

1-1-2009

"If Only I Didn't Embarrass Myself in Front of the Class!" Social Anxiety and Upward Counterfactual Thinking

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“IF ONLY I DIDN’T EMBARRASS MYSELF IN FRONT OF THE CLASS!”: SOCIAL
ANXIETY AND UPWARD COUNTERFACTUAL THINKING

by

Jennifer Monforton, Bachelor of Arts, Honours,
University of Windsor, 2006

A thesis

presented to Ryerson University

in partial fulfillment of the

requirements for the degree of

Master of Arts

in the Program of

Clinical Psychology

Toronto, Ontario, Canada, 2009

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Abstract

“If Only I didn’t Embarrass Myself in front of the Class!”: Social Anxiety and Upward Counterfactual Thinking

Master of Arts

2009

Jennifer Monforton

Psychology

Ryerson University

This study examined the relationship between social anxiety (SA) and the generation of upward counterfactual thoughts (U-CFT; “if only...” thoughts imagining better outcomes to past events). U-CFT has been associated with negative affect and with social anxiety in past research (e.g., Kocovski et al., 2005). Participants ($n= 89$) were randomly assigned to generate U-CFT in response to a controllable or uncontrollable social-evaluative scenario. When comparing those with extreme SA scores, those higher in SA generated a greater number of upward as compared with downward CFTs. A significant positive correlation between SA and U-CFT was found when examining subsets of the sample (i.e., those in the controllable scenario, students). Potential mediators between SA and CFT were examined. Postevent Processing emerged as the only significant mediator (among students only). There was no evidence of maladaptive CFT (i.e., in response to the uncontrollable scenario only) within subsets or the sample as a whole.

Acknowledgements

I would like to thank my thesis supervisor, Dr. Kristin Vickers, for the countless hours she has invested into guiding and assisting me with this project. Thanks also to Dr. Martin Antony, whose feedback has been essential in completing this thesis. I also send my thanks to Dr. Tara Burke, who has taken the time to act as member of my thesis committee. Finally, I would like to acknowledge the immense encouragement with which my friends and family have provided me throughout the course of my Master's degree. I could not have gotten here without your strength and support!

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“If Only I didn’t Embarrass Myself in front of the Class!”: Social Anxiety and Upward
Counterfactual Thinking

Since Cognitive-Behavioural Therapy (CBT) has become a prominent approach to conceptualizing and treating a wide range of psychopathology, much attention has been paid to the relationship between maladaptive thinking patterns and resulting emotions and behaviour. As such, the content of one’s cognitions has been a central area of investigation when trying to explain and subsequently reduce one’s psychological distress using a CBT framework. One psychological disorder that has been linked to self-defeating and anxiety-provoking thought patterns is Social Anxiety Disorder (SAD). Social Anxiety Disorder manifests itself through intense and persistent fears of being judged (and consequently of being embarrassed or humiliated) in social situations, and results in marked avoidance of such social-evaluative situations. Rachman, Gruter-Andrew, and Shafran (2000) stress that those high in social anxiety enter social situations with the assumption that they “are in danger of behaving ineptly and that this behaviour will have disastrous consequences for them,” such as rejection from others (p. 611). Further, Rachman and colleagues (2000) highlight that socially anxious individuals tend to employ maladaptive cognitive strategies (e.g., distorted interpretation and memory) when evaluating past social events. Given that social anxiety symptoms are believed to be maintained largely by maladaptive cognitions (e.g., Clark & Wells, 1995; Rachman et al., 2000), the central purpose of this research is to examine cognitive factors and tendencies that may work to exacerbate symptoms of social anxiety. While much previous research (e.g., Hartman, 1983) has investigated the effects of pre-event cognitions (i.e., maladaptive thoughts about upcoming social events), a newer area of inquiry is examining the potentially harmful effects of postevent

cognitions in those with social anxiety. In other words, how do those with social phobia think about a social situation they have just experienced? In turn, how might these postevent cognitions lead to subsequent anxiety-related avoidance of social situations?

An area of research directly related to the cognitive patterns of those with social anxiety is one that examines postevent processing (PEP). Introduced by Clark and Wells (1995), PEP is defined as “the period of reflection on actual or perceived inadequacies, mistakes, imperfections, and the like and is ruminative in nature” (Kocovski, Endler, Rector, & Flett, 2005, p. 972). Research by Rachman and colleagues (2000) supports the occurrence of PEP in those with social anxiety, such that these individuals (1) spend a great deal of time thinking about social events perceived as unsatisfactory, (2) experience such cognitions as intrusive, and (3) often have difficulty concentrating due to these distressing thoughts. Although the recurrent and intrusive nature of these thoughts may draw parallels to the obsessions hallmark to Obsessive-Compulsive Disorder (OCD), Rachman and colleagues (2000) note that while the content of classic obsessions is typically repulsive or horrifying, the intrusive thoughts experienced by those with social anxiety are more shameful and embarrassing. Further, while everyone may engage in PEP to an extent, it appears that for those high in social anxiety, such thoughts tend to exponentially exacerbate anxiety. Conversely, PEP does not appear to have deleterious effects for those low in social anxiety (Rachman et al., 2000). Additionally, experimental research by Mellings and Alden (2000) found that participants high in social anxiety reported engaging in more PEP about a social event occurring on the previous day than did participants low in social anxiety. Thus, it appears that socially anxious individuals may have a general tendency to repeatedly mull over and evaluate the events of past social events in which they did not perform as well as they would have liked.

One type of cognition that is frequently generated following events perceived to be negative or stressful is counterfactual thought. Counterfactual thoughts are simulated mental alternatives to past negative outcomes, and can be categorized into either downward counterfactual thoughts (“At least...” thoughts that imagine a worse possible outcome) or upward counterfactual thoughts (“If only...” thoughts that imagine a better possible outcome). While downward counterfactuals are linked to positive affect and related mood repair following an aversive outcome, upward counterfactuals are closely linked to the experience of negative affect (Sanna, Turley-Ames, and Meier, 1999). Although upward counterfactual thinking typically precedes the experience of negative mood, counterfactual research also suggests that such thoughts are highly adaptive and functional in that they enhance motivation for self-improvement (e.g., Roese, 1994; Sanna, Chang, & Meier, 2001). For instance, if someone is badly injured in an automobile accident, he or she may think: “If only I had been wearing my seatbelt, I would not be in such bad shape.” Although this may initially induce negative feelings of guilt and regret, such thoughts may increase the likelihood that this individual will wear a seatbelt more regularly in the future. Indeed, Roese (1994) found that upward counterfactual thinking (U-CFT) was related to augmented intentions to perform more adaptive behaviours in the future and experimentally demonstrated that previous U-CFT did lead to a greater likelihood of actually carrying through with these intended adaptive behaviours. From this perspective, then, the negative affect induced by upward counterfactuals soon diminishes after a negative event, and may encourage some form of intention towards self-improvement.

Despite this functional aspect of upward counterfactual thinking, a growing body of research suggests that for individuals with various forms of psychopathology, upward counterfactuals may produce negative affect in the absence of any beneficial, motivational

consequences. Indeed, Roese (1997) describes how upward counterfactual thinking can become maladaptive when such thinking “is not shut down normally but spins repeatedly into unhealthy ruminations” (p. 144). Further, when significant levels of psychopathology are present, “If only...” thoughts may work to exacerbate negative symptoms related to anxiety and depression. For instance, Markman and Miller (2006) found that those who were severely depressed (as compared with those with mild to moderate depression) generated upward counterfactuals that were less reasonable, less controllable, and more characterological in nature. Thus, severely depressed individuals generated upward counterfactuals that focused on aspects of the event that were unforeseeable and based on negative, enduring characteristics of the self. In turn, these unreasonable counterfactuals led to diminished perceptions of control over this past event. Moreover, Callander, Brown, Tata, and Regan (2007) examined the correlates of counterfactual thinking in women who had experienced repeated miscarriages. Such a circumstance represents a repeated event that is highly distressing and largely out of one’s control. Although it is intuitive that the negative affect induced by experiencing a miscarriage may facilitate upward counterfactual thinking, this thinking may not have an adaptive function because the negative outcome in question is not under the control of these expectant mothers. Indeed, Callander and colleagues (2007) found that within this sample, upward counterfactual thinking was associated with greater levels of anxiety and distress, thus suggesting a potential maladaptive function of U-CFT in this group.

Additionally, Kocovski and colleagues (2005) found that, after imagining themselves in scenarios that involved making mistakes and being embarrassed in public, those high in social anxiety generated more negative thoughts in general and more upward counterfactual thoughts specifically than those low in social anxiety. Indeed, Kocovski and colleagues had anticipated

this finding, as U-CFT generation has been shown to follow perceived failure (e.g., Roese, 1994) and because those with social anxiety are more likely to view unsatisfactory social experiences as “failures,” thus prompting a U-CFT reaction. Further, Ruiselova, Prokopcakova, and Kresanek (2009) found that for participants who were high in anxiety, upward counterfactual thinking was more frequent, led to feelings of sadness, and did not aid in generating solutions to future problems. Indeed, for this anxious group, upward counterfactual thinking was related to inhibition of developing these future solutions.

Overall, there is ample reason to believe that upward counterfactuals may be used in maladaptive ways by those who are experiencing anxiety, and that such self-defeating cognitive patterns have been found specifically in those with moderate to severe levels of social anxiety. Based on these findings, this study examined three central research questions. First, do those high in social anxiety generate more upward counterfactual thoughts than those low in social anxiety? Specifically, in line with the findings of Kocovski and colleagues (2005), it was hypothesized that those with high levels of reported social anxiety would generate a greater number of upward counterfactual thoughts (as compared with downward counterfactuals) in response to a vignette depicting a negative social-performance-related event than would those low in social anxiety.

Second, this research investigated whether those high in social anxiety generate a greater number of maladaptive upward counterfactual thoughts than those low in social anxiety. In other words, do socially anxious individuals tend to generate upward counterfactuals that are unlikely to lead to positive motivational outcomes, such as self-improvement? Past literature demonstrates that there are several ways to operationalize the “maladaptiveness” of upward counterfactuals. As previously outlined, Markman and Miller (2006) were interested in

counterfactuals that were unreasonable, characterological, and uncontrollable in nature. A common factor among these categories is that such counterfactuals are based on aspects of the self or the environment that are out of one's direct control. Indeed, valid room for self-improvement exists when there are aspects of a situation that the individual could have done or dealt with differently. Returning to the automobile accident example, it is realistic that the individual could have improved the situation by wearing his or her seatbelt that day. In turn, such potential for having done things differently inherently relates to the potential to change one's behaviour in the future. Imagine, however, that this individual had been hurt in a crash not because he or she was not wearing a seatbelt, but because another vehicle had been carelessly speeding and ran a red light. In such a situation, there might be little, if anything, the individual could do to minimize the negative effects of the crash. In such a situation, "If only..." thoughts may only work to exacerbate negative emotions without leading to any ultimate benefit. Thus, this study considered upward counterfactual thoughts to be maladaptive when they are generated in response to a situation in which the negative outcomes are largely out of the participant's control.

