *SD* |
| 1. Does not meet cutoff score | 117 | 55.00 | 14.69 | 117 | 29.85 | 10.65 |
| 2. Meets or exceeds cutoff score for one measure | 41 | 68.80 | 15.30 | 41 | 39.88 | 9.18 |
| 3. Meets or exceeds cutoff score for both measures | 52 | 82.30 | 13.33 | 52 | 46.14 | 7.92 |
| Total | 210 | 64.46 | 18.46 | 210 | 35.84 | 12.00 |

| | IUS | | | | | BFNE | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *SS* | *df* | *MS* | *F* | $\eta_p^2$ | *SS* | *df* | *MS* | *F* | $\eta_p^2$ |
| Group | 27789.52 | 2 | 13894.76 | 66.18* | .39 | 10385.92 | 2 | 5192.96 | 54.52* | .35 |
| Error | 43460.85 | 207 | 209.96 | | | 19717.55 | 207 | 95.25 | | |
| Total | 71250.37 | 209 | | | | 30103.47 | 209 | | | |

* $p < .001$

significantly higher on the IUS than the CTRL group, while the SIAS+SPS group also scored significantly higher than the SIAS/SPS Only group. A similar ANOVA with FNE as the dependent variable produced a statistically significant result, $F(2,63) = 21.08$, $p < .001$. Post hoc analyses showed that the SIAS+SPS group and the SIAS/SPS Only group reported significantly greater fear of negative evaluation on the BFNE-2 than the CTRL group, while the SIAS+SPS group also reported greater fear of negative evaluation than the SIAS/SPS Only group, $p < .05$.

**Hypothesis 3 – Do interpretations of ambiguous social information and accuracy beliefs differ between clinical groups?**

It was predicted that participants who met or exceeded the clinical cut-off scores for both the SPS and the SIAS, and those who met or exceeded the clinical cut-off scores for only SIAS or SPS, will 1) rank negative interpretations of ambiguous social situations on the ASSIQ as more likely to come to mind quickly and 2) report greater belief in the accuracy of the negative interpretations than control participants. Moreover, those who met or exceeded the clinical cut-off scores for both measures of anxiety were hypothesized to 1) rank negative interpretations of ambiguous social situations as more likely to come to mind and 2) report greater belief in the accuracy of those interpretations than those exceeding the cut-off scores for only one measure of social anxiety. A one-way ANOVA with group (SIAS+SPS, SIAS/SPS Only, CTRL) as the independent variable and ASSIQ ranking scores as the dependent variable revealed significant group differences, $F(2, 63) = 15.55$, $p < .001$). Scheffe´ multiple comparisons test indicated that participants who met/exceeded the clinical cut-off scores for *both* the SPS and the SIAS, and those who met/exceeded the clinical cut-off scores for only SIAS *or* SPS, ranked negative interpretations of ambiguous social scenarios as more likely to spring to mind than the CTRL group, $p \leq .001$. However, no differences in ranking scores were found between those who

met/exceeded cut-off scores on both measures of social anxiety and those who met/exceeded cut-off scores on only one measure, $p = .78$.

A second one-way ANOVA with group (SIAS+SPS, SIAS/SPS Only, CTRL) as the independent variable and ASSIQ ratings of belief as the dependent variable confirmed the latter part of the hypothesis, $F(2, 63) = 9.68$, $p < .001$. Results from post-hoc analyses showed that the SIAS+SPS group and the SIAS/SPS Only group provided significantly higher ratings of belief in negative interpretations of ambiguous situations than the CTRL group, $p \leq .001$. No differences in belief ratings were found between the SIAS+SPS group and the SIAS/SPS Only group, $p = .71$. As expected, no significant group differences were found with respect to ratings of belief in interpretations of control situations, $F(2, 63) = .47$, $p = .63$.

**Hypothesis 4 - Do interpretations of ambiguous vignette items and picture items differ between clinical groups?**

The fourth hypothesis stated that the SIAS+SPS group and the SIAS/SPS Only group will 1) rate ambiguous interpersonal items on the Social Vignette and Judgment Questionnaire more negatively and 2) rate ambiguous pictures but *not* positive, negative, or neutral pictures on the APRT as less pleasant than the CTRL group. Further, the SIAS+SPS group was hypothesized to 1) rate ambiguous interpersonal items more negatively and 2) rate ambiguous pictures but *not* positive, negative, or neutral pictures as less pleasant than the SIAS/SPS Only group. No differences between groups were expected on items of the Social Vignette and Judgment Questionnaire requiring disambiguation of non-personal events. A one-way ANOVA with group (SIAS+SPS, SIAS/SPS Only, CTRL) as the independent variable and ratings of ambiguous interpersonal events as the dependent variable indicated a statistically significant group difference, $F(2, 63) = 5.57$, $p < .01$. Scheffe´ multiple comparisons test indicated that participants

Table 8

*ANOVA Results and Descriptive Statistics for ASSIQ Ranking Scores and Belief Ratings by Type of Clinical Group*

| | Ranking Scores | | | Belief Ratings | | |
|---|---|---|---|---|---|---|
| | *n* | *M* | *SD* | *n* | *M* | *SD* |
| 1. Does not meet cutoff score | 43 | 1.48 | .41 | 43 | 2.92 | 1.39 |
| 2. Meets or exceeds cutoff score for one measure | 12 | 2.04 | .52 | 12 | 4.40 | 1.79 |
| 3. Meets or exceeds cutoff score for both measures | 11 | 2.16 | .43 | 11 | 4.93 | 1.86 |
| Total | 66 | 1.69 | .52 | 66 | 3.53 | 1.74 |

| | Ranking Scores | | | | | Belief Ratings | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *SS* | *df* | *MS* | *F* | $\eta_p^2$ | *SS* | *df* | *MS* | *F* | $\eta_p^2$ |
| Group | 5.84 | 2 | 2.92 | 15.55* | .33 | 46.50 | 2 | 23.25 | 9.68* | .24 |
| Error | 11.84 | 63 | .19 | | | 151.25 | 63 | 2.40 | | |
| Total | 17.68 | 65 | | | | 197.74 | 65 | | | |

*Note*: For the rankings data, a higher score indicates that the negative interpretation is more likely to come to mind quickly.

* $p < .001$

Table 9

*ANOVA Results and Descriptive Statistics for Social Vignette & Judgment Questionnaire Scores by Type of Clinical Group*

| | Interpersonal Events | | | Non-personal Events | | |
|---|---|---|---|---|---|---|
| | *n* | *M* | *SD* | *n* | *M* | *SD* |
| 1. Does not meet cutoff score | 43 | 5.05 | .90 | 43 | 3.74 | .73 |
| 2. Meets or exceeds cutoff score for one measure | 12 | 4.33 | .95 | 12 | 3.53 | .78 |
| 3. Meets or exceeds cutoff score for both measures | 11 | 4.18 | 1.08 | 11 | 3.40 | .76 |
| Total | 66 | 4.77 | 1.00 | 66 | 3.64 | .75 |

| | Interpersonal Events | | | | | Non-personal Events | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *SS* | *df* | *MS* | *F* | $\eta_p^2$ | *SS* | *df* | *MS* | *F* | $\eta_p^2$ |
| Group | 4.96 | 2 | 2.48 | 5.57* | .15* | 1.21 | 2 | .61 | 1.09 | .03 |
| Error | 28.02 | 63 | .45 | | | 35.07 | 63 | .56 | | |
| Total | 32.98 | 65 | | | | 36.29 | 65 | | | |

* $p < .01$

who met/exceeded the clinical cut-off scores for both anxiety subtypes, and those who met/exceeded the clinical cut-off scores for only one anxiety subtype, interpreted ambiguous interpersonal events in a more negative fashion than those who did not meet any clinical cut-offs, $p < .05$. No differences in vignette ratings were found between the SIAS+SPS group and the SIAS/SPS Only group, $p = .64$. As predicted, no significant group differences were found with respect to ratings of non-personal events, $F(2, 63) = 1.09$, $p = .34$. To test the latter part of the hypothesis, four one-way ANOVAs were performed with group (SIAS+SPS, SIAS/SPS Only, CTRL) as the independent variable and ambiguous picture ratings, positive picture ratings, negative picture ratings, and neutral picture ratings as the dependent variables, respectively. The groups did not differ in pleasantness ratings of ambiguous pictures [$F(2, 63) = .49$, $p = .62$], positive pictures [$F(2, 63) = .12$, $p = .89$], negative pictures [$F(2, 63) = 2.46$, $p = .09$], or neutral pictures [$F(2, 63) = .86$, $p = .43$].

**Hypothesis 5 - Do fear of negative evaluation and negative interpretations explain the relationship between intolerance of uncertainty and social anxiety?**

Mediation models were conducted using the PROCESS macro for SPSS (Hayes, 2012) to examine whether fear of negative evaluation and negative interpretations of ambiguous social information serve as mediators of the relationship between intolerance of uncertainty and social anxiety. Participants' scores on the IUS were entered as the independent variable (*X*) in the mediation model, BFNE-2 scores, ASSIQ ranking scores, ASSIQ belief ratings, and ratings of ambiguous interpersonal events on the social vignette were entered as proposed mediators (*M*), and measures of social anxiety were entered as the dependent variable (*Y*). Separate models were tested for each measure of social anxiety (i.e., SIAS and SPS).

Models were estimated using a bootstrapping approach (Hayes, 2013), which is a nonparametric procedure that involves repeatedly sampling random observations with replacement from the dataset and estimating the indirect effect in each resampled dataset. Repeating this process thousands of times builds an empirical approximation of the sampling distribution of *ab*, which is then used to construct confidence intervals for the indirect effect. Following the logic of confidence intervals, if the estimated indirect effect overlaps with the value of zero, then the data suggest that the indirect effect is not statistically different from zero. This approach was selected over conventional methods for testing mediation, such as the causal steps strategy (Baron & Kenny, 1986) and the Sobel test (Sobel, 1982), due to the inherent limitations imposed by the latter group of tests and the prevailing opinion in the literature that data should be analyzed with bootstrapping to obtain the optimal estimate of the indirect effect (especially when working with small datasets). As outlined by Hayes (2013), the causal steps approach is not based on formal quantification or statistical testing of the indirect effect, it has been found to exhibit below-expected Type I error rates, as well as to suffer from very low power resulting from the use of multiple comparison tests. Since the sampling distribution of *ab* is normal only in large samples, methodologists have moreover expressed concern about using the standard normal distribution to derive a *p* value for the indirect effect via the Sobel test. In contrast, the bootstrapping approach does not impose the assumption of normality of the sampling distribution, it provides a direct test of the indirect effect, and it has higher power while maintaining reasonable control over the Type I error rate.

Using the bootstrapping procedure, four mediation analyses were computed (for each of the SIAS and SPS), with fear of negative evaluation scores, ASSIQ ranking scores, ASSIQ belief ratings, and ratings on the social vignette as the mediators. Specifically, the relationship between

intolerance of uncertainty (*X*) and social interaction anxiety (*Y*) was examined for an indirect effect (*ab*) mediated from intolerance of uncertainty (*X*) to fear of negative evaluation (*M*, path *a*) and subsequently from fear of negative evaluation (*M*) to social interaction anxiety (*Y*, path *b*). As seen in Figure 1, the relationship between intolerance of uncertainty (*X*) and social interaction anxiety (*Y*) was similarly examined for an indirect effect (*ab*) mediated from intolerance of uncertainty (*X*) to interpretations of ambiguous social information (*M,* path *a*), and then from interpretations of ambiguous social information (*M*) to social interaction anxiety (*Y,* path *b*). In keeping with Hayes' (2013) recommendations, mediation was established by using a bias-corrected bootstrap confidence interval for the indirect effect (*ab*) based on 10,000 bootstrap samples, where confidence intervals that do not include zero provide 95% confidence that the indirect effect is statistically significant.

Results of the first analysis indicated that fear of negative evaluation mediated the relationship between intolerance of uncertainty and social interaction anxiety (SIAS scores). Participants who reported higher intolerance of uncertainty experienced greater fear of negative evaluation ($a = .51$), and participants who reported greater fear of negative evaluation experienced higher levels of social interaction anxiety ($b = .46$). The 95% confidence interval for this indirect effect ($ab = .24$) was significant as the confidence interval did not include zero (.10 to .38). However, there continued to be a significant effect of intolerance of uncertainty on social interaction anxiety independent of its effect on fear of negative evaluation ($c' = .35$, $p < .01$). The second analysis revealed that interpretations of ambiguous social information (as reflected by ASSIQ ranking scores) mediated the relationship between intolerance of uncertainty and social interaction anxiety. Participants who experienced higher intolerance of uncertainty reported negative interpretations of ambiguous social situations as more likely to come to mind quickly (*a*

= .01), and participants who reported negative interpretations of ambiguous social situations as more likely to come to mind quickly experienced greater levels of social interaction anxiety (*b* = 6.54). The 95% confidence interval for this indirect effect (*ab* = .09) was significant as the confidence interval did not include zero (.02 to .18). A significant effect of intolerance of uncertainty on social interaction anxiety remained apparent independent of its effect on negative interpretations of ambiguous social situations ($c' = .49$, $p < .01$). An indirect effect of intolerance of uncertainty on social interaction anxiety was also modeled through belief in the accuracy of negative interpretations of ambiguous social information (*ab*). Since the value of zero lied within the confidence interval range for this indirect effect, the indirect effect was non-significant. Finally, interpretations of ambiguous interpersonal events on the Social Vignette/Judgment Questionnaire mediated the relationship between intolerance of uncertainty and social interaction anxiety. Participants who reported greater intolerance of uncertainty interpreted ambiguous interpersonal events in the social vignette more negatively (*a* = -.01), and participants who interpreted ambiguous interpersonal events in a more negative fashion experienced greater levels of social interaction anxiety (*b* = -3.97). The 95% confidence interval for this indirect effect (*ab* = .05) was significant as it did not include the value of zero (-.19 to -.06). Intolerance of uncertainty continued to have a significant effect on social interaction anxiety independent of its effect on negative interpretations of ambiguous interpersonal events ($c' = .53$, $p < .01$).

With respect to performance anxiety (SPS scores), results from the fifth analysis showed that fear of negative evaluation mediated the association between intolerance of uncertainty and performance anxiety. Participants who reported higher intolerance of uncertainty experienced greater fear of negative evaluation (*a* = .51), and participants who reported greater fear of negative evaluation experienced higher levels of performance anxiety (*b* = .47). The 95%

confidence interval for this indirect effect (*ab* = .24) was significant as the confidence interval did not include zero (.09 to .40). Once again, there continued to be a significant effect of intolerance of uncertainty on performance anxiety independent of its effect on fear of negative evaluation ($c' = .37$, $p < .01$). Indirect effects of intolerance of uncertainty on performance anxiety were also modeled through ASSIQ ranking scores (*ab*), ASSIQ belief ratings (*ab*), and ratings of ambiguous interpersonal events on the Social Vignette/Judgment Questionnaire (*ab*). The value of zero lied within the confidence interval range for these three indirect effects, thereby rendering them non-significant.

## Discussion

The purpose of this study was threefold: 1) to examine whether intolerance of uncertainty contributes any significant variance in social anxiety severity above and beyond that accounted for by fear of negative evaluation, anxiety sensitivity, interpretation bias, and depression; 2) to investigate whether different clinical groups exhibit greater levels of intolerance of uncertainty *and* a greater tendency to interpret ambiguous social stimuli (lexical and pictorial) in a negative manner in comparison to individuals who do not meet the clinical cut-offs for social anxiety; and to examine whether negative interpretations of ambiguous social information mediate the relationship between intolerance of uncertainty and social anxiety.

