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Social Anxiety, Worry, and Intolerance of Uncertainty

Abstract

Numerous cognitive aspects of social anxiety have been examined. For example, the Fear of Negative Evaluation (FNE) has been incorporated into the cognitive-behavioral model of Social Anxiety (Rapee & Heimberg, 1997), and more recently the Fear of Positive Evaluation (FPE) has received great interest (c.f., Weeks et al., 2008). Other relevant cognitive aspects of social anxiety have received less attention. Of interest, intolerance of uncertainty (IU) is highly related to worry but also to social anxiety (e.g., Boelen & Reijntjes, 2009; Dugas et al., 2001). However, no research, to our knowledge, has examined whether social anxiety or worry accounts for more variance in IU. The potential links of FNE and FPE to IU have not been explored to our knowledge, despite the overlap between these variables; for example, fear of evaluation adds an element of uncertainty to social interactions, and uncertainty often contains aspects of evaluation. Thus, this study examined how the relationship between social anxiety and intolerance of uncertainty may be related to FNE and FPE. This study also examined how the relationship between worry and intolerance of uncertainty may be mediated by FNE and FPE. The result showed that worry and social anxiety were positively correlated with IU. As predicted, social anxiety accounted for IU above and beyond worry. FNE and FPE were positively related to IU. Maladaptive perfectionism and its subscales were positively correlated with social anxiety. FNE mediated the relationship between worry and IU, social anxiety and IU, and maladaptive perfectionism and social anxiety. However, FPE did not mediate the relationship between worry and IU, and social anxiety and IU.

Degree Type

Dissertation/Thesis

Degree Name

Master of Arts (MA)

Department

Psychology

Thesis Director

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Keywords

Social anxiety, Worry, Intolerance of uncertainty, FNE, FPE, Maladaptive Perfectionism

Subject Categories

Psychology

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Abstract

Numerous cognitive aspects of social anxiety have been examined. For example, the Fear of Negative Evaluation (FNE) has been incorporated into the cognitive-behavioral model of Social Anxiety (Rapee & Heimberg, 1997), and more recently the Fear of Positive Evaluation (FPE) has received great interest (c.f., Weeks et al., 2008). Other relevant cognitive aspects of social anxiety have received less attention. Of interest, intolerance of uncertainty (IU) is highly related to worry but also to social anxiety (e.g., Boelen & Reijntjes, 2009; Dugas et al., 2001). However, no research, to our knowledge, has examined whether social anxiety or worry accounts for more variance in IU. The potential links of FNE and FPE to IU have not been explored to our knowledge, despite the overlap between these variables; for example, fear of evaluation adds an element of uncertainty to social interactions, and uncertainty often contains aspects of evaluation. Thus, this study examined how the relationship between social anxiety and intolerance of uncertainty may be related to FNE and FPE. This study also examined how the relationship between worry and intolerance of uncertainty may be mediated by FNE and FPE. The result showed that worry and social anxiety were positively correlated with IU. As predicted, social anxiety accounted for IU above and beyond worry. FNE and FPE were positively related to IU. Maladaptive perfectionism and its subscales were positively correlated with social anxiety. FNE mediated the relationship between worry and IU, social anxiety and IU, and maladaptive perfectionism and social anxiety. However, FPE did not mediate the relationship between worry and IU, and social anxiety and IU.

Social Anxiety, Worry, and Intolerance of Uncertainty

Social anxiety has been linked to a number of associated cognitive styles in adults, such as the Fear of Negative Evaluation (FNE), many of which have been incorporated into the cognitive-behavioral model of social anxiety. However, a number of cognitive styles that have been associated with other types of worry have not yet been examined in conjunction with social anxiety. For example, ample research has found a positive correlation between worry and intolerance of uncertainty (IU) and social anxiety and intolerance of uncertainty (e.g., Bijsterbosch et al., 2020; Boelen & Reijntjes, 2009; Buhr & Dugas, 2002; Buhr & Dugas, 2006; Carleton et al., 2010, Carleton et al., 2012; Dugas et al., 2001; Dugas et al., 2004; Ladouceur et al., 2000; Norr, 2013; Meeten et al., 2012; Sahakian & Kazarian, 2015). However, no study to our knowledge has examined whether social anxiety can predict intolerance of uncertainty above and beyond worry. Fear of negative evaluation is one of the cognitive components that influence social anxiety (Rapee & Heimberg, 1997). Numerous studies have found a positive correlation between fear of negative evaluation and social anxiety (Leary, 1983; Rapee & Heimberg, 1997; Watson & Friend, 1969). Relatively recent studies have found that fear of positive evaluation is another cognitive component that is positively correlated with social anxiety (Weeks et al., 2008a; Weeks et al., 2008b; Weeks & Howell, 2012). Fear of negative and positive evaluation are positively correlated with social anxiety, and social anxiety is positively correlated with IU. This study predicted that fear of negative and positive evaluation would have significant relationships with intolerance of uncertainty.

Another cognitive style of interest is maladaptive perfectionism, which has not been examined in relation to social anxiety. In addition, we do not know how the specific aspects of maladaptive perfectionism relate to social anxiety in a nonclinical setting. This study predicted

that maladaptive perfectionism and its four subscales would have a significant relationship with social anxiety. Finally, this study examined whether the fear of negative evaluation mediates the relationship between worry and intolerance of uncertainty and whether the fear of positive evaluation mediates the relationship between worry and intolerance of uncertainty. Additionally, this study examined how fear of negative evaluation mediates the relationship between social anxiety and intolerance of uncertainty, and how fear of positive evaluation mediates the relationship between social anxiety and intolerance of uncertainty. Finally, this study examined whether the fear of negative evaluation mediates the relationship between maladaptive perfectionism and social anxiety.

Social Anxiety versus Worry

Persons with social anxiety are likely to engage in negative self-evaluative thoughts (Vassilopoulos, 2008). Additionally, they engage in anticipatory mental processes to cope with future stressful events, which includes planning how to hide their anxiety or avoiding stressful situations, and less in improving their performance in the situation (Vassilopoulos, 2008). When participants performed a “faces in a crowd” task on a computer, individuals with high social anxiety overestimated the proportion of people in a crowd looking at them compared to those with low social anxiety (Bolt et al., 2014).

Worry is considered one of the cognitive components of anxiety that serves to maintain high levels of vigilance for danger (Mathews, 1990). Worry has been more narrowly conceptualized than anxiety, which is a negative cognitive intrusion focusing on concerns about the future rather than past or present situations (Borkovec et al., 1983). People that have higher levels of worry have more difficulty shutting off worrisome thoughts once they start. For instance, they have higher difficulty engaging in a focused attention task because of the

distraction from uncontrollable thoughts. They also have a higher concern for social-evaluative situations and moderate awareness of somatic cues such as muscle tension and upset stomach (Borkovec et al., 1983).

Intolerance of Uncertainty

Individuals with high intolerance of uncertainty (IU) tend to interpret ambiguous, negative, and positive situations as more disconcerting than those with low IU, particularly in ambiguous situations (Koerner & Dugas, 2008). Intolerance of uncertainty has been assessed in research studies using the Intolerance of Uncertainty Scale (Freeston et al., 1994), which is a 27-item measure. The scale has demonstrated good test-retest reliability (Dugas et al., 1997) and convergent validity (Freeston et al., 1994).

Based on the finding that intolerance of uncertainty and emotional problem orientation, which is an immediate emotional response when faced with a problem, make common as well as unique contributions to the prediction of worry, there were two possible explanations that were examined. One is that emotional problem orientation may lead to intolerance of uncertainty, which would then lead to worry. The second possibility is that intolerance of uncertainty may lead to poor emotional problem orientation, which would lead to worry. It is thought that intolerance of uncertainty may be present in the absence of a problem situation, but it is difficult to imagine poor emotional problem orientation in the absence of ambiguous or uncertain elements. Therefore, intolerance of uncertainty may directly cause worry in that the individuals could overestimate the probability that the highly unlikely future events may occur, and the fact that there is an extremely low probability of the future events happening is considered to be intolerable (Dugas et al., 1997). According to Dugas and colleagues (2005), individuals with higher levels of intolerance of uncertainty are more likely to recall a higher proportion of words

indicating uncertainty and interpret ambiguous information in a more threatening way (Dugas et al., 2005). High levels of intolerance of uncertainty (IU) are also correlated positively with an aversion to waiting in a state of uncertainty. For instance, when given a decision task that allows the participants to make a choice between two rewards, high IU participants are more likely to choose the immediate, less valuable reward than the more valuable, but delayed reward (Luhmann et al., 2011).

Social Anxiety and Intolerance of Uncertainty

There is a relative lack of research directly investigating the relationship between intolerance of uncertainty and social anxiety (Carleton et al., 2010). Boelen and Reijntjes (2009) were the first to examine the relationship between IU and social anxiety among 126 adults. They found that IU explained a significant amount of variance in social anxiety severity when established cognitive correlates were controlled for social anxiety, such as fear of negative evaluation, anxiety sensitivity, low self-esteem, perfectionism, and neuroticism, which have been found to have been linked social anxiety from the previous research. Carleton and colleagues (2010) conducted a replication of Boelen and Reijntjes's (2009) study that demonstrated the relationship between IU and social anxiety. They found a positive correlation between IU and social anxiety, independent of all the other independent variables such as anxiety sensitivity, and fear of negative evaluation.

Norr and colleagues (2013) conducted a study with two nonclinical samples to examine the unique relationship between IU and other psychological symptoms. In the first sample of 217 college students, Intolerance of Uncertainty Scale (Freeston et al., 1994) total scores were associated positively with social anxiety symptom severity after controlling for covariates (gender, negative affect) as well as other relevant cognitive vulnerability factors (discomfort

intolerance, distress tolerance, anxiety sensitivity). In the second sample of 241 college students, Intolerance of Uncertainty Scale (Freeston et al., 1994) scores were correlated positively with the Social Interaction Anxiety Scale (Mattick & Clark, 1998) scores after controlling for the same covariates and relevant cognitive vulnerability factors as used in the first sample.