Finally, this research attempted to elucidate any potential mediators in the relationship between social anxiety and upward counterfactual thinking. The first potentially mediating factor examined was perfectionism. Antony, Purdon, Huta, and Swinson (1998) found that those high in social anxiety tend to endorse high levels of perfectionism, especially related to fears about making mistakes in front of others and having doubts about one's actions. Further, it appears that for those with social anxiety, engaging in treatment that addresses maladaptive thinking patterns may also reduce one's perfectionistic tendencies (Ashbaugh, Antony, Liss, Summerfeldt, McCabe, & Swinson (2007). In particular, following 12 sessions of group-based cognitive-

behavioural therapy, participants (whose principal diagnosis was Social Anxiety Disorder) evidenced significant reductions in their overall score on the Frost Multidimensional Perfectionism Scale (*FMPS*; Frost et al., 1990), as well as in their levels of perfectionism that related to Concerns over Mistakes and Doubts about Actions in particular (Ashbaugh et al., 2007). Moreover, participants did not show reductions in other forms of perfectionism, as measured by the FMPS (i.e., personal standards, parental expectations, and parental criticism), which may not be as overtly linked to social anxiety-related psychopathology. Overall, this study suggests that individuals with social anxiety disorder also tend to possess perfectionistic tendencies that may be considered maladaptive, due to their reduction following treatment. Indeed, it appears that following group-based CBT, participants were not only less socially anxious, but less perfectionistic when considering their actions in social situations. Additionally, Laurenti, Bruch, and Haase (2008) found that Socially Prescribed perfectionism (i.e., the belief that others hold high standards for oneself and place pressure on an individual to be perfect) moderated the relationship between social anxiety and the discrepancy between others' and self-ratings of their social skills. Thus, those higher in social anxiety perceived a large gap between their abilities and others' expectations of them, and this relationship was largely accounted for by their level of socially prescribed perfectionism.

Regarding the potential relationship between perfectionism and counterfactual thinking, it seems likely that those with very high standards for their social behaviour might be better able to imagine ways that a social situation could have turned out better. For instance, someone who is high in perfectionism related to concerns over mistakes may be likely to think "If only I had remembered the names of everyone I met at the party," and subsequently dwell on this perceived failure. To date, no published research has examined the relationship between perfectionism and

counterfactual thinking; thus, the perfectionism was included as a potential mediator on an exploratory basis.

The second potential mediator that was investigated is the tendency to ruminate. As noted by Kocovski and colleagues (2005), PEP possesses a ruminative quality in that such thoughts repeatedly scrutinize a past event and often result in the experience of anxiety. Further, Kocovski and colleagues (2005) found that participants high in social anxiety were more likely to engage in ruminative coping styles than those lower in social anxiety. Additionally, Wong and Moulds (2009) found that in an undergraduate sample, rumination (as compared to distraction) better maintained social anxiety in participants both high and low in social anxiety. Further, for those high in social anxiety, rumination also worked to maintain participants' negative beliefs about themselves in social situations. Moreover, Hofmann (2007) suggests that rumination following negative social events is a highly typical response demonstrated by those with social anxiety disorder. As such, he proposes that rumination should be included in the overall cognitive model of the disorder, and that rumination serves to promote increased apprehension about subsequent social situations among this population. Similarly, Field and Cartwright-Hatton (2008) suggested that rumination is one of the central cognitive factors that works to predict the presence of social anxiety (in addition to processes such as worry, shame, and intrusive thoughts). Indeed, a substantial body of research has examined the link between rumination and social anxiety (e.g., Kocovski & Rector, 2007; McEvoy & Perini, 2009; Morgan & Banerjee, 2008; Vassilopoulos, 2008).

It is important to note that rumination and counterfactual thinking are distinct cognitive processes in that rumination focuses on events that have actually transpired, while counterfactual thoughts reflect imagined alternative outcomes to an actual event. With this distinction in mind,

however, it is also highly plausible that a general tendency to ruminate on past events may also be related to a tendency to perseverate over how things could have turned out differently.

Further, Epstude and Roese (2008) suggest that counterfactual thinking may adopt a ruminative quality when it focuses on actions outside of one's control (e.g., focusing on how one could have avoided an accident in which the other driver was totally at fault). Here, like rumination, upward counterfactual thinking can become repetitive and seemingly devoid of any adaptive function. As such, rumination was examined as a potential mediating factor in the relationship between social anxiety and the generation of upward counterfactuals.

Lastly, this research examined whether one's memory for a previous negative social event might mediate the relationship between social anxiety and upward counterfactual thinking. Interestingly, a study by Field, Psychol, and Morgan (2004) found that high levels of social anxiety were associated with the recall of more negative and shameful memories of a recent social event. Thus, socially anxious participants were more likely to recall a disproportionate amount of negative aspects of a social situation than were nonanxious participants. Surprisingly, however, socially anxious individuals rated these negative memories as more calming than memories based on more positive aspects of the situation. Thus, while negative and shameful memories may be more readily available to those high in social anxiety, such memories may also play some type of adaptive functional role for these individuals, thus allowing such PEP to persist. Indeed, Field and colleagues (2004) suggested that repeatedly recalling such negative memories may aid the individual in coming to terms with the negative event. As such, one may achieve a sense of calm that may, in turn, reinforce future PEP. Further, Morgan and Banerjee (2008) found that those high in social anxiety tended to remember more anxiety-laden autobiographical memories following a social task about which they obtained negative feedback

than those low in social anxiety. Thus, following a social encounter that was judged negatively by others, only those with high levels of social anxiety demonstrated a bias towards remembering negatively-valenced memories.

Additionally, research has also examined how levels of social anxiety may also affect the accuracy of one's memories. For example, Hertel, Brozovich, Joorman, and Gotlib (2008) had both socially anxious and nonanxious participants complete conclusions to socially ambiguous scenarios. Following this, they were asked to recall these social scenarios. For the socially anxious participants, and not for controls, there was evidence of a memory bias such that the socially anxious participants made more memory errors when recalling these scenarios. In particular, the socially anxious group falsely recalled the scenarios that possessed emotionally negative components. Findings of this study suggest that social anxiety may interfere with one's memory accuracy, at least when recalling social scenarios with a negative valence. Additionally, Garner, Mogg, and Bradley (2006) found that socially anxious participants evidenced a bias towards inaccurately remembering how many angry faces (as compared with sad and happy faces) were presented in a previous trial. In particular, the anxious participants reported recalling a greater proportion of angry faces than were actually shown. Similar findings have been observed in a number of studies (e.g., Coles & Heimberg, 2005; Foa, Franklin, Perry, & Herbert, 1996; Lundh & Öst, 1996). Taken together, these studies suggest that socially anxious individuals may be less accurate when remembering negatively-valenced, socially relevant material.

Conversely, other research has supported the notion that socially anxious individuals may not be less accurate than nonanxious individuals when remembering negatively-valenced social information. For example, Brendle and Wenzel (2004) had participants read passages that

contained positive social/evaluative, negative social/evaluative, and neutral content. Immediately and 48 hours following reading these passages, the participants completed tasks to gauge their memory for and interpretation of these scenarios. Results indicated that the socially anxious participants did not differ from nonanxious participants regarding the accuracy of their memory for their scenario. Differences were evidenced regarding interpretation, however, such that socially anxious participants made more negative and fewer positive interpretations of these scenarios. Thus, while an interpretation bias was present, no memory biases were evidenced for the social anxiety group.

In light of these findings, the current research gauged the valence and accuracy of memories for the presented vignette and related these memory variables to levels of social anxiety as well as to the amount of upward counterfactuals generated. Indeed, it is a reasonable hypothesis that the more negative aspects of an event one remembers, the more likely one will be to generate “if only...” thoughts, imagining how the situation could have been more satisfactory. Because of the mixed literature on the topic of memory accuracy in those with social anxiety, no specific hypotheses were made regarding the relationship between level of social anxiety and how accurate one’s memory for the social scenario was.

In summary, it was hypothesized that participants high in social anxiety would generate a greater proportion of upward counterfactuals than those low in social anxiety and that the upward counterfactuals of socially anxious participants would be more maladaptive in nature. Additionally, perfectionism, rumination, and memory for the social event were examined as potential mediators in the relationship between social anxiety and the tendency to generate upward counterfactual thoughts in response to aversive social situations.

Method

Participants

Participants in this study ($n = 89$; 59 females and 30 males) were recruited from three sources. The first source included undergraduate students recruited from Ryerson University's introductory psychology participant pool ($n = 25$). Each received partial course credit for their participation. The second source included students from the University of Toronto ($n = 31$). These students were recruited via flyers posted around the University of Toronto campus and were compensated \$10 cash for their participation. The third source included individuals recruited from the community ($n = 33$). These individuals were recruited via an advertisement on the website Craigslist.com and from an advertisement placed in the Metro newspaper (a free, Toronto based, daily commuter newspaper). These participants were compensated \$10 cash for their participation.

Measures

Social Phobia Inventory (*SPIN*; Connor, Davidson, Churchill, Sherwood, Foa, & Weisler, 2000). The SPIN is a 17-item, self-report measure that assesses multiple facets of social anxiety such as avoidance of feared social situations, feelings of embarrassment, physiological changes (e.g., blushing), and fear of being the centre of attention. Internal consistency has been found to be strong among those with social anxiety ($\alpha = 0.87 - 0.94$) and good for nonsocially anxious participants ($\alpha = 0.82 - 0.90$; Connor et al., 2000). Further, the SPIN has been shown to be an effective screening tool for Social Anxiety Disorder (Connor et al., 2000). The SPIN has evidenced high internal consistency reliability within the current sample, with a Cronbach's alpha value of .91.

Positive and Negative Affect Schedule (*PANAS*; Watson, Clark, & Tellegen, 1988). This questionnaire assessed participants' baseline affect at the outset of the study. Participants

were prompted to rate how strongly they were currently experiencing a variety of emotions, such as “distressed,” “excited,” and “afraid” on a 5-point response scale from 1 (“very slightly to not at all”) to 5 (“extremely”). Watson and colleagues (1988) report very good internal consistency for both of the scales, with Cronbach’s alpha scores on the Positive Affect scale ranging from 0.86-0.90 and on the Negative Affect Scale ranging from 0.84-0.87. The PANAS Positive and Negative Affect scales possessed excellent internal consistency both at baseline ($\alpha = .88$, $\alpha = .82$, respectively) as well as postscenario ($\alpha = .91$, $\alpha = .93$, respectively).

Post-Event Processing Questionnaire (PEP-Q; Rachman et al., 2000). The PEP-Q is a 13-item questionnaire that assesses participants’ tendency to engage in intrusive and recurrent negative thinking about past anxiety-provoking social situations. Each question asks participants to rank their engagement in and consequences of such thoughts (e.g., “Did the thoughts about the event ever interfere with your concentration?”) along a visual analogue scale (0-100). Internal consistency reliability for the PEP-Q has been found to be high ($\alpha = 0.85$; Rachman et al., 2000). Research indicates that scores on the PEP-Q are positively correlated with symptoms of social anxiety and depression (Rachman et al., 2000). The PEP-Q evidenced good internal consistency reliability within the current sample, with a Cronbach’s alpha value of .84.

