

THE EFFICACY OF COGNITIVE RESTRUCTURING AND MINDFULNESS STRATEGIES
IN REDUCING POSTEVENT PROCESSING AMONG SOCIALLY ANXIOUS
INDIVIDUALS

by

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Abstract

The Efficacy of Cognitive Restructuring and Mindfulness Strategies in Reducing Postevent

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Doctor of Philosophy, 2014

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Social anxiety disorder (SAD) is defined as a marked and persistent fear of social situations in which an individual is exposed to potential scrutiny from others (American Psychiatric Association, 2013). Prominent models of SAD (Clark & Wells, 1995; Rapee & Heimberg, 1997) postulate that postevent processing (PEP), which involves reviewing a past social event in detail (typically in a negative way), serves as a key maintenance factor of SAD. The current study examined the efficacy of a single session cognitive restructuring or mindfulness strategy on decreasing PEP and its associated effects, and also investigated the cognitive processes involved. Seventy-four socially anxious participants completed a speech task to elicit PEP, were taught a cognitive restructuring, mindfulness, or control strategy to manage their negative thoughts related to the speech, and completed several questionnaires. Participants in the cognitive restructuring condition reported decreased PEP (degree and associated distress) and improved affect (but not reduced state anxiety), as compared to the control condition. Participants in the mindfulness condition also reported decreased PEP (degree but not associated distress) and improved affect (including reduced state anxiety), as compared to the control condition. No significant differences were found between the cognitive restructuring and mindfulness conditions. Participants in the cognitive restructuring condition also reported decreased beliefs about the perceived costs of negative social situations. Regardless of study condition, decreases

in cost biases and maladaptive beliefs significantly predicted reductions in PEP. Thus, cognitive restructuring and mindfulness appear to be promising strategies to decrease PEP and its associated negative effects.

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The Efficacy of Cognitive Restructuring and Mindfulness Strategies in Reducing Postevent Processing among Socially Anxious Individuals

Social anxiety disorder (SAD) is characterized by a marked fear of potential negative evaluation in social situations in which an individual is exposed to possible scrutiny by others (American Psychiatric Association, 2013). The individual either avoids social or performance situations, or endures them with a high level of distress. SAD is the fourth most common psychiatric disorder, with an estimated lifetime prevalence of 12.1% in the general population, according to the National Comorbidity Survey Replication (Kessler et al., 2005). It has a large negative impact on people's lives, and impairs many life domains including academics, career, social functioning, and life satisfaction (Katzelnick et al., 2001; Schneier et al., 1994; Turner, Beidel, Dancu, & Keys, 1986). Additionally, comorbidity is extremely high, with almost two-thirds of those with SAD suffering from at least one other mental disorder (Ruscio et al., 2008), with the most common disorders being specific phobia, agoraphobia, major depression, and alcohol abuse or dependence (Magee, Eaton, Wittchen, McGonagle, & Kessler, 1996; Schneier, Johnson, Hornig, Liebowitz, & Weissman, 1992). Due to its high prevalence and level of associated impairment, research to better understand and treat SAD is necessary.

Cognitive Behavioural Models of SAD

Theoretical models of SAD posit that cognitive, behavioural, and physiological factors play a role in the development and maintenance of this disorder. Although a number of cognitive behavioural models of SAD exist, the two most influential are those by Clark and Wells (1995), and by Rapee and Heimberg (1997). The model by Clark and Wells (1995) will be discussed in detail, followed by a discussion of Rapee and Heimberg's (1997) model.

Clark and Wells' (1995) model postulates that individuals with SAD have a strong desire to make a positive impression on others; however, they doubt their ability to perform well in

social situations due to distorted beliefs about themselves (e.g., “I am stupid,” “I am awkward”). As well, individuals with SAD tend to have negative beliefs about what others will think of them (e.g., “If I stumble on my words, people will think I am incompetent”), and rigid rules about how they should behave in social situations (e.g., “I should always have something witty to say”). They tend to believe that if they behave in an unfavourable way, it will lead to catastrophic consequences, such as rejection or loss of worth. These beliefs cumulatively lead to an anxiety reaction, involving a physiological response (e.g., rapid heart rate, sweating), which may be interpreted as another source of threat. Clark and Wells (1995) posit that these cognitions lead the individual to engage in certain behaviours, such as focusing attention towards the self during social interactions, leading to feelings of conspicuousness, increased attention to bodily sensations that often leads to higher anxiety, and decreased attention to social cues.

Clark and Wells (1995) also suggest that these negative cognitions lead to behavioural avoidance of feared social situations, or to the use of safety behaviours (i.e., cognitive and behavioural strategies designed to prevent feared events from occurring [Salkovskis, 1991]) in social situations. Both avoidance and the use of safety behaviours prevent individuals from learning that their feared predictions are generally inaccurate and unlikely to come true, or that they would likely be manageable if they did come true, contributing to the maintenance of their negative beliefs about themselves and negative predictions about the outcome of social situations.

Clark and Wells (1995) postulate that prior to social events, socially anxious individuals frequently engage in anticipatory anxiety, reviewing in detail what they predict will happen. Additionally, following social situations, socially anxious individuals tend to review the social event in great detail, often focussing on the anxiety they experienced and on negative perceptions

of themselves. This process has been called *postevent processing* (PEP), although it has also been referred to by other terms, such as “postmortem” (Clark & Wells, 1995), “postevent rumination” (Abbott & Rapee, 2004), and “retrospective brooding” (Rapee & Heimberg, 1997). Previous research has examined PEP, but have sometimes used the terms “rumination” or “analytical self-focus,” although it appears that these terms are all conceptually similar. For the purposes of this paper, this process will be referred to as PEP (with the exception of the discussion of prior research that used alternative terms). During PEP, socially anxious individuals also tend to recall past instances of social situations that they perceive to have been failures. This process then leads individuals to view the recent social situation as more negative than it objectively was, and further strengthens their beliefs regarding their inability to meet social expectations. Clark and Wells (1995) state that treatment for SAD should include a discussion of the role of PEP in the maintenance of the disorder, and that PEP should then be decreased or eliminated. However, further research is necessary in order to establish effective ways to help clients reduce or prevent PEP.

Finally, Clark and Wells (1995) suggest that socially anxious individuals hold dysfunctional beliefs or assumptions, which can be classified into three categories. Firstly, they tend to have excessively high standards for their social performance (e.g., “I must not let anyone see I am anxious”), which then leads to further anxiety since these goals are often difficult to achieve. Secondly, socially anxious individuals tend to have conditional beliefs concerning social evaluation, such as “If I disagree with someone, they will reject me.” Finally, they often hold unconditional beliefs about themselves specific to social situations (e.g., “I am odd,” “I am inadequate”), which are exacerbated when they believe that they are being evaluated by others.

Rapee and Heimberg's (1997) model shares many features with Clark and Wells' model, and it is also distinct in several important ways. Similar to Clark and Wells' (1995) model, Rapee and Heimberg's (1997) model suggests that individuals with SAD tend to have negative beliefs about themselves and predict negative outcomes in social situations. As well, both models suggest that socially anxious individuals view possible negative outcomes as catastrophic and unmanageable. Both models also highlight the role of maladaptive behaviours by socially anxious individuals, such as avoidance of social situations and the use of safety behaviours.

Unique to Rapee and Heimberg's (1997) model is the idea that individuals with SAD tend to have distorted self-images, which can be in the form of a mental representation of the self as seen by an "audience," and can lead to interference with performance. Additionally, these individuals are often highly sensitive to signs of rejection or disinterest, and frequently interpret ambiguous behaviours as consistent with their fears of being negatively evaluated by others. In both models, feedback loops among these different components serve to maintain the distorted beliefs of themselves and the inaccurate predictions of the outcomes of social situations; hence maintaining their social anxiety. Notably, Heimberg, Brozovich, and Rapee (2010) published an update and extension of their cognitive behavioural model of SAD (1997), highlighting the role of PEP as another maintenance factor of social anxiety. The researchers state that due to socially anxious individuals' high levels of fear of negative performance in social situations, they tend to brood about the details of these social situations, either after a social event (i.e., PEP) or in anticipation of an upcoming social event (i.e., anticipatory anxiety).

In conclusion, both prominent models of SAD (Clark & Wells, 1995; Heimberg, Brozovich, & Rapee, 2010; Rapee & Heimberg, 1997) suggest that PEP is one key factor that serves to maintain the disorder. They suggest that PEP may be a driving force behind social

anxiety as it reinforces one's negative beliefs about, or evaluations of, their performance in social situations.

Postevent Processing and Social Anxiety

As defined previously, PEP is the process of engaging in a detailed review of one's performance after a social situation (Clark & Wells, 1995). Kocovski and colleagues (2005) defined PEP slightly differently, defining it as "the period of reflection on actual or perceived inadequacies, mistakes, imperfections, and the like, and is ruminative in nature." For the purposes of this paper, PEP will be defined as being a negative review of a past social event.

Although research on PEP in social anxiety is still in its infancy, studies examining PEP have found support for the cognitive behavioural models of SAD put forth by Clark and Wells (1995) and Rapee and Heimberg (1997), as they have demonstrated that PEP is indeed related to social anxiety and fear of negative evaluation in social situations, as well as to avoidance behaviours. PEP has been examined in social anxiety using various methodologies, including correlational studies, diary methods, laboratory-induced social situations, and experimental manipulations.

Correlational Studies of PEP in Social Anxiety. There is ample literature demonstrating that socially anxious individuals, from both clinical and nonclinical samples, engage in PEP more frequently and more intensely than those lower in social anxiety (e.g., Abbott & Rapee, 2004; Dannahy & Stopa, 2007; Kocovski, Endler, Rector, & Flett, 2005; Mellings & Alden, 2000). Rachman and colleagues (2000) developed the first measure of PEP, the *Postevent Processing Questionnaire* (PEPQ), which is a 13-item measure assessing the frequency and amount participants engage in PEP after an anxiety-provoking social situation that occurred in the previous few months. Using this measure, it was found that socially anxious

individuals reported more PEP, even after controlling for depression, as compared to those lower in social anxiety. Those high in social anxiety reported that they recalled negative events more often than those low in social anxiety, and that these memories had an intrusive quality that interfered with concentration. Additionally, PEP was associated with a tendency to avoid similar social situations in the future. Kocovski and colleagues (2005) had participants complete questionnaires to assess how they typically cope after social situations and found that socially anxious individuals were more likely to cope using a ruminative style, reported more negative thoughts about a vignette of a social situation, and were more likely to produce upward counterfactual statements (“If only...” thoughts that imagine a better possible outcome) in response to the vignette.

There have been conflicting results regarding the specificity of PEP to social situations. McEvoy and Kingsep (2006) administered a slightly revised version of the PEPQ to individuals with SAD, and found that PEP was not significantly correlated with measures of social interaction or performance anxiety. When levels of depression, anxiety, and stress were controlled for, PEP was significantly correlated with state anxiety, suggesting that PEP may be related to elevated levels of general anxiety rather than to social anxiety specifically. On the other hand, Fehm and colleagues (2007) found evidence to support the specificity of PEP to social situations. In this study, an unselected student sample recalled a social anxiety provoking event or a nonsocial fear provoking (phobic) event, and then completed a modified version of the PEPQ for each event. It was found that social events were followed more often and by more intense PEP. Fear of negative evaluation was significantly associated with PEP for social but not for phobic situations; and general anxiety predicted PEP after phobic situations, but not after social situations. Additionally, PEP after one situation significantly predicted PEP after the other

situation, which perhaps suggests a general predisposition for engaging in PEP. The differences in findings of specificity of PEP to social situations between these two studies may have been due to the use of an unselected nonclinical sample in Fehm and colleagues' (2007) study, in contrast to the use of a clinical sample in the study by McEvoy and Kingsep (2006).