Bijsterbosch and colleagues (2020) examined the relationship between IU, social anxiety, and body dissatisfaction among young females. A simple regression analysis showed that the IU scores positively predicted social anxiety scores, with IU accounting for 38.4% of the variance in social anxiety. In Sahakian and Kazarian (2015), the relationship between social anxiety, anxiety sensitivity, intolerance of uncertainty, and shame among Lebanese college students was examined. As a result, the social anxiety symptom scores positively correlated with intolerance of uncertainty scores. Hierarchical multiple regression analysis showed that anxiety sensitivity was found to be the best predictor of social anxiety symptoms, followed by intolerance of uncertainty, and shame.

Worry and Intolerance of Uncertainty

Previous studies show that intolerance of uncertainty is highly correlated to worry in nonclinical populations (Dugas et al., 2001). Furthermore, experimentally reducing IU leads to less worry; whereas, increasing IU leads to more worry (Ladouceur et al., 2000). Findings from a treatment study suggest that decreases in IU significantly preceded decreases in worry during the course of cognitive-behavioral therapy for Generalized Anxiety Disorder (Dugas & Ladouceur, 2000).

Ladouceur and colleagues (2000) manipulated the level of intolerance of uncertainty to see how it impacts worry. The roulette game was used to manipulate the participant's IU level.

The subjects in the increased level IU group were given information that led them to think that their probability of winning was low. In the decreased level IU group, the participants received the explanation that the chance of winning is high since they are given one opportunity out of three to win. Compared to the group with a decreased level of IU, the group with a higher IU had more worry (Ladouceur et al., 2000). In another study (Meeten et al., 2012), four sets of two short stories were used to manipulate IU into two conditions for the study: high or low IU. In one set of the story, the character has a high IU; whereas, in the other set, the character has a low IU. Then the catastrophizing interview was conducted, where the experimenter asked the participant “What is it that worries you about X?” and then repeats the question by substituting X with the participant’s answer to the question. The participant would continue until they requested to end the interview, and the number of steps in this interview was measured. The mood was also measured. The manipulation was successful, with significant differences between the high and low IU groups. The high IU group demonstrated significantly more catastrophizing steps than the low IU group, indicating a greater amount of worry than the low IU group. The high IU group also reported more sadness and anxiety compared to the low IU group (Meeten et al., 2012).

Dugas and colleagues (2001) examined the relationship between IU and worries in a nonclinical sample and found a strong association between the two. IU was correlated significantly more strongly with worry than with obsessions, compulsions, and panic sensations. Furthermore, the relationship between IU accounted for a significant amount of variance in worry scores (42%) and was significantly stronger than that accounted for by responsibility and anxiety sensitivity (9.8%). According to research by Dugas and colleagues (2004), for an undergraduate nonclinical population, worry and depression were related positively to IU. IU was more highly related to worry than depression, but there was not a significant difference. IU

and worry had a stronger correlation (accounting for 14.4% of the variance) than the correlation between dysfunctional attitudes and worry. Norr and colleagues (2013) compared two non-clinical populations to investigate the unique relationship between IU, and other psychological symptoms. In the first sample of 217 college students, Intolerance of Uncertainty Scale total scores were associated positively with the Penn State Worry Questionnaire score after controlling for covariates (gender, negative affect) as well as other relevant cognitive vulnerability factors (discomfort intolerance, distress tolerance, anxiety sensitivity). Likewise, in the second sample of 241 college students, IU scores were associated positively with the Penn State Worry Questionnaire score after controlling the covariates and relevant cognitive vulnerability factors as done in the first sample (Norr et al., 2013).

When it comes to establishing the construct validity of IU and its contribution to worry, IU was the most salient predictor of worry compared to other cognitive processes such as perfectionism and perceived control. Among another nonclinical sample of undergraduate students (Buhr & Dugas, 2006), IU was correlated with both worry and intolerance of ambiguity. Therefore, IU was more highly correlated with worry than to intolerance of ambiguity. Worry and IU were significantly related even after controlling for intolerance of ambiguity, perfectionism, and perceived control. This suggested that IU has a unique relationship with worry, not accounting for the other cognitive factors (Buhr & Dugas, 2006). Additionally, even after excluding anxiety and depression, there was a unique relationship found between intolerance of uncertainty and worry (Buhr & Dugas, 2002). Thus, there is a growing literature suggesting that IU is a cognitive component of social anxiety.

Maladaptive Perfectionism

Frost and colleagues (1993) view perfectionism as multidimensional, which consists of maladaptive perfectionism and adaptive perfectionism. People who have high levels of maladaptive perfectionism have a tendency toward inferiority and search for approval and acceptance by setting standards for achievement or performance that are unrealistically high. Even when they achieve, however, they do not feel satisfied and think they should or could have performed better (Hamachek, 1978). According to Rice and Dellwo (2002), people with maladaptive perfectionism had poorer emotional, academic, and social well-being than people with adaptive perfectionism and non-perfectionist group. These suggest that they sacrifice their well-being in order to achieve academic success. Another study by Kawamura and colleagues (2001) found that the maladaptive dimension of perfectionism was related to higher levels of anxiety symptoms. Likewise, maladaptive perfectionism was positively related to depression.

Maladaptive Perfectionism and Social Anxiety

Frost and colleagues (1993) developed the Multidimensional Perfectionism Scale, which includes four subscales that evaluate maladaptive evaluative concerns: Concern over Mistakes (CM), Doubts about Actions (DA), Parental Expectations (PE), and Parental Criticism (PC). Despite ample research on social anxiety and its relationship with perfectionism, there is a lack of research on maladaptive perfectionism and its components/subscales. There are only two research studies, to our knowledge, that examined the relationship between maladaptive perfectionism subscales and social anxiety in a nonclinical setting: PE and PC were found to be positively correlated with social anxiety (Biran & Reese, 2007), and CM and DA were positively correlated with measures of social anxiety (Saboonchi & Lundh, 1997). In clinical settings, individuals who are socially anxious have higher scores on the Concern over Mistakes, Parental

Criticism, and Doubts about Actions than community controls but there were no significant differences in Parental Expectations (Juster et al., 1996). Likewise, individuals who were socially anxious had higher scores on CM, PC, and DA than normal controls (Saboonchi et al., 1999). Thus, although maladaptive perfectionism is not currently included in cognitive models of social anxiety, this variable seemed to merit further attention.

Fear of Evaluation and Social Anxiety

According to Watson and Friend (1969), fear of negative evaluation is apprehension about others' evaluations, distress over their negative evaluations, avoidance of evaluative circumstances, and the expectation that others would adversely judge oneself. In a group project, individuals with high FNE put in more effort than those with low FNE, out of the fear that their performance would be evaluated by an unseen, unknown group leader. Measures of fear of negative evaluation have been found to be correlated positively with measures of social anxiety and avoidance of social interactions (Watson & Friend, 1969). Watson and Friend (1969) were the first to examine the link between FNE and social anxiety. Cognitive-behavioral models of social anxiety (e.g., Rapee & Heimberg, 1997) have traditionally stressed fear of negative evaluation (FNE) as the core feature of social anxiety. Rapee and Heimberg (1997) mentioned the cycle in which people who are socially anxious create a mental representation of the distorted image of their external appearance and behavior when the audience is present and paying attention to any indication of potential negative evaluation from the audience such as frowns, or signs of boredom in the social situation. They then quickly pick up the signals and have difficulty disengaging their attention from them. Due to the signals, people who are socially anxious become threatened by the potential negative evaluation from the audience which maintains their anxiety (Rapee & Heimberg, 1997). Individuals who are socially anxious and are

extremely concerned about being negatively perceived or evaluated by others would be more likely to avoid behaving in ways that can result in unfavorable evaluations by being more responsive to such situations (Leary, 1983).

Gilbert's (2001) Psycho-Evolutionary Model of social anxiety suggests that individuals with social anxiety may fear the rise in status due to the fear of having to conflict with others, or the fear that any gains may not be upheld or protected in the future. However, they also fear being presented as undesirable and losing in the competition.

Weeks, Heimberg, and Rodebaugh (2008) hypothesized that people who are socially anxious may fear evaluation in general, experiencing fear of both positive and negative evaluation, based on this Psycho-Evolutionary Model of social anxiety (Weeks et al., 2008a). The Fear of Positive Evaluation Scale was developed by Weeks and colleagues (2008a) to examine whether fear of positive evaluation is able to predict social anxiety above and beyond fear of negative evaluation. They found that fear of positive evaluation and fear of negative evaluation were each uniquely related to social interaction anxiety. It also suggests that people with social anxiety may want to remain unnoticeable, because they fear not being able to live up to or exceed the standard of the audience, and as a result drawing either positive or negative evaluations. They have found that the Fear of Positive Evaluation Scale was more strongly related to a measure of social interaction anxiety than to those with generalized anxiety, worry, and depression (Weeks et al., 2008a). Weeks and colleagues (2008b) mentioned that people with FPE are more likely to experience discomfort when receiving positive feedback and less likely to believe the accuracy of the feedback. Additionally, they are likely to have submissive behavior, related to the Psycho-Evolutionary Model of social anxiety. This study found that FPE and FNE contribute uniquely to both social interaction anxiety and anxiety about being observed by

others. Therefore, the social threat could entail any experience of conspicuousness or self-consciousness in which the person might receive either positive or negative evaluation (Weeks et al., 2008b).

According to these studies, both FPE and FNE are cognitive components of social anxiety, and they are related strongly to one another. Weeks and Howell (2012) created the Bivalent Fear of Evaluation Model, given that positive and negative social feedback indicate distinct valences of social evaluation. Weeks and Howell (2012) found that FPE exhibited a unique and significantly stronger relationship with concerns of social reprisal as a result of establishing positive impressions than did FNE. Additionally, individuals with FPE related more strongly to the tendency to disqualify positive social experiences and outcomes by minimally attributing one's social success to one's own capacity for effort than those with FNE and social anxiety (Weeks & Howell, 2012).