The results of the correlation analyses demonstrated significant interrelationships between all of the variables of interest and in theoretically congruent directions. For example, intolerance of uncertainty was strongly associated with social anxiety, fear of negative evaluation was likewise highly correlated with social anxiety, while social anxiety was strongly associated with negative interpretations of ambiguous social events. These results are in accordance with growing research indicating a relationship between intolerance of uncertainty and social anxiety

(Boelen & Reijntjes, 2009; Carleton et al., 2010; Carleton et al., 2007; Whiting et al., 2014), fear of negative evaluation and social anxiety (Carleton, Collimore, McCabe, & Antony, 2011; Clark, 2001; Nichols, 1974; Winton et al., 1995), as well as negative interpretation bias and social anxiety (Amir et al., 1998; Constans et al., 1999; Kanai et al., 2009; Moser et al., 2012, Yoon and Zinbarg, 2008).

**Intolerance of Uncertainty and Social Anxiety?**

The first hypothesis that intolerance of uncertainty will uniquely explain additional variance in social anxiety scores after controlling for fear of negative evaluation, anxiety sensitivity, and depression was supported. Regression analyses indicated a significant relationship between intolerance of uncertainty and social interaction anxiety as measured by the SIAS, independent of all other variables and similar to the precedent results from Carleton et al. (2007) and Boelen and Reijntjes (2009). Boelen and Reijntjes' (2009) results indicated that uncertainty intolerance accounted for a significant additional 4% of the variance in social anxiety severity when controlling for neuroticism, fear of negative evaluation, and anxiety sensitivity, whereas Carleton et al. (2007) similarly found that intolerance of uncertainty continued to account for a statistically significant amount of the variance (4%) above and beyond negative affect, positive affect, fear of negative evaluation, and the anxiety sensitivity-based fear of socially observable anxiety symptoms. In the current study, intolerance of uncertainty accounted for a smaller yet significant 2.3% of variability in social interaction anxiety severity after adjusting for fear of negative evaluation, anxiety sensitivity, and depression, and it was also a significant predictor of change in SIAS scores. The second regression analysis revealed a significant, albeit miniscule relationship between intolerance of uncertainty and performance anxiety as measured by the SPS, independent of all other variables. That is, intolerance of

uncertainty accounted for a small additional .01% of variability and it was a significant predictor of change in SPS scores. These results along with previously reported findings suggest that the inability to tolerate the uncertainty associated with social situations may be a critical element in the development and maintenance of social anxiety symptoms.

Although the independent contribution of uncertainty intolerance to observed variance was rather small in this study, it should be acknowledged that this may be due to its entry in the final step of the regression analyses rather than its actual role in social anxiety. Since intolerance of uncertainty overlapped with the other variables in the study and was entered last, the shared variance with the other variables was removed and what was examined is only the unique variance explained by the construct that was not shared with the other predictor variables. Not only did the hierarchical regressions in the study involve several strongly correlated independent variables, but they were also run on a relatively small sample, which may have further prevented a more robust finding for the construct. Had the order of entry for the variables in this study also been reversed, intolerance of uncertainty may have demonstrated a substantial contribution to variance in social anxiety scores, possibly greater than the one observed with the other variables. To illustrate, even though Carleton et al. (2007) found that intolerance of uncertainty explained an additional 4% of the variance in social anxiety severity above and beyond the other variables under investigation, they also found that the inhibitory anxiety subscale of the IUS accounted for 51% of the variance in social anxiety scores when the order of entry for the independent variables was reversed and intolerance of uncertainty scores were entered in the first step of their regression. This amount was greater than the variance accounted for by fear of negative evaluation (47%) when it was entered first in the previous analysis. Whiting et al. (2013) similarly found that IUS scores accounted for 20% of the variance in social interaction anxiety

scores and 32% of the variance in performance anxiety scores when it was entered first. Finally, although the mediating effect of uncertainty intolerance was not the aim of this investigation, it should be noted that past research using the same measures in this study (IUS, SIAS, SPS) has shown it to have mediated the relationship between neuroticism and symptoms of social anxiety, which is arguably further evidence for its salient role in this phenomenon (McEvoy & Mahoney, 2012).

**Intolerance of Uncertainty and Fear of Negative Evaluation Between Clinical Groups**

The second hypothesis stated that participants who met or exceeded the clinical cut-off scores for *both* the SPS and the SIAS, and those who met or exceeded the clinical cut-off scores for only SIAS *or* SPS, will report greater IU and FNE than will those who did not exceed any cut-offs. Further, those who met or exceeded the clinical cut-off scores for *both* the SPS and the SIAS were hypothesized to experience greater IU and FNE than those exceeding the cut-off scores for only SIAS or SPS. This hypothesis was confirmed. Participants who met or exceeded the clinical cut-off scores for *both* the SPS and the SIAS, and those who met or exceeded the clinical cut-off scores for only one measure of social anxiety experienced greater IU and FNE than control participants. Individuals who met or exceeded the cut-off scores for both social anxiety measures moreover reported greater IU and FNE than those who were in the clinical range on only one measure of social anxiety. Intolerance of uncertainty thus seems to have an additive and specific effect on social anxiety severity, with increasing levels of IU corresponding with more intensified symptoms of social anxiety—a finding that adds to earlier studies by showing that IU is not only specific for GAD and OCD, but is also specifically related to social anxiety (Boelen & Reijntjes, 2008; Carleton et al., 2009; McEvoy, & Mahoney, 2012).

This finding is consistent with that of Whiting et al. (2014), who discovered that individuals who exceeded the clinical cut-off scores for both subtypes experienced greater intolerance of uncertainty than individuals high in only one social anxiety subtype or neither, suggesting an additive effect of intolerance of uncertainty in the presence of both anxiety subtypes (i.e., social interaction anxiety and performance anxiety). The results from the present study also echo the findings of Carleton et al. (2010), whose comparisons across different symptom groups suggested that there were differences in IU levels between persons with a probable diagnosis of SAD, GAD, neither, or both disorders. Participants who reported SAD and GAD symptoms well below levels reported by those meeting diagnostic criteria for either disorder reported IU levels significantly lower than participants reporting symptoms congruent with diagnoses of either or both SAD and GAD. Moreover, participants reporting symptoms consistent with *both* SAD and GAD experienced significantly higher levels of IU than all other groups. These results in conjunction with the current study's findings contribute to the growing body of literature suggesting that IU may be a fundamental, transdiagnostic component of several anxiety disorders. The present study moreover provides novel evidence that IU levels additively contribute to anxiety symptom severity as measured by whether one meets criteria for one or both subtypes of social anxiety.

**Interpretations of Ambiguous Social Information and Accuracy Beliefs**

The third hypothesis predicted that participants who met or exceeded the clinical cut-off scores for both the SPS and the SIAS, and those who met or exceeded the clinical cut-off scores for only SIAS or SPS, will 1) rank negative interpretations of ambiguous social situations on the ASSIQ as more likely to come to mind quickly and 2) report greater belief in the accuracy of the negative interpretations than nonanxious participants. Moreover, those who met or exceeded the

clinical cut-off scores for both measures of anxiety were hypothesized to 1) rank negative interpretations of ambiguous social situations as more likely to come to mind and 2) report greater belief in the accuracy of those interpretations than those exceeding the cut-off scores for only one measure of social anxiety. The former but not the latter part of this hypothesis was confirmed. Participants with both anxiety subtypes and participants with one anxiety subtype indeed ranked negative interpretations of ambiguous social scenarios as more likely to spring to mind than did control participants. However, participants with both anxiety subtypes did not rank the negative interpretations as more likely to come to mind than participants with only one anxiety subtype, suggesting that negative thoughts/interpretations of ambiguous social information are likely to more automatically come to mind in those with social anxiety irrespective of the severity or specificity of their symptoms. Participants with both anxiety subtypes and those with only one anxiety subtype also reported greater belief in the accuracy of the negative interpretations than control participants; however, there was once again no difference between those with both anxiety subtypes and those with one anxiety subtype in beliefs about the accuracy of the negative interpretations. In other words, regardless of the severity of social anxiety symptoms, individuals who experience social anxiety are more likely to interpret ambiguous social situations in a negative fashion *and* more likely to believe these interpretations. In contrast to intolerance of uncertainty, which demonstrated an additive effect across the different levels of social anxiety, the stable tendency to appraise ambiguous social events negatively irrespective of anxiety severity level entails that negative interpretation bias is a core cognitive appraisal process that may be more inflexible and difficult to modify than uncertainty intolerance. The fact that the preference for negative interpretations of ambiguous scenarios persisted despite the availability of alternative, neutral explanations moreover suggests

that the observed negative interpretation bias does not reflect deficits in retrieval of neutral information. It rather implies that in individuals with social anxiety, ambiguous social scenarios are construed as negative, thus priming a negative interpretation and overriding a neutral (or positive) one.

The ambiguous situation interpretation data in the present study are highly consistent with those reported by Stopa and Clark (2000) in their investigation of social phobia and interpretation of social events. Using the same version of the ASSIQ that was administered in the current study, they found that that patients with social phobia ranked negative interpretations of ambiguous social scenarios as more likely to come to mind, and they were more likely to believe these interpretations than did non-patients. The specificity of this interpretation bias for ambiguous social scenarios was demonstrated by Amir, Foa, and Coles (1998), who presented patients with both self-relevant and other-relevant (i.e., related to a 'typical person') ambiguous social and non-social scenarios. They found that, in comparison to patients with OCD and non-anxious controls, individuals with social phobia were more likely to make negative interpretations of ambiguous social events despite the availability of alternative positive interpretations. Moreover, the interpretive bias only occurred when they were presented with self-relevant social scenarios.

The results of the present investigation are also reflected in the study by Kanai et al. (2009), wherein individuals with high levels of social anxiety and non-anxious controls were asked to give a four minute anxiety-provoking speech to a confederate of the opposite sex who performed various ambiguous behaviors. It was found that individuals with high social anxiety interpreted the ambiguous behaviours of other people in a more negative and threatening manner and in a less neutral manner than did non-anxious participants, and this negative interpretation

bias remained even after controlling for depression levels. Finally, the present study's findings complement the results of Moser et al.'s (2008) investigation using event-related brain potentials (ERPs) to examine interpretation bias for ambiguous social scenarios by recording P600 data from non-anxious and high-anxious participants. In contrast to non-anxious controls, ERP data from high socially anxious individuals revealed no difference in P600 amplitude between positive and negative terminal words in ambiguous scenarios, suggesting the absence of a positive interpretation bias and the likely presence of a negative bias in these individuals. In sum, the finding that participants with social anxiety (regardless of severity level) ranked negative interpretations as more likely to come to mind and had greater belief in the accuracy of the negative interpretations than control participants, adds to the body of literature indicating a biased interpretation of ambiguous social information in social anxiety.

**Interpretations of Ambiguous Social Vignette Items and APRT Picture Items**

It was hypothesized that participants who met or exceeded the clinical cut-off scores for both the SPS and the SIAS, and those who met or exceeded the clinical cut-off scores for only SIAS or SPS, will 1) rate ambiguous interpersonal items on the Social Vignette and Judgment Questionnaire more negatively and 2) rate ambiguous pictures but *not* positive, negative, or neutral pictures on the APRT as less pleasant than non-anxious participants. Further, the SIAS+SPS group was hypothesized to 1) rate ambiguous interpersonal items more negatively and 2) rate ambiguous pictures but *not* positive, negative, or neutral pictures as less pleasant than participants with only one anxiety subtype. Once again, the hypothesis was partially confirmed. Regardless of social anxiety severity (one versus both subtypes), participants with social anxiety interpreted ambiguous interpersonal items more negatively than non-anxious control participants. The expected absence of group differences in interpretations of non-personal events indicates

that socially-anxious participants did not uniformly rate all ambiguous events as more negative. This discrimination between personal and non-personal items suggests content specificity in the interpretation biases of those with social anxiety and consequently rules out possible response bias explanations.

This finding is in agreement with those reported by Constans et al. (1999), who similarly administered the Social Vignette and Judgment Questionnaire to high socially anxious participants and non-anxious controls, and found that socially-anxious participants showed more negative interpretations of ambiguous, interpersonal events when compared with their non-anxious counterparts. The groups in their study also failed to differ on items measuring interpretations of non-personal events, thereby demonstrating content specificity in the observed interpretation bias. The current study's finding of a specific negative interpretation bias for social scenarios using a vignette methodology is also congruent with the aforementioned findings from Amir et al. (1998), who found that compared to non-anxious individuals, individuals with generalized social phobia favored negative interpretations for ambiguous social scenarios but not non-social scenarios.

Contrary to expectation, there were no significant differences between groups with respect to their appraisals of ambiguous pictures, nor with appraisals of neutral, positive, or negative pictures. This finding stands in contrast to the overall literature discussed thus far showing that elevated anxiety leads to biased processing and interpretation of ambiguous social material. It is moreover inconsistent with previous studies that have employed pictorial stimuli to examine interpretation bias and discovered that individuals with moderate to high levels of social anxiety endorsed threatening interpretations for ambiguous facial expressions (Winton et al., 1995; Yoon and Zinbarg, 2007).

The decision to administer the affective picture rating task was influenced by well-known knowledge that the basic fear in social anxiety is about being negatively evaluated by others (APA, 2013). Since facial expression and body language are important ways of conveying evaluation, pictures of human faces and human social interaction would be expected to serve as somewhat ecologically valid stimuli for research on disambiguation bias related to social anxiety. However, an image of a face or social interaction is certainly not the same as a person with whom we are interacting and, thus, the images presented in the APRT may have been less ecologically valid than the linguistic content of the online and paper-based questionnaires. Indeed, this may be why the bulk of research demonstrating the association between anxiety and the tendency to appraise neutral/ambiguous events more negatively, has employed social vignettes, diary-like tasks or social interactions, but not digital photographs (e.g., Alden, Taylor, Mellings, & Laposa, 2008; Butler & Mathews, 1983; Constans et al., 1999; Kanai et al., 2010; Stopa & Clark, 2000). It is possible that the ability to imagine oneself in the situation is necessary for a socially anxious individual to appraise the ambiguous event as more negative or threatening compared to a non-anxious individual. Viewing photographs of others or viewing unfamiliar scenes may have prevented participants from being able to experience the image as though it were occurring to them. The pictures in the APRT, which were selected from a set of normative emotional stimuli made available by the International Affective Picture System in 1991, moreover contained somewhat outdated content which may not have resonated with participants today. It has also been proposed that cognitive processing biases are most evident for *self-relevant* situations (Rosmarin, Bourque, Antony, & McCabe, 2009). Conceivably, had idiographic images been used wherein the individual views pictures of familiar and personally-relevant scenes, different results may have emerged on the affective picture task.

**Do fear of negative evaluation and negative interpretations explain the relationship between intolerance of uncertainty and social anxiety?**

The final hypothesis predicted that fear of negative evaluation and negative interpretations would explain the relationship between intolerance of uncertainty and social anxiety. As expected, fear of negative evaluation mediated the association between intolerance of uncertainty and social interaction anxiety scores, as well as the association between intolerance of uncertainty and performance anxiety scores. The finding is consistent with the cognitive model of social anxiety proposed by Clark (2001), which was discussed earlier. Intolerance of uncertainty about the possibility of being negatively judged by others, making a bad impression, or acting in a way that could be embarrassing, may lead to a fear of such negative evaluation. This fear of negative evaluation leads the individual to perceive social situations as inherently dangerous or threatening. An individual's assumption that the audience in a particular social situation is likely to evaluate them negatively and that such an evaluation will result in dire consequences then induces anxiety or apprehension experienced in interpersonal or performance situations. The distress associated with the anxiety results in attempts to reduce it through a variety of safety behaviors (e.g., wearing cosmetics to conceal blushing), which have the counterproductive effect of increasing self-focused attention and self-monitoring while reducing attention to and processing of others' objective behaviour. This, in turn serves to maintain one's negative self-image and social anxiety in feared situations (Clark & Wells, 1995).