Related to the specificity of PEP to performance or interaction situations, Fehm and colleagues (2007) found PEP to be higher for interaction situations, possibly due to the ambiguity of the event. In contrast, Kocovski and colleagues (2005) presented high and low socially anxious students with two mildly embarrassing vignettes, one related to a social interaction and the other to a performance situation, and found no differences between the vignettes on frequency of negative thoughts or upward counterfactual statements. However, in another study using an unselected student sample, Kocovski and Rector (2007) found that participants who chose to report on a presentation situation reported significantly more PEP as compared to those who reported on a party situation. Similarly, Makkar and Grisham (2011) found that in an unselected student sample, PEP was higher after a speech task in comparison to a conversation task that took place in the laboratory. In line with these findings, Kiko and colleagues (2012) also found that a speech task conducted in the laboratory resulted in significantly greater PEP as compared to the interaction task for both participants diagnosed with SAD and healthy controls. These inconsistencies in findings across studies may be attributed to differences in samples (unselected nonclinical, clinical), assessments of PEP (*Postevent Processing Questionnaire* developed by Rachman et al., 2000, *Extended Postevent Processing Questionnaire* developed by Fehm et al., 2008, *Postevent Processing Questionnaire-Revised* developed by McEvoy & Kingsep, 2006, thought listing procedure), and methods (recall of a

past social situation, vignettes, laboratory tasks); however, the more recent studies have suggested that speech tasks may lead to greater PEP than interaction tasks.

In summary, correlational studies using self-report measures have demonstrated that socially anxious individuals, regardless of whether criteria for SAD are met, engage in more PEP after social situations, and more upward counterfactual thinking and negative thoughts about a social situation, as compared to those lower in social anxiety. Behaviourally, it has been demonstrated that PEP is associated with avoidance of similar social situations in the future. There have been mixed findings regarding the specificity of PEP to social situations, with at least one study finding that PEP is related to more general state anxiety, and another study suggesting that it is specific to social situations versus nonsocial, phobic situations. The literature is also inconclusive regarding whether PEP is experienced to a higher degree for social interaction or performance situations, with more recent studies suggesting the latter.

Diary Studies of PEP in Social Anxiety. To date, only one diary study has been conducted, shedding some light on the nature and course of PEP in the natural environment. Lundh and Sperling (2002) examined the relationship between social anxiety and PEP of socially distressing events using an unselected student sample, employing a diary record methodology. Social anxiety, as measured by the *Social Phobia Scale* (SPS; Mattick & Clark, 1998), was not correlated with PEP of socially distressing events in general; however, it was correlated with PEP specific to events with a negative evaluation component. Additionally, the degree of PEP engaged in on the same day as the social event was predictive of the degree of PEP reported the following day. These findings demonstrate the specificity of PEP to social anxiety when negative evaluation is involved, and are in line with those of Fehm and colleagues (2007).

Laboratory-Induced Social Situations Examining PEP in Social Anxiety. Laboratory studies have been conducted in which a social situation is set up, and PEP and its associated effects are then assessed. Mellings and Alden (2000) had individuals high or low in social anxiety engage in an in-laboratory conversation with a confederate and then complete questionnaires on self-focused attention and anxiety-related physiological sensations. The next day participants were asked to recall aspects of the conversation, as well as complete a measure of PEP (specific to the in-laboratory conversation). Memory biases were found, in that socially anxious individuals who engaged in more frequent PEP recalled more negative self-related information. Similarly, Edwards and colleagues (2003) also found a negative memory bias among socially anxious individuals, even when controlling for depression.

Abbott and Rapee (2004) found that socially anxious individuals maintained their negative appraisals of an in-laboratory speech task over a period of at least 1 week, whereas nonanxious individuals actually increased their positive appraisals of their performance over time. Dannahy and Stropa (2007) had individuals high or low in social anxiety engage in an in-laboratory conversation task, and found that socially anxious individuals reported more overall anxiety, predicted worse performance, rated their actual performance as worse (a perception that became more negative over time), and engaged in more PEP (both immediately after the conversation and over the following week) about the speech, as compared to individuals low in social anxiety. Additionally, both social anxiety severity and negative appraisals of social performance predicted the amount of PEP 1 week following the conversation task. Interestingly, no differences between groups were found on frequency of positive PEP (i.e., review of the social event in detail, focussing on positive aspects of the situation). However, individuals low

in social anxiety tended to engage in more positive than negative PEP overall, while the socially anxious individuals tended to engage in more negative than positive PEP.

More recent studies have attempted to better understand the nuances of PEP. Cody and Teachman (2011) examined whether there were differences in PEP between global (i.e., overall impression of oneself) versus local aspects (i.e., specific details of the social situation) of performance. After giving a series of speeches, participants high in social anxiety rated their performances as worse than those low in social anxiety. Notably, the global ratings of performance provided by participants high in social anxiety became significantly more negative over time as compared to those low in social anxiety, as well as in comparison to the local ratings of both groups. It was also found that PEP fully mediated the relationship between social anxiety group and decrease in global performance ratings. Kashdan and Roberts (2007) had an unselected student sample engage in an in-laboratory conversation with an opposite sex partner that was based either on small-talk or self-disclosure. Social anxiety was found to be correlated with PEP more highly in participants who endorsed depressive symptomatology. As well, for socially anxious individuals, PEP was associated with more negative affect after the self-disclosure conversation, but was associated with less negative affect after the small-talk conversation. The authors noted that the effects of PEP on socially anxious individuals may be context specific.

Makkar and Grisham (2011) conducted a study using an unselected sample and had participants engage in both a speech and conversation task, and then assessed predictors and content of PEP. They found that negative beliefs and assumptions predicted PEP, over and above several other factors, including state anxiety, performance ratings, safety behaviours, self-focused attention, depression, and trait anxiety. The negative beliefs and assumptions that

predicted PEP were those postulated by Clark and Wells (1995), specifically, excessively high standards for social performance, conditional beliefs about the consequences of behaviour, and unconditional negative beliefs about the self. In terms of the content of PEP, those higher in social anxiety had more negative self-views (e.g., shame, self-criticism about the speech) and negative thoughts about the past (e.g., regret, past failures), even after controlling for both depression and state anxiety. In light of these findings, the researchers concluded that challenging these negative assumptions and beliefs in treatment is of utmost importance, and may lead to the reduction of PEP.

In summary, studies that have set up a social situation in the laboratory have found that socially anxious individuals continue to engage in PEP up to 1 week after the social task, and that global evaluations of performance in particular seem to become more negative over time. As well, socially anxious individuals tend to have negative beliefs and assumptions about their social performance (which predicts PEP), and may experience associated increased negative affect and thoughts depending on the social situation. Engaging in PEP also appears to lead to a bias to remember more negative self-related thoughts about the social performance. Challenging the negative assumptions and beliefs held by socially anxious individuals may be one avenue to decrease PEP.

Experimental Studies of PEP in Social Anxiety. A number of studies have experimentally manipulated PEP, often comparing the effects of PEP to distraction or a type of self-focus. Blagden and Craske (1996) asked a student sample to recall an anxiety-provoking event while listening to sad music, and were then randomly assigned to: i) read index cards containing neutral facts (distract-passive), ii) read index cards containing ruminative thoughts (ruminate-passive), iii) sort index cards containing neutral facts (distract-active), or iv) sort index

cards containing anxiety adjectives (ruminate-active). The tasks in each condition were performed for 10 minutes. It was found that the distraction conditions (both the active and passive groups) led to a decrease in anxiety and negative affect, whereas the rumination conditions did not. Similarly, Field and Morgan (2004) had an undergraduate sample describe a recent ambiguous social event, and they were then asked to either: i) focus on the negative aspects of the event (negative PEP), ii) focus on the positive aspects of the event (positive PEP), or iii) distract themselves. The tasks in each condition were performed for 3 minutes. It was found that individuals high in social anxiety recalled more negative and shameful memories of the event regardless of which PEP condition they were in. However, socially anxious individuals rated these memories as more calming, suggesting that there may be a perceived adaptive value to PEP.

Wong and Moulds (2009) had undergraduate students high or low in fear of negative evaluation engage in an in-laboratory speech induction, and were then asked to either distract or ruminate by reading either neutral or ruminative statements for 7 minutes. It was concluded that distraction decreased anxiety whereas rumination maintained anxiety in all participants. Socially anxious individuals in the distraction condition experienced decreases in the strength of their unconditional beliefs (e.g., “People think badly of me”), while those in the rumination condition maintained these beliefs. Nonanxious participants did not experience any changes in the strength of their maladaptive beliefs in either condition. Kocovski, MacKenzie, and Rector (2011) asked an unselected student sample to give a 3-minute impromptu speech, then placed them into a 10-minute guided rumination (i.e., completing a form that asked questions to elicit rumination) or distraction (i.e., completing an anagram task) condition. One week later, socially anxious participants in the distraction condition reported more positive thoughts, but had no differences

in the frequency of PEP, as compared to the guided rumination condition. No differences were found between the two conditions for nonanxious participants. These results remained even after controlling for the effects of depression and the frequency with which participants thought about the speech in general.

In contrast to these studies that demonstrated positive effects of distraction as compared to PEP, two recent studies have reported different findings. Makkar and Grisham (2012) had students high or low in social anxiety give a speech, randomly assigned them to an 8-minute PEP or distraction condition, and then asked them to give a second speech. Surprisingly, all participants in the PEP condition, as compared to those in the distraction condition, reported better perceived speech quality. As well, participants high in social anxiety reported decreases in negative performance appraisals and underestimations of their performance quality, and those low in social anxiety increased their willingness to give the second speech. The authors noted that they may have unintentionally induced an adaptive form of PEP by increasing concrete thinking. Specifically, participants were asked to think about aspects such as: parts of the speech that went wrong, anxious feelings and sensations experienced during the speech, parts of the speech they would do differently, and negative thoughts that came up during the speech. Given these positive findings of PEP and those found by Field and Morgan (2004), more research is needed to better understand the differences between adaptive and maladaptive forms of PEP. Using a clinical sample of participants with SAD, Rowa and colleagues (2013) had participants engage in a speech task, followed by either PEP or distraction instructions. Similar to other studies, it was found that participants in the distraction condition reported greater decreases in anxiety as compared to the PEP condition. Unexpectedly, those in the distraction condition experienced greater PEP in comparison to the PEP condition; however, this

relationship was partially accounted for by the significant positive relationship between baseline anxiety (which was higher in the distraction condition at baseline) and degree of PEP.

A recent line of research has examined the effects of encouraging participants to engage in experiential self-focus as compared to analytical self-focus after a social situation. Watkins and Teasdale (2001) define analytical self-focus as thinking analytically about the meanings, causes, and consequences of one's feelings and experiences; it is abstract and evaluative in nature, and is typically the type of self-focus used when ruminating. In contrast, experiential self-focus is defined as focusing on the direct experience of one's feelings and experiences, is more concrete and present-focused in nature, and is thought to be an adaptive process. This process appears to be conceptually similar to mindfulness. Like mindfulness, experiential self-focus has been found to have beneficial effects as compared to analytical self-focus in depressed samples (e.g., Rimes & Watkins, 2005; Watkins & Teasdale, 2001), and this work has now been extended to social anxiety.