Frost Multidimensional Perfectionism Scale (FMPS; Frost et al., 1990). The FMPS is a 35-item, 5-point likert type questionnaire that is comprised of six subscales that measure various domains or perfectionism. The six subscales are as follows: Concern over Mistakes (e.g., “The fewer mistakes I make, the more people will like me”), Organization (e.g., “I try to be an organized person”), Parental Criticism (e.g., “I never felt like I could meet my parents’ standards”), Personal Standards (e.g., “I expect higher performance in my daily tasks than most people”), Doubts about Actions (e.g., “Even when I do something very carefully, I often feel that

it is not quite right”), and Parental Expectations (e.g., “My parents wanted me to be the best at everything”). Two of these scales were of particular interest to the current study due to their potential relation to social anxiety symptoms. In particular, we were interested in the Concerns over Mistakes scale (CM) and the Doubts about Actions scale (DA). Research has indicated that these two subscales of the FMPS are particularly elevated in people with high levels of social anxiety (Antony et al., 1998). A total FMPS score is calculated by summing the scores of each item, excluding those in the Organization scale. The FMPS demonstrated strong internal consistency in the current sample, with a Cronbach’s alpha value of .87. Further, the Concerns over Mistakes Scale and Doubts about Actions scales evidenced moderate to strong internal consistency, with Cronbach’s alpha values of .87 and .78, respectively.

Anxiety Rumination Scale (ARQ; Rector, Antony, Laposa, Kocovski, & Swinson, 2008). The ARQ is designed to measure one’s general ruminative responses when feeling anxious and consists of 22 items rated along a 4-point, likert-type scale ranging from “*Almost never*” to “*Almost always.*” Examples of items include “When I’m anxious I think about... How I’ll try to focus my mind on something positive” and “... How feeling keyed up makes everything difficult.” Each of the three subscales have demonstrated adequate to good levels of internal consistency, with the Anxious Control-Focused Rumination, Anxious Coping Focused Rumination, and Cognitive Reframing subscales possessing Cronbach’s alpha values of 0.86, 0.83, and 0.75, respectively in a student sample (Rector et al., 2008). The ARQ demonstrated good internal consistency in the current sample, with a Cronbach’s alpha value of 0.80. Alpha values for the Control, Cope, and Cognitive Reframing subscales were 0.74, 0.74, and .69, respectively.

Single Item Measures of Personality (SIMP; Woods & Hampson, 2005). The SIMP is

a five-item, analogue scale questionnaire that measures each of the “Big Five” personality dimensions (i.e., Extraversion, Neuroticism, Openness, Agreeableness, and Conscientiousness). For each personality dimension, brief descriptions are provided at either end of the analogue scale. For instance, the descriptions on either end of the Extraversion scale are as follows: “Someone who is talkative, outgoing, is comfortable around people, but could be noisy and attention seeking” and “someone who is a reserved, private person, doesn’t like to draw attention to themselves and can be shy around strangers.” The SIMP has demonstrated acceptable levels of convergent validity with longer and more established Big-Five measures of personality ($r = 0.61$; Woods & Hampson, 2005).

Beck Depression Inventory-II (*BDI-II*; Beck, Steer, & Brown, 1996). The BDI-II is a 21-item multiple choice questionnaire that assesses for the presence and severity of a variety of depressive symptoms (e.g., sleep difficulties, feelings of guilt, anhedonia) within the “past two weeks, including today” (Beck, Steer, Ball, & Ranieri, 1996). Internal consistency reliability for the BDI-II has been found to be excellent ($\alpha = 0.91$) among psychiatric outpatients. This scale demonstrated similarly strong internal consistency reliability in the current sample ($\alpha = .89$).

Procedure

Prior to the study session, introductory psychology students had the opportunity to view a description of the current study online through SONA, an online system for managing psychology participant pools. Students who were interested in completing the study were able to sign up as participants via SONA online.

Participants who were recruited via Craigslist.com, the Metro newspaper, or from the University of Toronto campus were encouraged to call or email the researcher if they were interested in participating. Participants were then informed about further details of the study

(either via telephone or email) and if they remained interested in participating, an appointment was scheduled.

One to two participants completed the study at each session and were separated to ensure privacy and independence of responses. A general between-subjects design was used in which participants were randomly assigned to receive one of two social-evaluative-based vignettes. Participants were first prompted to read and subsequently sign a statement of informed consent, which outlined the general purpose and procedure of the study.

The remainder of the study consisted of five general segments. In the first segment, participants completed a booklet of questionnaires (i.e., outlined in the *Measures* section above) assessing for baseline mood, social anxiety, and other measures of personality and individual differences.

During the second segment of the study, participants were presented with a vignette that depicted a stressful and potentially embarrassing social situation. They were instructed to read the scenario carefully, imagining that this scenario was happening to them. They were given two minutes to read and re-read this scenario. As mentioned previously, participants were randomly assigned to read one of two vignettes, the first of which depicted a public speaking event in which the negative outcome is largely under the participant's control. The second possible vignette depicted a public speaking scenario in which the negative outcome is largely out of the participant's control (see Appendix C for both scenarios and related instructions to participants).

After reading and imagining themselves in this scenario, participants once again completed the PANAS (Watson et al., 1988) to gauge whether imagining themselves in this stressful social situation induced a significant amount of negative affect as compared to baseline.

Next, they re-read the scenario once more to refresh their memory about the content of the vignette.

During the third segment of the study, participants were prompted to generate counterfactual thoughts in response to the scenario they read. The specific instructions given for this activity were adapted from Markman and Miller's (2006) study regarding counterfactual thinking, depression, and control (see Appendix C for these specific instructions). Participants were given 5 minutes to complete this task.

The fourth segment of the study consisted of a brief distracter task in which participants were given 5 minutes to construct words using letter tiles from the game Scrabble. They were instructed to construct any words that came to mind and that, although the task was to be timed, it did not matter how many words were made or how long the words were. This was designed to motivate the participants to engage in the task without pressuring them to construct numerous or elaborate words, which could be stressful. Thus, this task was designed to be engaging and as stress-free as possible.

Finally, the fifth segment of the study featured a memory task that assessed participants' memory for the content of the scenario they read during the second segment. Participants were randomly assigned to receive either an open-ended recall memory task or a true/false recognition task (See Appendix C for the instructions and content of these memory tasks). These memory tasks were included at the end of the study to examine whether high levels of social anxiety were associated with the accuracy of participants' memory for the social-evaluative scenario they read earlier in the study. Finally, whether such a trend in memory mediates the relationship between social anxiety and the amount and content of counterfactual thoughts generated was also assessed.

Results

Data Cleaning and Outliers

The data were screened for the presence of outliers and particular attention was paid to the variables of interest. Boxplots were generated for each of these variables in order to quantify and specify these outliers. No outliers were found for the mean scores of the ARQ, PEP-Q, the CM or DA subscales of the FMPS, or the SPIN. One low-scoring outlier was identified on the FMPS total scale and one high-scoring outlier was identified on the BDI-II. When examining the difference between upward and downward counterfactuals generated (CFT Difference), 4 outliers (3 high-scoring and 1 low-scoring) were identified by the boxplot. In the end, it was decided that the outliers present in the CFT Difference scores would be retained in the dataset for all subsequent analyses. The central analysis (i.e., the correlation between social anxiety scores and CFT Difference) was run with and without these 4 outliers and the results of the test were not altered (i.e., significance of the test did not change). Further, the outliers on CFT Difference were retained because they appeared to represent true extremes on these measures, rather than the result of confounding circumstances, such as time of day run or room used. Likewise, the outliers on the FMPS and the BDI-II were retained for the same reason.

Counterfactual Thinking Index

In order to calculate the central dependent variable in this research (i.e., pertaining to counterfactual thought generation) an index score was created by subtracting the number of downward counterfactuals from the number of upward counterfactuals that each participant generated (CFT Difference). Thus, higher scores on this index represent a greater number of upward counterfactuals generated in comparison to downward counterfactuals. This type of CFT index has been used in previous studies in the area of counterfactual thinking (e.g., Roese, 1994).

Descriptive Statistics for Social Anxiety

The mean SPIN score for the entire sample was 22.71 ($SD = 12.87$, $n = 87$), which is greater than the clinical cut-off score of 19 proposed by the authors of the measure to differentiate those with Social Anxiety Disorder from those who do not have the disorder (Connor et al., 2000). Using this cut-off score, the authors report a sensitivity value of 0.73 and a specificity value of 0.84 when considering the SPIN's ability to differentiate a clinical from a non-clinical sample. Additionally, positive and negative predictive values were reported as 0.81 and 0.77, respectively. Further, those in the High SA group (highest third) evidenced a mean SPIN score of 38.21 ($SD = 7.00$, $n = 28$), notably greater than the clinical cut-off. The Low SA group (lowest third) had a mean SPIN score of 10.45 ($SD = 4.91$, $n = 33$) and the Medium SA group (middle third) had a mean SPIN score of 21.92 ($SD = 3.77$, $n = 25$), placing only the Low group below this clinical cut-off. Of note, Ranta, Kaltiala-Heino, Rantanen, Tuomisto, and Marttunen (2007) have subsequently suggested the use of a clinical cut-off score of 24 when measuring a general adolescent/young adult population. If this cut-off score is considered here, only the High group would fall into the clinical range. Considering the ages of participants in the current sample, however, the use of Ranta and colleagues' (2007) proposed cut-off score seems inappropriate, as there was a large range of ages represented in this study. Although age demographics were not collected for the current sample (and thus the specific range of ages cannot be reported here), it can be said with confidence that all participants were 18 years of age or older, as this was an inclusion criteria to participate in the study. Indeed, within the Ryerson students subset, only participants 18 years or older could view the study via SONA. Further, all participants recruited from the community (i.e., from the University of Toronto or via the Metro

newspaper or Craigslist.com) were asked to confirm that they were at least 18 years old during their first contact with the experimenter (i.e., over the telephone or email).

Manipulation Check: Mood Induction via the Scenarios

Paired-samples *t*-tests were conducted to examine whether PANAS positive and negative affect scale scores changed significantly from baseline to postscenario. It was predicted that positive affect scores would be lower and that negative affect scale scores would be higher after participants had read the scenario, as compared with baseline. Both of these hypotheses were supported. In particular, there was a significant decrease in positive affect from baseline to postscenario ($t(88) = 3.78, p < .01, d = 0.30$) and a significant increase in negative affect from baseline to postscenario ($t(88) = -6.65, p < .01, d = -0.83$). These significant changes in affect persisted when analyzing each of the scenarios separately as well (Positive Affect, Uncontrollable, $t(44) = 2.92, p < .01, d = 0.32$; Negative Affect, Uncontrollable, $t(44) = -5.12, p < 0.01, d = -0.93$; Positive Affect, Controllable, $t(43) = 2.47, p = 0.02, d = 0.29$; Negative Affect, Controllable, $t(43) = -4.24, p < .01, d = -0.73$). Thus, both scenarios were effective at inducing negative affect (and decreasing positive affect), which would have properly set the stage for counterfactual thought generation.

Does Depression Account for the Relationship between Social Anxiety and CFT?