With respect to the latter part of the hypothesis, negative interpretations of ambiguous social information on the ASSIQ and negative interpretations of ambiguous interpersonal events on the Social Vignette/Judgment Questionnaire were found to mediate the relationship between intolerance of uncertainty and social interaction anxiety. Participants who experienced higher

intolerance of uncertainty reported more negative interpretations of ambiguous social situations and greater levels of social interaction anxiety. One possible explanation for this finding is that individuals with social interaction anxiety are so distressed by uncertainty about the possible meaning or consequences of ambiguous social information, that they automatically (and biasedly) interpret the information negatively in order to experience a swift reduction in distress. Indeed, this explanation is consistent with literature indicating that individuals with OCD engage in checking behaviors to regain a sense of certainty and with Koerner and Dugas' (2006) finding that individuals with GAD were so distressed by uncertainty that they would prefer a certain negative outcome to an uncertain one. These findings overall also lend support to the notion that intolerance of uncertainty is a transdiagnostic factor that manifests itself differently across anxiety disorders.

Within the context of social anxiety, and in keeping with Clark's (2001) cognitive theory, intolerance of uncertainty might come into play during pre-processing of an anxiogenic event, during the actual anxiety-inducing event, and during post-event processing. If intolerance of uncertainty is conceptualized as a cognitive bias that leads to anxiety, as proposed by Dugas et al. (2004), then one would expect it to be associated with specific information processing biases that occur prior to, during, and following a social situation and that are conducive to the development or persistence of social anxiety. Given that social situations are inherently ambiguous and ill-defined, high socially anxious persons may be more likely to generate negative interpretations of ambiguous social information than individuals with low or no social anxiety. As suggested by Clark (2001), the negative interpretation of social cues as signs of disapproval may be a consequence of misapplying a rule about one to one interactions.

Particularly prior to and during the feared social event, the negative interpretations are likely to have a direct anxiety-inducing effect by increasing the perceived danger and possible negative consequences of the social situation. Due to this increased perceived danger and fear of negative consequences, individuals with social anxiety are likely to engage in the aforementioned safety-seeking behaviors which could adversely affect other people's response to them (Curtis & Miller, 1985; Clark & Wells, 1995; Rapee & Heimberg, 1997). That is, they may draw others' attention to the individual with social anxiety and influence others' behaviour in a way that confirms the fears and assumptions held by the socially anxious person (Clark & McManus, 2002). Moreover, the negative interpretations of social events are likely to undermine individuals' perceived self-efficacy and increase the subjective probability of adverse outcomes in future social interactions (Stopa & Clark, 2000). The likely consequence of this sequence of experiences may be an increased tendency to avoid social situations in the future.

Although it was found that negative interpretations of ambiguous social information mediated the relationship between intolerance of uncertainty and social interaction anxiety, no such mediating effect was found for beliefs in the accuracy of negative interpretations of ambiguous social information. Moreover, negative interpretations on the ASSIQ, belief in the accuracy of negative interpretations, and interpretations of ambiguous interpersonal events on the Social Vignette did not mediate the association between intolerance of uncertainty and performance anxiety. It may be that interpretation bias is more salient in anxiety which occurs in contingent interactions, wherein individuals must continually process and be responsive to the ambiguous social cues of others, rather than noncontingent interactions wherein individuals are performing some preplanned material before others. However, this explanation fails to echo the rest of the current study's results, particularly the finding that regardless of the severity of social

anxiety symptoms (one versus both subtypes), individuals who experience social anxiety are more likely to interpret ambiguous social situations in a negative fashion *and* more likely to believe these interpretations. A more likely explanation for the failure to find the abovementioned mediating effects involves the absolute Type II error rate of the bootstrapping analysis employed. For example, MacKinnon, Lockwood, and Williams (2004) found that the "best case" Type II error rate for bootstrapping averaged across various effect size conditions with $N = 100$ was .38, which is considerably greater than the recommended Type II error rate of .20 (corresponding to statistical power of 0.80; Cohen, 1992). Thus, the fact that a rather small subsample size of 66 participants was utilized to perform the bootstrapping analyses may have resulted in a failure to detect a mediating effect that actually exists.

**Limitations and Future Directions**

The present study had several limitations. Firstly, the sample of participants was comprised exclusively of undergraduate students (the majority of whom were Caucasian), and as such the results may not be generalizable to members of the general population. Secondly, while power to detect effects was adequate for the first four hypotheses, power was arguably not sufficient for the fifth set of hypotheses. Specifically, no mediating effect of negative interpretation bias on the association between uncertainty intolerance and performance anxiety was detected. To detect the presence of an indirect effect at the broadly recommended threshold of 80% power with a medium sized effect, a sample size of at least 71 is recommended (Fritz & MacKinnon, 2007). Notable methodologists such as Shrout and Bolger (2002. p. 424), however, have suggested that bootstrapping "can be applied even when sample sizes are moderate or small, that is, in the range of 20 - 80 cases," and advocacy for this practice has been sustained by similar recommendations from other researchers and methodologists such as Preacher and Hayes

(2004). Nevertheless, it is possible that the sample size of 66 for the fifth set of hypotheses may have been insufficient to detect actual indirect effects, should they exist. Therefore, this hypothesized effect and the current negative interpretation findings will have to be confirmed in future experimental/longitudinal studies with larger samples. These studies can moreover consider computing ordinary least squares (OLS) regression-based path analysis where the relationships between the 4 mediators (or fear of negative evaluation and a measure of interpretation bias) are all modelled together. This would allow for an assessment of the shared variance within the mediation model, which is particularly useful given the shared variance among the related variables under investigation.

Thirdly, no diagnostic information was collected from the current sample. There may have been important differences associated with participants who were formally diagnosed with SAD or another anxiety disorder and their responses to the variables measured in the current study. Indeed, the IU scores of participants who reported being high in social anxiety may have been the result of a clinical diagnosis of GAD, OCD, comorbid GAD/OCD, or GAD and/or OCD symptoms that were clinically significant even in the absence of a diagnosis. To rule out this possibility or control for such symptoms and possible comorbidity, future researchers would benefit from administering measures like the Generalized Anxiety Disorder Questionnaire for DSM-IV (GAD-Q-IV; Newman et al., 2002), the Penn State Worry Questionnaire (PSWQ; Meyer, Miller, Metzger, & Borkovec, 1990), and the Obsessive Compulsive Inventory – Revised Version (OCI-R; Foa et al., 2002). Given the accumulating evidence that IU might be a transdiagnostic mechanism that contributes to the maintenance of symptoms across anxiety disorders, this would be particularly important for the obtainment of valid data. Future researchers should also explore intolerance of uncertainty and interpretations of social ambiguity

across diagnosed clinical samples, particularly persons with SAD. It may be helpful to consider including a measure of intolerance of uncertainty and negative interpretation bias as treatment outcome measures among persons treated for SAD to determine whether reductions in social anxiety symptoms correspond with reductions in levels of intolerance of uncertainty and negative interpretations of ambiguous events. Alternatively, researchers might examine whether targeted reductions in levels of intolerance of uncertainty and negative interpretations result in an amelioration of social anxiety symptoms, even in the absence of treatments targeting social anxiety.

Recent research has begun to examine the value of incorporating interpretation modification paradigms, where individuals are trained to interpret ambiguous information in a more neutral manner as opposed to a threat-related manner, into treatments for anxiety in hopes of enhancing treatment efficacy (Beard & Amin, 2008; Brosan, Hoppitt, Shelfer, Sillence, & Mackintosh, 2011). Although this area of research is beginning to expand, it appears that the role of intolerance of uncertainty as a transdiagnostic cognitive processing bias with distinct manifestations in social anxiety has not received adequate research attention. Given that intolerance of uncertainty was shown to contribute to negative appraisals of ambiguous social information to come to mind more quickly among individuals with social anxiety, the role of this cognitive phenomenon as it relates to negative interpretation biases warrants inclusion in future investigations, particularly mediation research.

One such avenue for future research pertains to the *process* by which intolerance of uncertainty may lead to or exacerbate the negative interpretations bias underlying social anxiety. While, as suggested by Clark (2001), the negative interpretation of social cues as signs of disapproval may be a consequence of misapplying a rule about one to one interactions, one may

also surmise that intolerance of uncertainty engenders "What if…?" questions that result in a negative interpretation of the social cue or scenario. For instance, when anticipating a feared social situation such as giving a presentation to a group of strangers, the uncertainty of whether one will achieve their desired level of performance may result in questions such as "What if my mind goes blank in the middle of the presentation?," "What if my face turns red while I'm talking?," "What if I don't know how to answer audience questions?," or "What if they'll think I'm not intelligent?" The uncertainty surrounding these questions and the possibility that one will not achieve their desired level of performance may be so distressing that the individual might attempt to resolve it, albeit maladaptively, by recalling past failures, generating negative images of themselves during the presentation, and by making other predictions of poor performance in front of the audience. Consequently, upon ultimately giving the presentation, the individual may already be in a self-focused processing mode defined by a reduced capacity to notice disconfirmatory evidence such as nodding and smiling, while simultaneously being more likely to notice and remember ambiguous cues (e.g., looking down at one's notes) that are then interpreted in a negative manner.

When a socially anxious individual finds themselves in a feared situation, intolerance of uncertainty might again come into play. Attempts to decipher or ruminate about the multiple possible meanings of an ambiguous social cue (e.g., an audience member occasionally breaking eye contact) in order to achieve certainty about whether that cue signifies approval or disapproval requires time and cognitive resources that one must allocate to the task at hand (i.e., the presentation). In other words, elaboration of the social material for the purpose of restoring a sense of certainty is not possible. This can arguably be said of virtually any social interaction. Since normal human communication demands cognitive resources to facilitate a well-timed

exchange of verbal and non-verbal messages with relatively short pauses or hesitations, one does not have the available resources to simultaneously engage in elaboration and re-processing of the social information they are attending to in the moment. In the case of a socially anxious individual in a feared situation, the distressing uncertainty about the meaning of ambiguous social information accompanied by an inability to reprocess and elaborate the ambiguous material "online" may lead them to make a negative interpretation of the ambiguous material in order to restore a sense of certainty and reduce distress. The individual giving a presentation might therefore interpret breaking eye contact as an indicator that the audience member finds the presentation boring in order to impose some meaning on the ambiguity of their behaviour.

Following the presentation, uncertainty about the meaning of the ambiguous social cues received during the presentation and the potential consequences of any perceived deviation from their desired level of performance may lead the socially anxious individual to embark on a painstaking review of the event, as suggested by Clark (2001). Given that the true meaning of ambiguous social cues such as looking down at one's notes and breaking eye contact cannot be ascertained, the individual may be compelled to make an arbitrary appraisal of this information. Since the review is dominated by the individual's negative self-impression, erroneous inferences about how they appear to others, and attempts to reduce the distressing uncertainty surrounding the ambiguous cues they received, they may be likely to negatively interpret the ambiguous social cues as signs of disapproval and to appraise their performance as much more negative than it truly was. As can be seen through this example, intolerance of uncertainty may play a crucial role in information processing prior to entering, during, and after leaving a feared social situation. This hypothesis should be explored in future research in order to ascertain the precise mechanisms by which this cognitive bias leads to or exacerbates negative interpretations of

ambiguous information in social anxiety. Such examination should ideally occur within experimental and longitudinal designs that also take into account additional variables (e.g., attentional bias, fear of positive evaluation, anxiety sensitivity) that have been shown to maintain social anxiety.

**Conclusion**

The results of this study indicate that an inability to tolerate the uncertainty associated with ambiguous social situations may be a critical element in the development and maintenance of social anxiety. They also add to the growing body of literature which has demonstrated that intolerance of uncertainty is a transdiagnostic feature across anxiety disorders. Regression analyses revealed that intolerance of uncertainty explained unique variance in social interaction and performance anxiety beyond fear of negative evaluation, anxiety sensitivity, and depression, while also being a significant predictor of social anxiety symptoms. Concerning its impact among different clinical groups, it was found to have an additive and specific effect on social anxiety severity, with increasing levels of uncertainty intolerance corresponding with more intensified symptoms of social anxiety. In contrast, a stable tendency to appraise ambiguous social events negatively irrespective of anxiety severity level was also found, suggesting that negative interpretation bias is a core cognitive appraisal process in social anxiety. To this author's knowledge, no studies to date have explored a theoretical model wherein the relationship between intolerance of uncertainty and social anxiety is mediated by fear of negative evaluation and negative interpretation bias. Results from bootstrapping analyses indicated that fear of negative evaluation mediated the association between intolerance of uncertainty and social interaction anxiety scores, as well as the association between uncertainty intolerance and social phobia scores. Additionally, negative interpretations of ambiguous social information were

found to mediate the relationship between intolerance of uncertainty and social interaction anxiety, but not the relationship between uncertainty intolerance and performance anxiety. Future researchers should explore these variables across diagnosed clinical samples, particularly individuals with SAD, in larger experimental and longitudinal investigations. Finally, and on a clinical note, it is hoped that the current findings make apparent that one function of cognitive behavior therapy should be to not only enhance tolerance for uncertainty and decrease threatening interpretations, but also to shape a positive interpretation bias in individuals experiencing social anxiety.

**References**

Alden, L. E., Taylor, C. T., Mellings, T. M. J. B., & Laposa, J. M. (2008). Social anxiety and the interpretation of positive social events. *Journal of Anxiety Disorders, 22,* 577-590.

Amir, N., Foa, E. B., & Coles, M. E. (1998). Negative interpretation bias in social phobia. *Behaviour Research and Therapy, 36*, 945–957.

Anderson, E. R., & Hope, D. A. (2009). The relationship among social phobia, objective and perceived physiological reactivity, and anxiety sensitivity in an adolescent population. *Journal of Anxiety Disorders, 23*, 18–26.

Antony, M. M, & Rowa, K. (2008). *Social anxiety disorder*. Ashland, OH: Hogrefe & Huber Publishers.

Antony, M. M., Bieling, P. J., Cox, B. J., Enns, M. W., & Swinson, R. P. (1998). Psychometric properties of the 42-item and 21-item versions of the depression anxiety stress scales in clinical groups and a community sample. *Psychological Assessment, 10*(2), 176-181. doi:http://dx.doi.org/10.1037/1040-3590.10.2.176

American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: Author.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: Author.

Asmundson, G. J. G., & Stein, M. B. (1994). Selective processing of social threat in patients with generalized social phobia: Evaluation using a dot-probe paradigm. *Journal of Anxiety Disorders, 8*(2), 107-117. Retrieved from http://ezproxy.lakeheadu.ca/login?url=http://search.proquest.com/docview/618504371?accountid=11956

Beard, C., & Amir, N. (2008). A multi-session interpretation modification program: Changes in interpretation and social anxiety symptoms. *Behaviour Research and Therapy, 46*(10), 1135-1141. doi:10.1016/j.brat.2008.05.012

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

Birrell, J., Meares, K., Wilkinson, A., & Freeston, M. (2011). Toward a definition of intolerance of uncertainty: A review of factor analytical studies of the intolerance of uncertainty scale. *Clinical Psychology Review, 31*(7), 1198-1208. doi:10.1016/j.cpr.2011.07.009

Boelen, P. A., & Reijntjes, A. (2009). Intolerance of uncertainty and social anxiety. *Journal of Anxiety Disorders, 23*(1), 130-135. doi:http://dx.doi.org/10.1016/j.janxdis.2008.04.007

Boelen, P. A., Vrinssen, I., & van Tulder, F. (2010). Intolerance of uncertainty in adolescents: Correlations with worry, social anxiety, and depression. *Journal of Nervous and Mental Disease, 198*(3), 194-200. doi:http://dx.doi.org/10.1097/NMD.0b013e3181d143de

Brosan, L., Hoppitt, L., Shelfer, L., Sillence, A., & Mackintosh, B. (2011). Cognitive bias modification for attention and interpretation reduces trait and state anxiety in anxious patients referred to an out-patient service: Results from a pilot study. *Journal of Behavior Therapy and Experimental Psychiatry, 42*(3), 258-264. doi:10.1016/j.jbtep.2010.12.006

Buhr, K., & Dugas, M. J. (2002). The intolerance of uncertainty scale: Psychometric properties of the english version. *Behaviour Research and Therapy, 40*(8), 931-945. doi:10.1016/S0005-7967(01)00092-4

Butler, G., & Mathews, A. (1983). Cognitive processes in anxiety. *Advances in Behaviour Research and Therapy, 5,* 51-62.