In a study by Vassilopoulos (2008), students high or low in social anxiety were randomly assigned to either a 7-minute analytical or experiential self-focus condition. In the analytical self-focus condition, participants read a series of 28 items that instructed them to think about the causes, meanings, and consequences of the items, while in the experiential self-focus condition the instructions were to use their imagination and concentration to focus their mind on each experience. Individuals high in social anxiety who were in the experiential self-focus condition reported more positive thoughts and less anxiety, as compared to those in the analytical self-focus condition. There were no differences among the self-focus conditions for those low in social anxiety. In another study, Vassilopoulos and Watkins (2009) also found positive effects of experiential self-focus on self-ratings using a similar method. Participants high in social anxiety

in the experiential self-focus condition reported decreased ratings of themselves as worthless and incompetent, while these ratings did not change for socially anxious participants in the analytical self-focus condition. Using a small sample of individuals with a SAD diagnosis, Nilsson and colleagues (2012) had participants deliver a speech, and then engage in both self-focus conditions in an experimental cross-over design. It was found that the analytical condition led to significantly less neutral thoughts, and there were no differences between the conditions on positive or negative thoughts. In contrast, Wong and Moulds (2012) had students high or low in social anxiety give a speech and then engage in a 7-minute analytical or experiential self-focus task, and found that both conditions had similar effects on anxiety for participants high in social anxiety. However, those high in social anxiety in the experiential self-focus condition reported stronger maladaptive unconditional beliefs during the PEP period following the speech. It is important to note that the studies by Wong and Moulds (2012) and Nilsson and colleagues (2012) differ from those by Vassilopoulos (2008) and Vassilopoulos and Watkins (2009) as they induced anxiety and PEP by asking participants to give a speech in the laboratory.

In summary, the majority of studies have found that PEP can lead to more (or at least maintain) negative thoughts and memories, negative affect including anxiety, and maladaptive beliefs, as compared to distraction. Preliminary evidence has been found to support the beneficial effects of engaging in experiential self-focussed attention as compared to analytical self-focussed attention on anxiety, amount of positive and negative thoughts, and self-judgments. However, recent research suggests that experiential self-focus may lead to more maladaptive unconditional beliefs; thus more research is necessary to clarify this discrepancy in findings. Next, available treatments for social anxiety will be reviewed in order to provide a background for examining strategies aimed specifically at decreasing PEP.

Cognitive Behavioural Therapy for Social Anxiety Disorder

Cognitive behavioural therapy (CBT) is based on the theory that clients can reduce their negative emotions and physiological reactions by changing their maladaptive beliefs and behaviours (Beck, 2005). Its aim is to develop new learning that competes with and modifies the clients' fear-based networks and memories, by challenging their thoughts and engaging in exposures to the feared situation, in order to challenge their anxious predictions about the situation or outcome (Foa & Kozak, 1986). CBT for SAD typically includes a number of components, such as psychoeducation, self-monitoring, cognitive restructuring, exposure to feared situations, and sometimes social skills training or applied relaxation.

CBT is a well-established and well-researched treatment for SAD. Meta-analyses of CBT for SAD have consistently shown moderate to large effect sizes in symptom reduction at posttreatment, as compared to waitlist control groups; as well as moderate to large effect sizes from pre to posttreatment. These treatment outcomes are typically maintained or are further improved at follow-up periods, ranging from 2 to 12 months posttreatment (e.g., Chambless & Hope, 1996; Federoff & Taylor, 2001; Feske & Chambless, 1995; Gould, Buckminster, Pollack, Otto, & Yap, 1997; Taylor, 1996). A recent study examining the long-term effectiveness of CBT found that both resource-oriented CBT (in which clients' strengths are a focus) and cognitive therapy for SAD led to treatment gains that were maintained at 2-year follow-up, with further reductions of social anxiety symptoms between posttreatment and 10-year follow-up (Willutzki, Teismann, & Schulte, 2012).

The literature is inconclusive regarding the efficacy of the individual components of CBT on symptom reduction, such as the efficaciousness of cognitive restructuring alone, exposure alone, and the combination of cognitive restructuring and exposure. Some studies have

demonstrated equivalent treatment outcomes, while others have found that the combination of exposure plus cognitive restructuring leads to better outcomes and results in additional gains after treatment completion (e.g., Feske & Chambless, 1995; Rodebaugh et al., 2004; Taylor, 1996). It is important to note that exposures are rarely used in isolation for the treatment of SAD, and instead are often combined with the use of cognitive restructuring (Juster & Heimberg, 1995), which is particularly effective when used before, during, and after the exposures. Since fear of negative evaluation, a cognitive construct, is the core aspect of SAD, cognitive techniques are often useful to challenge this fear (Butler, 1985; Turk, Fresco, & Heimberg, 1999). Indeed, Taylor and colleagues (1997) found that cognitive restructuring was more effective in decreasing social anxiety symptoms and maladaptive beliefs as compared to simply recalling and discussing anxiety-provoking social situations. Moreover, cognitive restructuring is also thought to play a crucial role in exposures, as clients learn new information regarding the social threat and the likelihood of their negative predictions coming true during exposure exercises, which aids in challenging their maladaptive beliefs. A recent study demonstrated that cognitive restructuring using a thought record was equally efficacious as a behavioural experiment for decreasing an unhelpful belief (not related to social anxiety), with the behavioural experiment leading to earlier and more generalized belief change (McManus, Doorn, & Yiend, 2012). Other studies comparing thought records to behavioural experiments have found behavioural experiments to be more efficacious (Bennett-Levy, 2003; Tang & Harvey, 2006), while others have found no differences between the two strategies in efficacy (Jarrett & Nelson, 1987; O'Donohue & Szymanski, 1993). However, these studies were not specific to anxious thoughts related to social situations. More dismantling treatment studies are necessary in order to further clarify the relative efficacy of individual treatment components.

Despite the success of CBT for SAD, there is still a notable percentage of individuals who do not respond to treatment. For example, in one study examining group CBT for SAD, one-sixth of participants were considered to be nonresponders (Liebowitz et al., 1999). Hofmann and Bögels (2006) suggested that 40% to 50% of individuals with SAD only show minimal improvement with conventional CBT treatment. Heimberg, Brozovich, and Rapee (2010) postulate that PEP may hinder CBT treatment, as exposures may be perceived as failures due to the process of ruminating over the event and focussing on perceived mistakes or feelings of anxiety. Hence, the exposures may not be as successful for teaching clients that the social stimulus is not as threatening as previously believed. Heimberg and colleagues (2010) speculate that it may be especially important to engage in cognitive restructuring exercises after exposures in order to decrease PEP, and thus increase new adaptive learning. Rodebaugh and colleagues (2009) propose that cognitive restructuring may assist certain socially anxious individuals in thinking about prior social events in a more realistic way so that these thoughts do not lead to increased distress.

Three studies have demonstrated that CBT for SAD results in a reduction of PEP at posttreatment. Price and Anderson (2011) found that individuals with SAD with a primary fear of public speaking experienced a decrease in PEP after 8 sessions of group CBT or individual virtual-reality treatment, both of which did not explicitly target PEP. PEP was also found to be associated with reduced improvements in social anxiety symptoms; that is, if clients scored higher on PEP at posttreatment, they did not tend to experience as much symptom reduction. Similarly, McEvoy and colleagues (2009) found that after 7 sessions of group CBT that directly targeted PEP using attentional shifting and cognitive restructuring techniques, individuals with SAD experienced a reduction in social anxiety symptoms, depressive symptoms, and PEP.

Reductions in PEP were significantly correlated with reductions in social anxiety symptoms, but not with depressive symptoms. Abbott and Rapee (2004) had individuals with SAD complete a speech task, followed by a 12-session group CBT treatment that did not explicitly target PEP, followed by another speech task. At posttreatment, individuals with SAD had reduced negative self-appraisals about the speech task and had less PEP, as compared to pretreatment, with no differences found for positive PEP. As well, it was found that the degree of negative PEP was associated with initial social anxiety severity, in addition to their negative appraisals of their speech. In conclusion, CBT for SAD appears to reduce both social anxiety symptoms and the amount of negative PEP, regardless of whether PEP reduction is specifically targeted in treatment.

Mechanisms of Action in CBT. It has been traditionally viewed that the exposure component of CBT works through extinction of the learned association between the stimuli and the fear response (see Barlow, 1988, for a review). However, the current perspective also considers the role of cognition, whereby clients are seen to engage in new learning during the exposure session, learning that their feared outcome is unlikely to occur or is manageable if it does (Foa & Kozak, 1986). It is thought that new parallel associations are formed or original associations are modified, rather than becoming completely unlearned. Specifically, as a result of repeated exposures, the client learns that the threat no longer signals danger. Similarly, cognitive restructuring also works to challenge and decrease these maladaptive associations. Indeed, research has indicated that decreases in maladaptive interpersonal beliefs fully mediate the relationship between the effects of CBT for SAD and reduced social anxiety (Boden et al., 2012).

Another proposed mechanism of CBT is changes to judgmental biases, specifically decreases in probability overestimation and cost biases (Foa, Franklin, Perry, & Herbert, 1996; Foa, Huppert, & Cahill, 2006; Hofmann, 2004; McManus, Clark, & Hackmann, 2000; Smits, Rosefield, McDonald, & Telch, 2006). Taylor and Alden (2008) assessed various factors at pre, mid, and posttreatment during a 12-week group interpersonal-CBT treatment for SAD, as compared to a waitlist control group. It was found that decreases in beliefs about the likelihood that other people would react in a negative manner towards them (i.e., reductions in probability overestimation) and the costs if this were to occur (i.e., reductions in cost biases) mediated positive treatment outcome. Similarly, Moscovitch and colleagues (2012) found a pattern that approached significance that indicated that treatment responders of CBT for SAD had judgment biases that decreased from pre to posttreatment, as compared to nonresponders who reported fewer changes to judgment biases over the course of treatment. However, given that these findings did not reach significance, they need to be interpreted with caution. Another study found that residential cognitive therapy and residential interpersonal psychotherapy led to decreases in estimated probability and cost biases, which in turn predicted less social anxiety 4 days later (Hoffart, Borge, Sexton, & Clark, 2009).

The research has been equivocal regarding whether change in probability overestimation or cost biases is a more potent mechanism of change. Studies by Foa and colleagues (1996) and Hofmann (2004) found that change in cost biases was a mechanism of change for treatment response. Similarly, Rapee and colleagues (2009) found that a group CBT protocol enhanced with performance feedback and attentional training components led to decreased cost biases, and changes in cost biases partially mediated the relationship between treatment condition and changes in SAD severity. Studies have also found positive treatment outcomes for SAD when

cost biases were directly targeted (Hofmann & Scepkowski, 2006; Nelson, Lickel, Sy, Dixon, & Deacon, 2010; Voncken & Bögels, 2006). On the other hand, McManus and colleagues (2000) found that decreases in cost biases did not play a role in treatment outcome when probability bias was controlled. Smits and colleagues (2006) found that decreases in probability biases led to a decrease in fear, while decreases in cost biases were simply a consequence of this reduction in fear, at least in exposures for public speaking.