These cognitive components of social anxiety overlap in various ways. One such potential overlap that has not been examined yet to our knowledge is the link between fear of evaluation and intolerance of uncertainty. Given the lack of empirical study here, we can only speculate theoretically what these variables have in common. Individuals with high fear of evaluation may anticipate potential judgment from others in social interactions, which can add an element of uncertainty. For example, when entering a social situation, a person with social anxiety may be uncertain about whether they will be evaluated negatively. Conversely, intolerance of uncertainty may contain aspects of potential evaluation, which could increase fear of evaluation. For example, someone with high levels of IU may try to increase certainty in social situations, such as making sure that they leave extra early for a party so that they do not arrive late and therefore incur social judgment.

Current Study and Hypotheses

In summary, a large amount of research has examined various cognitive styles associated with social anxiety. However, some of these variables have not yet been included in traditional cognitive-behavioral models of social anxiety, particularly the relatively new construct of the fear of positive evaluation. Thus, this study sought to examine how this particular set of cognitive variables interacts and may jointly be related to social anxiety. By including both social anxiety and worry, this study allowed for a comparison of how these various cognitive styles relate differentially to two different forms of anxiety.

For example, the relationship between worry and intolerance of uncertainty has been documented in numerous studies (e.g., Buhr & Dugas, 2002; Buhr & Dugas, 2006; Dugas et al., 2001; Dugas et al., 2004; Ladouceur et al., 2000; Meeten et al., 2012; Norr, 2013;). Thus, Hypothesis 1a examined the relationship between worry and intolerance of uncertainty. Worry was predicted to be correlated positively with IU. Also, there is much research that has found a positive relationship between social anxiety and intolerance of uncertainty (e.g., Bijsterbosch et al., 2020; Boelen & Reijntjes, 2009; Carleton et al., 2010; Carleton et al., 2012; Norr et al., 2013; Sahakian & Kazarian, 2015). Hypothesis 1b examined the relationship between social anxiety and intolerance of uncertainty. Social anxiety was predicted to be correlated positively with IU (e.g., Bijsterbosch et al., 2020; Boelen & Reijntjes, 2009; Carleton et al., 2010, Carleton et al., 2012; Norr et al., 2013; Sahakian & Kazarian, 2015). However, to examine the differential relationships of IU to both worry and social anxiety, Hypothesis 2 examined whether worry and social anxiety predict intolerance of uncertainty by using a hierarchical multiple regression model. It was predicted that social anxiety would be a positive predictor of IU above and beyond the worry. Worry was entered in block one to be controlled for the direct relationship between

worry and IU. Social anxiety was entered in block two. The study examined whether social anxiety would be a significant predictor even after controlling for the direct relationship between worry and IU.

Hypothesis 3a examined the relationship between fear of negative evaluation and intolerance of uncertainty, and Hypothesis 3b examined the relationship between fear of positive evaluation and intolerance of uncertainty. There were no studies to our knowledge that have examined either of these relationships. However, it was predicted that there would be a positive correlation between fear of negative evaluation and intolerance of uncertainty, as well as a positive correlation between fear of positive evaluation and intolerance of uncertainty. These hypotheses were made because FPE and FNE are highly related to social anxiety (e.g., Leary, 1983; Rapee & Heimberg, 1997; Watson & Friend, 1969; Weeks et al., 2008a; Weeks et al., 2008b; Weeks & Howell, 2012), which is known to have a positive relationship with IU (Carleston et al., 2010). FNE is specifically considered to have a robust relationship with social anxiety (Rapee & Heimberg, 1997). Although FPE was more recently incorporated into the cognitive-behavioral model of social anxiety (c.f., Weeks et al., 2008a), it is related to social anxiety (e.g., Weeks et al., 2008a; Weeks et al., 2008b; Weeks & Howell, 2012). Moreover, Weeks and colleagues (2008a) suggested that social threat could entail any experience of conspicuous or self-consciousness in which the person might receive either a positive or negative evaluation.

Despite ample research on social anxiety and its relationship with perfectionism, considerably less research has examined social anxiety and its relationship with maladaptive perfectionism. Hypothesis 4a examined the relationship between maladaptive perfectionism and social anxiety. It was predicted that there will be a positive correlation between maladaptive

perfectionism and social anxiety. There are four subscales on The Frost Multidimensional Perfectionism Scale (Frost et al., 1993) that evaluate maladaptive evaluative concerns: Concern over Mistakes (CM), Doubts about Actions (DA), Parental Expectations (PE), and Parental Criticism (PC). However, there is only two research that examined the relationship between social anxiety and maladaptive perfectionism subscales in a nonclinical setting. PE and PC were found to be positively correlated with social anxiety (Biran & Reese, 2007), and CM and DA were positively correlated with measures of social anxiety (Saboonchi & Lundh, 1997). Therefore, Hypothesis 4b examined the relationship between Concern over Mistakes and social anxiety. It was predicted that there would be a positive correlation between Concern over Mistakes and social anxiety. Hypothesis 4c examined the relationship between Parental Expectations and social anxiety. It was predicted that there would be a positive correlation between Parental Expectations and social anxiety. Hypothesis 4d examined the relationship between Parental Criticism and social anxiety. It was predicted that there will be a positive correlation between Parental Criticism and social anxiety. Hypothesis 4e examined the relationship between Doubts about Actions and social anxiety. It was predicted that there would be a positive correlation between Doubts about Actions and social anxiety. Although there is some research that found a significant relationship between CM, DA, PC, and social anxiety (Biran & Reese, 2007; Saboonchi & Lundh, 1997; Shumaker & Rodebaugh, 2009), there is no research that looked at the relationship between social anxiety and PE in a nonclinical population.

Hypothesis 5a examined whether fear of negative evaluation mediates the relationship between worry and intolerance of uncertainty. It was predicted that fear of negative evaluation would mediate the relationship between worry and IU. Hypothesis 5b examined whether fear of

positive evaluation mediates the link between worry and intolerance of uncertainty. It was predicted that fear of positive evaluation would mediate the relationship between worry and intolerance of uncertainty. Hypothesis 5c examined whether fear of negative evaluation mediates the relationship between social anxiety and intolerance of uncertainty. It was predicted that fear of negative evaluation would mediate the relationship between social anxiety and intolerance of uncertainty. Hypothesis 5d examined whether fear of positive evaluation mediates the relationship between social anxiety and intolerance of uncertainty. It was predicted that fear of positive evaluation would mediate the relationship between social anxiety and intolerance of uncertainty. Hypothesis 5e examined whether fear of negative evaluation serves as a mediator for the association between maladaptive perfectionism and social anxiety. It was predicted that fear of negative evaluation would mediate the link between maladaptive perfectionism and social anxiety.

Method

Participants

Participants were recruited through Amazon Mechanical Turk (MTurk). With an α level of .05, a power of 95%, a priori power analysis indicated that approximately 115 participants were needed to find a moderate effect size of .30. On MTurk, we set the inclusion criteria requiring that participants be college students within the age range of 18 to 25 years, and reside in the United States. Among 123 participants who met the criteria (see Table 1), 58.5% identified as male ($N = 72$), and 41.5% identified as female ($N = 51$). Of the participants, 97.6% ($n = 120$) indicated that were students at a 4-year college, with 3 of the participants indicating that they were students at a 2-year community college (2.4%). In terms of class, 2.4% were Freshmen ($N = 3$), 14.6% were a Sophomore ($N = 18$), 9.8% were a Junior ($N = 12$), and 73.2% were a Senior

($N = 90$). Regarding racial background, the majority of the participants (91.9%) identified as Caucasian ($N = 113$), 4.1% identified as Hispanic or Latino/a ($N = 5$), 3.3% identified as Asian or Pacific Islander ($N = 4$), and 0.8% of them identified as both “Caucasian” and “American Indian, Alaskan Native, or Native Hawaiian” ($N = 1$).

Procedure

Participants provided consent to be in the study and completed the questionnaires online through Amazon Mechanical Turk. Specifically, the measures were administered using Qualtrics and were counter-balanced to prevent order effects. Participants were compensated with 50 cents for their participation.

Measures

Demographics Questionnaire

Participants were asked to provide demographic details about themselves, which included their sex, age, type of college, year in school, and racial background (See Appendix A).

Social Anxiety

Social anxiety was measured using the Social Interaction Anxiety Scale (SIAS; Mattick & Clark, 1998). The SIAS is a self-report scale that consists of 20 items. It was developed to assess distress when meeting and talking with other people, be those people members of the opposite sex, strangers, or friends (Mattick & Clark, 1998). Items are rated on a five (0-4) Likert rating scale, ranging from 0 = not at all characteristic or true of me to 4 = extremely characteristic or true of me. Sample items include “I have difficulty making eye contact with others,” and “I become tense if I have to talk about myself or my feelings” (Mattick & Clark, 1998). The SIAS has a high level of internal consistency, with Cronbach’s α ranging from .88 to .94, and test-retest reliability $r = .92$. Furthermore, SIAS scores correlate with Fear of Negative

Evaluation Scale ($r = .44$, Heimberg et al., 1992; $r = .66$, Mattick & Clark, 1998), Social Avoidance and Distress Scale ($r = .74$, Heimberg et al., 1992; $r = .74$, Mattick & Clark, 1998), Social Phobia Scale ($r = .72$, Brown et al., 1997), indicating high convergent validity.

Frost Multidimensional Perfectionism Scale

The Frost Multidimensional Perfectionism Scale (FMPS; Frost et al., 1990) is a 35-item self-report measure that contains six subscales: (a) Concern over Mistakes (Nine items to reflect one's negative reactions to making mistakes and equate mistakes with failure; "People will probably think less of me if I make a mistake"), (b) Doubts about Actions (Four items to reflect one's propensity to doubt one's capability; "I tend to get behind in my work because I repeat things over and over"), (c) Personal Standards (Seven items to measure whether one sets high standards for himself or herself; "I hate being less than the best at anything"), (d) Parental Expectations (Five items to measure one's beliefs that parents set high standards or and are overly critical; "My parents expected excellence of me"), (e) Parental Criticism (Four items to assess perception of one's parents as being overly critical; "As a child, I was punished for doing things less than perfectly"), and (f) Organization (Six items to reflect one's preference to be orderly; "I am an organized person") (Frost et al., 1990).