Carleton, R. N., Collimore, K. C., & Asmundson, G. J. G. (2010). "It's not just the judgements—It's that I don't know": Intolerance of uncertainty as a predictor of social anxiety. *Journal of Anxiety Disorders, 24*(2), 189-195. doi:http://dx.doi.org/10.1016/j.janxdis.2009.10.007

Carleton, R. N., McCreary, D. R., Norton, P. J., & Asmundson, G. J. G. (2006). Brief Fear of Negative Evaluation Scale-Revised. *Depression and Anxiety, 23*, 297-303. doi:10.1002/da. 20142

Carleton, R. N., Norton, P. J., & Asmundson, G. J. (2007). Fearing the unknown: A short version of the Intolerance of Uncertainty Scale (IUS-12). *Journal of Anxiety Disorders, 21*, 105–117.

Carleton, R. N., Sharpe, D., & Asmundson, G. J. G. (2007). Anxiety sensitivity and intolerance of uncertainty: Requisites of the fundamental fears? *Behaviour Research and Therapy, 45*(10), 2307-2316. doi:http://dx.doi.org/10.1016/j.brat.2007.04.006

Clark D. M. (2001). A cognitive perspective on social phobia. In W. R. Crozier & L. E. Alden (Eds.). *International Handbook of Social Anxiety: Concepts, Research and Interventions Relating to the Self and Shyness* (pp. 405 – 430). Chichester: John Wiley & Sons.

Clark, D. M., & McManus, F. (2002). Information processing in social phobia. *Biological Psychiatry, 51*(1), 92-100. doi:10.1016/S0006-3223(01)01296-3

Cohen, J. (1992). A power primer. *Psychological Bulletin, 112,* 155–159. doi:10.1037/0033-2909.112.1.155

Curtis, R. C., & Miller, K. (1985). Believing another likes or dislikes you: Behaviours making the beliefs come true. *Journal of Personality and Social Psychology, 51*, 284-290.

Constans, J. I., Penn, D. L., Ihen, G. H., & Hope, D. A. (1999). Interpretive biases for ambiguous stimuli in social anxiety. *Behaviour Research and Therapy,37*(7), 643-651. Retrieved

from http://ezproxy.lakeheadu.ca/login?url=http://search.proquest.com/docview/619410316?accountid=11956

de Bruin, G. O., Rassin, E., van, d. H., & Muris, P. (2006). Psychometric properties of a dutch version of the intolerance of uncertainty scale. *Netherlands Journal of Psychology, 62*(2), 91-97. doi:http://dx.doi.org/10.1007/BF03061055

Deschenes, S. S., Dugas, M. J., Radomsky, A. S., & Buhr, K. (2010). Experimental manipulation of beliefs about uncertainty: Effects on interpretive processing and access to threat schemata. *Journal of Experimental Psychopathology,1*(1), 52-70. doi:http://dx.doi.org/10.5127/jep.008510

Dugas, M. J., Gosselin, P., & Ladouceur, R. (2001). Intolerance of uncertainty and worry: Investigating specificity in a nonclinical sample. *Cognitive Therapy and Research, 25*(5), 551-558. Retrieved fromhttp://resolver.scholarsportal.info/resolve/01475916/v25i0005/551_iouawisians

Dugas, M., & Ladouceur, R. (2000). Treatment of gad. *Behavior Modification, 24*(5), 635-657. doi:10.1177/0145445500245002

Dugas, M. J., Hedayati, M., Karavidas, A., Buhr, K., Francis, K., & Phillips, N. A. (2005). Intolerance of uncertainty and information processing: Evidence of biased recall and interpretations. *Cognitive Therapy and Research, 29*(1), 57-70. doi:10.1007/s10608-005-1648-9

Dugas, M. J., Schwarzt, A., & Francis, K. (2004). Intolerance of uncertainty, worry, and depression. *Cognitive Therapy and Research, 28*, 835–842.

Foa, E. B., Huppert, J. D., Leiberg, S., Langner, R., Kichic, R., Hajcak, G., & Salkovskis, P. M. (2002). The obsessive-compulsive inventory: Development and validation of a short version. *Psychological Assessment, 14*(4), 485-496. doi:http://dx.doi.org.ezproxy.lakeheadu.ca/10.1037/1040-3590.14.4.485

Freeston, M. H., Rhéaume, J., Letarte, H., Dugas, M. J., & Ladouceur, R. (1994). Why do people worry? *Personality and Individual Differences, 17*(6), 791-802. doi:10.1016/0191-8869(94)90048-5

Fritz, M. S., & MacKinnon, D. P. (2007). Required sample size to detect the mediated effect. *Psychological Science, 18*(3), 233-239, doi:10.1111/j.1467-9280.2007.01882.x.

Grant, D. M., Beck, J. G., & Davila, J. (2007). Does anxiety sensitivity predict symptoms of panic, depression, and social anxiety? *Behaviour Research and Therapy, 45*(9), 2247-2255. doi:10.1016/j.brat.2007.02.008

Hassin, R. R., Aviezer, H., & Bentin, S. (2013). Inherently ambiguous: Facial expressions of emotions, in context. *Emotion Review, 5*(1), 60-65. doi:http://dx.doi.org/10.1177/1754073912451331

Hayes, A. F. (2012). PROCESS: A versatile computational tool for observed variable mediation, moderation, and conditional process modeling [White paper]. Retrieved from http://www.afhayes.com/public/process2012.pdf

Henry, J. D., & Crawford, J. R. (2005). The short-form version of the depression anxiety stress scales (DASS-21): Construct validity and normative data in a large non-clinical sample. *The British Journal of Clinical Psychology, 44*, 227-39. Retrieved from http://ezproxy.lakeheadu.ca/login?url=http://search.proquest.com/docview/218632664?accountid=11956

Holaway, R. M., Heimberg, R. G., & Coles, M. E. (2006). A comparison of intolerance of uncertainty in analogue obsessive-compulsive disorder and generalized anxiety disorder. *Journal of Anxiety Disorders, 20*(2), 158-174. doi:http://dx.doi.org/10.1016/j.janxdis.2005.01.002

Hook, J. N., & Valentiner, D. P. (2002). Are specific and generalized social phobias qualitatively distinct? *Clinical Psychology: Science and Practice, 9*(4), 379-395. Retrieved from http://resolver.scholarsportal.info/resolve/09695893/v09i0004/379_asagspqd

Huppert, J. D., Foa, E. B., Furr, J. M., Filip, J. C., & Mathews, A. (2003). Interpretation bias in social anxiety: A dimensional perspective. *Cognitive Therapy and Research, 27*(5), 569-577. Retrieved from http://resolver.scholarsportal.info/resolve/01475916/v27i0005/569_ibisaadp

Kanai, Y., Sasagawa, S., Chen, J., Shimada, H., & Sakano, Y. (2010). Interpretation bias for ambiguous social behavior among individuals with high and low levels of social anxiety. *Cognitive Therapy and Research, 34*(3), 229-240. doi:http://dx.doi.org/10.1007/s10608-009-9273-7

Koerner, N., & Dugas, M. J. (2006). A cognitive model of generalized anxiety disorder: The role of intolerance of uncertainty. In G. C. L. Davey, & A. Wells (Eds.), *Worry and its psychological disorders: Theory, assessment and treatment* (pp. 201–216). Chichester: John Wiley & Sons Ltd.

Koerner, N., & Dugas, M. J. (2008). An investigation of appraisals in individuals vulnerable to excessive worry: The role of intolerance of uncertainty. *Cognitive Therapy and Research, 32*(5), 619-638. doi:10.1007/s10608-007-9125-2

Koerner, N., Hedayati, M., & Dugas, M. J. (2004, September). *Intolerance of uncertainty and processing of ambiguous and emotionally-evocative pictures*. Poster presented at the European Association of Behavioural and Cognitive Therapies, Manchester, UK.

Ladouceur, R., Blais, F., Freeston, M. H., & Dugas, M. J. (1998). Problem solving and problem orientation in generalized anxiety disorder. *Journal of Anxiety Disorders, 12*(2), 139-152. Retrieved fromhttp://resolver.scholarsportal.info/resolve/08876185/v12i0002/139_psapoigad

Ladouceur, R., Gosselin, P., & Dugas, M. J. (2000). Experimental manipulation of intolerance of uncertainty: A study of a theoretical model of worry. *Behaviour Research and Therapy, 38*(9), 933-941. doi:10.1016/S0005-7967(99)00133-3

Ladouceur, R., Talbot, F., & Dugas, M. (1997). Behavioral expressions of intolerance of uncertainty in worry. *Behavior Modification, 21*(3), 355-371. doi:10.1177/01454455970213006

Lang, P.J., Bradley, M.M., & Cuthbert, B.N. (2008). *International affective picture system (IAPS): Affective ratings of pictures and instruction manual. Technical Report A-8.* University of Florida, Gainesville, FL.

Le Blanc, A., Bruce, L., Heimberg, R., Hope, D., Blanco, C., Schneier, F., & Liebowitz, M. (2014). Evaluation of the psychometric properties of two short forms of the social interaction anxiety scale and the social phobia scale. *Assessment, 21*(3), 312-323. doi:10.1177/1073191114521279

Leary, M. R. (1983). A brief version of the fear of negative evaluation scale.*Personality and Social Psychology Bulletin, 9*(3), 371-375. Retrieved from

http://ezproxy.lakeheadu.ca/login?url=http://search.proquest.com/docview/616874170?accountid=11956

Lovibond, S. H., & Lovibond, P. F. (1995). *Manual for the Depression Anxiety Stress Scales* (2nd ed.). Sydney, Australia: The Psychology Foundation of Australia.

Mattick, R. P., & Clarke, J. C. (1998). Development and validation of measures of social phobia scrutiny fear and social interaction anxiety. Unpublished Manuscript.

Mattick, R. P., & Clarke, J. C. (1998). Development and validation of measures of social phobia scrutiny fear and social interaction anxiety. *Behavior Research and Therapy, 36*, 455–470.

McEvoy, P. M., & Mahoney, A. E. J. (2011). Achieving certainty about the structure of intolerance of uncertainty in a treatment-seeking sample with anxiety and depression. *Journal of Anxiety Disorders, 25*(1), 112-122. doi:10.1016/j.janxdis.2010.08.010

McEvoy, P. M., & Mahoney, A. E. J. (2012). To be sure, to be sure: Intolerance of uncertainty mediates symptoms of various anxiety disorders and depression. *Behavior Therapy, 43*(3), 533-545. doi:10.1016/j.beth.2011.02.007

MacKinnon, D. P., Lockwood, C. M., & Williams, J. (2004). Confidence limits for the indirect effect: Distribution of the product and resampling methods. *Multivariate Behavioral Research, 39,* 99-128. doi:10.1207/s15327906mbr3901_4

Mellings, T. M. B., & Alden, L. E. (2000): Cognitive processes in social anxiety: The effects of self-focus, rumination and anticipatory processing. *Behavior Research and Therapy, 38*, 243–257.

Moser, J. S., Hajcak, G., Huppert, J. D., Foa, E. B., & Simons, R. F. (2008). Interpretation bias in social anxiety as detected by event-related brain potentials. *Emotion, 8*(5), 693-700. doi:http://dx.doi.org/10.1037/a0013173

Moser, J. S., Huppert, J. D., Foa, E. B., & Simons, R. F. (2012). Interpretation of ambiguous social scenarios in social phobia and depression: Evidence from event-related brain potentials. *Biological Psychology, 89*(2), 387-397. doi:http://dx.doi.org/10.1016/j.biopsycho.2011.12.001

Newman, M. G., Zuellig, A. R., Kachin, K. E., Constantino, M. J., Przeworski, A., Erickson, T., & Cashman-McGrath, L. (2002). Preliminary reliability and validity of the generalized anxiety disorder questionnaire-IV: A revised self-report diagnostic measure of generalized anxiety disorder. *Behavior Therapy, 33*(2), 215-233. doi:http://dx.doi.org/10.1016/S0005-7894(02)80026-0

Nichols, K. A. (1974). Severe social anxiety. *British Journal of Medical Psychology, 47*(4), 301-306. Retrieved from http://ezproxy.lakeheadu.ca/login?url=http://search.proquest.com/docview/615985077?accountid=11956

Norton, P. J. (2005). A psychometric analysis of the intolerance of uncertainty scale among four racial groups. *Journal of Anxiety Disorders, 19*(6), 699-707. doi:10.1016/j.janxdis.2004.08.002

Norton, G. R., Cox, B. J., Hewitt, P. L., & McLeod, L. (1997). Personality factors associated with generalized and non-generalized social anxiety. *Personality and Individual Differences, 22*(5), 655-660. Retrieved from

http://ezproxy.lakeheadu.ca/login?url=http://search.proquest.com/docview/619069246?accountid=11956

Peters, L. (2000). Discriminant validity of the Social Phobia and Anxiety Inventory (SPAI), the Social Phobia Scale (SPS) and the Social Interaction Anxiety Scale (SIAS). *Behaviour Research and Therapy*, *38*, 943-950. doi:10.1016/S0005-7967(99)00131-X

Peters, L., Sunderland, M., Andrews, G., Rapee, R. M., & Mattick, R. P. (2012). Development of a short form social interaction anxiety (SIAS) and social phobia scale (SPS) using nonparametric item response theory: The SIAS-6 and the SPS-6. *Psychological Assessment, 24*(1), 66-76. doi:http://dx.doi.org/10.1037/a0024544

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

Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments & Computers, 36*(4), 717-731. doi:http://dx.doi.org/10.3758/BF03206553

Rapee, R. M., & Heimberg, R. G. (1997). A cognitive-behavioral model of anxiety in social phobia. *Behaviour Research and Therapy, 35*, 741-756.

Rector, N. A., Szacun-Shimizu, K., & Leybman, M. (2007). Anxiety sensitivity within the anxiety disorders: Disorder-specific sensitivities and depression comorbidity. *Behaviour Research and Therapy, 45*(8), 1967-1975. doi:http://dx.doi.org/10.1016/j.brat.2006.09.017

Ruscio, A. M. (2010). The latent structure of social anxiety disorder: Consequences of shifting to a dimensional diagnosis. *Journal of Abnormal Psychology, 119*(4), 662-671. Retrieved from

http://ezproxy.lakeheadu.ca/login?url=http://search.proquest.com/docview/755206606?accountid=11956

Rosmarin, D., Bourque, L., Antony, M., & McCabe, R. (2009). Interpretation bias in panic disorder: Self-referential or global? *Cognitive Therapy and Research, 33*(6), 624-632. doi:10.1007/s10608-009-9249-7

Shrout, P. E., & Bolger, N. (2002). Mediation in experimental and nonexperimental studies: New procedures and recommendations. *Psychological Methods, 7*, 422-445. doi:10.1037/1082-989X.7.4.422

Sobel, M. E. (1982) Asymptotic confidence intervals for indirect effects in structural equation models. In S. Leinhardt (Ed), *Sociological Methodology 1982* (p. 290–312). San Francisco (CA): Jossey-Boss.