As much research has demonstrated a link between social anxiety and levels of depression, it was necessary to first rule out the possibility that the relationship between SA level and CFT Difference could be better explained by participants' scores on the BDI-II. In order to determine this, a partial correlation was conducted in which the variance accounted for by BDI-II scores was controlled when determining the strength of the relationship between SA Level and CFT Difference. This analysis revealed that while controlling for depression scores, the

relationship between SA and CFT Difference remained nonsignificant ($r = .12, p = .11, n.s.$). To reinforce this finding, a mediation analysis was attempted in which BDI-II score was a potential mediator between our two variables of interest. This mediation could not be completed, however, because depression score was not a significant predictor of the outcome measure, CFT Difference ($R^2 = 0.02, F(1, 41) = 0.98, p = 0.33, n.s., \beta = 0.16, n.s.$). Results from both of these analyses suggest that depression scores did not play a significant role in determining the strength of the relationship between social anxiety and counterfactual thinking within the current sample.

Relationship between Social Anxiety and Counterfactual Thinking

Social anxiety scores consisted of participants' mean scores on the SPIN (SA Level), while the outcome variable of interest was an index score of the difference between the number of upward versus downward counterfactuals generated (CFT Difference). Initial correlational analyses revealed no significant linear relationship between these variables ($r = .21, n.s.$). As stated previously, this relationship remained nonsignificant (and was even smaller in magnitude) when outliers on the CFT Difference variable were removed from the analysis ($r = 0.06, n.s.$). In order to further explore a possible relationship, a one-way analysis of variance (ANOVA) comparing CFT Difference scores between High and Low social anxiety (SA) groups was conducted. These groups were constructed by splitting mean SPIN scores into thirds. The High SA group and Low SA group represented the top and bottom thirds of the sample, respectively. The results of this ANOVA were likewise nonsignificant, ($F(2, 84) = 2.31, p = 0.11$).

Because the first ANOVA did not focus on the extremes—the people with the highest and lowest SA scores—a second ANOVA was performed. In this analysis, the extreme groups were calculated using a two-stage process comprised of the SPIN's clinical cut-off and then percentiles. In the first step, two groups were formed using the SPIN's clinical cutoff of 19; a

High SA group was constructed of those participants scoring above the clinical cut-off (19 and above) and a Low SA group was constructed of those participants scoring 18 or lower on the SPIN. Then, participants above the 50th percentile in the High SA group (scoring 31 or above; $n = 23$) and participants below the 50th percentile in the Low SA group (scoring 13 or below; $n = 24$) were selected as the Extreme High and Extreme Low SA groups, respectively, and included in the analysis. When running these two extreme groups, a significant main effect was observed via the ANOVA ($F(1, 45) = 4.36, p = .042$). Thus, those in the upper extreme of SA level had significantly higher CFT Difference scores (i.e., generated more upward CFTs, as compared with downward CFTs) than those in the lower extreme of SA level.

Maladaptive Counterfactual Thinking

To test for the presence of maladaptive counterfactual thinking, the relationship between SA level and CFT Difference was examined among the participants who were in the Uncontrollable scenario condition only ($n = 55$). As above, no significant correlation was found among these variables ($r = .08, n.s.$).

Potential Mediators

It was hypothesized that rumination, PEP, perfectionism, and memory for the event would mediate the relationship between SA level and CFT difference. Because no relationship was found between these variables of interest (when considering the sample as a whole), no analyses of mediations could be conducted. Indeed, as proposed by Baron and Kenney (1986), one of the conditions necessary for completing a mediational analysis is a significant correlation between the central predictor (here, SA level) and outcome (here, CFT Difference) variables. Of note, however, SA level was significantly correlated with each of the potential mediators. These correlations are summarized in the Table 1. There were no significant correlations

between SA level and accuracy on the recognition (i.e., True/False) memory task. This may be explained by the fact that there was a notable restriction of range in these variables. All participants scored at least 6/10 on this task, with 86.7% scoring 8/10 or above. As such, no analyses were run regarding the valence of responses on the recognition task, as the same issue or restriction of range was anticipated. Also, there was an extremely high correlation between number of Fully Correct statements and number of Incorrect statements on the recall task ($r = .97, p < .01$), suggesting those that recorded more accurate memories for the event also tended to record more inaccurate aspects of the event.

Relationships between CFT Difference and other variables of interest

The relationship between CFT difference and other variables of interest were analyzed and are also outlined in the Table 1. In summary, CFT Difference was significantly correlated with PEP ($r = .28, p < .01$), Concerns over Mistakes Perfectionism ($r = .22, p < .05$), and Doubts about Actions Perfectionism ($r = .28, p < .01$).

Further, CFT difference was also significantly correlated with mean postscenario PANAS Positive Affect scale score ($r = -.21, p < .05$). Thus, the lower one's positive affect after reading the scenario, the more upward counterfactuals (as compared with downward) she or he generated subsequently. There were no significant correlations between CFT Difference and postscenario PANAS Negative Affect scale scores. Additionally, CFT Difference did not correlate with either PANAS scale score at baseline. Thus, participants' mood at the outset of the study did not subsequently affect their CFT generation patterns.

Analyses using only participants in the Controllable Scenario condition

Table 1:*Correlations among SPIN scores and each potential mediator*

	Social Anxiety	CFT Difference	Correct Recall Statements	Incorrect Recall Statements	Mean Post-Event Processing	Mean Perfectionism	Mean Concerns over Mistakes	Mean Doubts about Actions	Mean Anxious Rumination
Social Anxiety	--								
CFT Difference	.20	--							
Correct Recall Statements	.37*	.02	--						
Incorrect Recall Statements	.31*	.00	.97**	--					
Mean Post-Event Processing	.35**	.28**	-.22	-.24	--				
Mean Perfectionism	.52**	.17	.37*	.31*	.212	--			
Mean Concerns over Mistakes	.60**	.22*	.34*	.28	.31**	.81**	--		
Mean Doubts about Actions	.53**	.28**	.34*	.31*	.35**	.62**	.70**	--	
Mean Anxious Rumination	.29**	.17	.00	.01	.40**	.35**	.37**	.30**	--

* $p < 0.05$, ** $p < 0.01$

In order to examine whether any effects were found for certain subsets of the sample, the main analyses were also run on only those who had read the controllable (i.e., unprepared for the presentation) scenario ($n = 44$). Using this segment of the sample only, significant findings emerged. In particular, among participants in this group, there was a significant correlation between mean SPIN scores and CFT Difference ($r = .37, p < .05$).

As this correlation was significant, mediation analyses for this subset of the sample were conducted next. Full mediation results (i.e., standardized coefficient and model fit statistics) for the Controllable scenario group are presented in Table 2. The first potential mediator examined was level of anxious rumination (i.e., mean ARQ scores). Although the first two steps of the mediation satisfied Baron and Kenney's (1986) criteria for mediation, the third criterion was not met. Specifically, when SA level was the lone predictor of CFT Difference (the central dependent variable) entered into the regression equation, the model was significant ($R^2 = 0.14, F(1, 42) = 6.67, p = 0.01$), and SA level emerged as a significant predictor of CFT Difference ($t = 2.58, \beta = 0.37, p = 0.01$). Further, SA level also significantly predicted the potential mediator, Anxious Rumination ($R^2 = 0.19, F(1, 42) = 9.57, p < 0.01, \beta = 0.44$). Mean Anxious Rumination, however, did not predict the outcome variable, thus precluding the chance for mediation.

The second potential mediator examined was PEP (as measured by the PEP-Q). The results showed a similar pattern to that found with Anxious Rumination. In particular, while SA level significantly predicted PEP-Q scores ($R^2 = 0.19, F(1, 41) = 9.24, p < 0.01, \beta = 0.43$), PEP-Q score did not, in turn, predict U-CFT Difference, thus precluding mediation.

The third potential mediator examined was perfectionism, as measured by the FMPS. As with the two previously discussed variables, overall perfectionism (i.e., all items, excluding those

in the Organization scale) did not emerge as a significant mediator between SA level and CFT Difference scores. Additionally, Concerns over Mistakes (CM) and Doubts about Actions (DA) perfectionism were examined for potential mediating roles as well. CM did prove to be a significant predictor of the outcome variable, CFT Difference ($R^2 = 0.14$, $F(1, 41) = 6.73$, $p = 0.01$, $\beta = 0.38$); however, when both CM and SA level were in the equation simultaneously, neither predictor emerged as significant. Likewise, although DA proved to be a significant predictor of the outcome variable ($R^2 = 0.17$, $F(1, 41) = 8.38$, $p = 0.01$, $\beta = 0.42$), it did not remain a significant predictor when it was entered simultaneously with SA level. Thus, neither overall perfectionism nor the specific pertinent subscales of the FMPS proved to be significant mediators.

Finally, the number of Fully Correct recall statements was examined as a potential mediator between SA level and CFT Difference. As with the variables above, correct recall statements did not mediate this relationship, as SA level did not significantly predict this memory variable.

Analyses using only student participants

As was done with those in the controllable condition only, separate analyses were also run on only student participants (i.e., those recruited through Ryerson or from the University of Toronto; $n = 56$). These analyses were run for purely exploratory purposes and were not based on prior hypotheses or for establishing equivalence between this and other subsets of the sample. For this student group, a significant relationship emerged between level of social anxiety and CFT difference scores ($r = 0.34$, $p < .05$). Because this correlation was significant, mediation analyses were carried out for this subset of the sample as well. Full mediation results (i.e.,

Table 2.

Mediation results for those in the controllable scenario.

Mediator	Predictive Path	Standardized Coefficient(s) for Predictors(s) / Sig.	Model Fit (R ²)	Sig.
	SA Level → CFT Difference	$\beta = 0.37/ p = 0.01$	0.14	$p = 0.01$
Anxious Rumination	SA Level → Anxious Rumination	$\beta = 0.44/ p < 0.01$	0.19	$p < 0.01$
	Anxious Rumination → CFT Difference	$\beta = 0.18/ p = 0.24, n.s.$	0.03	$p = 0.24, n.s.$
	SA Level + Anxious Rumination → CFT Difference	$\beta = 0.36/ p < 0.03,$ $\beta = 0.02/ p < 0.88, n.s.$	0.14	$p = 0.05$
PEP	SA Level → PEP	$\beta = 0.43/ p < 0.01$	0.19	$p < 0.01$
	PEP → CFT Difference	$\beta = 0.27/ p < 0.08, n.s.$	0.07	$p = 0.08, n.s.$
	SA Level + PEP → CFT Difference	$\beta = 0.33/ p < 0.05, n.s.,$ $\beta = 0.13/ p < 0.44, n.s.$	0.16	$p = 0.03$
Perfectionism	SA Level → Perfectionism	$\beta = 0.57/ p < 0.01$	0.33	$p < 0.01$
	Perfectionism → CFT Difference	$\beta = 0.23/ p < 0.14, n.s.$	0.05	$p = 0.14, n.s.$
	SA Level + Perfectionism → CFT Difference	$\beta = 0.02/ p < 0.91, n.s.,$ $\beta = 0./ p < 0.44, n.s.$	0.15	$p = 0.05$
Concern over Mistakes	SA Level → Concern over Mistakes	$\beta = 0.63/ p < 0.01$	0.39	$p < 0.01$
	Concern over Mistakes → CFT Difference	$\beta = 0.40/ p = 0.01$	0.14	$p = 0.01$
	SA Level + Concern over Mistakes → CFT Difference	$\beta = 0.24/ p = 0.21, n.s.,$ $\beta = 0.23/ p = 0.23, n.s.$	0.18	$p = 0.02$
Doubts about Actions	SA Level → Doubts about Actions	$\beta = 0.40/ p < 0.01$	0.35	$p < 0.01$
	Doubts about Actions → CFT Difference	$\beta = 0.42/ p = 0.01$	0.17	$p = 0.01$
	SA Level + Doubts about Actions → CFT Difference	$\beta = 0.21/ p = 0.25, n.s.,$ $\beta = 0.29/ p = 0.11, n.s.$	0.20	$p = 0.01$
Fully Correct Recall Statements	SA Level → Correct Recall Statements	$\beta = 0.38/ p = 0.09, n.s.$	0.14	$p = 0.09, n.s.$
	Correct Recall Statements → CFT Difference	$\beta = 0.34/ p = 0.13, n.s.$	0.12	$p = 0.13, n.s.$
	SA Level + Correct Recall Statements → CFT Difference	$\beta = 0.37/ p = 0.12, n.s.,$ $\beta = 0.20/ p = 0.38, n.s.$	0.23	$p = 0.09, n.s.$

standardized coefficient and model fit statistics) for the student group are presented in Table 3. For student participants, PEP emerged as a partial mediator between the two variables of interest.