Participants indicate what best reflected their opinion on each item on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) (Frost et al., 1990). The Total Perfectionism score is the sum of all subscales except Organization, which tends to not correlate highly with the other subscales or with Total Perfectionism (Frost et al., 1990). The Maladaptive Evaluative Concern subscale is the sum of all items from Concern over Mistakes, Doubts about Actions, Parental Criticism, and Parental Expectations. Good internal consistency has been found

for the total perfectionism score ($\alpha = .90$) and for the subscales (α s range from .77 to .93; Frost et al., 1990).

Worry

Worry was measured by using Penn State Worry Questionnaire (PSWQ; Meyer et al., 1990). The PSWQ is a 16-item self-report questionnaire with 5-Likert scale (1 = not at all typical of me to 5 = very typical of me), used to measure the trait of worry. The range of possible scores for the PSWQ is 16 to 80. Sample items include “My worries overwhelm me” and “I do not tend to worry about things.” PSWQ has high internal consistency ranging from $\alpha = .91$ to .94 (Meyer et al., 1990), good test-retest reliability ($r = .93$; Meyer et al., 1990), and discriminate validity (Meyer et al., 1990).

Intolerance of Uncertainty

Intolerance of uncertainty was measured using the Intolerance of Uncertainty Scale (IUS; Freeston et al., 1994). The IUS contains 27 items that assess emotional, cognitive and behavioral reactions to ambiguous situations, implications of being uncertain, and attempts to control the future (Freeston et al., 1994). Sample items include “Uncertainty makes life intolerable” and “It’s unfair having no guarantees in life.” Items are rated on a five-point Likert Scale (1 = Not at all representative to 5 = Completely representative). The internal consistency for the retained items is excellent $\alpha = .91$ (Freeston et al., 1994) and it had good test-retest reliability ($r = .78$; Dugas et al., 1997). Also, the IUS has good demonstrated convergent validity (Freeston et al., 1994).

Fear of Positive Evaluation

Fear of positive evaluation was measured by using The Fear of Positive Evaluation Scale (FPES; Weeks et al., 2008a). The FPES is a self-report questionnaire that consists of 10 items rated on a 10 points Likert scale (0 = not at all true to 10 = very true). Sample items include “I try to choose clothes that will give people a little impression of what I am like” and “I feel uneasy when I receive praise from authority figures” (Weeks et al., 2008a). The FPES has shown good internal consistency ($\alpha = .89$; Weeks et al., 2012) and test-retest reliability ($r = .80$; Weeks et al., 2012). The convergent validity of the FPES is significantly and positively correlated with other social anxiety measures (Weeks et al., 2012).

Fear of Negative Evaluation

The Brief Fear of Negative Evaluation Scale-II (BFNE- II; Leary, 1983) was used to assess the fear of negative evaluation. The BFNE-II was adapted from Watson and Friend's (1969) 30-item Fear of Negative Evaluation Scale. The BFNE- II is a self-report questionnaire that measures people's concerns about being evaluated unfavorably by others. It consists of 12-items, with a 5-point Likert scale ranging from 1 = not at all characteristic of me to 5 = extremely characteristic of me. Sample items include “I am afraid that people will find fault with me” and “Other people's opinions of me do not bother me.” The BFNE-II is highly correlated with the original version ($r = .96$; Leary, 1983). The test-retest reliability of the BFNE-II is good ($r = .75$; Leary, 1983), ($r = .94$, Collins et al., 2005) which compares favorably to Watson and Friend's reported test-retest ($r = .68$; Leary, 1983).

Results

Preliminary Analyses

The internal consistency of each measure was calculated using Cronbach's α analyses. The Cronbach's α (see Table 2) for three scales were strong: the Social Interaction Anxiety Scale = .86; the Frost Maladaptive Perfectionism Scale = .95; and the Intolerance of Uncertainty Scale = .96. The Cronbach's α for the Frost Multidimensional Perfectionism Scale subscales were acceptable to strong, ranging from .71 to .87.

In contrast, the internal consistency for the Penn State Worry Questionnaire total score was not acceptable: Cronbach's α = .49. Thus, this scale was examined further. First, we considered that the internal consistency of measures with reverse-scored items sometimes suggests two factors: reverse- and non-reverse scored items. Fresco and colleagues (2002) labeled the 11 non-reverse scored items as a "Worry Engagement" subscale and the 5 reverse scored items as an "Absence of Worry" subscale. Thus, we examined the internal consistencies of these putative subscales and found strong internal consistency: Worry Engagement = .92 and Absence of Worry = .82.

The Penn State Worry Questionnaire (PSWQ) was developed initially by Meyer and colleagues (1990) as a uni-factor measure, with high internal consistency for the PSWQ in a non-clinical college student sample (α = .93). However, factor analysis with subsequent samples has yielded mixed findings, leading to debate regarding whether to use a one-factor or a two-factor model for the PSWQ.

Brown and colleagues (1992) supported a one-factor model for individuals with anxiety disorders. Although positively keyed items accounted for more variance than the reverse keyed

items, the study found high internal consistency for the 16-item PSWQ ($\alpha = .93$). However, Fresco and colleagues (2002), using a Dutch sample, found that a two-factor model better fit the data based on confirmatory factor analyses among nonclinical undergraduate students. The total PSWQ score was $\alpha = .90$. The study labeled 11 non-reverse scored items a Worry Engagement ($\alpha = .94$) and 5 reverse scored items an Absence of Worry ($\alpha = .70$) (Fresco et al., 2002). Another study (van Rijsoort et al., 1999) found that, in a Dutch sample Cronbach's α for the total scale was .88, the positively keyed score was .92, and the negatively keyed score was .62 among the community sample. Therefore, it was found that reversed key items weakened the total scale. Considering that PSWQ is widely used, the authors decided to not eliminate reverse-keyed items from the total scale, although some studies suggested a two-factor model (van Rijsoort et al., 1999).

Given the mixed findings from our study and others regarding whether the PSWQ should be used as a one- or two-factor measure, we turned again to the literature to see whether the mean scores from our study were similar. In the current study, the mean and standard deviation (SD) for PSWQ Total were 52.01 and 5.90; for the subscales, the mean and standard deviations for the PSWQ-Worry Engagement were 40.07 and 8.93, and for PSWQ-Absence of Worry was 11.94 and 4.10. The measure's total mean score and SD were similar to other studies. For instance, Fresco and colleagues (2022) found that the PSWQ had a mean score of 48.39 (SD = 13.87) for a nonclinical undergraduate sample. Startup and Erickson (2006) found that their sample of predominantly nonclinical college students had a total mean and SD of 47.42 and 13.40. The community sample in Dutch had a total mean and SD of 43.14 and 12.02 (Rijsoort et al., 1999). The unifactorial model is widely used and the study's mean and SD were similar to that of other research. Thus, although the internal consistency of the PSWQ total score was not

acceptable, there does not seem to be compelling evidence suggesting that we should use a two-factor model in the current study; thus, we will use the total score. However, all findings using the PSWQ in this study will be considered purely exploratory in nature.

Second, the internal consistency of the Fear of Positive Evaluation Scale was questionable: Cronbach's $\alpha = .68$. Thus, this scale was examined further. Weeks and colleagues (2008a) examined the psychometric properties of Fear of Positive Evaluation Scale in undergraduate samples. The study suggested two reverse-scored items (items 5 and 10) be excluded in calculating the total FPES score as 8 straightforward items were a better fit than the 10-item model. However, the study mentioned that reverse-scored items were to be included in calculating internal consistency to reduce the response bias of acquiescence. Result showed that the internal consistency was high: Cronbach's $\alpha = .80$. Howell and colleagues (2016) found an acceptable ($\alpha = .76$) to good ($\alpha = .80$) internal consistency in two undergraduate samples. Therefore, it is possible that some participants in the study have engaged in a response bias of acquiescence.

Finally, the internal consistency of the Brief Fear of Negative Evaluation-II was not acceptable: Cronbach's $\alpha = .08$. Thus, this scale was examined further. First, we examined non-reverse scored items ($\alpha = .87$) and reverse scored items ($\alpha = .75$). According to Rodebaugh and colleagues (2004), the straightforward items of the Brief Fear of Negative Evaluation-II are more reliable and more highly discriminating than reverse-worded items among the undergraduate sample. However, reverse-worded items were suggested to be used for discriminating between people who have a particular response tendency. In the study, the internal consistency was high for overall items ($\alpha = .88$) and straightforwardly worded items ($\alpha = .93$) but was a bit lower for reverse worded items ($\alpha = .63$). The internal consistency for overall items was high in another

study ($\alpha = .90$; Leary, 1983). Although the study had high internal consistency in non-reverse scored items and reverse scored items, the total internal consistency was poor. Therefore, it is possible that the participants engaged in a particular response tendency.

The mean for the measures in the study were elevated compared to those in other studies except for the Penn State Worry Questionnaire: Social Interaction Anxiety Scale ($M = 48.81$, $SD = 11.57$); in other studies, mean ranged from 20.38 to 22.38 (Purdon et al., 2001; Gore et al., 2016), Intolerance of Uncertainty Scale ($M = 100.16$, $SD = 19.12$); in other studies, mean ranged from 54.78 to 55.54 (Dugas et al., 2004; Buhr & Dugas, 2002), Fear of Positive Evaluation Scale non-reverse items ($M = 41.83$, $SD = 14.33$); in other studies, mean ranged from 22.80 to 28.69 (Carter et al., 2012; Weeks et al., 2008a), Brief Fear of Negative Evaluation Scale-II non-reverse items ($M = 29.25$, $SD = 5.97$); in other studies, mean ranged from 19.97 to 21.35 (Rodebaugh et al., 2004; Levinson et al., 2013). The subscales for Frost Maladaptive Perfectionism Scale also showed higher mean than the other studies except for Parental Criticism: Concern over Mistakes ($M = 34.33$, $SD = 6.21$), Parental Expectations ($M = 19.32$, $SD = 3.07$), Parental Criticism ($M = 15.26$, $SD = 2.88$), Doubts about Actions ($M = 15.62$, $SD = 2.76$). According to Rice and colleagues (1998), the mean for the Concern over Mistakes was 21.31, Parental Expectations was 14.16, Parental Criticism was 15.26, and Doubts about Actions was 10.14. Therefore, the result should be interpreted with caution.