Stopa, L., & Clark, D. M. (2000). Social phobia and interpretation of social events.*Behaviour Research and Therapy, 38*(3), 273-283. Retrieved from http://ezproxy.lakeheadu.ca/login?url=http://search.proquest.com/docview/619521138?accountid=11956

Steketee, G., Frost, R. O., & Cohen, I. (1998). Beliefs in obsessive-compulsive disorder. *Journal of Anxiety Disorders, 12*(6), 525-537. doi:10.1016/S0887-6185(98)00030-9

Smith, R. E., & Sarason, I. G. (1975). Social anxiety and the evaluation of negative interpersonal feedback. *Journal of Consulting and Clinical Psychology, 43*(3), 429. doi:http://dx.doi.org/10.1037/h0076855

Spielberger, C.D., Gorsuch, R.L., & Lushene, R.E. (1970). *Manual for the State-Trait Anxiety Inventory*. Palo Alto: Consulting Psychologists Press.

Taylor, S., Koch, W. J., Woody, S., & McLean, P. (1996). Anxiety sensitivity and depression: How are they related? *Journal of Abnormal Psychology, 105*(3), 474-479. doi:10.1037//0021-843X.105.3.474

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

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

Turner, S. M., Beidel, D. C., Dancu, C. V., & Stanley, M. A. (1989). An empirically derived inventory to measure social fears and anxiety: The Social Phobia and Anxiety Inventory. *Psychological Assessment*, *1*, 35-40. doi:10.1037/1040-3590.1.1.35

Vriends, N., Becker, E. S., Meyer, A., Williams, S. L., Lutz, R., & Margraf, J. (2007). Recovery from social phobia in the community and its predictors: Data from a longitudinal epidemiological study. *Journal of Anxiety Disorders, 21*(3), 320-337. doi:http://dx.doi.org/10.1016/j.janxdis.2006.06.005

Watson, D., & Friend, R. (1969). Measurement of social-evaluative anxiety. *Journal of Consulting and Clinical Psychology, 33*(4), 448-457. doi:http://dx.doi.org/10.1037/h0027806

Weeks, J. W., Heimberg, R. G., Fresco, D. M., Hart, T. A., Turk, C. L., Schneier, F. R., & Liebowitz, M. R. (2005). Empirical validation and psychometric evaluation of the brief fear of negative evaluation scale in patients with social anxiety disorder. *Psychological Assessment, 17*(2), 179-190. doi:http://dx.doi.org/10.1037/1040-3590.17.2.179

Wells, A. (1999). A cognitive model of generalized anxiety disorder. *Behavior Modification, 23*(4), 526-555. doi:10.1177/0145445599234002

White, K. S., & Barlow, D. H. (2002). Panic disorder and agoraphobia. In D. H. Barlow (ed.), *Anxiety and its disorders: The nature and treatment of anxiety and panic* (2nd ed). New York: Guilford Press.

Whiting, S. E., Jenkins, W. S., May, A. C., Rudy, B. M., Davis, T. E., & Reuther, E. T. (2014). The role of intolerance of uncertainty in social anxiety subtypes. *Journal of Clinical Psychology, 70*(3), 260-272. doi:http://dx.doi.org/10.1002/jclp.22024

Winton, E. C., Clark, D. M., & Edelmann, R. J. (1995). Social anxiety, fear of negative evaluation and the detection of negative emotion in others. *Behaviour Research and Therapy, 33*(2), 193-196. Retrieved from http://ezproxy.lakeheadu.ca/login?url=http://search.proquest.com/docview/618634476?accountid=11956

Yoon, K. L., & Zinbarg, R. E. (2007). Threat is in the eye of the beholder: Social anxiety and the interpretation of ambiguous facial expressions. *Behaviour Research and Therapy, 45*(4), 839-847. doi:http://dx.doi.org/10.1016/j.brat.2006.05.004

Yoon, K. L., & Zinbarg, R. E. (2008). Interpreting neutral faces as threatening is a default mode for socially anxious individuals. *Journal of Abnormal Psychology, 117*(3), 680-685. doi:http://dx.doi.org/10.1037/0021-843X.117.3.680

Zinbarg, R. E., Barlow, D. H., & Brown, T. A. (1997). Hierarchical structure and general factor saturation of the anxiety sensitivity index: Evidence and implications. *Psychological Assessment, 9*(3), 277-284. doi:http://dx.doi.org/10.1037/1040-3590.9.3.277

## Appendix A: Recruitment Mass Email - Pilot Session

Dear Graduate Students,

You are invited to participate in a brief pilot session testing a novel computerized measure of information processing in social anxiety—the Affective Picture Rating Task. The purpose of the session is to determine the validity and reliability of the instrument. The research is being conducted by myself under the supervision of Dr. Amanda Maranzan.

If you choose to participate, you will be invited to complete one (1) twenty minute session in the Mental Health Research Lab. During the visit, you will view a number of photographs depicting various individuals and social scenarios. You will be asked to rate the pleasantness of each picture using a predetermined scale (via the keyboard) and to classify each picture into one of four discrete categories.

Please contact me via email or by telephone (416-732-3911) and I will be happy to arrange a mutually agreeable date/time to complete the Affective Picture Rating Task. I am aware that your schedules are quite busy and would really appreciate your participation.

Sincerely,

Flavia Spiroiu
fspiroiu@lakeheadu.ca
(416) 732-3911

Dr. Amanda Maranzan
kamaranz@lakeheadu.ca
(807) 343-8322

Lakehead UNIVERSITY

EXCEPTIONAL. UNCONVENTIONAL.

## Appendix B: Participant Information Letter - Pilot Session

Dear Prospective Participant,

You are invited to participate in a brief pilot session testing a novel computerized measure of information processing in social anxiety—the Affective Picture Rating Task. The purpose of the session is to determine the validity and reliability of the instrument. The research is being conducted by Flavia Spiroiu (MA student) under the supervision of Dr. Amanda Maranzan (Psychology professor).

### Description of the Study

The session will consist of one twenty minute visit to the Mental Health Research Lab. During the laboratory visit, you will view a number of photographs depicting various individuals and social scenarios. You will be asked to rate the pleasantness of each picture using a predetermined scale (via the keyboard) and to classify each picture into one of four discrete categories.

### Potential Risks or Discomforts

There is minimal risk involved if you agree to participate in this session. You understand that you may experience some discomfort while viewing some of the pictures. You have the right to refuse or discontinue participation at any time.

### Potential Benefits of the Pilot Study to You or Others

It is possible that you will not receive any direct benefits from participating in this session. However, you may develop a better understanding of research methodology, and your participation will help us further develop this measure.

### Confidentiality

To ensure your anonymity, your data will be assigned a number at the beginning of the session and all of the data for you will be coded under this number. Thus, all your responses to the affective picture rating task and all computer files that contain the data you generate will be associated with the assigned number and not with your identity. The informed consent agreement will be stored in a locked storage space in the Mental Health Research Lab. The researcher conducting the study and the supervisor will be the sole individuals with access to the collected data. The data will be will be retained for 5 years, after which point it will be destroyed by secure and confidential disposal. Only group findings will be reported in publications and presentations arising from this research.

**Voluntary Nature of Participation**

Participation in this session is voluntary. Your choice of whether or not to participate will not influence your future relations with Lakehead University. If you decide to participate, you are free to withdraw your consent and to stop your participation at any time. Your right to withdraw your consent also applies to our use of your data. Should you decide that you do not want us to retain or analyze data that you have provided during the session, please feel free to notify us. If at any point during or after this session you would like to speak to a mental health professional, feel free to contact the Student Health and Counseling Centre at (807) 343-8361 (Prettie Residence). A list of additional local/community resources is provided at the end of this information letter.

**Questions about the Study**

If you have any questions about the research now or at a later time, please contact Flavia Spiroiu, H.B.A., Graduate Student, Department of Psychology, Lakehead University, 416-732-3911. You may also contact Dr. Amanda Maranzan, Ph.D., Associate Professor, Department of Psychology, Lakehead University, (807) 343-8322. If you would like any information about the results of the study once it is completed, please contact Flavia Spiroiu. Alternatively, you are welcome to attend the researcher's thesis defense.

This pilot session has been reviewed and approved by the Lakehead University Research Ethics Board. If you have any questions related to the ethics of the research and would like to speak to someone outside of the research team, please contact Sue Wright at the Research Ethics Board at 807-343-8283 or research@lakeheadu.ca.

Thank you for considering participating in this session.

Sincerely,

Flavia Spiroiu
fspiroiu@lakeheadu.ca
(416) 732-3911

Dr. Amanda Maranzan
kamaranz@lakeheadu.ca
(807) 343-8322

MENTAL HEALTH RESOURCES
*please print this page for your reference*

**Lakehead University Resource**

**Counseling Services**
Lakehead University
955 Oliver Road
Thunder Bay, Ontario, P7B 5E1
(807) 343-8361

**Community Resources**

**Good2Talk**
1-866-925-5454
Good2Talk is a free, confidential helpline providing professional counselling and information and referrals for mental health, addictions and well-being to post-secondary students in Ontario, 24/7/365.

**Thunder Bay Crisis Response Service**
(807) 346-8282
Mental health workers provide support 24 hours a day and can help you to access further services, as needed

**Thunder Bay Counselling Centre**
(807) 684-1880
Mental health workers provide counselling to individuals, couples, and families

**Beendigen Crisis Line**
(807) 346-HELP
(807) 346-4357

**Mental Health Assessment Team**
At the Emergency Department (Thunder Bay Regional Health Sciences Centre)
Mental health workers will assess your emergency mental health needs

**Thunder Bay Sexual Assault/Abuse Crisis Service**
(807) 344-4502
Crisis workers are available 24 hours to give immediate help, as well as follow-up counseling, court advocacy and other services. Phone support for women who have experienced current ot past assault or abuse.

**Walk-in Counselling Services** –Wednesdays from 12 noon to 8 pm
-1st & 3rd Wednesday each month at –Thunder Bay Counselling Centre – 544 Winnipeg Avenue
-2nd & 4th Wednesday each month at Children's Centre Thunder Bay – 283 Lisgar Street

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## Appendix C: Participant Consent Agreement - Pilot Session

By consenting to participate in this research, I indicate that I have read the "Participant Information Letter" and I have had the opportunity to receive satisfactory answers from the researchers concerning any questions that I might have about my participation in the **Pilot Session of the Affective Picture Rating Task**. I understand and agree to the following:

- I understand all of the information in the "Information Letter."
- I am a volunteer and can withdraw at any time from this session without penalty or consequence.
- There are no anticipated physical risks associated with participation in this session. Should I experience any personal distress or discomfort during or following my participation, I know that I may personally contact the Health and Counselling Centre at Lakehead University (Thunder Bay campus) to speak to a mental health professional, and/or utilize the list of community resources provided to me.
- My personal information will be securely stored in the Mental Health Research Lab at Lakehead University for 5 years as per University regulations.
- My personal information will remain anonymous should any publications or public presentations come out of this project.
- I may receive a summary of this research upon completion if I so request.
- I give my permission to be contacted by telephone and/or email for the purpose of participation in this session.

I agree with the above statements and consent to participate in this pilot session.

_____

Full Name of Participant (please print)

_____ _____

Signature of Participant Date

_____ _____

Signature of Experimenter who Obtained Informed Consent Date

## Appendix D: Recruitment Mass Email - Study

Dear Prospective Participant,

My name is Flavia Spiroiu and I am a graduate student working with Dr. Amanda Maranzan in the Department of Psychology. We are seeking students to participate in a research study entitled "Interpreting Social Information: The Role of Uncertainty and Cognitive Processing Styles." The purpose of this study is to examine the role of uncertainty and other cognitive-emotional processing variables (e.g., fear of negative evaluation) in the perception and interpretation of social information/situations.

If you choose to participate in the study, you will be invited to complete two sessions:
**Part 1 (Online)**: Complete a package of online questionnaires regarding uncertainty and your thoughts, emotions, and behaviours in a variety of social contexts. Session 1 will take approximately 30-45 minutes. You will receive 1 bonus point toward your grade and one entry into a draw to win a $50 (CAD) Visa gift card.

**Part 2 (In Lab)**: Visit the Mental Health Research Lab located in the Lakehead University Psychology department for a one-hour session. During the lab session, you will be asked to read a short vignette depicting a meeting between two university students. After you have read the vignette, you will complete a brief questionnaire asking about your interpretation of events that were presented in the story. You will then complete a questionnaire that examines the ways in which different people perceive various social scenarios. Finally, you will complete a computerized affective picture rating task (APRT) in which you will rate the pleasantness of various images depicting social stimuli. In return for your participation in Part 2, you will receive 1.25 bonus points and 1 entry into a draw to win a $100 (CAD) Visa gift card.

Should you be interested, please click on the following link to read more information about the study and complete Part 1: https://lupsych.sona-systems.com/default.aspx?p_return_experiment_id=143. You will then be redirected to the Sona system where you may select a time slot of your choice for Part 2.

Your participation is extremely valuable to us and we look forward to your involvement! Sincerely,

Flavia Spiroiu
fspiroiu@lakeheadu.ca
(416) 732-3911

Dr. Amanda Maranzan
kamaranz@lakeheadu.ca
(807) 343-8322

**Appendix E: Recruitment Flyer**

# SEEKING PARTICIPANTS TO TAKE PART IN THE STUDY:

## *INTERPRETING SOCIAL INFORMATION: THE ROLE OF UNCERTAINTY AND COGNITIVE PROCESSING STYLES*

**One online session** lasting about 45 minutes and **one laboratory visit** lasting about 60 minutes.

**Part 1:** Complete online questionnaires regarding uncertainty and cognitive processing variables

- **1 BONUS POINT & 1 ENTRY INTO A DRAW TO WIN A $50 VISA GIFT CARD.**

**Part 2 (In-Lab):** Read a short story, complete two paper questionnaires, and complete a computerized affective picture rating task:

- **1.25 BONUS POINTS & 1 ENTRY INTO A DRAW TO WIN A $100 VISA GIFT CARD.**

For more information or to volunteer for this study, please contact:
Flavia Spiroiu, Department of Psychology, at **fspiroiu@lakeheadu.ca or go to: https://lupsych.sona-systems.com/default.aspx?p_return_experiment_id=143**

## Appendix F: Study Description on SONA Online Management System

**Part 1: Interpreting Social Information: The Role of Uncertainty and Cognitive Processing Styles**

This study aims to examine the role of uncertainty and other cognitive-emotional processing variables (e.g., fear of negative evaluation) in the perception and interpretation of social information and situations. It constitutes part 1 of a two-part investigation. During this study (session 1), you will complete online questionnaires regarding uncertainty and your thoughts, emotions, and behaviors in a variety of social contexts. Session 1 will take approximately 45 minutes. You will receive 1 bonus point toward your grade in an eligible Psychology course and 1 entry into a draw to win a $50 (CAD) Visa gift card. Given that our study is a 2 part study, we kindly ask that you do not sign up for part 1 only. Please sign up for session 2 (laboratory visit) on SONA as soon as you have completed part 1. COMPLETION OF BOTH PARTS IS VERY IMPORTANT IN ORDER TO OBTAIN VALID AND MEANINGFUL RESULTS.

**Part 2: Interpreting Social Information: The Role of Uncertainty and Cognitive Processing Styles**

This study aims to examine the role of uncertainty and other cognitive-emotional processing variables (e.g., fear of negative evaluation) in the perception and interpretation of social information and situations. During the laboratory visit, you will be asked to read a short vignette depicting a meeting between two university students. After you have read the vignette, you will complete a brief questionnaire asking about your interpretation of events that were presented in the story. You will then complete a questionnaire that examines the ways in which different people look at various social scenarios. Finally, you will complete a computerized affective picture rating task (APRT) in which you will rate the pleasantness of various images depicting social stimuli. In return for your participation in Session 2, you will receive 1.25 bonus points and 1 entry into a draw to win a $100 (CAD) Visa gift card. COMPLETION OF BOTH PARTS IS VERY IMPORTANT IN ORDER TO OBTAIN VALID AND MEANINGFUL RESULTS.