In particular, when SA level and PEP-Q mean were entered simultaneously as predictors in the regression equation, the model was significant overall ($R^2 = 0.21$, $F(1, 53) = 6.68$, $p < 0.01$), and both proved to be significant predictors of CFT Difference (SA level, $\beta = 0.27$, $p = 0.04$; PEP-Q mean, $\beta = 0.30$, $p = 0.03$). To complete the partial mediation, SA level carried less weight when entered simultaneously with PEP-Q mean (i.e., lower beta value; $\beta = 0.27$) than when it was the sole predictor of the outcome variable ($\beta = 0.37$). None of the other variables of interest met the criteria for a full or partial mediator within the student sample.

Evidence for maladaptive counterfactual thinking among students was also sought. In particular, the correlation between SA level and CFT Difference was examined for students in the Uncontrollable scenario only ($n = 30$). This correlation was not significant, however ($r = .25$, n.s.), suggesting that SA level was not associated with maladaptive CFT among student participants.

Analyses using only community participants

When examining the community sample only (i.e., those recruited via Craigslist or the Metro newspaper; $n = 33$), there was no significant relationship between SA level and CFT Difference. As such, no mediation analyses were conducted for this group.

Table 3.

Mediation Results for Student Participants

Mediator	Predictive Path	Standardized Coefficient(s) for Predictors(s) / Sig.	Model Fit (R ²)	Sig.
	SA Level → CFT Difference	$\beta = 0.34/ p = 0.01$	0.12	$p = 0.01$
Anxious Rumination	SA Level → Anxious Rumination	$\beta = 0.35/ p < 0.01$	0.12	$p < 0.01$
	Anxious Rumination → CFT Difference	$\beta = 0.21/ p = 0.12, n.s.$	0.04	$p = 0.12, n.s.$
	SA Level + Anxious Rumination → CFT Difference	$\beta = 0.30/ p = 0.03,$ $\beta = 0.10/ p = 0.46, n.s.$	0.13	$p = 0.03$
PEP	SA Level → PEP	$\beta = 0.28/ p = 0.04$	0.08	$p = 0.04$
	PEP → CFT Difference	$\beta = 0.37/ p < 0.01$	0.14	$p < 0.01$
	SA Level + PEP → CFT Difference	$\beta = 0.27/ p = 0.04,$ $\beta = 0.30/ p = 0.03$	0.21	$p < 0.01$
Perfectionism	SA Level → Perfectionism	$\beta = 0.39/ p < 0.01$	0.16	$p < 0.01$
	Perfectionism → CFT Difference	$\beta = 0.20/ p = 0.13, n.s.$	0.04	$p = 0.13, n.s.$
	SA Level + Perfectionism → CFT Difference	$\beta = 0.29/ p = 0.04,$ $\beta = 0.09/ p = 0.53, n.s.$	0.12	$p = 0.04$
Concern over Mistakes	SA Level → Concern over Mistakes	$\beta = 0.50/ p < 0.01$	0.25	$p < 0.01$
	Concern over Mistakes → CFT Difference	$\beta = 0.24/ p = 0.08, n.s.$	0.06	$p = 0.08, n.s.$
	SA Level + Concern over Mistakes → CFT Difference	$\beta = 0.28/ p = 0.07, n.s.,$ $\beta = 0.10/ p = 0.50, n.s.$	0.12	$p = 0.04$
Doubts about Actions	SA Level → Doubts about Actions	$\beta = 0.42/ p < 0.01$	0.17	$p < 0.01$
	Doubts about Actions → CFT Difference	$\beta = 0.33/ p = 0.01$	0.11	$p = 0.01$
	SA Level + Doubts about Actions → CFT Difference	$\beta = 0.32/ p = 0.11, n.s.,$ $\beta = 0.23/ p = 0.10, n.s.$	0.15	$p = 0.01$
Fully Correct Recall Statements	SA Level → Correct Recall Statements	$\beta = 0.32/ p = 0.13$	0.10	$p = 0.13, n.s.$
	Correct Recall Statements → CFT Difference	$\beta = 0.02/ p = 0.92, n.s.$	0.00	$p = 0.92, n.s.$
	SA Level + Correct Recall Statements → CFT Difference	$\beta = 0.46/ p = 0.04,$ $\beta = -0.13/ p = 0.56,$ n.s.	0.19	$p = 0.11, n.s.$

Discussion

Past research and theory suggest that the presence of social anxiety symptoms is related to the tendency to think back on past negative social events and imagine how the situation could have turned out differently. In particular, social anxiety has been associated with the generation of upward counterfactual thoughts, negative affect-inducing thoughts that simulate a better possible outcome to these events (Kocovski et al., 2005). As such, the current study predicted that those higher in social anxiety would generate a greater number of upward (as compared with downward) counterfactual thoughts in response to a negative social-evaluative scenario. Findings in the sample as a whole did not support this hypothesis, as there was no significant correlation between these variables of interest. It was considered that this lack of statistical significance may be a result of extreme values on the CFT Difference variable; however, the correlation between these variables remained nonsignificant when outliers on the CFT index were removed. As such, this nonsignificant relationship between SA level and CFT Difference remains difficult to interpret. Notably, this relationship (or lack thereof) between one's level of social anxiety and upward counterfactual thinking could not be accounted for by one's level of depression (i.e., score on the BDI-II). Indeed, partial correlation and well as mediational analyses revealed that the strength of the relationship between SA level and CFT Difference was not altered once the variance accounted for the BDI-II scores was controlled for. Also, BDI-II scores did not significantly predict CFT Difference scores, providing further evidence that the association between the central variables of interest was not confounded by any effect of depression scores.

When those in the extremes of social anxiety were examined (those above the 50th percentile in the clinical range and those below the 50th percentile in the nonclinical range), however, a significant effect was found. In particular, those in the High extreme SA group

generated a greater number of upward CFTs (as compared with downward) than those in the Low extreme SA group. Thus, when examining the extremes of social anxiety only, the central hypothesis of this study was supported. Of note, the ANOVA run on these extreme groups was low in statistical power, as there were only 46 participants in the entire analysis. This factor is important because, if an effect can be found with such a small sample size, the significance of this relationship would most likely increase in strength as the sample size increases. Thus, in reality, the relationship between SA level and CFT Difference when examining extremes may be even stronger than what this current statistical test suggests.

It was also hypothesized that those high in social anxiety would evidence a higher number of maladaptive upward counterfactuals (counterfactuals in response to the uncontrollable scenario, as compared with downward counterfactuals). This prediction stemmed from research suggesting that those with notable psychopathology, including moderate depression and social anxiety, tend to generate counterfactuals that are based on uncontrollable aspects of past situations, thus precluding any adaptive, self-improvement function of these thoughts (e.g., Callander et al., 2007, Kocovski et al., 2005; Markman & Miller, 2006). Upon examining this relationship with those in the uncontrollable condition only, no significant relationship between these variables was found. Thus, those higher in social anxiety did not generate more “if only...” thoughts in response to a negative, uncontrollable social scenario than did those lower in social anxiety, showing no evidence of a relationship between social anxiety and maladaptive counterfactual thinking.

Additional central hypotheses focused on the potential mediating roles of perfectionism, rumination, and memory for the scenario, which might better explain the relationship between social anxiety (SA level) and U-CFT generation (U-CFT Difference). These mediators were

considered because each has shown to possess a relationship with social anxiety in the past literature. Further, these potential mediators also possess a logical (and in some instances, empirical) connection to one's general counterfactual generation tendencies. Because SA level and U-CFT Difference were not correlated, however, these mediations were not conducted when examining the entire sample. Nevertheless, there were significant and notable correlations between SA level and these three potential mediators. In particular, participants' scores on the SPIN were significantly related to level of overall Perfectionism, as measured by the FMPS and to Concerns over Mistakes and Doubts about Actions, more specifically. These moderately strong correlations suggest that those higher in social anxiety evidenced greater levels of perfectionism in general, as well as a greater tendency to be concerned about making mistakes and doubting the effectiveness of one's actions while in the presence of others. These latter findings (i.e., regarding the subscales) are understandable, as fear of evaluation or embarrassment in front of others is a central facet of Social Anxiety disorder. These correlations suggest that these forms of perfectionism may be a trait possessed by those evidencing higher levels of social anxiety symptoms. Further, this finding mirrors that of Ashbaugh and colleagues (2007) who found social anxiety to be correlated with high levels of perfectionism, and of Concerns over Mistakes and Doubts about Actions, in particular.

Further, SA Level was significantly correlated with rumination, as measured by the ARQ and with PEP, as measured by the PEP-Q. These results suggest that those higher in social anxiety tend to ruminate more about their anxiety-related symptoms and that they tend to engage in PEP with greater intensity and frequency. Regarding PEP in particular, this significant correlation was expected, given the literature that suggests PEP is a phenomenon unique to social anxiety. Indeed, while rumination is a phenomenon associated with a variety of psychological

disorders, PEP is an occurrence that applies specifically to the re-consideration of unsatisfactory social events (Kocovski et al., 2005). Moreover, Fehm, Schneider, and Hoyer (2007) found that student participants engaged in more frequent PEP following social situations (as compared to nonsocial situations) and that the PEP that followed social situations lasted longer and was more intense than that following nonsocial events. Thus, it should be expected that one's level of social anxiety would be positively associated with one's frequency and intensity of PEP.

Finally, levels of Social Anxiety were related to the number of fully correct statements in the Recall task and to the number of incorrect statements in the Recall task. Thus, those who scored higher on the SPIN tended to record more accurate statements as well as inaccurate statements when asked to recall aspects of the negative social scenario. This finding is intriguing in that it does not represent a memory bias in one direction or the other. Instead, those higher in social anxiety generated more memories in both categories. This suggests that while socially anxious individuals may have more detailed memory for the social-evaluative scenario presented in this study, they may also "recall" a greater number of aspects of the scenario that did not transpire or that represent distortions of what transpired in the scenario. Further, there was a very high correlation between the amount of Fully Correct and the amount of Incorrect statements ($r = .97, p < .01$) generated by participants. This strong positive association suggests that some participants were more likely to generate a greater number of "memories," regardless of their accuracy, highlighting a tendency towards fluidity or generativity of recorded memories. Further, since SA level was correlated significantly with both Fully Correct and Incorrect statements, it could be hypothesized that such a fluidity or generativity may be a characteristic of those higher in social anxiety. I am aware of no research to date that explores the relationship between social

anxiety and the fluidity of memories (regardless of accuracy) for past negative social-evaluative situations. This topic may prove to be an interesting and novel future research direction.