For Hypothesis 2, which predicted that social anxiety would be a positive predictor of IU above and beyond worry, a multicollinearity test was conducted to examine whether social anxiety and worry are independent of each other, given the overlap between these constructs. There was a positive correlation between social anxiety and worry $r(121) = .78$, $p < .001$ (one-tailed) (see Table 3). However, multicollinearity was not an issue, as the Tolerance Index Value

(.4) was not less than .2 and the Variance Inflation Factor Index Value (2.502) was not greater than 5.

Main Hypotheses

Hypothesis 1a and 1b were supported. Hypothesis 1a predicted a positive correlation between worry and intolerance of uncertainty; worry and intolerance of uncertainty correlated positively, $r(121) = .66, p < .001$ (one-tailed). Hypothesis 1b predicted a positive correlation between social anxiety and intolerance of uncertainty; social anxiety and intolerance of uncertainty correlated positively, $r(121) = .83, p < .001$ (one-tailed).

Hypothesis 2 predicted that social anxiety would be a positive predictor of IU above and beyond worry. A hierarchical multiple regression analysis was conducted to predict IU scores. In Step One, worry was used as the predictor. The worry was a positive predictor, $R^2 = .44, F(1,121) = 94.56, \beta = 2.15, p < .001$. Worry accounted for a 44% variance in IU (see Table 4). In Step Two, social anxiety was added to determine if it can predict IU over and above worry. The results indicate that social anxiety does provide added predictive value, $\Delta R^2 = .24, F(1,120) = 91.39, \beta = 1.29, p < .001$. Therefore, social anxiety was found to be a significant predictor of IU. Social anxiety explained an additional 24% of the variance in IU (see Table 4).

Hypothesis 3a and 3b were supported. Hypothesis 3a predicted a positive correlation between fear of negative evaluation and intolerance of uncertainty. Fear of negative evaluation correlated positively with intolerance of uncertainty, $r(121) = .82, p < .001$ (one-tailed). Hypothesis 3b predicted a positive relationship between fear of positive evaluation and intolerance of uncertainty. Fear of positive evaluation correlated positively with intolerance of uncertainty, $r(121) = .27, p = .001$ (one-tailed).

Hypothesis 4a was supported. Hypothesis 4a predicted a positive correlation between social anxiety and maladaptive perfectionism. Social anxiety correlated positively with maladaptive perfectionism, $r(121) = .66, p < .001$ (one-tailed). Hypothesis 4b, 4c, 4d, and 4e predicted a positive correlation between maladaptive perfectionism subscales and social anxiety. Concern over Mistakes correlated positively with social anxiety, $r(121) = .65, p < .001$ (one-tailed), and Parental Criticism correlated positively with social anxiety, $r(121) = .58, p < .001$ (one-tailed). Parental Expectations correlated positively with social anxiety, $r(121) = .58, p < .001$ (one-tailed), and Doubts about Actions correlated positively with social anxiety, $r(121) = .56, p < .001$ (one-tailed).

Hypothesis 5a predicted that fear of negative evaluation would act as a mediator in the relationship between worry and intolerance of uncertainty. A Baron and Kenny test of mediation (Baron & Kenny, 1986; Kenny, 2021) was conducted to examine if fear of negative evaluation mediated the relationship between worry (the causal variable) and intolerance of uncertainty (the outcome variable). Step one examined the relationship between the causal variable and the outcome variable. Worry correlated positively with intolerance of uncertainty, $\beta = 2.15, p < .001$. Step two tested the relationship between the causal variable and the potential mediator. Worry correlated positively with fear of negative evaluation, $\beta = .63, p < .001$. Step three then examined the relationship between the potential mediator and the outcome variable while controlling the causal variable. The relationship between fear of negative evaluation and intolerance of uncertainty was statistically significant while controlling for worry, $\beta = 2.11, p < .001$ (see Table 5). Fear of negative evaluation and intolerance of uncertainty were positively correlated.

Finally, step four tested whether the relationship between the causal variable and the outcome variable while controlling the mediator is zero. The relationship between worry and

intolerance of uncertainty while controlling fear of negative evaluation decreased but not to zero, $\beta = .81, p < .001$ (see Table 5). The amount of mediation was $\beta_{Indirect\ Effect} = 1.33$. According to Sobel's test, this partially mediated effect was statistically significant ($Z = 6.68, p < .001$ (one-tailed)). Thus, fear of negative evaluation partially mediated the relationship between worry and intolerance of uncertainty (see Figure 1).

Hypothesis 5b predicted that fear of positive evaluation would act as a mediator in the relationship between worry and intolerance of uncertainty. A Baron and Kenny test of mediation (Baron & Kenny, 1986; Kenny, 2021) was conducted to examine if fear of positive evaluation mediated the relationship between worry (the causal variable) and intolerance of uncertainty (the outcome variable). Step one examined the relationship between the causal variable and the outcome variable. Worry correlated positively with intolerance of uncertainty, $\beta = 2.15, p < .001$. Step two tested the relationship between the causal variable and the potential mediator. Worry correlated positively with fear of positive evaluation, $\beta = .44, p = .046$. Step three then examined the relationship between the potential mediator and the outcome variable while controlling the causal variable. The relationship between fear of positive evaluation and intolerance of uncertainty was statistically significant while controlling for worry, $\beta = .21, p = .03$. Fear of positive evaluation correlated positively with intolerance of uncertainty.

Finally, Step four tested whether the relationship between the causal variable and the outcome variable while controlling the mediator is zero. The relationship between worry and intolerance of uncertainty while controlling fear of positive evaluation decreased but not to zero, $\beta = 2.06, p < .001$ (see Table 6). The amount of mediation was $\beta_{Indirect\ Effect} = .09$. According to Sobel's test, this partially mediated effect was not statistically significant ($Z = 1.50, p = .07$ (one-tailed)) (see Figure 2).

Hypothesis 5c predicted that fear of negative evaluation would mediate the relationship between social anxiety and intolerance of uncertainty. A Baron and Kenny test of mediation (Baron & Kenny, 1986; Kenny, 2021) was conducted to examine if fear of negative evaluation mediated the relationship between social anxiety (the causal variable) and intolerance of uncertainty (the outcome variable). Step One examined the relationship between the causal variable and the outcome variable. Social anxiety correlated positively with intolerance of uncertainty, $\beta = 1.36, p < .001$. Step Two tested the relationship between the causal variable and the potential mediator. Social anxiety correlated positively with fear of negative evaluation, $\beta = .39, p < .001$. Step Three then examined the relationship between the potential mediator and the outcome variable while controlling the causal variable. The relationship between fear of negative evaluation and intolerance of uncertainty was statistically significant while controlling for social anxiety, $\beta = 1.43, p < .001$ (see Table 7). Fear of evaluation correlated positively with intolerance of uncertainty.

Finally, Step Four tested whether the relationship between the causal variable and the outcome variable while controlling the mediator is zero. The relationship between social anxiety and intolerance of uncertainty while controlling fear of negative evaluation decreased but not to zero, $\beta = .81, p < .001$ (see Table 7). The amount of mediation was $\beta_{\text{Indirect Effect}} = .56$. According to Sobel's test, this partially mediated effect was statistically significant ($Z = 5.89, p < .001$ (one-tailed)). Thus, fear of negative evaluation partially mediated the relationship between social anxiety and intolerance of uncertainty (see Figure 3).

Hypothesis 5d predicted that the fear of positive evaluation would mediate the relationship between social anxiety and intolerance of uncertainty. A Baron and Kenny test of mediation (Baron & Kenny, 1986; Kenny, 2021) was conducted to examine if fear of positive

evaluation mediated the relationship between social anxiety (the causal variable) and intolerance of uncertainty (the outcome variable). Step One examined the relationship between the causal variable and the outcome variable. Social anxiety correlated positively with intolerance of uncertainty, $\beta = 1.36, p < .001$. Step Two tested the relationship between the causal variable and the potential mediator. Social anxiety correlated positively with fear of positive evaluation, $\beta = .31, p = .01$. Step Three then examined the relationship between the potential mediator and the outcome variable while controlling the causal variable. The relationship between fear of positive evaluation and intolerance of uncertainty was not statistically significant while controlling for social anxiety, $\beta = .09, p = .23$ (see Table 8). Therefore, no mediation was found (see Figure 4).

Hypothesis 5e predicted that fear of negative evaluation would mediate the relationship between maladaptive perfectionism and social anxiety. A Baron and Kenny test of mediation (Baron & Kenny, 1986; Kenny, 2021) was conducted to examine if fear of negative evaluation mediated the relationship between maladaptive perfectionism (the causal variable) and social anxiety (the outcome variable). Step One examined the relationship between the causal variable and the outcome variable. Maladaptive perfectionism correlated positively with social anxiety, $\beta = .57, p < .001$. Step Two tested the relationship between the causal variable and the potential mediator. Maladaptive perfectionism correlated positively with fear of negative evaluation, $\beta = .28, p < .001$. Step Three then examined the relationship between the potential mediator and the outcome variable while controlling the causal variable. The relationship between fear of negative evaluation and social anxiety was statistically significant while controlling for maladaptive perfectionism, $\beta = 1.08, p < .001$ (see Table 9). Fear of negative evaluation correlated positively with social anxiety.