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## Appendix G: Participant Information Letter - Study

Dear Prospective Participant,

You are kindly invited to participate in the research study "Interpreting Social Information: The Role of Uncertainty and Cognitive Processing Styles." The purpose of the study is to to examine the influence of uncertainty and other cognitive-emotional processing variables (e.g., fear of negative evaluation) in the perception and interpretation of social information and situations. The research is being conducted by Flavia Spiroiu (MA student) under the supervision of Dr. Amanda Maranzan (Psychology professor). If you choose to participate in this study, it is important that you read the following information.

### Description of the Study

The study will consist of two (2) parts. During part one, you will first be asked to provide your name and email. This information will be used to connect your responses from part one with your responses from part two of the study. You will then complete a package of online questionnaires regarding uncertainty and your thoughts, emotions, and behaviors in a variety of social contexts. Session one will take approximately 45 minutes. By participating in Part one of this study, you will receive 1 bonus point toward your grade in an eligible Psychology course and 1 entry into a draw to win a $50 (CAD) Visa gift card. After you complete the online questionnaires, you may select a time to visit the laboratory in the Department of Psychology for the second portion of the study, which will take approximately 1 hour of your time.

During the laboratory visit (part two), you will be asked to read a short vignette depicting a meeting between two university students. After you have read the vignette, you will complete a brief questionnaire asking about your interpretation of events that were presented in the story. You will then complete a questionnaire that examines the ways in which different people look at various social scenarios. Finally, you will complete a computerized affective picture rating task (APRT) in which you will rate the pleasantness of various images depicting social stimuli. In return for your participation in Part two, you will receive 1.25 bonus points and 1 entry into a draw to win a $100 (CAD) Visa gift card.

### Potential Risks or Discomforts

There is minimal risk involved if you agree to participate in this study. You understand that you may experience some negative or unpleasant emotions when completing the questionnaires. You have the right to refuse or discontinue participation at any time. If you decide to stop participating, you will still receive your course credits.

**Potential Benefits of the Study to You or Others**

It is possible that you will not receive any direct benefits from participating in this study, other than the course credits mentioned above. However, you may derive benefit from the self-assessments, as they may increase your awareness of your thoughts, emotions, and behaviors. You may also develop a better understanding of research methodology, and your participation will provide researchers with valuable insight.

**Confidentiality**

To ensure your anonymity, your data will be assigned a number at the beginning of the session and all of the data for you will be coded under this number. Thus, all questionnaire responses and all computer files that contain the data you generate during the study will be associated with the assigned number and not with your identity. The informed consent agreement and all data that identifies you will be stored in a locked storage space in the Mental Health Research Lab. The researcher conducting the study and the supervisor will be the sole individuals with access to the collected data. The data will be retained for 5 years, after which point it will be destroyed by secure and confidential disposal. Consent forms will be locked up separately from any identifying information. Only group findings will be reported in publications and presentations arising from this research.

Data for Session 1 will be collected using Survey Monkey. *Survey Monkey* is a websurvey company based in the United States, and data will be stored on secure servers in the USA. Please note that Survey Monkey is hosted by a server located in the USA. The US Patriot Act permits U.S. law enforcement officials, for the purpose of anti-terrorism investigation, to seek a court order that allows access to the personal records of any person without the person's knowledge. In view of this we cannot absolutely guarantee the full confidentiality and anonymity of your data. With your consent to participant in this study, you acknowledge this. You can read more about *Survey Monkey*'s privacy policy here: https://www.surveymonkey.com/mp/policy/privacy-policy/

**Compensation**

In return for your participation and efforts in both components of this research project, you will receive 2 bonus points towards you grade in an undergraduate course that is eligible for bonus points.

**Voluntary Nature of Participation**

Participation in this study is voluntary. Your choice of whether or not to participate will not influence your future relations with Lakehead University. If you decide to participate, you are free to withdraw your consent and to stop your participation at any time without any penalty. Your right to withdraw your consent also applies to our use of your data. Should you decide that you do not want us to retain or analyze data that you have provided during the course of your participation in this study, please feel free to notify us. At any point during the study, you may refuse to answer any question or stop participation altogether. If at any point during or after this study you would like to speak to a mental health professional, feel free to contact the Student

Health and Counseling Centre at (807) 343-8361 (Prettie Res). A list of additional local/community resources is provided at the end of this information letter.

**Questions about the Study**

If you have any questions about the research now or at a later time, please contact Flavia Spiroiu, H.B.A., Graduate Student, Department of Psychology, Lakehead University, 416-732-3911. You may also contact Dr. Amanda Maranzan, Ph.D., Department of Psychology, Lakehead University, (807) 343-8322.
This research study has been reviewed and approved by the Lakehead University Research Ethics Board. If you have any questions related to the ethics of the research and would like to speak to someone outside of the research team, please contact Sue Wright at the Research Ethics Board at 807-343-8283 or research@lakeheadu.ca.

Thank you for considering participating in this study.

Sincerely,

Flavia Spiroiu
fspiroiu@lakeheadu.ca
(416) 732-3911

Dr. Amanda Maranzan
kamaranz@lakeheadu.ca
(807) 343-8322

MENTAL HEALTH RESOURCES
*please print this page for your reference*

**Lakehead University Resource**

**Counseling Services**
Lakehead University
955 Oliver Road
Thunder Bay, Ontario, P7B 5E1
(807) 343-8361

**Community Resources**

**Good2Talk**
1-866-925-5454
Good2Talk is a free, confidential helpline providing professional counselling and information and referrals for mental health, addictions and well-being to post-secondary students in Ontario, 24/7/365.

**Thunder Bay Crisis Response Service**
(807) 346-8282
Mental health workers provide support 24 hours a day and can help you to access further services, as needed

**Thunder Bay Counselling Centre**
(807) 684-1880
Mental health workers provide counselling to individuals, couples, and families

**Beendigen Crisis Line**
(807) 346-HELP
(807) 346-4357

**Mental Health Assessment Team**
At the Emergency Department (Thunder Bay Regional Health Sciences Centre)
Mental health workers will assess your emergency mental health needs

**Thunder Bay Sexual Assault/Abuse Crisis Service**
(807) 344-4502
Crisis workers are available 24 hours to give immediate help, as well as follow-up counseling, court advocacy and other services. Phone support for women who have experienced current ot past assault or abuse.

**Walk-in Counselling Services** –Wednesdays from 12 noon to 8 pm
-1st & 3rd Wednesday each month at –Thunder Bay Counselling Centre – 544 Winnipeg Avenue
-2nd & 4th Wednesday each month at Children's Centre Thunder Bay – 283 Lisgar Street

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**Appendix H: Participant Consent Agreement - Study**

By consenting to participate in this research, I indicate that I have read the "Participant Information Letter" and that I have had the opportunity to receive satisfactory answers from the researchers concerning any questions that I might have about my participation in **Interpreting Social Information: The Role of Uncertainty and Cognitive Processing Styles**. I understand and agree to the following:

- I understand all of the information in the "Information Letter."
- I am a volunteer and can withdraw at any time from this study without penalty or consequence.
- I may choose not to answer any question asked in this online questionnaire without penalty or consequence.
- There are no anticipated physical risks associated with participation in this study. Should I experience any personal distress or discomfort during or following my participation, I know that I may personally contact the Health and Counselling Centre at Lakehead University (Thunder Bay campus) to speak to a mental health professional, and/or utilize the list of community resources provided to me.
- My personal information will be securely stored in the Mental Health Research Lab at Lakehead University for 5 years as per University regulations.
- My personal information will remain anonymous should any publications or public presentations come out of this project.
- I may receive a summary of this research upon completion if I so request.
- I give my permission to be contacted by telephone and/or email for the purpose of participation in this study.

I agree with the above statements and consent to participate in this study.

_____

Full Name of Participant (please print)

_____ _____

Signature of Participant Date

_____ _____

Signature of Experimenter who Obtained Informed Consent Date

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## Appendix I: Debriefing Form

**Purpose of the Study:** Research has indicated that individuals who experience social anxiety exhibit higher levels of intolerance of uncertainty, a cognitive bias involved in the perception and interpretation of uncertain situations. The purpose of this study is to investigate the cognitive mechanisms through which intolerance of uncertainty might lead to the development and maintenance of social anxiety. More specifically, it examines the possibility that intolerance of uncertainty may contribute to selective processing and negative interpretations of ambiguous social cues and situations, which may in turn evoke and/or maintain feelings of social anxiety.

This study will therefore elucidate the role of intolerance of uncertainty about ambiguous social information in specific information processing biases associated with social anxiety. In doing so, it will contribute to our understanding of interpretative processes as they specifically relate to intolerance of uncertainty and anxiety in interpersonal and performance situations. Knowledge about these factors can, in turn, lead to improvements in psychological treatments for social anxiety.

**Resources:** We provide everyone who completes this study with the same list of resources in case they are interested in learning more about social anxiety. Our list of resources contains titles of books about the management of social anxiety, as well as referral sources (please turn over this page for the list).

**Contact Information**: If you have any questions or concerns about this experiment or your participation in this study, you may contact:


| | | |
|---|---|---|
| Flavia Spiroiu, HBA | Amanda Maranzan, PhD | Susan Wright |
| Main Study Investigator | MA Study Supervisor | Research Ethics Officer |
| Department of Psychology | Department of Psychology | Office of Research Services |
| Lakehead University | Lakehead University | Lakehead University |
| 955 Oliver Road | 955 Oliver Road | 1294 Balmoral St., NO 2011C |
| Thunder Bay, ON P7B 5E1 | Thunder Bay, ON P7B 5E1 | Thunder Bay, ON P7B 5Z5 |
| (416) 732-3911 | (807) 343-8322 | (807) 343-8283 |
| fspiroiu@lakeheadu.ca | kamaranz@lakeheadu.ca | research@lakeheadu.ca |


If you would like any information about the results of the study once it is completed, please contact Flavia Spiroiu.

**A note about disclosure**: In order to maintain the integrity of this research, we ask that you not disclose the purpose of this experiment to others who may be interested in taking part in this study. When participants possess too much prior knowledge about the purpose of an experiment, it can affect how they behave in the experiment and may consequently render the data for that individual unusable.

Thank you very much for participating in this study!

**Self-Help Books for Social Anxiety**

Antony, M. M. (2004). *10 simple solutions to shyness: How to overcome shyness, social anxiety, and fear of public speaking*. Oakland, CA: New Harbinger.

Antony, M. M., & Swinson, R. P. (2008). *The shyness and social anxiety workbook: Proven, step-by-step techniques for overcoming your fear* (2nd ed.). Oakland, CA: New Harbinger.

Butler, G. (2008). *Overcoming social anxiety and shyness: A self-help guide using cognitive behavioral techniques*. New York: Basic Books.

Hope, D. A., Heimberg, R. G., & Turk, C. L. (2010). *Managing social anxiety: A cognitive-behavioral therapy approach* (2nd ed., workbook). New York: Oxford University Press.

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MENTAL HEALTH RESOURCES
*please print this page for your reference*

**Lakehead University Resource**

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Thunder Bay, Ontario, P7B 5E1
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Good2Talk is a free, confidential helpline providing professional counselling and information and referrals for mental health, addictions and well-being to post-secondary students in Ontario, 24/7/365.

**Thunder Bay Crisis Response Service**
(807) 346-8282
Mental health workers provide support 24 hours a day and can help you to access further services, as needed

**Thunder Bay Counselling Centre**
(807) 684-1880
Mental health workers provide counselling to individuals, couples, and families

**Beendigen Crisis Line**
(807) 346-HELP
(807) 346-4357

**Mental Health Assessment Team**
At the Emergency Department (Thunder Bay Regional Health Sciences Centre)
Mental health workers will assess your emergency mental health needs

**Thunder Bay Sexual Assault/Abuse Crisis Service**
(807) 344-4502
Crisis workers are available 24 hours to give immediate help, as well as follow-up counseling, court advocacy and other services. Phone support for women who have experienced current ot past assault or abuse.

**Walk-in Counselling Services** –Wednesdays from 12 noon to 8 pm
-1st & 3rd Wednesday each month at –Thunder Bay Counselling Centre – 544 Winnipeg Avenue
-2nd & 4th Wednesday each month at Children's Centre Thunder Bay – 283 Lisgar Street

## Appendix J: Demographic Questionnaire

Please answer the following questions listed below by writing your response or checking the most appropriate answer.

1. What is your age? ____

2. What is your biological sex?
   - Female □
   - Male □
   - Other □

3. Which gender do you most closely identify with?
   - Female □
   - Male □
   - Transgender □
   - Gender variant/non-conforming □
   - Other □
   - Prefer not to answer □

4. Which ethnicity do you most closely identify with?
   - White/Caucasian □
   - Asian □
   - Black/African Canadian □
   - First Nations □
   - Other □ Please specify _____

5. What is your current level of education? (Please choose one)
   - University Year 1 □
   - University Year 2 □
   - University Year 3 □
   - University Year 4 □
   - University Year 5 (or more) □

6. Are you completing your Psychology:
   - Major □
   - Minor □
   - Neither □
   - Undecided □

7. What is your occupational status? (Please check all that apply)
   - Full time Student □
   - Part time Student □
   - Full time Employee □
   - Part time Employee □
   - Unemployed □
   - Other: _____

8. What is your marital status?
   - Married □
   - Separated □
   - Divorced □
   - Cohabitating □
   - Single □
   - Widowed □

## Appendix K: Anxiety Sensitivity Index - 3 (ASI-3)

Taylor, Cox, Deacon, Heimberg, Ledley, et al., 2007; ASI; Reiss, Peterson, Gursky, & McNally, 1986

Please choose the number that best corresponds to how much you agree with each item. If any items concern something that you have never experienced (e.g., fainting in public), then answer on the basis of how you think you might feel *if you had* such an experience. Otherwise, answer all items on the basis of your own experience. Be careful to choose only one number for each item and please answer all items.

| | Very little | A little | Some | Much | Very much |
|---|---|---|---|---|---|
| 1. It is important for me not to appear nervous. | 0 | 1 | 2 | 3 | 4 |
| 2. When I cannot keep my mind on a task, I worry that I might be going crazy. | 0 | 1 | 2 | 3 | 4 |
| 3. It scares me when my heart beats rapidly. | 0 | 1 | 2 | 3 | 4 |
| 4. When my stomach is upset, I worry that I might be seriously ill. | 0 | 1 | 2 | 3 | 4 |
| 5. It scares me when I am unable to keep my mind on a task. | 0 | 1 | 2 | 3 | 4 |
| 6. When I tremble in the presence of others, I fear what people might think of me. | 0 | 1 | 2 | 3 | 4 |
| 7. When my chest feels tight, I get scared that I won't be able to breathe properly. | 0 | 1 | 2 | 3 | 4 |
| 8. When I feel pain in my chest, I worry that I'm going to have a heart attack. | 0 | 1 | 2 | 3 | 4 |
| 9. I worry that other people will notice my anxiety. | 0 | 1 | 2 | 3 | 4 |
| 10. When I feel "spacey" or spaced out I worry that I may be mentally ill. | 0 | 1 | 2 | 3 | 4 |
| 11. It scares me when I blush in front of people. | 0 | 1 | 2 | 3 | 4 |
| 12. When I notice my heart skipping a beat, I worry that there is something seriously wrong with me. | 0 | 1 | 2 | 3 | 4 |
| 13. When I begin to sweat in a social situation, I fear people will think negatively of me. | 0 | 1 | 2 | 3 | 4 |
| 14. When my thoughts seem to speed up, I worry that I might be going crazy. | 0 | 1 | 2 | 3 | 4 |
| 15. When my throat feels tight, I worry that I could choke to death. | 0 | 1 | 2 | 3 | 4 |
| 16. When I have trouble thinking clearly, I worry that there is something wrong with me. | 0 | 1 | 2 | 3 | 4 |
| 17. I think it would be horrible for me to faint in public. | 0 | 1 | 2 | 3 | 4 |
| 18. When my mind goes blank, I worry there is something terribly wrong with me. | 0 | 1 | 2 | 3 | 4 |