Notably, there were no significant relationships between social anxiety and accuracy on the recognition memory task, in which participants responded to 10 true/false questions about the scenario they had read. This result may be best understood by considering that all participants scored at least 6/10 on this task, with nearly ninety percent scoring 8 out of 10 or higher. As such, there was a remarkable restriction of range in this variable, thus likely preventing any effect from being found. In order to address this issue, future studies may consider implementing a larger delay between reading and responding to the scenario and the memory task. This may more accurately measure true longer-term memory processes (paralleling one's real-life memory for past social events), as well as elicit a wider range of scores on the task. Further, although it was initially proposed that the participants' accuracy on the recognition task would also be analyzed by valence (based on the hypothesis that those high in social anxiety would be more accurate about negative aspects of the scenario), this analysis was not conducted due to the aforementioned restriction of range on this task. The valence of memories recorded in the recall task could have also been coded via qualitative analysis; however this was outside the scope of the current project. It would certainly be valuable for future research to examine the valence of memories (or distorted/incorrect memories) recorded in such a recall task and relate this variable to one's level of social anxiety. This would contribute to the rich, yet inconsistent literature on the relationship between social anxiety and memory.

Additionally, some other intriguing relationships were observed. In particular, U-CFT Difference was related to some variables of interest. First, U-CFT Difference was negatively correlated with PANAS Positive Affect after reading the scenario. In other words, the lower

one's positive affect after reading the scenario, the greater number of upward counterfactuals one generated. This finding fits with past research, as low mood has been shown to facilitate the generation of upward counterfactual thinking (Roese, 1997). Interestingly, however, U-CFT proportion was not related to postscenario negative affect, suggesting a greater proportion of U-CFT generation was preceded by lower levels of positive affect, but not by higher levels of negative affect. This finding can be reconciled by the theory that positive and negative affect represent two separate and independent mood structures. Indeed, in developing their Positive and Negative Affect Schedule (PANAS) Watson, Clark, & Tellegen (1998) purported that while positive and negative affect may appear to be opposites along a singular continuum, they have "emerged as highly distinctive dimensions that can be meaningfully represented as orthogonal dimensions in factor analytic studies of affect" (p. 1063). Further, while theory suggests that the induction of negative affect may lead to an automatic upward counterfactual cognitive response (e.g., Roese, 1997), it appears that studies in this literature may not have teased out the differential influence of low positive affect versus high negative affect when considering their precursory role in upward counterfactual thinking. Thus, the fact that high negative affect postscenario did not relate significantly to CFT Difference in the current sample (and low positive affect did significantly relate) does not necessarily refute past counterfactual-affective theory.

The proportion of upward counterfactuals generated was also related to one's level of PEP, Concerns over Mistakes, Doubts about Actions and level of Agreeability on the SIMP. The relationship with PEP is not surprising, given that counterfactual thinking is akin to PEP. In particular, both require looking back to past negative situations and considering what did not turn out as planned. The relationship between U-CFT proportion and Concerns over Mistakes was

also anticipated because it makes sense that those who are highly concerned about not making mistakes around others would look back at negative social situations and imagine how they could have performed differently to make the situation better. Likewise, the relationship with Doubts about Actions is also intuitive. Specifically, it makes sense that those who second-guess the effectiveness and appropriateness of their behaviours may be more likely to think about things they could have done differently when interacting with others. To date, there are no published data to suggest a relationship between perfectionism and counterfactual thinking, so further elucidation of this association may prove to be a worthwhile and novel research direction.

The relationship between U-CFT proportion and Agreeability is notable, yet difficult to explain because it has not been supported in the literature. Agreeability can be generally described as a lack of antagonism towards others; someone high in Agreeability could be characterized as trustful, sympathetic to others, cooperative, polite, and altruistic (McCrae & Costa, 1987). Regarding any relationship with social anxiety, research has suggested that those with social anxiety may actually be characterized by a lack of trust of others (e.g., Bienvenu, Nestadt, Samuels, Costa, Howard, & Eaton, 2001; Bienvenu, Samuels, Costa, Reti, Eaton, and Nestadt, 2004). Further, no other previous research seems to have found any relationship between agreeableness and social anxiety. In the current study, Agreeableness was gauged by one item only, the SIMP's (Woods and Hampson, 2005) Agreeableness item. The dichotomous pole representing high Agreeableness reads as follows: "Someone who is generally trusting and forgiving, is interested in people, but can be taken for granted and finds it difficult to say no." When examining the latter portion of this item, it is possible to see an overlap between being taken for granted and not being able to say "no" and the lack of assertion in social situations often seen in those with social anxiety. Additionally, it is possible that those who are more

agreeable have a greater aspiration to perform effectively in social situations because of their “interest in people” or overall desire to get along well with others. In turn, this desire may relate to a tendency to imagine how one’s social performance in past situations could have been improved.

While the primary hypotheses were not supported when examining the sample as a whole, significant correlations and mediations were discovered when subsets of the sample were analyzed separately. First, some significant correlations were discovered when only those in the controllable scenario (i.e., where the student had not prepared enough for the presentation) were examined. Particularly, when only this half of the sample was analyzed ($n = 43$), there was a significant correlation between level of social anxiety and proportion of upward counterfactuals generated. In other words, the more socially anxious one was, the more likely he or she was to generate a greater number of U-CFTs (compared to D-CFTs) when responding to the controllable scenario. As outlined above, no such relationship was found when analyzing only those in the uncontrollable group, suggesting no tendency towards maladaptive counterfactual thinking in those with higher levels of social anxiety.

Because of this significant relationship among those in the controllable scenario group, potential mediating relationships were examined within this subset of the sample only. Despite the main significant relationship (i.e., between SA level and CFT difference), no significant mediators were found in this segment in the sample. In particular, Anxious Rumination, PEP, Perfectionism (including the Concerns over Mistakes and Doubts about Actions subscales), and number of Fully Correct Recall statements all failed to surface as significant mediators. Thus, in this sample, SA level prevailed as the strongest predictor of CFT Difference. Overall, then, it appears that one’s level of social anxiety outweighs the contributions of factors, such as

perfectionism, when predicting the number of upward counterfactual thoughts one generates following a stressful, controllable, social situation. Such a finding may instigate a new area of inquiry around trait-like correlates of counterfactual thinking. While low self-esteem has emerged as a correlate of upward counterfactual thinking in past research (e.g., Sanna, Meier, & Turley-Ames, 1998), little, if any research has examined how factors such as perfectionism, rumination, and memory for negative events may relate to this cognitive pattern, and how they may relate when weighed against one's level of social anxiety.

One potential explanation for why there were significant results for the controllable scenario group and not for the uncontrollable group or for the entire sample as a whole may be considered. In particular, it makes sense that generating upward counterfactuals is an easier and more automatic process when responding to a scenario in which one had a sense of personal control. In other words "if only..." thoughts should come to mind more quickly when there are specific things one could have done differently (e.g., preparing more for the presentation) than when there was little one could have done differently. Taking this into consideration, it makes sense that this relationship was observed only for those who read and responded to the Controllable scenario.

Second, the significant positive relationship between SA level and U-CFT Difference was also evidenced when only student participants (i.e., recruited from Ryerson University or the University of Toronto) were analyzed. This relationship was statistically significant when the sample was collapsed across both scenario conditions (i.e., controllable and uncontrollable). Thus, for student participants, those higher in SA generated a greater number of U-CFTs regardless of whether they had control over the negative situation presented in the scenario. When looking for the presence of maladaptive U-CFT in particular within this group (i.e.,

student participants in the No Control/AV malfunction scenario), however, no significant relationship was observed. Thus, while social anxiety was related to a general tendency to generate a greater number of U-CFTs for this student sample, no relationship between SA level and maladaptive counterfactual thinking was found.

Potential mediators were also analyzed in this student subset. The only variable that emerged as a partial mediator among students was PEP. In other words, for students the significant relationship between SA level and CFT Difference could be partially accounted for by how much students look back upon unsatisfactory social experiences. It is curious that this relationship would emerge for students only and not for those recruited from the community. To date, no previous research has found that PEP is a cognitive style highly more prevalent in adolescent/young adult or academically-oriented populations than with older, nonstudents. As such, this finding remains difficult to interpret.

There are several possible explanations for why the central hypothesis (i.e., positive relationship between level of social anxiety and upward counterfactual generation) was supported within a student sample but not the entire sample (or within the community-only sample). First, it may be the case that students were better able to relate to the scenario they were presented. Although the prospect of a presentation is generally a ubiquitous situation to which those in many professions can relate, both scenarios in the current study presented a presentation within a classroom setting. Thus, students may have been better able to immerse themselves in the scenario, while those in the community may have had more difficulty doing so. In turn, if students could more readily relate to the proceedings of the scenario they read, it may have been easier to generate thoughts about what they could have done differently or what may have made the situation better. Additionally, it may have been more likely that students had experienced a

similar situation to the one in the scenario recently, which could have also facilitated counterfactual thought generation. Taken together, these possibilities may have enabled a genuine, externally valid relationship between social anxiety and counterfactual thinking to emerge among only the students.

Conversely, the fact that no maladaptive CFT was observed in the student populations may be explained in two ways. First, it may be that those students who volunteered for this study were typically high achievers who could not relate fully with a scenario in which they are not prepared for an academic assignment. This is merely a hypothesis, however, as we did not collect any data regarding student participants' grades or level of academic achievement. Second, it may also be that these students did not evidence high enough levels of psychopathology (i.e., social anxiety symptoms) to facilitate maladaptive counterfactual thinking patterns. Overall, the hypothesis that subclinical levels of social anxiety prevented maladaptive CFT among students can be challenged when examining mean scores on the SPIN for this group. In particular, mean SPIN scores the current student sample ($M= 21.50$) lie above the clinical cutoff of 19 suggested by the authors of the measure (Connor et al., 2000). Indeed, in developing the SPIN, Connor and colleagues concluded that using a cutoff score of 19 was effective at identifying clinically significant levels of social anxiety. In past research using the SPIN, means for nonclinical undergraduate populations have typically been below the clinical cutoff of 19 (e.g., Radomsky, Ashbaugh, Saxe, Ouimet, Golden, Lavoie, & O'Connor, 2006; Stewart & Mandrusiak, 2007). Stewart and Mandrusiak (2007) do reiterate, however that individuals diagnosed with Social Anxiety Disorder typically score at or above 40 on the SPIN. This finding is also corroborated by research by Antony, Coons, McCabe, Ashbaugh, and Simpson (2006). Overall, then, although students in this sample fell into a clinical range on average, their SPIN scores did not approach

levels typical of individuals who are currently suffering from Social Anxiety Disorder. As such, it may remain a valid argument that the students in this sample did not evidence levels of social anxiety pathological enough to evoke maladaptive thinking patterns.