Finally, Step Four tested whether the relationship between the causal variable and the outcome variable while controlling the mediator is zero. The relationship between maladaptive perfectionism and social anxiety while controlling fear of negative perfectionism decreased but not to zero, $\beta = .26, p < .001$ (see Table 9). The amount of mediation is $\beta_{\text{Indirect Effect}} = .30$. According to Sobel's test, this partially mediated effect was statistically significant ($Z = 5.84, p < .001$ (one-tailed)). Thus, fear of negative evaluation partially mediated the relationship between maladaptive perfectionism and social anxiety (see Figure 5).

Discussion

The purpose of this study was to examine how the relationship between social anxiety and intolerance of uncertainty, and the relationship between worry and intolerance of uncertainty may be mediated by fear of positive evaluation and fear of negative evaluation. Also, the study examined how the relationship between maladaptive perfectionism and social anxiety may be mediated by fear of negative evaluation.

Social Anxiety, Worry, and Intolerance of Uncertainty

This study examined the relationship between social anxiety, worry, and intolerance of uncertainty. Although there are numerous studies that have examined the relationship between worry and intolerance of uncertainty, there is a relative lack of research that examined the relationship between social anxiety and intolerance of uncertainty. As predicted, Hypothesis 1a was supported in that there is a positive correlation between worry and intolerance of uncertainty. Hypothesis 1b was supported in that there is a positive correlation between social anxiety and intolerance of uncertainty. These support the previous research that has found a positive relationship between worry and intolerance of uncertainty, and social anxiety and

intolerance of uncertainty (e.g., Dugas et al., 2001; Ladouceur et al., 2000; Dugas & Ladouceur, 2000; Boelen and Reijntes, 2009; Norr et al., 2013).

Hypothesis 2 was supported in that social anxiety predicted intolerance of uncertainty above and beyond worry. Worry was found to be the significant predictor of intolerance of uncertainty, and social anxiety did add a significant predictive value. This finding strongly supports the previous findings that social anxiety is positively related to intolerance of uncertainty (e.g., Carleton et al., 2010; Boelen and Reijntjes 2009). This finding may have occurred because people with social anxiety can experience fear in social situations due to possible scrutiny from others, and the uncertainty may maintain their anxiety. This finding is particularly interesting because of the similar aspects of social anxiety and worry, which are both negative cognitions (Vassilopoulos, 2008; Mathews, 1990) related to concerns and stress about future events (Vassilopoulos, 2008; Borkovec et al., 1983). Future research may help determine what aspect of social anxiety can predict intolerance of uncertainty above and beyond worry.

Fear of Evaluation and Intolerance of Uncertainty

This study examined the relationship between fear of evaluation and intolerance of uncertainty, which was not previously researched to our knowledge. As anticipated, there was a positive correlation between fear of negative evaluation and intolerance of uncertainty (Hypothesis 3a) as well as between fear of positive evaluation and intolerance of uncertainty (Hypothesis 3b). Fear of evaluation could add an element of uncertainty to social interactions, and uncertainty often contains aspects of evaluation. For example, when entering a social situation, a person with social anxiety may be uncertain about whether they will be evaluated negatively. Conversely, intolerance of uncertainty may contain aspects of potential evaluation, which could increase fear of evaluation. For example, someone with high levels of IU may try to

increase certainty in social situations, such as making sure that they leave extra early for a party so that they do not arrive late and therefore incur social judgment. This outcome is also plausible as fear of positive evaluation and fear of negative evaluation are highly related to social anxiety (e.g., Leary, 1983; Rapee & Heimberg, 1997), which is known to be also positively related to intolerance of uncertainty (Carleston et al., 2010).

Maladaptive Perfectionism and Social Anxiety

There is no research in our knowledge that has examined the relationship between maladaptive perfectionism and social anxiety. Hypothesis 4a was supported as there is a positive correlation between maladaptive perfectionism and social anxiety. This finding supports Juster and colleague's (1996) point that perfectionism may be a risk factor for social anxiety or even exacerbates it, and individuals with social anxiety may manifest perfectionism by setting unreasonably high standards for themselves in the social setting.

In previous research, some of the subscales of the Multidimensional Perfectionism Scale were positively correlated to social anxiety. For instance, individuals who were socially anxious had higher scores on Concern over Mistakes, Parental Criticism, and Doubts about Actions (Saboonchi et al., 1999). Parental Expectations and Parental Criticism were found to be positively correlated with social anxiety (Biran & Reese, 2007). However, there is a lack of research that has examined the relationship between the subscales of the Multidimensional Perfectionism Scale and social anxiety in a nonclinical setting. In the current research, Hypothesis 4b, 4c, 4d, and 4e were supported as Concern over Mistakes, Doubts about Actions, Parental Criticism, and Parental Expectations were positively correlated with social anxiety.

Fear of Evaluation as a Mediator

Hypothesis 5a was supported as fear of negative evaluation partially mediated the relationship between worry and intolerance of uncertainty. This suggests that as worry increases, fear of negative evaluation increases which may lead to an increase in intolerance of uncertainty. Hypothesis 5b was not supported, as the partially mediated effect of fear of positive evaluation between worry and intolerance of uncertainty was not statistically significant. However, there was a direct effect between worry and intolerance of uncertainty. This suggests that worry may contribute significantly to intolerance of uncertainty. This finding supports the previous research findings that worry is positively related to intolerance of uncertainty (e.g., Dugas et al., 2001; Ladouceur et al., 2000; Dugas & Ladouceur, 2000).

Hypothesis 5c was supported as fear of negative evaluation also partially mediated the relationship between social anxiety and intolerance of uncertainty. This suggests that as social anxiety increases, fear of negative evaluation increases which leads to an increase in intolerance of uncertainty. Individuals with social anxiety may perceive threat from potential negative evaluation from the audience which maintains their anxiety (Rapee & Heimberg, 1997). In turn, the possibility of the negative evaluation from others can increase their intolerance of uncertainty. Hypothesis 5d was not supported as fear of positive evaluation did not mediate the relationship between social anxiety and intolerance of uncertainty. This is because the relationship between fear of positive evaluation and intolerance of uncertainty was not statistically significant while controlling social anxiety. However, there was a positive correlation between fear of positive evaluation and intolerance of uncertainty when not controlling for social anxiety. This suggests that social anxiety may contribute significantly to the relationships between fear of positive evaluation and intolerance of uncertainty. This finding

may have occurred because there are research findings that social anxiety is positively related to fear of positive evaluation (Weeks et al., 2008a, Weeks et al., 2008b).

Hypothesis 5e was supported as fear of negative evaluation partially mediated the relationship between maladaptive perfectionism and social anxiety. This suggests that as maladaptive perfectionism increases, fear of negative evaluation increases which leads to an increase in social anxiety. This may have occurred because maladaptive perfectionism may be triggered because of the fear of potential negative evaluation from others. Increased fear of negative evaluation could have increased social anxiety as individuals may become threatened by the potential negative evaluation from others and maintain the anxiety (Rapee & Heimberg, 1997).

Limitations

This study has a few limitations that should be noted. First, the internal consistency for some of the measures was poor to questionable ($\alpha = .08$ to $= .68$), which is contradictory to the high internal consistency that has been shown in some other research. There are some possible factors that may have contributed to this low internal consistency. The participants could have engaged in acquiescence bias, which is a preference for the positive or negative side of the rating scale. The reversed score items may have detected the self-contradictory responses. Therefore, the results should be interpreted with caution.

Second, the participant population lacked diversity as the participants were primarily Caucasian (91.9%), Senior (73.2%), and attending 4-year college (100%). Therefore, results may not represent the general college student population in the United States.

Using MTurk as a research participant tool has certain limitations. Research has shown that MTurk is beneficial as it has a large and diverse participant pool, and easy to collect data (Aguinis et al., 2021). However, using MTurk can be challenging as the participants may pay less attention to the study and put in less effort due to the distracting environment and desire to maximize monetary returns (Aguinis et al., 2021). For instance, Kim & Oh (2023) found that data from MTurk had higher careless or insufficient effort responses compared to face-to-face or email recruitment data. Participants may also misrepresent the demographics in order to meet the study's qualification criteria (Aguinis et al., 2021). In this study, 212 participants initially responded. However, due to the failure of the MTurk system of keeping track of the participant's ages, 89 of the participants that self-reported their age in the questionnaire failed to meet the age criteria. Therefore, those data were eliminated from the study.

Finally, the study is correlational in nature. Therefore, although it can provide information about the relationships and possible interactions among variables, it is difficult to determine the direction of these relationships.

Future Directions

This study should be replicated in a college setting to minimize the limitations of using MTurk. The study result showed that social anxiety accounts for intolerance of uncertainty above and beyond worry. It could be investigated what aspects of social anxiety can account for intolerance of uncertainty above and beyond worry, as worry and social anxiety are both highly related to and share a common aspect with intolerance of uncertainty. Based on the result that fear of negative evaluation partially mediates the relationship between worry and intolerance of uncertainty and that worry positively correlates with fear of positive evaluation in the mediation model, it would be valuable to examine the unique relationship between worry and fear of

negative evaluation as well as the relationship between worry and fear of positive evaluation as it has not been previously studied to our knowledge. It is plausible that the result would show a positive correlation because individuals that worry tend to have higher concern for social-evaluative situations (Borkovec et al., 1983).

Clinical Implication

With the outcome of social anxiety accounting more for intolerance of uncertainty than worry, it could be inferred that college students could see improvement in their intolerance of uncertainty by implementing effective treatment to decrease social anxiety. The research found that fear of negative evaluation mediates the relationship between worry and intolerance of uncertainty, social anxiety and intolerance of uncertainty, and maladaptive perfectionism and social anxiety. The research found that fear of positive evaluation mediates the relationship between worry and intolerance of uncertainty. It was also found that maladaptive perfectionism and its subscales were positively related to social anxiety. Therefore, clinicians can implement effective treatment to lower fear of negative evaluation, fear of positive evaluation, social anxiety, and worry to lower intolerance of uncertainty among college students. They could also implement effective treatment to lower fear of negative evaluation, and maladaptive perfectionism to lower social anxiety among college students.