## Appendix L: Social Interaction Anxiety Scale (SIAS)

Mattick & Clarke (1998)

Instructions: For each item, please circle the number to indicate the degree to which you feel the statement is characteristic or true for you. The rating scale is as follows:

0 = Not at all characteristic or true of me.
1 = Slightly characteristic or true of me.
2 = Moderately characteristic or true of me.
3 = Very characteristic or true of me.
4 = Extremely characteristic or true of me.

| Characteristic | **Not at all** | **Slightly** | **Moderately** | **Very** | **Extremely** |
|---|---|---|---|---|---|
| 1. I get nervous if I have to speak with someone in authority (teacher, boss, etc.). | 0 | 1 | 2 | 3 | 4 |
| 2. I have difficulty making eye contact with others. | 0 | 1 | 2 | 3 | 4 |
| 3. I become tense if I have to talk about myself or my feelings. | 0 | 1 | 2 | 3 | 4 |
| 4. I find it difficult to mix comfortably with the people I work with. | 0 | 1 | 2 | 3 | 4 |
| 5. I find it easy to make friends my own age. | 0 | 1 | 2 | 3 | 4 |
| 6. I tense up if I meet an acquaintance in the street. | 0 | 1 | 2 | 3 | 4 |
| 7. When mixing socially, I am uncomfortable. | 0 | 1 | 2 | 3 | 4 |
| 8. I feel tense if I am alone with just one other person. | 0 | 1 | 2 | 3 | 4 |
| 9. I am at ease meeting people at parties, etc. | 0 | 1 | 2 | 3 | 4 |
| 10. I have difficulty talking with other people. | 0 | 1 | 2 | 3 | 4 |
| 11. I find it easy to think of things to talk about. | 0 | 1 | 2 | 3 | 4 |
| 12. I worry about expressing myself in case I appear awkward. | 0 | 1 | 2 | 3 | 4 |
| 13. I find it difficult to disagree with another's point of view. | 0 | 1 | 2 | 3 | 4 |
| 14. I have difficulty talking to attractive persons of the opposite sex. | 0 | 1 | 2 | 3 | 4 |
| 15. I find myself worrying that I won't know what to say in social situations. | 0 | 1 | 2 | 3 | 4 |

| Characteristic | **Not at all** | **Slightly** | **Moderately** | **Very** | **Extremely** |
|---|---|---|---|---|---|
| 16. I am nervous mixing with people I don't know well. | 0 | 1 | 2 | 3 | 4 |
| 17. I feel I'll say something embarrassing when talking. | 0 | 1 | 2 | 3 | 4 |
| 18. When mixing in a group, I find myself worrying I will be ignored. | 0 | 1 | 2 | 3 | 4 |
| 19. I am tense mixing in a group. | 0 | 1 | 2 | 3 | 4 |
| 20. I am unsure whether to greet someone I know only slightly. | 0 | 1 | 2 | 3 | 4 |

## Appendix M: Social Phobia Scale (SPS)

Mattick & Clarke (1998)

Instructions: For each item, please circle the number to indicate the degree to which you feel the statement is characteristic or true for you. The rating scale is as follows:

0 = Not at all characteristic or true of me.
1 = Slightly characteristic or true of me.
2 = Moderately characteristic or true of me.
3 = Very characteristic or true of me.
4 = Extremely characteristic or true of me.

| Characteristic | **Not at all** | **Slightly** | **Moderately** | **Very** | **Extremely** |
|---|---|---|---|---|---|
| 1. I become anxious if I have to write in front of people. | 0 | 1 | 2 | 3 | 4 |
| 2. I become self-conscious when using public toilets. | 0 | 1 | 2 | 3 | 4 |
| 3. I can suddenly become aware of my own voice and of others listening to me. | 0 | 1 | 2 | 3 | 4 |
| 4. I get nervous that people are staring at me as I walk down the street. | 0 | 1 | 2 | 3 | 4 |
| 5. I fear I may blush when I am with others. | 0 | 1 | 2 | 3 | 4 |
| 6. I feel self-conscious if I have to enter a room where others are already seated. | 0 | 1 | 2 | 3 | 4 |
| 7. I worry about shaking or trembling when I'm watched by other people. | 0 | 1 | 2 | 3 | 4 |
| 8. I would get tense if I had to sit facing other people on a bus or train. | 0 | 1 | 2 | 3 | 4 |
| 9. I get panicky that others might see me faint or be sick or ill. | 0 | 1 | 2 | 3 | 4 |
| 10. I would find it difficult to drink something in a group of people. | 0 | 1 | 2 | 3 | 4 |
| 11. It would make me feel self-conscious to eat in front of a stranger in a restaurant. | 0 | 1 | 2 | 3 | 4 |
| 12. I am worried people will think my behavior is odd. | 0 | 1 | 2 | 3 | 4 |
| 13. I would get tense if I had to carry a tray across a crowded cafeteria. | 0 | 1 | 2 | 3 | 4 |
| 14. I worry I'll lose control of myself in front of other people. | 0 | 1 | 2 | 3 | 4 |

| Characteristic | **Not at all** | **Slightly** | **Moderately** | **Very** | **Extremely** |
|---|---|---|---|---|---|
| 15. I worry I might do something to attract the attention of other people. | 0 | 1 | 2 | 3 | 4 |
| 16. When in an elevator, I am tense if people look at me. | 0 | 1 | 2 | 3 | 4 |
| 17. I can feel conspicuous standing in a line. | 0 | 1 | 2 | 3 | 4 |
| 18. I can get tense when I speak in front of other people. | 0 | 1 | 2 | 3 | 4 |
| 19. I worry my head will shake or nod in front of others. | | | | | |
| 20. I feel awkward and tense if I know people are watching me. | 0 | 1 | 2 | 3 | 4 |

**Appendix N: Intolerance of Uncertainty Scale (IUS)**

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

Please choose the number that best corresponds to how much you agree with each item.

| | Not at all representative of me | A little representative of me | Somewhat representative of me | Very representative of me | Entirely representative of me |
|---|---|---|---|---|---|
| 1. Uncertainty stops me from having a strong opinion. | 1 | 2 | 3 | 4 | 5 |
| 2. Being uncertain means that a person is disorganized. | 1 | 2 | 3 | 4 | 5 |
| 3. Uncertainty makes life intolerable. | 1 | 2 | 3 | 4 | 5 |
| 4. It's unfair having no guarantees in life. | 1 | 2 | 3 | 4 | 5 |
| 5. My mind can't be relaxed if I don't know what will happen tomorrow. | 1 | 2 | 3 | 4 | 5 |
| 6. Uncertainty makes me uneasy, anxious or stressed. | 1 | 2 | 3 | 4 | 5 |
| 7. Unforeseen events upset me greatly. | 1 | 2 | 3 | 4 | 5 |
| 8. It frustrates me not having all the information I need. | 1 | 2 | 3 | 4 | 5 |
| 9. Uncertainty keeps me from living a full life. | 1 | 2 | 3 | 4 | 5 |
| 10. One should always look ahead so as to avoid surprises. | 1 | 2 | 3 | 4 | 5 |
| 11. A small unforeseen event can spoil everything, even with the best of planning. | 1 | 2 | 3 | 4 | 5 |
| 12. When it's time to act, uncertainty paralyzes me. | 1 | 2 | 3 | 4 | 5 |
| 13. Being uncertain means that I am not first rate. | 1 | 2 | 3 | 4 | 5 |
| 14. When I am uncertain, I can't go forward. | 1 | 2 | 3 | 4 | 5 |

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

**Appendix O: Brief Fear of Negative Evaluation – II (BFNE-II)**

Carleton, Collimore, & Asmundson, 2007

Please choose the number that best corresponds to how much you agree with each item.

| | Not at all characteristic of me | A little characteristic of me | Somewhat characteristic of me | Very characteristic of me | Entirely characteristic of me |
|---|---|---|---|---|---|
| 1. I worry about what other people will think of me even when I know it doesn't make any difference. | 1 | 2 | 3 | 4 | 5 |
| 2. It bothers me when people form an unfavourable impression of me. | 1 | 2 | 3 | 4 | 5 |
| 3. I am frequently afraid of other people noticing my shortcomings. | 1 | 2 | 3 | 4 | 5 |
| 4. I worry about what kind of impression I make on people. | 1 | 2 | 3 | 4 | 5 |
| 5. I am afraid that others will not approve of me. | 1 | 2 | 3 | 4 | 5 |
| 6. I am afraid that other people will find fault with me. | 1 | 2 | 3 | 4 | 5 |
| 7. I am concerned about other people's opinions of me. | 1 | 2 | 3 | 4 | 5 |
| 8. When I am talking to someone, I worry about what they may be thinking about me. | 1 | 2 | 3 | 4 | 5 |
| 9. I am usually worried about what kind of impression I make. | 1 | 2 | 3 | 4 | 5 |
| 10. If I know someone is judging me, it tends to bother me. | 1 | 2 | 3 | 4 | 5 |
| 11. Sometimes I think I am too concerned with what other people think of me. | 1 | 2 | 3 | 4 | 5 |
| 12. I often worry that I will say or do wrong things. | 1 | 2 | 3 | 4 | 5 |

**Appendix P: Depression, Anxiety and Stress Scale - 21 (DASS-21)**
Lovibond & Lovibond, 1995

Please read each statement and circle a number 0, 1, 2 or 3 which indicates how much the statement applied to you over the past week. There are no right or wrong answers. Do not spend too much time on any statement. The rating scale is as follows:

0 Did not apply to me at all - NEVER
1 Applied to me to some degree, or some of the time - SOMETIMES
2 Applied to me to a considerable degree, or a good part of time - OFTEN
3 Applied to me very much, or most of the time - ALMOST ALWAYS

| | Never | Sometimes | Often | Almost Always |
|---|---|---|---|---|
| 1. I found it hard to wind down. | 0 | 1 | 2 | 3 |
| 2. I was aware of dryness of my mouth. | 0 | 1 | 2 | 3 |
| 3. I couldn't seem to experience any positive feeling at all. | 0 | 1 | 2 | 3 |
| 4. I experienced breathing difficulty (e.g., excessively rapid breathing, breathlessness in the absence of physical exertion) | 0 | 1 | 2 | 3 |
| 5. I found it difficult to work up the initiative to do things. | 0 | 1 | 2 | 3 |
| 6. I tended to over-react to situations. | 0 | 1 | 2 | 3 |
| 7. I experienced trembling (e.g., in the hands) | 0 | 1 | 2 | 3 |
| 8. I felt that I was using a lot of nervous energy. | 0 | 1 | 2 | 3 |
| 9. I was worried about situations in which I might panic and make a fool of myself. | 0 | 1 | 2 | 3 |
| 10. I felt that I had nothing to look forward to. | 0 | 1 | 2 | 3 |
| 11. I found myself getting agitated. | 0 | 1 | 2 | 3 |
| 12. I found it difficult to relax. | 0 | 1 | 2 | 3 |
| 13. I felt down-hearted and blue. | 0 | 1 | 2 | 3 |
| 14. I was intolerant of anything that kept me from getting on with what I was doing. | 0 | 1 | 2 | 3 |
| 15. I felt I was close to panic. | 0 | 1 | 2 | 3 |
| 16. I was unable to become enthusiastic about anything. | 0 | 1 | 2 | 3 |
| 17. I felt I wasn't worth much as a person. | 0 | 1 | 2 | 3 |
| 18. I felt that I was rather touchy. | 0 | 1 | 2 | 3 |
| 19. I was aware of the action of my heart in the absence of physical exertion (e.g., sense of heart rate increase, heart missing a beat). | 0 | 1 | 2 | 3 |
| 20. I felt scared without any good reason. | 0 | 1 | 2 | 3 |
| 21. I felt that life was meaningless. | 0 | 1 | 2 | 3 |

**Appendix Q: Ambiguous Social Vignette I**

Constans, Penn, Ihen, & Hope (1999)

Steve had a blind date that evening. So, after class, he went to the bar where they decided to meet. As he entered the bar, he saw a young woman sitting alone having a drink. He knew that this was her; she was wearing the dress she had described over the phone. Steve approached the table, tapped her on the shoulder and asked "Pardon me, but are you Lisa?" She turned to him and replied "Yes, you must be Steve." As he was sitting down, she added "You're certainly not what I expected." They then had a drink together. At the bar, they began to get acquainted with one another. For example, they talked about where they grew up, what kind of music they liked, and what they were majoring in. After a half hour of chatting, Steve suggested that they go to the restaurant for dinner. Steve had told Lisa that he had a favorite restaurant that he really wanted her to try.

As they entered the restaurant, Lisa turned to Steve and said "This is an unusual place." The waiter then led them to their table. Steve had requested this table in advance, as he thought its location was especially intimate. When he shared this with Lisa, she replied "Hmmm, I had a feeling you might have chosen this table." They began the dinner by ordering a couple of appetizers and drinks. About twenty minutes later, the waiter approached asking if they had decided upon their dinner selection and a bottle of wine. After choosing her entree, Lisa asked Steve if he wouldn't mind ordering the wine. Steve agreed, scanned the wine list and made his selection. After what appeared to be a moment or two pause, the waiter looked at Steve and asked "So, you would like a bottle of the '89 Chardonnay?" Steve replied "Yes" and the waiter walked away.

During dinner, they found that they had mutual interests in traveling. Both had been to Europe in high school and had enjoyed it thoroughly. In fact, both spoke a foreign language: Steve spoke Spanish, while Lisa spoke Italian. They spent some time discussing where in the U.S. they had visited and where they would like to go in the future. Steve thought that the dinner was at its usual high standard of quality. He was also pleased with his wine selection, especially when Lisa, after taking her initial sip, looked at him and said with a slightly perceptible smile "You certainly know how to pick wine."

Following the dinner, Steve asked Lisa if she wanted to go to his favorite place for coffee and dessert. Lisa replied "Since you chose for the dinner, how about I choose for desert?" This was okay with Steve, especially since he wanted to make a good impression. So, they went to a coffee place she knew of and chatted about their university. Towards the end of the coffee, Lisa told Steve that she had to make a phone call to a girlfriend who was having a birthday party. When she returned, they finished their coffee and decided to walk home. As they were walking, Lisa pointed towards an apartment building where her friend's birthday was being held. As they approached it, Lisa turned to Steve and said "If you don't mind, I'd really like to stop by the party. Joan is my best friend and today is her birthday. When I called before, I was checking to see if the party would be going on late. Anyway, it is still going on and I really shouldn't miss it." There was a second or two of silence before Lisa added "The people at the party are probably a different sort of crowd than you're used to. But, I'm sure if you went you'd have a pretty good time. I don't think Joan would mind."

Upon arriving there, Joan greeted them both and, while glancing at Steve, appeared to whisper something into Lisa's ear. The party actually turned out to be pretty good. Lisa seemed to feel quite at home and was having a good time. She introduced Steve to some of her friends

who appeared to be fairly friendly. Steve even ran into a couple of people with whom he had classes. After some time, Steve and Lisa decided to leave. He walked Lisa to her house, where they stood outside and chatted a bit more. After a while, Lisa smiled and said "Well it's getting late. I better go in. Thanks for the evening." They talked a few minutes more, before Lisa eventually went in. Steve then walked home.

**Appendix R: Ambiguous Social Vignette Judgment Questionnaire I**

Constans, Penn, Ihen, & Hope (1999)

**STORY QUESTIONS**

INSTRUCTIONS

Below are questions based on the story you just read. Some of these questions are multiple choice. Other questions require you to make a rating on a 1-7 scale. Please answer all items.