Despite the fact that some of the central hypotheses of the study were not supported, the findings of this research point to some notable conclusions. In particular, when examining only those in the Controllable scenario condition, there was a significant relationship between one's level of social anxiety and the tendency to generate a greater proportion of upward counterfactuals than downward counterfactuals. This finding was also evidenced among student participants in the current sample. Thus, when considering these two subsets individually, the fundamental prediction of this research was supported, namely that the higher one's level of social anxiety, the more upward counterfactuals (compared to downward) one generated in response to the negative social-evaluative events. Further, this central finding was also evidenced when examining those with extreme social anxiety scores, regardless of group membership or what scenario they were presented. Indeed, there were significant differences in counterfactual thought generation between the lowest 50% of the nonclinical group (as per the SPIN's clinical cut-off) and the highest 50% of the clinical group, with those highest in social anxiety symptoms generating a greater number of upward counterfactuals.

Additionally, while the results of this study did not support the presence of maladaptive counterfactual thinking patterns, findings did solidify the prevalence of an upward counterfactual thinking style following a negative, controllable event. Further, results suggested that the generation of more upward counterfactual thoughts was associated with lower positive affect before the CFT task. This finding also corroborates the literature that proposes that low mood is a necessary precursor to upward counterfactual thought generation (e.g., Roese, 1997).

Finally, this study evidenced some notable and significant relationships between the variables of interest, unrelated to the central hypothesis mentioned above. Indeed, several significant correlates of social anxiety and CFT Difference emerged, some of which confirmed prior theory and some of which may highlight potential new research directions. For instance, the relationship between social anxiety and variables such as perfectionism, PEP, rumination, and memory were confirmed by the current data. Further, novel results such as the relationship between upward counterfactual thought generation and variables such as Perfectionism and Agreeableness may lead to further exploration of these associations.

Strengths of this study include the fact that the sample included both student and community participants. A large portion of psychological research conducted utilizes only undergraduate students, which is not representative of the general population (e.g., in terms of age, intelligence, and socio-economic status, for example). By including participants from outside an academic setting, the sample of this study better represents the homogeneity that would be found in a true random community sample.

Another strength of the current research is that it utilized a truly experimental design. Because participants were randomly assigned to one of two scenario conditions, any differences between these groups can be explained only by this experimental manipulation (i.e., which scenario they read and responded to). Thus, it can be concluded confidently that the differential relationships between social anxiety and CFT between these groups can be attributed to the thematic content of the scenarios themselves.

There were also some limitations to this research that may partially account for some of the nonsignificant relationships evidenced. First, some of the analyses conducted, namely those where only a subset of the sample was analyzed, may have been somewhat low in statistical

power. It is possible that with a larger sample size some of the nonsignificant findings may have reached statistical significance. Additionally, although this sample was more representative of a true community sample than other samples consisting of students only, the fact remains that this was an analog sample, not a clinical one. Indeed, some of the main hypotheses may not have been supported in this study because some of the key phenomena discussed (e.g., focusing on aspects of negative situations out of one's control) may apply only to true clinical populations, where levels of psychopathology are at significant, clinical levels. This theory may be contradicted, however, when considering the SPIN scores for participants in this sample. Although the SPIN is not used for diagnostic purposes, authors of this measure recommend that scores of 19 or higher on the questionnaire effectively distinguish those who have Social Anxiety Disorder from those who do not. Overall, this sample evidenced a mean SPIN score of almost 23, with the highest third of SPIN scores yielding a mean of over 38. Thus, even the average participant in this sample would be considered to be scoring at a clinical level, if Connor and colleagues' (2000) criteria are used.

In fact, it may be considered a limitation in itself that the current community and student sample inexplicably evidenced seemingly clinical levels of social anxiety when averaged out. One might hypothesize that the content of this study (e.g., the theme of social anxiety, reading a scenario that was social-evaluative in nature) might have led to inflated scores on the SPIN. The questionnaire package in which the SPIN was contained, however, was purposefully administered prior to the experimental induction as to best capture true, day-to-day baseline levels of the constructs measured, without the influence of other study tasks. As such, it is unlikely to account for these high SPIN scores by considering that other tasks completed during the study could have augmented SA levels. On the other hand, this study was advertised to all

participants (i.e., via SONA, flyers around the University of Toronto, and advertisements in the Metro newspaper and on Craigslist.com) as one that dealt with social anxiety. Indeed, the email address at which participants recruited from the University of Toronto, Craigslist.com, and the Metro newspaper could contact the researcher included the term “social anxiety thoughts”. Further, all recruitment materials suggested that the current study was an “Anxiety Study” that dealt with the relationship between “thoughts and anxiety”. Therefore, it is possible that individuals who experience anxiety in social situations (or generally anxious people) may have decided to participate in this study due to its potential personal relevance. If this was the case, this could partially explain why SPIN scores were somewhat elevated in the current sample. As mentioned previously, however, scores above the clinical cutoff do not necessarily indicate the presence of Social Anxiety Disorder. Further, those suffering from the disorder tend to score at least 20 points higher than the clinical cutoff (e.g., Antony et al., 2006), which is much higher than what the current sample evidenced (i.e., approximately 4 points above the cut-off). As such, although SPIN scores were higher than expected (potentially due to participant self-selection), it cannot necessarily be concluded that the current sample represents a clinical or significantly pathological group in terms of their social anxiety levels.

Considering the findings, strengths, and limitations of this research, directions for future study may be considered. First and foremost, it is crucial that this study be replicated with a clinical sample, to determine if there are differences in upward counterfactual thinking (and maladaptive upward counterfactual thinking in particular) between a community sample and those who have been diagnosed with Social Anxiety Disorder. If such a difference is found, it would hold implications for the need to identify and restructure maladaptive counterfactual thoughts in those in treatment for issues surrounding social anxiety.

Further, participants in the current study (as in the majority of counterfactual research) read and responded to a hypothetical scenario depicting a stressful social situation. While engaging in such a task can indeed evoke negative affect (as it did in the current study) and prompt counterfactual thinking, issues of ecological validity may be considered. In order to augment the authenticity of counterfactual thought generation, future research may instruct participants to recall and record an instance of social/evaluate stress that actually occurred to them in the recent past. In responding about this particular, personal event, participants may evidence a counterfactual thought pattern that is more akin to their natural and automatic thought patterns following social stress in their daily life.

Finally, more research must be conducted in the area of maladaptive counterfactual thinking in particular. Although research has typically defined maladaptive CFT as that which focuses on uncontrollable circumstances (e.g., Markman & Miller, 2006), a consensus on the definition of this construct has not been solidified. Further, qualitative methods of analyzing upward counterfactual thought content may prove more valid and fruitful when examining how maladaptive these thoughts are. A qualitative analysis was beyond the scope of this thesis; however such an endeavor would undoubtedly add to the depth and clarity of this literature.

Overall, the current research suggests that individuals highest in social anxiety tend to respond to negative social-evaluative situations with a greater number of upward counterfactuals than do those lowest in social anxiety. Although no evidence for maladaptive counterfactual thinking was found, these results bear clinical implications in that upward counterfactual thinking is associated with the generation of negative affect (e.g., Roese, 1997), regardless of how adaptive the individual thoughts may be. Taking this perspective, our findings point to the possibility that highly socially anxious individuals are engaging in a cognitive pattern that is

provoking negative affect on a potentially frequent basis. This negative affect, in turn, may work to exacerbate or maintain social anxiety symptoms for these individuals. It would be worthwhile for future research to examine this possibility. Finally, the current study importantly builds upon the relatively new area of postevent cognitions in social anxiety. Indeed, while a great body of research has examined how pre-event, apprehensive cognitions lead to social avoidance, little has examined how negative thoughts following an event may similarly facilitate avoidance and increase distress. As such, this study, along with those examining PEP specifically, represents a new research direction vital to the further conceptualization of cognitive vulnerability to social anxiety.

Appendix A- Recruitment Materials

Craigslist.com Recruitment

ANXIETY STUDY- Participants needed! (Downtown Toronto)

Researchers in the Psychology Department at Ryerson University are recruiting individuals to participate in a study about the relationship between **Thoughts** and **Anxiety**. Participants will complete a series of questionnaires and other written tasks.

Who can participate? English-speaking adults aged 18+

Where is the study? The Psychology Research and Training Centre at
Ryerson University (105 Bond St., 2nd Floor)

Duration of Study: Approximately 1 hour

COMPENSATION PROVIDED!

If you are interested in participating, please contact us at (416) 979-5000, ext. 4985 or at socialanxietythoughts@gmail.com

* It is NOT ok to respond to this post with services or other commercial interests.

ANXIETY STUDY at Ryerson- Participants needed!

Researchers in Ryerson University's Psychology Department are recruiting participants for a study about the relationship between **Thoughts** and **Anxiety**.

Who can participate? English-speaking adults aged 18+

Where is the study? At the Psychology Research and Training Centre at
Ryerson University (105 Bond St., 2nd Floor)

Duration of the study? Approximately 1 hour

COMPENSATION PROVIDED!

If you are interested in participating, please contact us at:

(416) 979-5000 ext. 4985 or at

socialanxietythoughts@gmail.com

Appendix B- Informed Consent Form

Ryerson University: Consent Agreement

Anxiety and Counterfactual Thinking Study

You are being asked to participate in a research study. Before you give your consent to be a volunteer, it is important that you read the following information and ask as many questions as necessary to be sure you understand what you will be asked to do.

Investigator: Jennifer Monforton, B.A., Department of Psychology, Ryerson University

Supervisor: Dr. Kristin Vickers, Ph.D., Department of Psychology, Ryerson University

Purpose of Study: The purpose of this study is to learn about the thoughts and emotions people experience when thinking about previous anxiety-provoking social situations. Approximately 200 undergraduate students enrolled in introductory psychology classes will participate in the study.

Description of the Study:

- After viewing the details of this study in our posted advertisement, you will be able to contact the researcher to schedule an appointment to come into our research lab for the study. The lab is located on the Ryerson University campus at 105 Bond Street (room SBB 220).
- 2-3 students will be participating in the study during each scheduled time slot. You will be in the same room with other participants, however you will be separated by a barrier such that your personal responses will remain private from these other participants.
- At the outset of your lab visit, Jennifer will describe the study to you in more detail and you will have the opportunity to ask further questions about this research. Following this you will have the opportunity to sign this consent form or to decline participation. This portion of the study will take approximately 10 minutes.
- During the first segment of the study you will be asked to complete a booklet of paper and pencil questionnaires that ask questions about your thoughts, feelings, and personality. This portion of the study will take approximately 20 minutes.
- During the second segment of the study, you will be asked to read and respond to a scenario that describes a hypothetical anxiety-provoking scenario. All responses to this scenario will be using paper and pencil forms. This portion of the study will take approximately 10 minutes.
- During the third segment of the study, you will be asked to complete an individual word-forming task using letter tiles. This portion of the study will take approximately 5 minutes.

- The fourth segment of the study will ask you to provide further written responses about the hypothetical scenario you read previously. This portion of the study will take approximately 10 minutes.
- Finally, you will have the opportunity during debriefing to learn more about the study through a 5 minute discussion with Jennifer. You will be welcome to ask any questions or address any concerns you may have at this point. Following this, your participation in the study will be finished.

Walk-Through Option: If you decide that you would like to experience the study without providing data for analysis, you have the option of completing the study tasks without submitting these completed materials for data collection. This walk-through option will still result in your receiving \$10 compensation.

What is experimental in this study: None of the procedures or questionnaires used in this study is experimental in nature. The only experimental aspect of this study is the gathering of information for the purpose of analysis.