Forman and colleagues (2007) conducted a study examining cognitive therapy compared to Acceptance and Commitment Therapy (ACT; Hayes, Strosahl, & Wilson, 2011) for individuals with anxiety disorders or depression, and found that both groups experienced large and comparable improvements in anxiety and depressive symptoms, quality of life, life satisfaction, and clinician-rated functioning. However, there were differences between the cognitive therapy and ACT conditions with respect to the mechanisms of action underlying these changes. The mechanisms of action of treatment outcome for the cognitive therapy group were found to be changes in “observing” and “describing” one’s experiences, while the mechanisms of action underlying ACT were changes in “experiential avoidance,” “acting with awareness,” and “acceptance.” In a more recent study, Forman and colleagues (2012) randomly assigned students presenting for treatment for anxiety or depression to either cognitive therapy or ACT, and found that greater use of cognitive and affective change strategies mediated positive treatment outcome for cognitive therapy, while greater use of acceptance strategies mediated positive treatment outcome for ACT. They found common mediators of both treatment groups, which included reductions in dysfunctional thinking and increased willingness to engage in activities despite unpleasant thoughts or emotions. Common mediators of group Mindfulness and Acceptance-based Therapy (MAGT) and group CBT (CBGT) were also found in Kocovski and colleagues’

(2013) randomized controlled trial that compared these two treatments for SAD, and included: acceptance, rumination, and decentering (discussed below). Cognitive reappraisal, which is defined as an emotion regulation strategy that involves purposely changing one's thinking about a situation to change one's affect (Gross & John, 2003), was found to be a unique mediator of CBGT.

A final proposed mechanism of CBT for SAD is *decentering*, which is the “ability to observe one's thoughts and feelings as transitory events in the mind that do not necessarily reflect reality, truth, or self-worth, and are not necessarily important, and do not require particular behaviours in response” (Fresco et al., 2007). Teasdale and colleagues (2001) found that decentering, or increases in metacognitive awareness, can result from repeated cognitive reappraisal, at least in cognitive therapy for depression relapse-prevention. In line with this finding, Hayes-Skelton and Graham (2012) conducted a cross-sectional, questionnaire-based study and, using structural equation modelling analyses, found decentering to be a common mechanism of both cognitive reappraisal and mindfulness strategies for an unselected student sample. In the Forman (2012) study reported above, decentering was also found to be a mediator for both cognitive therapy and ACT.

Mindfulness Based Treatment for Social Anxiety Disorder

Mindfulness has been defined as, “paying attention in a particular way – on purpose, in the present moment and nonjudgmentally” (Kabat-Zinn, 1994, p. 4). Bishop and colleagues (2004) operationalized mindfulness and proposed that it is comprised of two components: i) self-regulation of attention so that it is attuned to the immediate experience, and ii) orientation of oneself towards one's experience in the present, with curiosity, openness, and acceptance. The skill of mindfulness encourages individuals to simply notice their thoughts, sensations, and

emotions, and not to apply any judgment to these experiences, with the goal of increasing psychological flexibility, or “the capacity to make contact with experiences in the present moment and choose to act in ways that are consistent with their chosen values” (Hayes et al., 1999).

Mindfulness is a core component of various psychological treatments, including ACT (Hayes et al., 1999), Mindfulness-Based Cognitive Therapy (MBCT; Segal et al., 2002), Mindfulness-Based Stress Reduction (MBSR; Kabat-Zinn, 1990), and Dialectical Behaviour Therapy (DBT; Linehan, 1993). These therapies have demonstrated effectiveness in reducing stress, depression, and anxiety symptoms (e.g., Chiesa & Serretti, 2009; Evans et al., 2008; Segal et al., 2002). Mindfulness theory postulates that mindfulness decreases the risk for depression by teaching clients to view their thoughts as mental events, without applying judgment to them, which then breaks the connection between low mood and an automatic, ruminative, depressive thought pattern (Teasdale et al., 1995). Mindfulness is proposed to be useful in the treatment of SAD since it can help to decrease attentional biases towards the self and towards threatening social cues, as well as reduce self-critical thoughts and beliefs. It is suggested that it would help individuals learn to decentre themselves from their self-critical thoughts, including their negative thoughts involved in PEP, and to increase their awareness of the external cues in the social situation. As well, mindfulness is purported to be able to help decrease the degree of distress related to the physiological symptoms that often accompany SAD (Miller et al., 1995). Similarly, Kocovski and Rector (2007) propose that mindfulness and acceptance of anxious symptoms may influence the extent to which PEP is engaged in after social situations. They suggest that it is possible that being low in mindfulness may lead individuals to engage in excessive PEP, especially for those who are socially anxious.

Accordingly, interventions with a mindfulness component have recently been applied to the treatment of SAD, with research supporting its efficacy and effectiveness. Vøllestad and colleagues (2012) conducted a review and meta-analysis of mindfulness and acceptance-based interventions for anxiety disorders, which included seven studies specific to SAD. Six out of seven of these studies found significant reductions in anxiety symptoms from pre to posttreatment, with findings indicating that CBGT outperformed MBSR, and that CBGT had similar effects to MBCT. Three representative studies are reviewed in detail below.

Kocovski and colleagues (2009) conducted an open trial examining MAGT for SAD, using a protocol that was heavily based on ACT (Hayes et al., 1999) and MBCT (Segal et al., 2002). Of the total sample, 69% of participants were treatment completers, and there were large effect sizes for social anxiety and depressive symptom reductions at posttreatment, and these reductions were maintained at 3-month follow-up. Additionally, at posttreatment, analyses indicated significant increases in mindfulness and acceptance, and decreases in rumination, and these gains were maintained at follow-up. Koszycki and colleagues (2007) conducted a randomized control trial comparing an 8-week group MBSR for SAD treatment to a 12-week group CBT for SAD treatment. Participants in both treatment conditions experienced improvements, and were comparable on the outcomes of improved mood, functionality, and quality of life. Although participants in the group CBT for SAD experienced greater decreases in social anxiety and better response and remission rates (perhaps due to the longer duration of treatment), the findings indicate that MBSR is also effective in treating SAD. Similarly, Piet and colleagues (2010) conducted a randomized controlled trial comparing MBCT (8 sessions) to CBGT (12 sessions) for SAD, and found that both treatments resulted in moderate to large effect

sizes from pre to posttreatment and led to continued improvement until the 6-month follow-up assessment.

More recently, Kocovski and colleagues (2013) conducted a randomized controlled trial comparing MAGT, CBGT, and a waitlist control group for SAD. It was found that both MAGT and CBGT were more effective at symptom reduction as compared to the waitlist control group, and the two active treatment conditions did not differ significantly from one another. These findings provide further support that mindfulness-based interventions are just as effective as CBT for treating SAD.

Mechanisms of Action in Mindfulness-based Treatments. The mechanisms of action underlying mindfulness-based treatments are largely unknown; however there is preliminary support for a few proposed factors. Acceptance is one such factor. As described previously, Forman and colleagues' (2007) study that compared cognitive therapy to ACT for individuals with anxiety disorders or depression found that the mechanisms of action underlying ACT were changes in "experiential avoidance," "acting with awareness," and "acceptance." As also mentioned earlier, Forman and colleagues (2012) found that greater use of acceptance strategies mediated positive treatment outcome for ACT for anxiety and depression. Additionally, common mediators of both ACT and CBT were found, including decreased dysfunctional thinking and increased willingness to participate in activities despite having unpleasant cognitions or emotions. In an open trial of individual ACT for SAD, Dalrymple and Herbert (2007) also reported acceptance as a potential mediator of treatment. Similarly, Kocovski and colleagues (2009) found preliminary support for acceptance as a mediator of treatment outcome in MAGT. As mentioned previously, Kocovski and colleagues' randomized controlled trial of MBCT and CBGT (2013) found acceptance to be a common mediator as well.

Similar to the mechanism of treatment outcome in cognitive therapy, Teasdale and colleagues (2001) suggest that increases in decentering, or metacognitive awareness, is a mechanism of action underlying MBCT for depression relapse-prevention. As discussed earlier, Hayes-Skelton and Graham (2012) found decentering to be a common mediator of both mindfulness and cognitive reappraisal strategies in an unselected student sample. Feldman and colleagues (2010) randomly assigned novice meditators to engage in exercises comprised of either: i) mindful breathing, ii) progressive muscle relaxation, or iii) loving kindness meditation. Results indicated that participants in the mindful breathing condition reported higher scores on a measure of decentering as compared to the other conditions. Additionally, there was a weak nonsignificant association between the frequency of repetitive thoughts and negative reactions to these thoughts in the mindful breathing condition, as compared to the other conditions, which demonstrated large significant correlations. The researchers suggested that mindful breathing may be a strategy to reduce one's negative reactivity to repetitive thoughts. As mentioned previously, Kocovski and colleagues (2013) also found decentering to be a common mechanism of both MAGT and CBGT for SAD, providing further support for this proposed mediator.

Coffey and Hartman (2008) conducted a study using nonclinical undergraduate students to examine three proposed mechanisms that may underlie the beneficial effects of mindfulness. Using a correlational methodology, they found an inverse relationship between mindfulness and psychological distress, which was mediated by emotion regulation, nonattachment, and rumination. Hence, there is preliminary support for these factors as potential mediators. However, it is important to note that this was a correlational, nontreatment study, using a nonclinical sample, and may not generalize to individuals receiving mindfulness treatment for SAD. In line with these findings, using a student sample presenting for treatment for distress,

Jain and colleagues (2007) found that mindfulness meditation reduced rumination (while somatic relaxation did not), and that decreases in rumination mediated the relationship between mindfulness meditation and psychological distress. Similarly, Alleva and colleagues (2012) found that rumination mediated the relationship between various subscales of mindfulness and depressive symptomatology in a sample of nonclinical students. Using a clinical sample of individuals presenting for treatment for SAD, Kocovski and colleagues (2013) also found rumination to be a common mechanism of both MAGT and CBGT.

Comparison of CBT to Mindfulness

Although some theorists and researchers state that CBT and mindfulness-based treatments are very distinct (e.g., Eifert & Forsyth, 2005; Hayes, Strosahl, & Wilson, 2011), others believe that these treatments are in fact more similar than they are dissimilar (e.g., Arch & Craske, 2008; Hofmann & Asmundson, 2008). On the surface, the theoretical goals and methods of each of the treatment modalities may seem somewhat different. The goal of CBT is to reduce anxiety symptoms by targeting cognitions and behaviours, while mindfulness-based treatments aim to have clients accept their anxiety and behave in accordance with their values, without the explicit goal of anxiety reduction. CBT encourages clients to identify and change the *content* of their thoughts to be more realistic and evidence-based, while mindfulness-based treatments encourage clients to change their *relationship* to their thoughts, rather than changing the actual content. That is, mindfulness-based treatments encourage clients to notice and accept their thoughts, without judgment (however, this may also be interpreted as changing the content of one's thoughts to be more accepting of anxiety). Proponents of ACT argue that CBT focuses too heavily on changing anxious thoughts, which may actually increase the client's struggle to reduce anxious thinking, leading to increased rumination (Eifert & Forsyth, 2005; Roemer &

Orsillo, 2002). However, the goal of CBT is also to change clients' thoughts to be more accepting of their anxiety (e.g., "It is okay if my hands shake during my presentation"); hence, acceptance is an important goal of both CBT and mindfulness-based treatments. Common to both modalities is the aim to help clients develop an objective stance towards their thoughts, and view them as just thoughts rather than as the truth. As mentioned earlier, this process is referred to as decentering, and research has supported it as a possible mediator for both CBT and mindfulness-based treatments (e.g., Hayes-Skelton & Graham, 2012; Teasdale et al., 2001). Therefore, although these two approaches appear to be different in their theoretical underpinnings and the way they are presented, the goals and mechanisms may in fact be very similar.