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Table 1*Ages (in years) of Student Participants*

Age	<i>n</i>
19	1
20	2
21	7
22	18
23	42
24	14
25	39
	123

Table 2*Descriptive Statistics for Scales and Subscales*

Measure	Possible Range	Range	Mean	Standard Deviation	Internal Consistency
SIAS	0-80	12-68	48.81	11.57	.86
SIAS (Reverse Items)	0-12	0-12	4.16	2.74	.78
SIAS (Positive Items)	0-68	0-66	44.65	13.67	.95
IUS	27-135	43-132	100.16	19.12	.96
FPES	0-90	26-70	48.48	10.97	.68
FPES (Reverse Items)	0-18	0-16	6.65	4.07	.85
FPES (Positive Items)	0-72	11-69	41.83	14.33	.94
BFNE-II	12-60	29-46	38.66	3.70	.08
BFNE-II (Reverse Items)	4-20	4-18	9.41	3.14	.75
BFNE-II (Positive Items)	8-40	11-40	29.25	5.97	.87
FMPS	29-145	60-143	111.80	17.43	.95

Maladaptive Evaluative Concern	22-110	48-108	84.52	13.59	.93
CM	9-45	19-45	34.33	6.21	.87
PE	5-25	11-25	19.32	3.07	.73
PC	4-20	6-20	15.26	2.88	.71
DA	4-20	7-20	15.62	2.76	.72
PSWQ	16-80	30-61	52.01	5.90	.49
Worry	11-55	11-54	40.07	8.93	.92
Engagement					
Absence of Worry	5-25	5-25	11.94	4.10	.82

Note. SIAS = Social Interaction Anxiety Scale; IUS = Intolerance of Uncertainty Scale; FPES = Fear of Positive Evaluation Scale; BFNE-II = Brief Fear of Negative Evaluation-II; FMPS = Frost Multidimensional Perfectionism Scale; CM = Concern over Mistakes; PE = Parental Expectations; PC = Parental Criticism; DA = Doubts about Actions; PSWQ = Penn State Worry Questionnaire

Table 3*Pearsons Correlations among All Scales*

	1.	2.	3.	4.	5.	6.
1.Worry	-					
2.Social Anxiety	.78**	-				
3.Intolerance of Uncertainty	.66**	.83**	-			
4.Fear of Negative Evaluation	.63**	.75**	.82**	-		
5.Fear of Positive Evaluation	.63**	.25**	.27**	.34**	-	
6.Maladaptive Perfectionism	.56**	.66**	.80**	.64**	.16*	-

Note. * $p < .05$ ** $p < .01$

Table 4

Hierarchical Regression Analysis for Variables Predicting Overall Intolerance of Uncertainty (N = 123)

Variable	<i>B</i>	<i>SE B</i>	β	<i>T</i>	<i>p</i>
Step 1					
Worry	2.15	.22	.66	9.72	< .001
Step 2					
Worry	.19	.26	.06	.72	.47
Social Anxiety	1.29	.14	.78	9.56	< .001

Note. $R^2 = .44$ for Step 1 ($p < .001$); $\Delta R^2 = .24$ for Step 2 ($p < .001$).

Table 5

Summary of Multiple Regression Analysis for Variables for Predicting Intolerance of Uncertainty (N = 123)

Variable	<i>B</i>	<i>SE B</i>	β	<i>T</i>	<i>p</i>
Worry	.81	.21	.25	3.92	< .001
FNE	2.11	.21	.66	10.30	< .001

Note. $R^2 = .70$; adjusted $R^2 = .70$.

Table 6

Summary of Multiple Regression Analysis for Variables for Predicting Intolerance of Uncertainty (N = 123)

Variable	<i>B</i>	<i>SE B</i>	β	<i>T</i>	<i>p</i>
Worry	2.06	.22	.64	9.32	< .001
FPE	.21	.09	.15	2.26	.03

Note. $R^2 = .46$; adjusted $R^2 = .45$.

Table 7

Summary of Multiple Regression Analysis for Variables for Predicting Intolerance of Uncertainty (N = 123)

Variable	<i>B</i>	<i>SE B</i>	β	<i>T</i>	<i>p</i>
Social Anxiety	.81	.11	.49	7.27	< .001
FNE	1.43	.22	.45	6.67	< .001

Note. $R^2 = .77$; adjusted $R^2 = .76$.

Table 8

Summary of Multiple Regression Analysis for Variables for Predicting Intolerance of Uncertainty (N = 123)

Variable	<i>B</i>	<i>SE B</i>	β	<i>T</i>	<i>p</i>
Social Anxiety	1.34	.09	.81	15.24	< .001
FPE	.09	.07	.06	1.20	.23

Note. $R^2 = .68$; adjusted $R^2 = .68$.

Table 9

Summary of Multiple Regression Analysis for Variables for Predicting Social Anxiety (N = 123)

Variable	<i>B</i>	<i>SE B</i>	β	<i>T</i>	<i>p</i>
Maladaptive Perfectionism	.26	.06	.31	4.25	< .001
FNE	1.08	.14	.56	7.65	< .001

Note. $R^2 = .62$; adjusted $R^2 = .62$.

Figure 1

Relationship between Worry and Intolerance of Uncertainty as Partially Mediated by Fear of Negative Evaluation

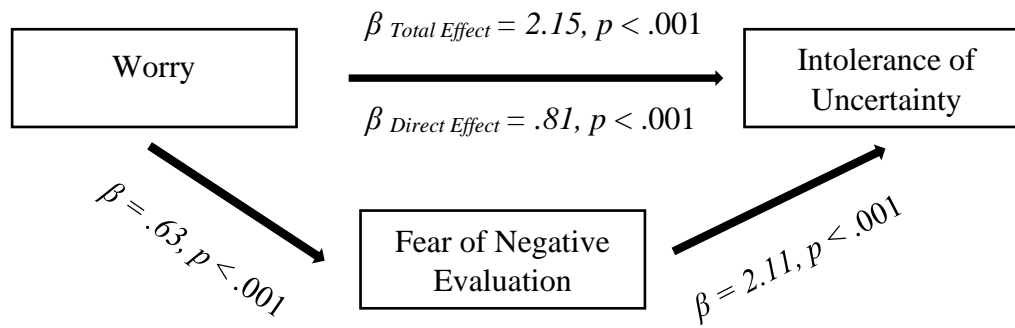


Figure 2

Relationship between Worry and Intolerance of Uncertainty as Partially Mediated by Fear of Positive Evaluation

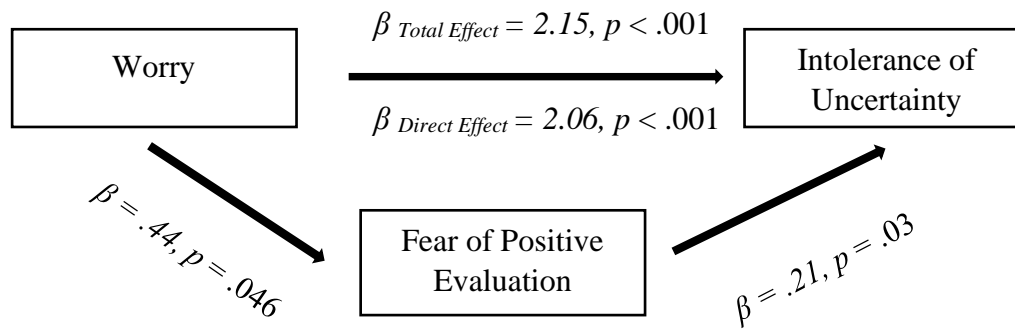


Figure 3

Relationship between Social Anxiety and Intolerance of Uncertainty as Partially Mediated by Fear of Negative Evaluation

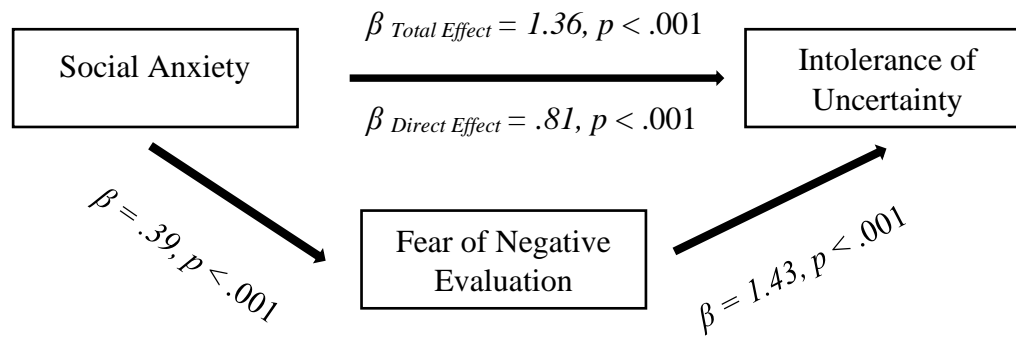


Figure 4

Relationship between Social Anxiety and Intolerance of Uncertainty as Partially Mediated by Fear of Positive Evaluation