Risks or Discomforts: There are no significant risks or discomforts associated with participating in this study. If this is your first time participating in a psychological study, you may experience mild discomfort due to being unfamiliar with such an experience. Additionally, you may experience brief discomfort when reading about the hypothetical anxiety-provoking scenario. This discomfort, if any, is expected to be mild and temporary and will subside by the end of the study.

Benefits of the Study: The results of this study will not benefit you directly, but the knowledge gained may help the researcher and others in the field to understand the types of thoughts and emotions people experience following anxiety-provoking social situations. I cannot guarantee, however, that you will receive benefits from participating in this study.

Confidentiality: Confidentiality of records identifying you will be maintained at all times. Specifically, access to collected data will be limited to Jennifer Monforton and her supervisor, Dr. Kristin Vickers. Data will be stored in computer file form (accessible only through a password) and paper copies will be securely locked up. As an added precaution, no names will appear anywhere except on the consent form signature. All other paper copies will have a numerical code only. No video tapes or audio tapes are used in this study. Throughout this study, confidentiality will be maintained to the extent allowed by law for a period of at least 5 years and then the data will be destroyed.

Incentives to Participate: Your participation will be compensated with \$10 cash. You will still receive this monetary compensation if you choose to stop participation before the end of the lab visit.

Costs and/or Compensation for Participation: There are no costs associated with your participation in this study. You are asked to be at Ryerson University on one occasion.

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 Ryerson University. If you decide to participate, you are free to withdraw your consent and to stop your participation at any time without penalty or loss of benefits to which you are allowed.

You will have the right to withdraw your data from the study up until the time of data analysis.

At any particular point in the study you may refuse to answer any particular question or stop participation all together.

Questions about the Study: If you have any questions about the research now, please ask. If you have questions later about the research, you may contact:

Jennifer Monforton
jennifer.monforton@psych.ryerson.ca

If you have questions regarding your rights as a human subject and participant in this study, you may contact the Ryerson University Research Ethics Board for information.

Research Ethics Board
c/o Office of the Vice President, Research and Innovation
Ryerson University
350 Victoria Street
Toronto, ON M5B 2K3
416-979-5043

Agreement: Your signature below indicates that you have read the information in this agreement and have had a chance to ask any questions you have about the study. Your signature also indicates that you agree to be in the study and have been told that you can change your mind and withdraw your consent to participate at any time. You have been given a copy of this agreement.

You have been told that by signing this consent agreement you are not giving up any of your legal rights.

Name of Participant (please print)

Signature of Participant

Date

Signature of Investigator

Date

Appendix C- Scenarios, Instructions to Participants, and Memory Tasks

Please read the following scenario carefully, while imagining that the situation is happening to you. Once you have finished reading the scenario, please re-read it until I tell you to stop.

You have to do a 30-minute presentation in your psychology class this morning and you arrive at class nervous and uncertain because you have not taken the time to fully prepare. You have known about this presentation for some time, but only began working on it yesterday. The topic is something that interests you, but you did not put much effort into this assignment and you fear your Power Point slides are messy and unclear. As you start the presentation, you can feel your heart racing and your face getting warm, but you pretty much stick to your script and are able to answer a couple of questions from other students. Although the presentation starts out well, as time goes on you find it more difficult to remember what you had planned to say. You find yourself stumbling over several words and are unable to explain a couple of key concepts about your topic. As your presentation is about to end, a classmate asks a question that completely takes you by surprise. You know you should be able to answer it, but remember that this was one area you had not had time to review. As you try to put together answer, you notice that your palms are sweaty and your voice is shaky. The student who asked the question appears satisfied with your response, but you notice that others are shifting impatiently in their seats. When your presentation has finished, you receive some kind comments from a few of your classmates, but you are unsure how well you actually did...

Please read the following scenario carefully, while imagining that the situation is happening to you. Once you have finished reading the scenario, please re-read it until I tell you to stop.

You have been preparing for quite a while for a 30-minute presentation in your psychology class and you arrive at class nervous, yet confident that you know all of the material you will be presenting. You are very interested in the topic you will be discussing and your PowerPoint slides look great. As you start the presentation, you can feel your heart racing and your face getting warm, but you remember everything you had planned to say and are able to answer a couple of questions from other students. Twenty minutes into the presentation, you notice that the computer screen is flashing and then the screen at the front of the class goes black. You fiddle with the computer and the classroom's AV equipment, but the computer will not restart. While some students attempt to help you with the computer, you notice that others are shifting impatiently in their seats. Your heart begins to pound as you realize that you will have to finish the last 10 minutes of your presentation without your slides. Even though you know your material very well, you have difficulty finishing your presentation. Without your slides to guide you, you forget to mention some key points and you begin to speak more quickly because you are anxious to finish. When your presentation has finished, you receive some kind comments from a few of your classmates, but you are unsure how well you actually did...

In order to refresh your memory about what happened, please carefully re-read the scenario once again. When you are finished reading the scenario, please pass this sheet to the experimenter.

You have to do a 30-minute presentation in your psychology class this morning and you arrive at class nervous and uncertain because you have not taken the time to fully prepare. You have known about this presentation for some time, but only began working on it yesterday. The topic is something that interests you, but you did not put much effort into this assignment and you fear your Power Point slides are messy and unclear. As you start the presentation, you can feel your heart racing and your face getting warm, but you pretty much stick to your script and are able to answer a couple of questions from other students. Although the presentation starts out well, as time goes on you find it more difficult to remember what you had planned to say. You find yourself stumbling over several words and are unable to explain a couple of key concepts about your topic. As your presentation is about to end, a classmate asks a question that completely takes you by surprise. You know you should be able to answer it, but remember that this was one area you had not had time to review. As you try to put together answer, you notice that your palms are sweaty and your voice is shaky. The student who asked the question appears satisfied with your response, but you notice that others are shifting impatiently in their seats. When your presentation has finished, you receive some kind comments from a few of your classmates, but you are unsure how well you actually did...

In order to refresh your memory about what happened, please carefully re-read the scenario once again. When you are finished reading the scenario, please pass this sheet to the experimenter.

You have been preparing for quite a while for a 30-minute presentation in your psychology class and you arrive at class nervous, yet confident that you know all of the material you will be presenting. You are very interested in the topic you will be discussing and your PowerPoint slides look great. As you start the presentation, you can feel your heart racing and your face getting warm, but you remember everything you had planned to say and are able to answer a couple of questions from other students. Twenty minutes into the presentation, you notice that the computer screen is flashing and then the screen at the front of the class goes black. You fiddle with the computer and the classroom's AV equipment, but the computer will not restart. While some students attempt to help you with the computer, you notice that others are shifting impatiently in their seats. Your heart begins to pound as you realize that you will have to finish the last 10 minutes of your presentation without your slides. Even though you know your material very well, you have difficulty finishing your presentation. Without your slides to guide you, you forget to mention some key points and you begin to speak more quickly because you are anxious to finish. When your presentation has finished, you receive some kind comments from a few of your classmates, but you are unsure how well you actually did...

For this next task, please think back to the scenario that you read and responded to earlier in the study. In the space provided below, please list as many aspects of the scenario as you remember, using point-form. You will be given 5 minutes to complete this task.

- 1) _____

- 2) _____

- 3) _____

- 4) _____

- 5) _____

- 6) _____

- 7) _____

- 8) _____

- 9) _____

- 10) _____

For this next task, please recall the scenario that you read and responded to earlier in the study. As you read each statement below, please indicate whether each event/aspect did occur during the scenario (True) or did not occur during the scenario (False).

- | | | |
|---|---|---|
| 1) You arrived at the presentation well-prepared and confident | T | F |
| 2) You worried that your presentation slides were unclear | T | F |
| 3) You felt nervous at the beginning of your presentation | T | F |
| 4) You began to stumble over several words as your presentation went on | T | F |
| 5) You felt very comfortable with all of the questions that were asked | T | F |
| 6) During the presentation, you experienced a racing heart | T | F |
| 7) At one point during the presentation, you noticed that some students
appeared to be impatient | T | F |
| 8) When your presentation was over, you received some kind comments
from your classmates | T | F |
| 9) During the presentation, you thought you were going to faint | T | F |
| 10) When finished, you thought that your presentation had gone horribly | T | F |

For this next task, please recall the scenario that you read and responded to earlier in the study. As you read each statement below, please indicate whether each event/aspect did occur during the scenario (True) or did not occur during the scenario (False).

- | | | |
|--|---|---|
| 1) You arrived at the presentation well-prepared and confident | T | F |
| 2) You worried that your presentation slides were unclear | T | F |
| 3) You felt nervous at the beginning of your presentation | T | F |
| 4) You were able to answer questions from classmates | T | F |
| 5) During the presentation, you experienced a racing heart | T | F |
| 6) At one point during the presentation, you noticed that some students appeared to be impatient | T | F |
| 7) You were able to remember all of the key points of your presentation after the technical difficulty | T | F |
| 8) During the presentation, you thought you were going to faint | T | F |
| 9) When your presentation was over, you received some kind comments from some of your classmates | T | F |
| 10) When finished, you thought that your presentation had gone horribly | T | F |

Appendix D- Debriefing Form

Debriefing: Anxiety and Counterfactual Thinking Study

Thank you very much for your participation in this study! Your time and effort are greatly appreciated and will aid in our better understanding of what types of thoughts people have in response to anxiety-provoking social scenarios.

Research suggests that one way people can respond to negative life events is to look back and imagine how the outcome could have turned out differently. These types of thoughts are called counterfactual thoughts. Downward counterfactual thoughts (“at least...” thoughts) imagine a worse possible outcome and often lead to an improvement of mood after something negative has happened. On the other hand, upward counterfactual thoughts (“if only...” thoughts) imagine a better possible outcome and often worsen someone’s mood after a negative event. The current study is particularly interested in looking at the relationship between one’s level of anxiety in social situations and one’s tendency to generate “if only... thoughts” after such events. In particular, we are investigating whether those with higher levels of anxiety tend to generate more “if only...” thoughts, which could be related to a negative mood following stressful social situations. Additionally, we are examining whether the relationship between anxiety and counterfactual thinking could be accounted for by factors such as one’s perfectionism in social situations, one’s tendency to dwell on negative social events, and one’s memory for such events.

Feeling anxious in social situations (such as at a party or during a presentation) is a common occurrence, experienced to different degrees in the general population. If you find you experience anxiety in such situations, or if you would like to learn more about this issue, the resource listed below may be of interest:

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

Finally, if you are currently experiencing psychological distress and would like to discuss your concerns in a safe and confidential environment, please be aware that the Ryerson Centre for Student Development and Counselling (CSDC) is a free resource located on campus. Staff at the Counseling Centre provides support and guidance for a range of concerns including anxiety, low mood, and academic difficulties.

The contact information for the CSDC is as follows:

Centre for Student Development and Counselling

Website: <http://www.ryerson.ca/counselling/index.html>

Email: cfdc@ryerson.ca/Phone: 416-979-5195

Location: JOR-07C (Lower level of Jorgensen Hall, 380 Victoria Street)

Thank you once again, and if you have any further questions or concerns, feel free to discuss them with the experimenter at this study session. You may also contact Jennifer Monforton, the primary investigator of this study, with any additional comments or questions (jennifer.monforton@psych.ryerson.ca).

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