Exposures to feared objects or situations are a primary component for both treatment modalities, although CBT and mindfulness-based treatments present different rationales for their purposes. CBT encourages clients to engage in repeated exposures to feared situations in order to learn that one's negative predictions are not likely to come true or are manageable if they do, which leads to an extinguishing of the fear response. On the other hand, mindfulness-based treatments encourage clients to accept fear and anxiety, without labelling them as good or bad, in order to live in accordance with one's values without letting emotions thwart one's goals (Hayes et al., 1999). However, these two treatment modalities are in fact very similar, as CBT also encourages clients to tolerate and accept their anxiety during the exposures, and the exposures are to objects and situations that clients wish to reintegrate into their lives, and are thus in accordance with their life goals and values. As well, the exposures in mindfulness-based treatments also typically lead to anxiety reduction, even if this is not the explicit short-term

objective. Thus, although the theorized goals of exposures seem to differ between CBT and mindfulness-based treatments, they share many similarities in practice.

Regarding effectiveness, there have only been three studies thus far comparing CBT to a mindfulness-based treatment for SAD. Block and Wulfert (2000) conducted a pilot study, comparing the effectiveness and mechanisms of action of a 4-week ACT ($n = 3$) to a 4-week group CBT ($n = 4$) intervention (as compared to a wait-list control condition, $n = 4$) for socially anxious individuals with a fear of public speaking. Statistical analyses could not be performed as the sample size was too small. However, upon examination of the data, it appeared that for both interventions, level of social anxiety, fear of negative evaluation, and avoidance decreased, whereas scores for the waitlist control condition either remained constant or increased. Additionally, the data suggested that willingness to engage in feared social situations increased in both conditions, whereas willingness scores for the waitlist control did not. CBT seemed to result in slightly greater decreases of anxiety, whereas ACT resulted in slightly greater willingness to approach feared situations. Thus, these trends appear to support the effectiveness of CBT and ACT for social anxiety, with similar levels of improvement for both treatment modalities. However, results from this study must be interpreted cautiously as the sample size was very small and statistical analyses could not be conducted.

In the study mentioned previously, Koszycki and colleagues (2007) conducted an open-trial comparing an 8-week group MAGT treatment for SAD to a 12-week group CBT treatment for SAD. Both groups experienced symptom reductions (with large effect sizes), as assessed by measures of social anxiety, mood, disability, and quality of life. However, participants in the CBT condition scored significantly lower on both clinician and patient-rated measures of social anxiety at posttreatment, and had greater response and remission rates. In terms of the outcome

measures of self-rated depression, disability, and quality of life, both the CBT and MAGT conditions had comparable results. In summary, group CBT fared significantly better than MAGT for treatment of SAD, although MAGT may still be a useful alternative treatment. It is unclear whether the greater effectiveness of CBT was due to differences in the content of the treatments or differences in the duration of the treatments. As also mentioned earlier, Kocovski and colleagues (2013) conducted a randomized controlled trial comparing MAGT, CBGT, and a waitlist control group for SAD. Findings indicated that both MAGT and CBGT were more effective at social anxiety symptom reduction across treatment as compared to the waitlist control group, and that the two treatment conditions were equally effective. Thus, preliminary evidence indicates that mindfulness-based interventions are as effective as the more established CBT interventions for SAD. More research is necessary to determine the underlying mechanisms involved in each of these modalities.

As mentioned previously, CBT encourages clients to notice and change the content of their thoughts to be more realistic, while mindfulness-based treatment does not focus on changing the content of the thoughts, but rather on noticing and being accepting of them. Related to the current study, when socially anxious individuals engage in PEP after a social stressor, cognitive restructuring theoretically aims to assist clients with shifting their negative thoughts about their social performance and its perceived consequences to be more balanced and realistic. On the other hand, mindfulness theoretically aims to assist clients with noticing these negative thoughts and accepting them without judgment. Thus, theoretically, cognitive restructuring may lead to decreases in both the degree of their negative thoughts about the past social situation by changing the content of these thoughts, as well as decreases in the distress associated with these thoughts. Mindfulness may lead only to reductions in the distress

associated with these thoughts, but not in the degree, since the content of the thoughts is not specifically targeted and altered.

Single Session and Brief Interventions

Several studies have been conducted examining very brief (e.g., single session) cognitive restructuring or mindfulness interventions for various difficulties, and have generally found them to be efficacious.

Cognitive Interventions. Single session cognitive interventions have been shown to be efficacious in treating certain specific phobias. De Jongh and colleagues (1995) examined the efficacy of a single session cognitive restructuring strategy on dental phobias. Specifically, they randomly assigned participants with a fear of dentists to a single session of cognitive restructuring, a single session of psychoeducation regarding oral health, or a waitlist control condition. The sessions for each condition were a maximum of 1 hour in length. The researchers found that the cognitive restructuring strategy resulted in large reductions in both the frequency and believability of negative cognitions, as well as a reduction of dental trait anxiety, as compared to both the psychoeducation and waitlist conditions. Koch and colleagues (2004) also examined the effects of a single session strategy on fear reduction in individuals with a specific phobia of animals. The researchers compared a behavioural strategy only to a behavioural plus cognitive restructuring strategy, with sessions being a maximum of 3 hours in length. It was found that both conditions showed significant improvements from pre to posttest on cognitive, behavioural, and somatic symptoms; and these outcomes were maintained at 1-year follow-up.

Additionally, single session cognitive and behavioural strategies have been examined in samples of individuals either low or high in perfectionism, specifically of concern over mistakes.

DiBartolo (2001) conducted a study comparing an 8-minute cognitive restructuring strategy to an 8-minute distraction task, using individuals high or low in perfectionism. Participants gave an impromptu speech in the laboratory and were then randomly assigned to one of the conditions. As compared to the distraction task, participants in the cognitive restructuring condition, regardless of level of perfectionism, reported less cost and probability biases, which was associated with lower anxiety ratings. However, overall ratings of negative affect and negative thoughts about the speech task were not affected by study condition. In a study mentioned previously, using a nonclinical sample, McManus and colleagues (2012) compared the efficacy of two key CBT techniques, namely a single session thought record versus a single session behavioural experiment for decreasing the belief that not washing one's hands will lead to illness. It was found that, as compared to the control group, both techniques significantly reduced these beliefs, related anxiety, and obsessional and irrational beliefs, and increased the likelihood of engaging in the behaviour. The behavioural experiment was found to be slightly more efficacious than the thought record, as belief change occurred earlier and generalized to beliefs about others.

Short-term cognitive restructuring strategies have also been shown to be efficacious in a sample of adults suffering from posttraumatic stress disorder (PTSD) who had experienced sexual abuse during their childhood, and had distressing feelings of being contaminated (Steil, Jung, & Stangier, 2011). Participants received two sessions of cognitive restructuring and imagery modification aimed at reducing feelings of being contaminated. They were given homework exercises to complete over a 1-week period. At 6-weeks follow-up, participants reported significantly less intensity, vividness, uncontrollability, and associated distress of feelings of being contaminated, and scored significantly lower on a measure of PTSD symptoms.

Taken together, it appears that one- and two-session cognitive restructuring strategies can indeed result in reductions in fear and associated symptoms for various difficulties; however, a more in-depth intervention may be required to change certain anxious beliefs, predictions, and biases.

To date, few studies have explored the role of a single session cognitive restructuring or reappraisal technique in reducing negative affect (including anxiety) that can be associated with thoughts about upcoming or past situations. Rood and colleagues (2012) asked an unselected sample of adolescents to recall a recent stressful event that did not have to be related to a social situation, and were then randomly assigned to engage in a 5-minute cognitive strategy of either: positive reappraisal (“think about the benefits of the situation and the contribution to personal growth”), acceptance (“notice and accept thoughts without judgment”), distancing (“think about the situation as if you are a journalist”), or rumination (“think about the consequences of the event repeatedly”). Analyses indicated that positive reappraisal led to greater increases in positive affect and decreases in negative affect as compared to all other cognitive strategies. Unexpectedly, acceptance was not more efficacious as compared to distancing or rumination; and rumination led to a decrease in negative affect, which was equivalent to the acceptance strategy. The authors proposed several possible reasons as to why rumination led to decreased negative affect, such as: there was a ceiling effect for negative affect after the stress-induction and thus ratings could not have been higher at postmanipulation, the rumination elicited was too structured and artificial, or the rumination instructions unintentionally elicited a constructive form of rumination by increasing concrete thinking.

Hofmann and colleagues (2009) examined the efficacy of using brief strategies that emphasized cognitive reappraisal, acceptance, or emotional suppression, for speech-related

anxiety-reduction in an unselected student sample. In the cognitive reappraisal condition, participants were asked to recognize that the speech does not pose a threat as there are no negative consequences. In the acceptance condition, participants were encouraged to experience their feelings without controlling or changing them. In the emotional suppression group, participants were told to try not to display any feelings during the speech. It was found that participants in the suppression condition reported more anxiety than the reappraisal group, and exhibited greater increases in heart rate during the speech compared to both other conditions. There were no significant differences between the reappraisal and acceptance conditions on heart rate changes. Participants in the acceptance and suppression conditions did not report significantly different subjective levels of anxiety. The authors concluded that cognitive reappraisal may be more efficacious for managing subjective anxiety, while both cognitive reappraisal and acceptance appear to be more efficacious at managing physiological arousal as compared to suppression.

Using a socially anxious sample, Nilsson and colleagues (2011) had participants give a speech and then listen to and evaluate an audio-recording of it. Before listening to the recording, half of the participants were led through a single session “cognitive preparation” exercise, in which they were asked to predict exactly how they thought they would sound (e.g., “boring”), and to operationalize how they would know whether they exhibited this characteristic (e.g., what they would hear on the recording to indicate that they sounded boring). They were also asked to form an image of how they sounded during the speech, participated in a discussion about the differences between how they felt they performed and how they objectively sounded, and were then instructed to listen to the recording as if they were listening to a stranger. Results indicated that compared to the condition that did not receive cognitive preparation, cognitive preparation

plus audio-recording feedback led to less negative evaluations about one's speech and less anxiety about one's speech performance. In another study using a socially anxious sample, Rodebaugh and colleagues (2009) divided students who were high in social interaction anxiety into those who purposefully engaged with unpleasant thoughts and were open to different points of view (high purposeful engagers) and those who did not (low purposeful engagers). They were asked to think of a recent negative social situation and were randomly assigned to a 25-minute unstructured writing condition about the social situation, or to a 25-minute structured writing condition that involved cognitive restructuring prompts. It was found that low purposeful engagers who did not receive cognitive restructuring prompts reported worsened mood at the end of the study, whereas low purposeful engagers who received the prompts and purposeful engagers in both conditions did not report as much deterioration in mood. The researchers proposed that cognitive restructuring may be efficacious for socially anxious individuals who are low purposeful engagers, specifically after engaging in exposures or when they start to engage in PEP. Thus, preliminary research has demonstrated that engaging in a brief cognitive strategy of restructuring or reappraising the situation appears to have beneficial effects on mood.

Mindfulness Interventions. Several studies in the depression and anxiety literature have found support for the efficacy of single session mindfulness strategies in reducing negative mood. Kohl and colleagues (2012) conducted a review and meta-analysis of experimental studies examining acceptance strategies as compared to other emotion regulation strategies for negative affect and pain. For negative affect, the meta-analysis found no significant differences between the benefits of acceptance compared to other emotion regulation strategies; however, acceptance strategies demonstrated equivalence to strategies such as suppression and distraction. A representative sample of these studies is reviewed in detail below.