01) Lisa seemed to like Steve.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| Strongly Disagree | | | Neutral | | | Strongly Agree |

02) Lisa would go out again with Steve.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| Strongly Disagree | | | Neutral | | | Strongly Agree |

03) Steve probably felt that the date went:

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| Very Poorly | | | Neutral | | | Very Well |

04) What are the chances that Steve and Lisa will go out again?

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| Very Low | | | Neutral | | | Very High |

05) Steve had a date with:

a. Girlfriend
b. Someone he didn't know
c. An acquaintance
d. An old girlfriend

06) They agreed in advance that Steve would choose the restaurant.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| Strongly Disagree | | | Neutral | | | Strongly Agree |

07) When Lisa said to Steve, "You're not what I expected", she was impressed.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| Strongly Disagree | | | Neutral | | | Strongly Agree |

08) Steve requested the table at the restaurant in advance because he thought it

a. Had the best view
b. Was especially intimate
c. Would bring him luck
d. Brought back memories

09) Which one of these topics was <u>not</u> brought up at all during the entire date?

a. Music
b. Family
c. Travel
d. The university

10) Lisa had a positive first impression of the restaurant.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| Strongly Disagree | | | Neutral | | | Strongly Agree |

11) Lisa did not like the wine that Steve ordered.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| Strongly Disagree | | | Neutral | | | Strongly Agree |

12) At the coffee shop, Lisa made a telephone call to her:

a. Mother
b. Roommate
c. Friend
d. Sorority sister

13) If Lisa was having a really good time on the date, she wouldn't have gone to the party.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| Strongly Disagree | | | Neutral | | | Strongly Agree |

14) Lisa wanted Steve to go to the party with her.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| Strongly Disagree | | | Neutral | | | Strongly Agree |

15) Lisa's friend Joan appeared to be impressed with Steve

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| Strongly Disagree | | | Neutral | | | Strongly Agree |

16) Steve had a good time at the party

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| Strongly Disagree | | | Neutral | | | Strongly Agree |

17) At the party, Lisa turned to Steve and said:

a. I'm glad you came here
b. Didn't I tell you that this was a different sort of crowd?
c. Are you having a good time?
d. None of the above

18) Who decided to leave the party?

a. Steve
b. Lisa
c. Both Steve and Lisa
d. None of the above

19) As they walked up to Lisa's house, she said to Steve:

a. Thanks for the evening, let's do it again sometime
b. Thanks for the evening, I had a good time
c. Thanks for the evening
d. Thanks for the evening. I don't know, however, if we should go out again.

Subject #_____ Date_____

Male/Female Age_____

Group_____

**Appendix S: Ambiguous Social Vignette II**

Constans, Penn, Ihen, & Hope (1999)

Lisa had a blind date that evening. So, after class, she went to the bar where they decided to meet. As she entered the bar, she saw a young man sitting alone having a drink. She knew that this was him; he was wearing the jacket he had described over the phone. Lisa approached the table, tapped him on the shoulder and asked "Pardon me, but are you Steve?" He turned to him and replied "Yes, you must be Lisa." As she was sitting down, he added "You're certainly not what I expected." They then had a drink together. At the bar, they began to get acquainted with one another. For example, they talked about where they grew up, what kind of music they liked, and what they were majoring in. After a half hour of chatting, Lisa suggested that they go to the restaurant for dinner. Lisa had told Steve over the phone that she had a favorite restaurant that she really wanted him to try.

As they entered the restaurant, Steve turned to Lisa and said "This is an unusual place." The waiter then led them to their table. Lisa had requested this table in advance, as she thought its location was especially intimate. When she shared this with Steve, he replied "Hmmm, I had a feeling you might have chosen this table." They began the dinner by ordering a couple of appetizers and drinks. About twenty minutes later, the waiter approached asking if they had decided upon their dinner selection and a bottle of wine. After choosing his entree, Steve asked Lisa if she wouldn't mind ordering the wine. Lisa agreed, scanned the wine list and made her selection. After what appeared to be a moment or two pause, the waiter looked at Lisa and asked "So, you would like a bottle of the '89 Chardonnay?" Lisa replied "Yes" and the waiter walked away.

During dinner, they found that they had mutual interests in traveling. Both had been to Europe in high school and had enjoyed it thoroughly. In fact, both spoke a foreign language: Steve spoke Spanish, while Lisa spoke Italian. They spent some time discussing where in the U.S. they had visited and where they would like to go in the future. Lisa thought that the dinner was at its usual high standard of quality. She was also pleased with her wine selection, especially when Steve, after taking his initial sip, looked at her and said with a slightly perceptible smile "You certainly know how to pick wine."

Following the dinner, Lisa asked Steve if he wanted to go to her favorite place for coffee and dessert. Steve replied "Since you chose for the dinner, how about I choose for desert?" This was okay with Lisa, especially since she wanted to make a good impression. So, they went to a coffee place he knew of and chatted about their university. Towards the end of the coffee, Steve told Lisa that he had to make a phone call to a friend who was having a birthday party. When he returned, they finished their coffee and decided to walk home. As they were walking, Steve pointed towards an apartment building where his friend's birthday was being held. As they approached it, Steve turned to Lisa and said "If you don't mind, I'd really like to stop by the party. John is my best friend and today is his birthday. When I called before, I was checking to see if the party would be going on late. Anyway, it is still going on and I really shouldn't miss it." There was a second or two of silence before Steve added "The people at the party are probably a different sort of crowd than you're used to. But, I'm sure if you went you'd have a pretty good time. I don't think John would mind."

Upon arriving there, John greeted them both and, while glancing at Lisa, appeared to whisper something into Steve's ear. The party actually turned out to be pretty good. Steve seemed to feel quite at home and was having a good time. He introduced Lisa to some of his

friends who appeared to be fairly friendly. Lisa even ran into a couple of people with whom she had classes. After some time, Steve and Lisa decided to leave. He walked Lisa to her house, where they stood outside and chatted a bit more. After a while, Steve then smiled and said "Well it's getting late. I better going. Thanks for the evening." They talked a few minutes more, before Lisa eventually went in. Steve then walked home.

**Appendix T: Ambiguous Social Vignette Judgment Questionnaire II**

Constans, Penn, Ihen, & Hope (1999)

## STORY QUESTIONS

### INSTRUCTIONS

Below are questions based on the story you just read. Some of these questions are multiple choice. Other questions require you to make a rating on a 1-7 scale. Please answer all items.

01) Steve seemed to like Lisa.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| Strongly Disagree | | | Neutral | | | Strongly Agree |

02) Steve would go out again with Lisa.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| Strongly Disagree | | | Neutral | | | Strongly Agree |

03) Lisa probably felt that the date went:

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| Very Poorly | | | Neutral | | | Very Well |

04) What are the chances that Lisa and Steve will go out again?

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| Very Low | | | Neutral | | | Very High |

05) Lisa had a date with:

a. Boyfriend
b. Someone she didn't know
c. An acquaintance
d. An old boyfriend

06) They agreed in advance that Lisa would choose the restaurant.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| Strongly Disagree | | | Neutral | | | Strongly Agree |

07) When Steve said to Lisa, "You're not what I expected", he was impressed.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| Strongly Disagree | | | Neutral | | | Strongly Agree |

08) Lisa requested the table at the restaurant in advance because she thought it:

a. Had the best view
b. Was especially intimate
c. Would bring her luck
d. Brought back memories

09) Which one of these topics was <u>not</u> brought up at all during the entire date?

a. Music
b. Family
c. Travel
d. The university

10) Steve had a positive first impression of the restaurant.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| Strongly Disagree | | | Neutral | | | Strongly Agree |

11) Steve did not like the wine that Lisa ordered.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| Strongly Disagree | | | Neutral | | | Strongly Agree |

12) At the coffee shop, Steve made a telephone call to his:

a. Father
b. Roommate
c. Friend
d. Fraternity brother

13) If Steve was having a really good time on the date, he wouldn't have gone to the party.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| Strongly Disagree | | | Neutral | | | Strongly Agree |

14) Steve wanted Lisa to go to the party with him.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| Strongly Disagree | | | Neutral | | | Strongly Agree |

15) Steve's friend John appeared to be impressed with Lisa

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| Strongly Disagree | | | Neutral | | | Strongly Agree |

16) Lisa had a good time at the party

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| Strongly Disagree | | | Neutral | | | Strongly Agree |

17) At the party, Steve turned to Lisa and said:

a. I'm glad you came here
b. Didn't I tell you that this was a different sort of crowd?
c. Are you having a good time?
d. None of the above

18) Who decided to leave the party?

a. Steve
b. Lisa
c. Both Steve and Lisa
d. None of the above

19) As they walked up to Lisa's house, he said to Lisa:

a. Thanks for the evening, let's do it again sometime
b. Thanks for the evening, I had a good time
c. Thanks for the evening
d. Thanks for the evening. I don't know, however, if we should go out again.

Subject #_____ Date_____

Male/Female Age_____

Group _____

**Appendix U: Ambiguous Social Situations Interpretation Questionnaire**
Stopa & Clark, (2000)

Here are some outline descriptions of situations in which it is not quite clear what is happening. Read each one, and then answer the question below it very briefly. Write down the **first thing** that comes into your mind without thinking too long about it. Please write down what you think is happening before you turn over the page. Be as specific as possible.

When you have done that, turn over the page and you will see three possible explanations for the situation. Arrange these in the order in which they would be most likely to come to your mind if you found yourself in a similar situation. So the one that you would consider most likely to be true should come first, and the one that you would consider least likely to be true should come third. Do not think too long before deciding. We want your first impressions, and do not worry if none of them fits with what you actually did think.

1. You have a sudden pain in your stomach.

   Why?

1. a) You have appendicitis or an ulcer.

   b) You have indigestion.

   c) You are hungry.

   1st …… 2nd …… 3rd ……

2. You ask a friend to go out for a meal with you in a couple of days' time and they refuse.

   Why?

2. a) They are trying to economize.

   b) They don't want to spend the evening with you.

   c) They've already arranged to do something else.

   1st …… 2nd …… 3rd ……

3. You have been eating normally but have recently lost some weight.

   Why?

3. a) You have cancer.

   b) It's normal fluctuation.

   c) You have been rushing about more than usual.

   1st …… 2nd …… 3rd ……

4. You go into a shop and the assistant ignores you.

   Why?

4. a) They are bored with their job, and behave rudely.

   b) They are concentrating on something else.

   c) You are not important enough for them to bother with.

   1st …… 2nd …… 3rd ……

5. You notice that your heart is pounding, you feel breathless, dizzy and unreal.

   Why?

5. a) You have been exerting yourself and are overtired.

   b) Something you ate disagreed with you.

   c) You are dangerously ill.

   1st …… 2nd …… 3rd ……

6. Not long after starting a new job your boss asks to see you.

   Why?

6. a) He wants to make sure you have settled in alright.

   b) You haven't been doing the job properly.

   c) He is going to tell you how well you have been doing.

   1st …… 2nd …… 3rd ……

7. A letter marked "URGENT" arrives.

   What is in the letter?

7. a) It is a circular designed to attract your attention.

   b) You forgot to pay a bill.

   c) News that someone you know has died or is seriously ill.

   1st …… 2nd …… 3rd ……

8. A friend overhears your telephone conversation and starts to smile.

   Why?

8. a) You've said something amusing.

   b) You're making a fool of yourself.

   c) They're remembering a joke.

   1st …… 2nd …… 3rd ……

9. You wake up with a start in the middle of the night, thinking you heard a noise, but all is quiet.

   What woke you up?

9. a) You were woken by a dream.

   b) A burglar broke into your house.

   c) A door or window rattled in the wind.

   1st …… 2nd …… 3rd ……

10. You have visitors round for a meal and they leave sooner than you expected.

    Why?

10. a) They did not wish to outstay their welcome.

    b) They had another pressing engagement to go to.

    c) They were bored and did not enjoy the visit.

    1st …… 2nd …… 3rd ……

11. You are having a conversation with some friends. You say something and there is a long pause.

    Why?

11. a) You said something foolish.

    b) They are thinking about what you said.

    c) There was nothing more to say.

    1st …… 2nd …… 3rd ……

12. A member of your family is late arriving home.

    Why?

12. a) They have had a serious accident on the way home.

    b) They met a friend and are talking with them.

    c) It took longer than usual to get home.

    1st …… 2nd …… 3rd ……

13. You are in the middle of answering a question at an interview. The interviewers suddenly interrupt and ask you another question.

    Why?

13. a) They were satisfied with your answer and wanted to move on to another question.

    b) They are bad interviewers.

    c) They thought that you were talking rubbish.

    1st …… 2nd …… 3rd ……

14. Your chest feels uncomfortable and tight.

    Why?

14. a) You have indigestion.

    b) You have a sore muscle.

    c) Something is wrong with your heart.

    1st …… 2nd …… 3rd ……

15. You join a group of colleagues for lunch at work. As you sit down, two people in the group get up to leave without saying anything.

    Why?

15. a) They have got some work to finish.

    b) They don't much like you.

    c) They have to go to the bank.

    1st …… 2nd …… 3rd ……

16. A stranger approaches you in the street.

    Why?

16. a) He's lost and wants directions.

    b) You have done something wrong and are about to be told off.

    c) He wants to ask some questions for a survey.

    1st …… 2nd …… 3rd ……

17. You feel short of breath.

    Why?

17. a) You are developing flu.

    b) You are about to suffocate or stop breathing.

    c) You are physically “out of shape”.

    1st …… 2nd …… 3rd ……

18. You are talking to an acquaintance who briefly looks out of the window. Why?

18. a) Something outside has caught their attention.

    b) They are bored with you.

    c) They are tired and can't concentrate.

    1st …… 2nd …… 3rd ……

19. Some people whom you know are looking in your direction and talking. Why?

19. a) They are criticizing you.

    b) They are being friendly and want you to join them.

    c) They just happen to be looking your way.

    1st …… 2nd …… 3rd ……

20. You feel lightheaded and weak.

    Why?

20. a) You are about to faint.

b) You need to get something to eat.

c) You didn't get enough sleep last night.

1st …… 2nd …… 3rd ……

21. You've made a tentative arrangement to go to the cinema with a friend and then they tell you that they can't go.

Why?

21. a) They don't feel well.

    b) You've done something to offend them.

    c) They've arranged something else by mistake and are too embarrassed to tell you.

    1st …… 2nd …… 3rd ……

22. You are talking to someone at a party. They excuse themselves to go and get a drink and then start talking to someone else.

    Why?

22. a) They are just being sociable.

b) You are boring them.

c) They saw someone whom they haven't seen for a long time.

1st …… 2nd …… 3rd ……

23. You suddenly feel confused and are having difficulty in thinking straight. Why?

23. a) You are going out of your mind.

b) You are coming down with a cold.

c) You've been working too hard and need a rest.

1st …… 2nd …… 3rd ……

24. You walk past a group of tourists and they start laughing.

Why?

24. a) Their guide said something amusing.

b) You look odd.

c) They're enjoying their holiday.

1st …… 2nd …… 3rd ……

Now you have answered the preceding questions, we would be grateful if you would answer one more question about each of the ambiguous situations. Please return to the start of the booklet and then rate the extent to which you think each of the three explanations for a situation would be **likely to be true** if you found yourself in that situation.

Use the scale below for your ratings. Put a number between 0 and 8 next to each explanation in the text. Do not worry if your ratings appear to be different from your previous answers, and please do not change any of your original answers.

0----------1----------2----------3----------4----------5----------6----------7----------8
Not at all A little Moderately Very Extremely

**Appendix V: Positive Picture from the Social Anxiety Affective Picture Rating Task**

**Appendix W: Negative Picture from the Social Anxiety Affective Picture Rating Task**

**Appendix X: Neutral Picture from the Social Anxiety Affective Picture Rating Task**

**Appendix Y: Ambiguous Picture from the Social Anxiety Affective Picture Rating Task**