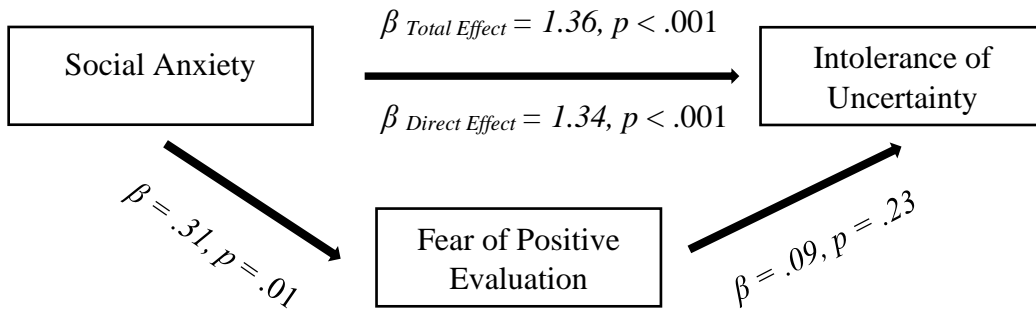
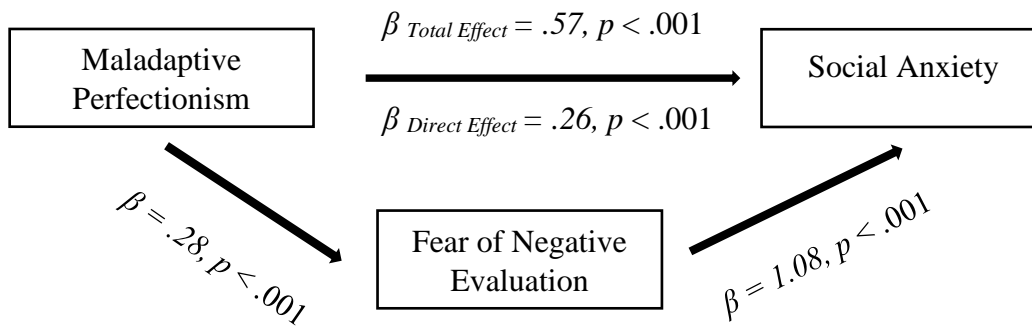


Figure 5

Relationship between Maladaptive Perfectionism and Social Anxiety as Partially Mediated by Fear of Negative Evaluation



Appendix A
Demographic Form

What is your sex?

- Male
- Female
- Non-binary / Third gender
- Prefer not to say

How old are you?

What type of College are you attending?

- 4 year college
- 2-year community college

What is your year in school?

- Freshman / 1st year
- Sophomore / 2nd year
- Junior
- Senior

How do you usually describe yourself (can choose more than one)?

- Caucasian
- Black or African American
- Hispanic or Latino/a
- Asian or Pacific Islander
- American Indian, Alaskan Native, or Native Hawaiian
- Biracial or Multiracial
- Other

Appendix B

Social Interaction Anxiety Scale (SIAS)

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.

1. I get nervous if I have to speak with someone in authority (teacher, boss, etc.).
2. I have difficulty making eye contact with others.
3. I become tense if I have to talk about myself or my feelings.
4. I find it difficult to mix comfortably with the people I work with.
5. I find it easy to make friends my own age.
6. I tense up if I meet an acquaintance in the street.
7. When mixing socially, I am uncomfortable.
8. I feel tense if I am alone with just one other person.
9. I am at ease meeting people at parties, etc.
10. I have difficulty talking with other people.
11. I find it easy to think of things to talk about.
12. I worry about expressing myself in case I appear awkward.
13. I find it difficult to disagree with another's point of view.
14. I have difficulty talking to attractive persons of the opposite sex.

15. I find myself worrying that I won't know what to say in social situations.
16. I am nervous about mixing with people I don't know well.
17. I feel I'll say something embarrassing when talking.
18. When mixing in a group, I find myself worrying I will be ignored.
19. I am tense mixing in a group.
20. I am unsure whether to greet someone I know only slightly.

Appendix C

Frost Multidimensional Perfectionism Scale (FMPS)

Instructions: Please answer the following questions in relation to how much they apply to you.

Do not spend too much time on any one question.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. My parents set very high standards for me.					
2. Organization is very important to me.					
3. As a child, I was punished for doing things less than perfectly.					
4. If I do not set the highest standards for myself, I am likely to end up a second rate person.					
5. My parents never tried to understand my mistakes.					

<p>6. It is important to me that I be thoroughly competent in what I do.</p>					
<p>7. I am a neat person.</p>					
<p>8. I try to be an organized person.</p>					
<p>9. If I fail at work/school, I am a failure as a person.</p>					
<p>10. I should be upset if I make a mistake.</p>					
<p>11. My parents wanted me to be the best at everything.</p>					
<p>12. I set higher goals than most people.</p>					
<p>13. If someone does a task at work/school better than I do, then I feel as if I failed the whole task.</p>					

<p>14. If I fail partly, it is as bad as being a complete failure.</p>					
<p>15. Only outstanding performance is good enough in my family.</p>					
<p>16. I am very good at focusing my efforts on attaining a goal.</p>					
<p>17. Even when I do something very carefully, I often feel that it is not quite right.</p>					
<p>18. I hate being less than the best at things.</p>					
<p>19. I have extremely high goals.</p>					
<p>20. My parents expect excellence from me.</p>					
<p>21. People will probably think less of me if I make a mistake.</p>					

22. I never feel that I can meet my parents' expectations.					
23. If I do not do as well as other people, it means I am an inferior being.					
24. Other people seem to accept lower standards from themselves than I do.					
25. If I do not do well all the time, people will not respect me.					
26. My parents have always had higher expectations for my future than I have.					
27. I try to be a neat person.					
28. I usually have doubts about the					

simple everyday things that I do.					
29. Neatness is very important to me.					
30. I expect higher performance in my daily tasks than most people.					
31. I am an organized person.					
32. I tend to get behind in my work because I repeat things over and over.					
33. It takes me a long time to do something “right”.					
34. The fewer mistakes I make, the more people will like me.					
35. I never feel that I can meet my parents’ standards.					

Appendix D

Penn State Worry Questionnaire (PSWQ)

Instructions: Choose the response that best describes how typical or characteristic each item is of you.

	Not at all typical	Rarely typical of me	Somewhat typical of me	Often typical of me	Very typical of me
1. If I don't have enough time to do everything, I don't worry about it.	5	4	3	2	1
2. My worries overwhelm me.	1	2	3	4	5
3. I do not tend to worry about things.	5	4	3	2	1
4. Many situations	1	2	3	4	5

make me worry.					
5. I know I shouldn't worry about things, but I just cannot help it.	1	2	3	4	5
6. When I am under pressure I worry a lot.	1	2	3	4	5
7. I am always worrying about something.	1	2	3	4	5
8. I find it easy to dismiss worrisome thoughts.	5	4	3	2	1

9. As soon as I finish one task, I start to worry about everything else I have to do.	1	2	3	4	5
10. I never worry about anything.	5	4	3	2	1
11. When there is nothing more I can do about a concern, I don't worry about it anymore.	5	4	3	2	1
12. I've been a worrier all my life.	1	2	3	4	5

13. I notice that I have been worrying about things.	1	2	3	4	5
14. Once I start worrying, I can't stop.	1	2	3	4	5
15. I worry all the time.	1	2	3	4	5
16. I worry about projects until they are done.	1	2	3	4	5

Appendix E**Intolerance of Uncertainty Scale**

1 = Not at all characteristic of me

2 = Slightly characteristic of me

3 = Moderately characteristic of me

4 = Very characteristic of me

5 = Extremely characteristic of me

1. Uncertainty stops me from having a strong opinion.
2. Being uncertain means that a person is disorganized.
3. Uncertainty makes life intolerable.
4. It's unfair having no guarantees in life.
5. My mind can't be relaxed if I don't know what will happen tomorrow.
6. Uncertainty makes me uneasy, anxious, or stressed.
7. Unforeseen events upset me greatly.
8. It frustrates me not having all the information I need.
9. Uncertainty keeps me from living a full life.
10. One should always look ahead so as to avoid surprises.

11. A small unforeseen event can spoil everything, even with the best planning.
12. When it's time to act, uncertainty paralyses me.
13. Being uncertain means that I am not first rate.
14. When I am uncertain, I can't go forward.
15. When I am uncertain, I can't function very well.
16. Unlike me, others seem to know where they are going with their lives.
17. Uncertainty makes me vulnerable, unhappy, or sad.
18. I always want to know what the future has in store for me.
19. I can't stand being taken by surprise.
20. The smallest doubt can stop me from acting.
21. I should be able to organize everything in advance.
22. Being uncertain means that I lack confidence.
23. I think it's unfair that other people seem to be sure about their future.
24. Uncertainty keeps me from living a full life.
25. I must get away from all uncertain situations.
26. The ambiguities in life stress me.
27. I can't stand being undecided about my future.

Appendix F

Fear of Positive Evaluation Scale

Read each of the following statements carefully and answer the degree to which you feel the statement is characteristic of you, using the following scale. For each statement, respond as though it involves people that you do not know very well. Rate each situation from 0 to 9.

1. I am uncomfortable exhibiting my talents to others, even if I think my talents will impress them.
2. It would make me anxious to receive a compliment from someone that I am attracted to.
3. I try to choose clothes that will give people little impression of what I am like.
4. I feel uneasy when I receive praise from authority figures.
5. If I have something to say that I think a group will find interesting, I typically say it.
6. I would rather receive a compliment from someone when that person and I were alone than when in the presence of others.
7. If I was doing something well in front of others, I would wonder whether I was doing “too well”.
8. I generally feel uncomfortable when people give me compliments.
9. I don't like to be noticed when I am in public places, even if I feel as though I am being admired.

10. I often feel under-appreciated, and wish people would comment more on my positive qualities.

Appendix G**Brief Fear of Negative Evaluation Scale**

Read each of the following statements carefully and indicate how characteristic it is of you according to the following scale:

1 = Not at all characteristic of me

2 = Slightly characteristic of me

3 = Moderately characteristic of me

4 = Very characteristic of me

5 = Extremely characteristic of me

1. I worry about what other people will think of me even when I know it doesn't make any difference.
2. I am unconcerned even if I know people are forming an unfavorable impression of me.
3. I am frequently afraid of other people noticing my shortcomings.
4. I rarely worry about what kind of impression I am making on someone.
5. I am afraid others will not approve of me.
6. I am afraid that people will find fault with me.
7. Other people's opinions of me do not bother me.

8. When I am talking to someone, I worry about what they may be thinking about me.

9. I am usually worried about what kind of impression I make.

10. If I know someone is judging me, it has little effect on me.

11. Sometimes I think I am too concerned with what other people think of me.

12. I often worry that I will say or do the wrong things.