Broderick (2005) induced negative mood in undergraduate students and randomly assigned them to a rumination, distraction, or mindfulness condition. The rumination and distraction conditions consisted of reading flashcards for 8 minutes, which were either ruminative or neutral in content, respectively. The mindfulness condition consisted of engaging in an 8-minute audiotaped breathing meditation exercise. Participants in the mindfulness condition reported significantly less negative mood, as compared to the rumination and distraction conditions. Although distraction was associated with less negative mood as compared to the rumination condition, it was not as efficacious as the mindfulness condition. Singer and Dobson (2007) randomly assigned a sample of participants who were previously depressed to a rumination, distraction, acceptance, or control condition. The active conditions consisted of 10 minutes of training, followed by 5 minutes of strategy application. Participants were then subjected to a negative mood induction. It was found that the rumination condition prolonged the intensity of negative mood, similar to the control group. Participants in both the distraction and acceptance conditions reported less negative mood, while those in the acceptance condition also reported reduced negative attitudes towards negative experiences.

Arch and Craske (2006) conducted a slightly different study examining strategy efficacy in response to negative stimuli. They randomly assigned undergraduate students to either a 15-minute focused breathing induction (mindfulness meditation exercise), an unfocused attention exercise, or a worry exercise, and then showed them aversive and neutral pictures. Participants in the focused breathing condition reported less negative affect and emotional reactivity to the pictures, as compared to both of the other conditions, and were more willing than the unfocused breathing group to view the optional negative slides. Additionally, the focused breathing group

had consistently moderately positive responses to the neutral pictures, while the other conditions had more negative responses to the neutral slides.

Other studies have examined the efficaciousness of various strategies on unwanted thoughts and negative statements about the self. A study by Najmi and colleagues (2009) examined unwanted intrusive thoughts in a sample of individuals with obsessive-compulsive disorder, using a within-subject design. Participants were asked to engage in a series of strategies, including thought suppression, focused distraction (using one distracter thought), acceptance, and creating-associates (generating word associations), for a total of 10 minutes each over the course of several days. Results indicated that the acceptance condition led to significant decreases in distress but did not lead to any differences in intrusion frequency. Suppression, on the other hand, led to increased distress but again did not lead to any differences in intrusion frequency. Marcks and Woods (2004) examined the efficacy of 5-minute thought suppression, acceptance, or monitor-only strategies on frequency and distress of personally-relevant intrusive thoughts, using an unselected student sample. It was found that participants in the thought suppression condition were not able to successfully suppress these thoughts and reported increased distress after strategy implementation, whereas participants in the acceptance condition reported decreased discomfort ratings, but no differences in the frequency of the intrusive thoughts. Similar results were found in a study by Healy and colleagues (2008), who examined the efficacy of presenting negative self-statements using a defused format to an unselected student sample. Specifically, statements such as “I am a failure” were presented either as is, in a defused format (“I am having the thought that I am a failure”), or in an abnormal format (“I have a wooden chair and I am a failure”). It was found that negative statements presented in a defused format, as compared to the other formats, decreased discomfort ratings and increased

participants' willingness to read and think about the statements. However, the negative statements presented in a defused format appeared to increase believability ratings. This may have occurred because participants were responding to whether they believed that they were having the thought, rather than responding to whether they believed the thought to be true. The researchers concluded that using cognitive defusion may be a useful method to decrease the negative emotional impact of unhelpful thoughts.

In a recent study that aimed to increase the generalizability of these findings, Huffziger and colleagues (2013) had an unselected sample of participants engage in a rumination induction, mindful attention induction, and noninduction exercise over the course of three separate days. They were asked to rate ruminative self-focus and mood 10 times per day. Results indicated that rumination led to immediate decreases in ratings of valence (i.e., feeling content and well) and calmness (i.e., feeling calm and relaxed), while mindful attention led to immediate increases in ratings of calmness. In conclusion, the findings from these studies suggest that brief mindfulness- and acceptance-based strategies may be efficacious in reducing negative affect and discomfort as compared to rumination and suppression.

However, single session mindfulness techniques have not always been shown to be efficacious. Kuehner and colleagues (2009) had undergraduate students undergo a negative mood induction, and then randomly assigned them to a rumination, distraction, or mindfulness group. Each group consisted of reading flashcards of ruminative, neutral, or mindful content, for 8 minutes. It was found that the distraction, but *not* the mindfulness condition, resulted in decreased dysphoric mood, as compared to the rumination group. Individuals in the rumination group reported significant increases in dysfunctional attitudes. The researchers suggested that, based on mindfulness theory, short-term effects on dysphoric mood should perhaps not be

expected, but rather an increased acceptance of dysphoric mood may occur. As well, Erisman and Roemer (2010) conducted a study using a sample of students with emotion regulation difficulties, and randomly assigned them to a 10-minute mindfulness condition or to a control group. No differences on emotional response and regulation were found between the two groups after exposing them to emotional videos. However, the mindfulness group did experience more positive affect after the positive videos, demonstrating an increase in the ability to experience and express positive emotion. The researchers suggested that the lack of findings may be due to the fact that a brief, single session mindfulness exercise is not as potent as an 8-week mindfulness course.

In summary, most, but not all, studies demonstrate the efficacy of mindfulness techniques in reducing negative affect, even when the techniques are as short as 5 minutes in length. Less is known about the efficacy of mindfulness techniques to specifically reduce anxiety and PEP, and the few existing studies on this topic are reviewed below.

As described previously, Hofmann and colleagues (2009) found that unselected participants who engaged in a brief acceptance strategy exhibited lower heart rate during a subsequent speech task, as compared to those who engaged in emotional suppression. However, these two strategies did not lead to significant differences on subjective levels of anxiety during the speech task. Only one published study has examined the role of mindfulness on PEP and its associated negative effects. Cassin and Rector (2011) used a clinical sample of individuals whose symptoms met criteria for SAD and gave them either 10 minutes of mindfulness training, 10 minutes of distraction training, or no training. They were asked to recall a recent negative social or performance situation for 5 minutes (PEP induction), and were then told to apply the thinking strategy in which they were trained. It was found that participants in the mindfulness

condition reported significantly less distress during the PEP induction and more positive affect, in comparison to the no training group. The distraction and no training groups performed similarly to each other, and both conditions did not lead to reductions in distress or change in affect over the PEP period. Hence, preliminary evidence suggests that brief mindfulness techniques may be useful in decreasing the distress associated with PEP and increasing positive affect.

Psychophysiological Effects

It is a widely held belief that emotions, such as anxiety, consist of experiential, behavioural, and physiological responses (e.g., Frijda, 1986; Levenson, 1994). Indeed, theoretical models of SAD propose that cognitive, behavioural, and physiological factors all contribute to the development and maintenance of this disorder (e.g., Clark and Wells, 1995; Rapee and Heimberg, 1997). However, there is little empirical evidence for this common assumption, particularly for the association between subjective and physiological measurements, which may be due to methodological limitations of previous research (Reisenzein, 2000). A meta-analysis by Patterson and Ritts (1997) found large effects of social anxiety on cognitive and behavioural measures, but much smaller effects on psychophysiological measures of anxiety. Similarly, in a review by Mauss and colleagues (2004), studies were equivocal regarding whether socially anxious individuals actually demonstrate higher psychophysiological activation in social situations as compared to nonanxious individuals, even though socially anxious individuals report feeling greater anxiety. This may be the case because socially anxious individuals tend to be more attuned to potential sources of threat, including their own physiological anxiety symptoms.

Pertinent to the current study is the link between self-reported symptoms of anxiety and psychophysiological measurements of anxiety. To date, most studies in the area of SAD, as well as studies specific to PEP and rumination, have relied heavily on the use of self-report data to assess participants' levels of anxiety. However, Brosschot and colleagues (2006) argue that perseverative cognitions, such as rumination, can prolong stress-related psychophysiological activity by lengthening the duration of stressors by maintaining its cognitive representation. For example, if an individual is exposed to a social stressor such as a speech performance, psychophysiological responses such as heart rate and skin conductance level (SCL) are expected to increase during the presence of the stressor. However, if the individual engages in PEP after the event, this can prolong the psychophysiological response long after the social stressor has ended. This can be detrimental, as several studies have found that prolonged psychophysiological activity can be a risk factor for disease (e.g., Borghi et al., 1986; Treiber et al., 2001). However, this has not been examined specifically in a socially anxious sample in relation to PEP.

It has been demonstrated using experimental paradigms that depressive rumination leads to increased psychophysiological responses. Sigmon and colleagues (2000) conducted a study using women high or low in anxiety sensitivity, which is the tendency to fear arousal-related sensations, and had them engage in a rumination induction or distraction procedure. All participants, regardless of their level of anxiety sensitivity, experienced increased levels of skin conductance as a result of the rumination induction; however, those high in anxiety sensitivity had greater levels of skin conductance during the rumination task. In a similar study, Vickers and Vogeltanz-Holm (2003) had dysphoric and nondysphoric participants engage in either a rumination or distraction task. Dysphoric individuals who engaged in rumination reported

significantly higher levels of depressed mood at postinduction as compared to dysphoric distracters. Both dysphoric and nondysphoric participants reported significantly higher worry ratings after the rumination condition compared to after the distraction condition. Notably, nondysphoric men had a significantly greater systolic blood pressure response than nondysphoric women in the rumination condition; hence, autonomic nervous system activation may be associated with rumination. However, diastolic blood pressure, SCL, and heart rate were not significantly higher in the rumination condition as compared to the distraction condition. In the study by Kuehner and colleagues (2009) discussed previously, no differences on cortisol responses were found between the rumination, distraction, and mindfulness conditions. However, participants high in depressive symptoms in the rumination condition showed smaller decreases in cortisol level after the negative mood induction as compared to participants low in depressive symptoms, indicating a slower recovery rate. A review by Zoccola and Dickerson (2012) examined the relationship between rumination and cortisol levels and concluded that the various methods of assessing rumination and cortisol contributed to the mixed findings in the literature. In general, findings have suggested that rumination was related to increased cortisol when state and stress-related measures of rumination were used, or when social-evaluative stressor tasks were completed in the laboratory.

These findings are in contrast to the literature on worry, which is a construct defined as such: “Worry is a chain of thoughts and images which is negatively affect-laden and relatively uncontrollable. The worry process represents an attempt to engage in mental problem solving on an issue whose outcome is uncertain but contains the possibility of one or more negative outcomes” (Borkovec, Robinson, Pruzinsky, & DePree, 1983). It has been found that worry leads to *decreases* in autonomic reactivity (e.g., Borkovec, Lyonfields, Wiser, & Deihl, 1993).

Borkovec's avoidance theory of worry (Borkovec, Alcaine, & Behar, 2004) suggests that worry is verbal-linguistic and serves to suppress threatening mental imagery, acting as a form of cognitive avoidance, as it is the mental imagery that is associated with increased arousal.

Although it remains an empirical question, PEP may be more image-focussed since it is based on memories of a past event that has actually occurred, and due to the tendency of socially anxious individuals to have mental representations of themselves as seen by an "audience." Hence, PEP may be viewed as a form of cognitive approach, and these images associated with PEP may then contribute to increased psychophysiological arousal.

As there are no known studies in the SAD and PEP literature that assess psychophysiological correlates during the PEP period, the emotion literature will be discussed. There have been mixed findings regarding whether mindfulness techniques improve psychophysiological recovery after exposure to negative emotion inductions. Campbell-Sills and colleagues (2006) had anxious individuals engage in either an acceptance or suppression exercise, and then watch a distressing video. They found that participants in the acceptance condition demonstrated greater recovery from negative affect after the watching the video, as compared to the suppression condition. As well, during the video, participants in the acceptance condition exhibited decreased heart rate, as compared to those in the suppression condition who exhibited increased heart rate, despite both conditions reporting similar levels of distress. Low and colleagues (2008) had an unselected student sample think of an ongoing stressful situation, and were randomly assigned to a writing task that involved: i) evaluating their emotional response to the situation, ii) attending to their emotional response in an accepting and nonjudgmental way, or iii) attending to the objective details of the situation. Heart rate was monitored throughout the two-session study. Results indicated that in the second session, which

took place 1 week later, participants in the evaluative writing condition exhibited slower heart rate habituation and recovery, as compared to those in the accepting writing condition. As well, it has been found that after a 7-week mindfulness training intervention, participants had lower baseline SCL, as compared to those who participated in a 7-week relaxation training intervention (Ortner, Kilner, & Zelazo, 2007). However, both conditions showed significantly lower skin conductance responses to distressing pictures from pre to postintervention.

On the other hand, some studies have not found any differences in psychophysiological response after exposure to a distressing stimulus. In the study by Erisman and Roemer (2010) discussed previously, it was predicted that participants who were instructed to engage in a mindfulness exercise after watching a distressing video would demonstrate improved recovery, as compared to participants in the control group. Contrary to their hypothesis, no differences were found between the mindfulness and control groups on either heart rate or skin conductance. Similarly, Eifert and Heffner (2003) conducted a study using individuals high in anxiety sensitivity who were assigned to engage in an acceptance exercise or control condition after exposure to an anxiety-provoking stimulus. No differences between groups were found on heart rate or SCL, even though those in the acceptance group reported less fear in comparison to the control group, indicating that self-report and objective ratings of psychophysiology are not always congruent. Hence, more research using both self-report and psychophysiological measurements is needed to elucidate their relationship, as well as to determine whether psychophysiological responses can be decreased through mindfulness or cognitive restructuring techniques.

Summary

In summary, PEP is proposed to be an important maintenance factor of SAD, as it reinforces negative beliefs about performance in social situations, and causes interference with the ability to learn that social situations are generally not threatening. Previous research using socially anxious samples has demonstrated that PEP is associated with a host of negative effects, such as negative affect (including increased anxiety), negative memories, and maladaptive beliefs. It is therefore important to examine both brief and longer-term strategies and interventions that can decrease the maintenance factor of PEP in socially anxious populations. Cognitive restructuring and mindfulness techniques appear to be promising methods to achieve this goal, and should be further explored as a means to decrease PEP and its associated effects after social situations.

Present Study

The present study compared single session cognitive restructuring, mindfulness, and control strategies to examine their effects on PEP, affect, and psychophysiological arousal in socially anxious individuals. This study also examined cognitive changes (e.g., probability and cost biases, degree of mindfulness) involved in these strategies.

The current study was designed to answer the following questions:

1. Does a single session cognitive restructuring strategy affect the amount of PEP and its associated effects in an analogue social anxiety sample, as measured by:
 - i) Changes in the amount of PEP (degree and associated distress)
 - ii) Changes in state positive affect, negative affect, and anxiety
 - iii) Changes in SCL
2. Does a single session mindfulness strategy affect the amount of PEP and its associated effects in an analogue social anxiety sample, as measured by:
 - i) Changes in the amount of PEP (degree and associated distress)
 - ii) Changes in state positive affect, negative affect, and anxiety
 - iii) Changes in SCL
3. Which strategy is the most efficacious at reducing PEP and its associated effects in the short-term?
4. Do single session cognitive restructuring and mindfulness strategies lead to cognitive changes, specifically in:
 - i) Probability and cost biases
 - ii) Maladaptive beliefs about the self and others
 - iii) Degree of mindfulness

- iv) Degree of decentering
- 5. Do greater cognitive changes in probability and cost biases, maladaptive beliefs, and degree of mindfulness and decentering predict less PEP at follow-up? Which of these four cognitive processes is the strongest predictor of reduced PEP?

Hypotheses

Hypothesis 1. It was hypothesized that participants in the cognitive restructuring condition (as compared to the control condition) would report or exhibit at poststrategy:

- i) Less PEP (degree and associated distress)
- ii) Improved state affect (including decreased state anxiety)
- iii) Greater decrease of SCL

Hypothesis 2. It was hypothesized that participants in the mindfulness condition (as compared to the control condition) would report or exhibit at poststrategy:

- i) Less distress associated with PEP
- ii) Improved state affect (including decreased state anxiety)
- iii) Greater decrease of SCL

Hypothesis 3. It was hypothesized that participants in the cognitive restructuring condition would experience the greatest decrease in PEP (along with its associated negative effects), followed by participants in the mindfulness condition, followed by participants in the control condition. Specifically, participants in the cognitive restructuring condition would experience a greater decrease in both the degree and distress ratings of PEP, while participants in the mindfulness condition would only experience a decrease in the distress ratings of PEP (although there may be minimal decreases in degree of PEP as well).

Hypothesis 4. It was hypothesized that participants in the cognitive restructuring condition would experience decreases in probability and cost biases, and decreases in maladaptive beliefs. It was hypothesized that participants in the mindfulness condition would experience increases in mindfulness and decentering. Participants in the cognitive restructuring condition may also experience increases in mindfulness and decentering, albeit to a lesser extent than those in the mindfulness condition.

Hypothesis 5. It was hypothesized that changes in the four cognitive processes (i.e., probability and cost biases, maladaptive beliefs, mindfulness, and decentering) would predict reduced PEP. That is, participants who experienced greater changes in the cognitive processes, as compared to those who experienced fewer changes, would report less PEP at follow-up. No hypothesis was put forth as to which cognitive process would be the strongest predictor of reduced PEP.

Method

Participants

Individuals from the Greater Toronto Area were recruited for study participation through advertisements posted at various locations around the community and on websites that allowed for free postings (e.g., Craigslist, Kijiji, Bizcaf, Facebook). Participants were informed that socially anxious individuals were being recruited for the study, however they were not told that they may be learning a therapeutic intervention. Interested community members were invited to complete an online version of the *Social Phobia Inventory* (SPIN; Connor et al., 2000) and the *Personal Report of Confidence as a Speaker* (PRCS; Paul, 1966). Individuals who scored 19 or above on the SPIN (Connor et al., 2000) and 16 or above on the PRCS (Paul, 1966) were invited to participate in the study, in exchange for a total compensation of \$35 for the two-part study.¹ Participants were also required to be between the ages of 17 to 65, be fluent in written and spoken English, and not have a history of either CBT or mindfulness-based treatment. Participants also could not have completed either of two separate studies that were being conducted in the Anxiety Research and Treatment Laboratory at Ryerson University, since these studies also involved teaching single session strategies for social anxiety. No other inclusion or exclusion criteria were used.

Participant recruitment for this study was completed concurrently with another study in the Anxiety Research and Treatment Laboratory using the same eligibility criteria. This was done to ensure that participants who completed one study did not participate in the other study because participation in one study was an exclusion criterion for participation in the other study, since both studies taught cognitive restructuring. Eligible participants were randomly and

¹ Toward the end of recruitment, participants ($n = 13$) were offered a total compensation of \$40 in order to increase interest in study participation.

equally divided between the two studies. A total of 538 participants completed the online prescreening questionnaire between June 6, 2012 and December 19, 2012. Of these 538 participants, 328 participants were eligible and were divided randomly and equally between the two studies. Of the 164 participants randomized into the current study, a total of 76 participants were willing to participate, and completed the two-part study. There were no dropouts between the first and second laboratory sessions. During the laboratory sessions, one participant reported having completed a 3-month mindfulness course and was therefore ineligible for the study, and a second participant did not attempt to engage in or comply with the study instructions. Both of these participants were excluded from data analyses, leaving a total sample of 74 participants.

An *a priori* power analysis was conducted to determine a statistically appropriate sample size. With 75 participants and a medium effect size ($p = .25$), power was calculated to be .99; and for a small to medium effect size ($p = .2$), power was calculated to be .94. As such, a sample size of 74 participants was deemed to be adequate.

Demographic Characteristics. Of these 74 participants, 70.3% were female and 29.7% were male. Their ages ranged from 17 to 59, with a mean age of 25.7 ($SD = 9.71$). The breakdown of self-identified ethnicity/cultural background was as follows: 40.5% White/European, 35.1% Asian, 12.2% Black/Afro-Caribbean/African, 4.1% Biracial/Multiracial, 1.4% Hispanic/Latin American, 1.4% Aboriginal, 1.4% Other, and 3.9% did not respond. For relationship status, 62.2% of participants reported being single, 24.3% in a steady relationship, 6.8% married, 4.1% cohabiting, and 2.7% divorced. The self-reported educational levels were as follows: 47.3% completed some college/university, 24.3% completed college/university, 18.9% completed high school/high school equivalency, 4.1% completed some graduate/professional school, 2.7% completed graduate/professional school, 1.4% attended some high school, and

1.3% did not respond. The majority of participants were not working (51.4%), while 33.8% worked part-time, 10.8% worked full-time, and 4% did not respond. Almost all of the participants who reported not working were enrolled in an educational programme (96%), such as community college, university, or adult/continuing education. Of the total sample, 79.2% of participants reported symptoms that met criteria for social anxiety disorder according to the DSM-IV-TR (American Psychiatric Association, 2000), as assessed by the social phobia section of the *Structured Clinical Interview for the DSM-IV* (SCID-I; First, Spitzer, Gibbon, & Williams, 1996). There were no significant differences on these variables between conditions (which was determined by random assignment). Sample characteristics separated by study condition are presented in Table 1.

Table 1

Sample Characteristics Separated by Study Condition

	Control (<i>n</i> = 25)	Cognitive Restructuring (<i>n</i> = 25)	Mindfulness (<i>n</i> = 24)
Age in years - <i>M</i> (<i>SD</i>)	24.20 (7.26)	26.50 (9.96)	26.53 (11.84)
Gender (Percentage)			
Male	8 (10.8%)	8 (10.8%)	6 (8.1%)
Female	17 (23.0%)	17 (23.0%)	18 (24.3%)
Race/Ethnicity (Percentage)			
Aboriginal	1 (1.4%)	0 (0.0%)	0 (0.0%)
Black/Afro-Caribbean/African	3 (4.1%)	3 (4.1%)	3 (4.1%)
White/European	9 (12.2%)	11 (14.9%)	10 (13.5%)
Hispanic/Latin American	0 (0.0%)	0 (0.0%)	1 (1.4%)
Asian	11 (14.9%)	8 (10.8%)	7 (9.5%)
Biracial/Multiracial	1 (1.4%)	2 (2.7%)	0 (0.0%)
Other	0 (0.0%)	1 (1.4%)	2 (2.7%)
Highest Education (Percentage)			
Some high school	0 (0.0%)	0 (0.0%)	1 (1.4%)
Completed high school/GED	5 (6.8%)	4 (5.4%)	5 (6.8%)
Some college/university	14 (18.9%)	14 (18.9%)	7 (9.5%)
Completed college/university	5 (6.8%)	5 (6.8%)	8 (10.8%)
Some graduate school	0 (0.0%)	1 (1.4%)	2 (2.7%)
Completed graduate school	1 (1.4%)	1 (1.4%)	0 (0.0%)

Employment Status (Percentage)

Not working	12 (16.2%)	14 (18.9%)	12 (16.2%)
Working part-time	9 (12.2%)	7 (9.5%)	9 (12.2%)
Working full-time	4 (5.4%)	2 (2.7%)	2 (2.7%)

Relationship Status (Percentage)

Single	12 (16.2%)	16 (21.6%)	18 (24.3%)
In a steady relationship	8 (10.8%)	6 (8.1%)	4 (5.4%)
Married	3 (4.1%)	1 (1.4%)	1 (1.4%)
Co-habiting	2 (2.7%)	1 (1.4%)	0 (0.0%)
Divorced	0 (0.0%)	1 (1.4%)	1 (1.4%)

Social anxiety disorder

(Percentage) ^a	16 (22.2%)	22 (30.6%)	19 (26.4%)
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^aNumber of participants in each group with symptoms meeting DSM-IV-TR criteria for social anxiety disorder.
Note. Numbers in each column may not add up to the total number of participants in each condition because of a small amount of missing data on the demographics questionnaire.

Measures

Social Phobia Inventory (SPIN; Connor et al., 2000). The SPIN was administered to determine whether individuals met the cutoff score of 19 or above that was necessary to participate in the study. The cutoff score of 19 has been found to distinguish individuals with and without SAD, with a diagnostic efficiency of 79% (Connor et al., 2000). The SPIN assesses level of social anxiety over the past week, across a variety of situations, including social interactions, performance situations, and fear of criticism. It is a 17-item, self-report measure in which participants record the extent to which they fear various social situations on a 5-point Likert scale, with response options ranging from 0 (*not at all*) to 4 (*extremely*). It is comprised of three subscales: fear, avoidance, and physiological arousal. The SPIN has demonstrated good validity and reliability (Antony, Coons, McCabe, Ashbaugh, & Swinson, 2006; Connor et al., 2000). In the present study, the Cronbach's alpha coefficient for the SPIN was .90.

Structured Clinical Interview for DSM-IV (SCID-I; First et al., 1996). The social phobia section of the SCID-I was administered to determine whether diagnostic criteria were met for SAD, though a diagnosis of SAD was not required for inclusion in the study. The SCID-I is a semistructured diagnostic interview that assesses the DSM-IV criteria for various psychological disorders, including SAD. The reliability of a SAD diagnosis using the SCID-I has been found to be satisfactory (Del-Ben et al., 2005). The version of the SCID-I used in this study was modified such that participants provided ratings of their anxiety in a wide range of social situations (in addition to the few that are asked about in the SCID-I). The experimenter, who was a doctoral student trained in SCID-I administration and scoring, administered the social phobia section of the SCID-I to each participant in the study.

Personal Report of Confidence as a Speaker (PRCS; Paul, 1966). The PRCS was administered to determine whether individuals met the cutoff score of 16 or above that was necessary to participate in the study. It is a measure of public speaking fear severity that was originally developed by Gilkinson (1942), and was further revised by Paul (1966). A cutoff score of 16 has been used in a previous study by Paul (1966) to indicate whether participants had public-speaking anxiety. The PRCS is a 30-item self-report questionnaire, in which participants respond “true” or “false” to statements of behavioural and affective responses to a recent public speaking experience. The PRCS has demonstrated high internal consistency and adequate reliability (Daly, 1978). In the present study, the Cronbach’s alpha coefficient for the PRCS was .74.

Depression Anxiety Stress Scales, 21-item version (DASS-21; Lovibond & Lovibond, 1995). The DASS-21 is a 21-item self-report measure that assesses depression, anxiety, and stress. Participants are required to indicate how much each question applied to them over the past week, using a scale ranging from 0 (*did not apply to me at all*) to 3 (*applied most of the time*). The DASS-21 has been found to have excellent reliability and validity in community (Crawford & Henry, 2003) and clinical samples (Antony, Bieling, Cox, Enns, & Swinson, 1998). The DASS-21 was administered to assess dysphoric mood, using the depression subscale, to determine whether depression was significantly different between study conditions at baseline. In the present study, the Cronbach’s alpha coefficient for the depression subscale of the DASS-21 was .88.

Positive and Negative Affect Schedule-State Version (PANAS-S; Watson, Clark, & Tellegen, 1998). The PANAS-S was administered to assess for state positive and negative affect, both pre and poststrategy. It is a 20-item self-report measure in which participants rate

the extent that they are feeling various positive (e.g., excited, determined) and negative emotions (e.g., afraid, guilty) at the present moment. Responses are made on a 5-point Likert scale, ranging from 1 (*very slightly or not at all*) to 5 (*extremely*). The internal consistency for positive and negative subscales is good to excellent, and discrimination between the two factors has been demonstrated (Mackinnon et al., 1999; Watson et al., 1998). In the present study, the Cronbach's alpha coefficient for the positive subscale of the PANAS ranged from .82 to .89, and the negative subscale ranged from .85 to .91.

Visual Analogue Scale (VAS) of State Anxiety. A visual analogue scale was used to assess state anxiety. The scale was 10 centimeters in length and had two anchors, which were "0 = not at all anxious" and "100 = extremely anxious." Participants rated the degree of their anxiety in the current moment by drawing a line at any point on the scale. This scale has been used in previous experimental PEP studies (e.g., Cassin & Rector, 2011; Wong & Moulds, 2009), as well as in experimental studies involving negative mood inductions (e.g., Singer & Dobson, 2007).

PEP Measure (PEPM; adapted from Edwards, Rapee, & Franklin, 2003). The PEPM is based on the *Thoughts Questionnaire* (Edwards et al., 2003). The questionnaire was modified by removing the questions regarding feedback on the speech performance, as no feedback was given in the current study, as well as by removing the two general questions. These modifications were also made by Abbott and Rapee (2004). The original questionnaire assesses the frequency of various positive and negative thoughts that participants experienced about a speech task during the previous week; however the instructions and response scale were modified to assess the degree to which participants currently agree with these thoughts about their in-laboratory speech task. As well, a second subscale was added to assess the distress

caused by each of these thoughts, similar to the modification made by Perini, Abbott, and Rapee (2006). Thus, the current questionnaire lists 9 positive and 14 negative thoughts about the speech, and consists of two subscales: i) the degree to which participants currently agree with these thoughts, and ii) the distress currently caused by these thoughts. For both subscales, responses are made on a 5-point Likert scale, ranging from 0 (*not at all*) to 4 (*extremely*). A second version of the PEPM was created to administer during the follow-up session (in addition to the first version), with the instructions modified to assess the degree to which participants experienced the thoughts on average, over the past two days since their first laboratory visit, and the resulting distress it caused. Previous studies have found no differences on responses to the positive PEP scale between clinical and control participants (or between high versus low socially anxious participants) (e.g., Abbott & Rapee, 2004; Dannahy & Stopa, 2007). As we were primarily concerned with negative PEP and its associated distress, only the negative PEP scale was used for the purposes of this study. This measure has demonstrated excellent internal consistency for all subscales (Abbott & Rapee, 2004; Perini et al., 2006). In the present study, the Cronbach's alpha coefficient for the degree subscale of negative PEP ranged from .89 to .92, and was .95 for the distress subscale of negative PEP.

Social Probability and Cost Questionnaire (SPCQ; originally developed by Foa, Franklin, Perry, & Herbert, 1996, and modified by McManus, Clark, & Hackman, 2000). The SPCQ is a 33-item self-report questionnaire developed from the questionnaire used by Foa and colleagues (1996). This measure was modified by McManus and colleagues (2000) by removing all of the nonsocial questions (which were originally developed as control items), as well as including more extreme negative social events in addition to the original mildly unpleasant social events. Half of the questions on the measure relate to social performance (e.g.,

“I will make a mistake in front of my colleagues”), and the other half do not mention social performance (e.g., “A friend will cancel an arrangement to meet me”); however, both of these subscales are highly correlated. Participants are asked to first rate the likelihood of the event occurring to them in the near future on a scale from 0 (*not at all likely to happen*) to 100 (*almost sure to happen*). Participants are then asked to rate the likely cost, by rating how bad or distressing it would be if each of these events happened to them from 0 (*not at all bad/distressing*) to 100 (*really bad/distressing*). Both the probability and cost subscales demonstrate excellent internal consistency and specificity, with socially anxious individuals scoring higher than patients with other anxiety disorders and nonpatient controls (McManus et al., 2000). The SPCQ was used to assess whether the cognitive restructuring and mindfulness strategies were associated with changes in probability and cost biases. In the present study, the Cronbach’s alpha coefficient for the SPCQ ranged from .96 to .97 for both the probability and cost subscales.

Self-Beliefs Related to Social Anxiety Scale (SBSA; Wong & Moulds, 2009). The SBSA is a 15-item self-report questionnaire that measures the strength of one’s beliefs about himself or herself within a social context. It is comprised of three subscales, each of which measures a type of belief that is based on Clark and Wells’ (1995) model of SAD. The subscales are: i) excessively high standards for social performance, ii) conditional beliefs concerning social evaluation, and iii) unconditional beliefs about the self. Participants are asked to respond to each question by rating the degree to which they agree with each belief at the present moment. Responses are made on an 11-point Likert scale, ranging from 0 (*do not agree at all*) to 10 (*strongly agree*). Each subscale of the SBSA has demonstrated good internal consistency, validity, and test-retest reliability with an undergraduate sample (Wong & Moulds, 2010). The

SBSA was used to assess whether the cognitive restructuring and mindfulness strategies were associated with changes in these beliefs. In the present study, the Cronbach's alpha coefficient for the high standards subscale of the SBSA ranged from .79 to .84, the conditional beliefs subscale ranged from .87 to .91, and the unconditional beliefs subscale ranged from .86 to .89.

Kentucky Inventory of Mindfulness Skills (KIMS; Baer, Smith, & Allen, 2004). The KIMS is a 39-item self-report measure of four dimensions of mindfulness: i) observing, ii) describing, iii) acting with awareness, and iv) accepting without judgment. Responses are made on a 5-point Likert scale, ranging from 1 (*never or very rarely true*) to 5 (*almost always or always true*). Instructions for the KIMS were modified slightly, from "Circle the number that best describes your own opinion of *what is generally true for you*" to "Circle the number that best describes your own opinion of *what has been true for you over the past few days*." This modification was made in attempt to capture a more state- versus trait-like assessment of mindfulness. The KIMS has demonstrated support for the factor structure, high internal consistency, and adequate to good test-retest reliability (Baer et al., 2004). This measure was used to assess whether the cognitive restructuring and mindfulness strategies were associated with changes in these dimensions of mindfulness. In the present study, the Cronbach's alpha coefficient for the observe subscale of the KIMS ranged from .77 to .82, the describe subscale ranged from -.28 to .10, the awareness subscale ranged from .33 to .44, and the acceptance subscale ranged from .86 to .92.

Experiences Questionnaire (EQ; originally developed by Teasdale, 2002, and further developed by Fresco et al., 2007). The EQ is an 11-item self-report measure that assesses *decentering*, or "the ability to observe one's thoughts and feelings as transitory events in the mind that do not necessarily reflect reality, truth, or self-worth, and are not necessarily important,

and do not require particular behaviours in response” (Fresco et al., 2007). Responses are made on a 5-point Likert scale, ranging from 1 (*never*) to 5 (*all the time*). This measure has demonstrated good internal consistency in clinical and nonclinical samples, as well as good convergent and discriminant reliability (Fresco et al., 2007). The EQ was used to assess whether the cognitive restructuring and mindfulness strategies were associated with changes in the degree of decentering. In the present study, the Cronbach’s alpha coefficient for the EQ ranged from .78 to .83.

Psychophysiological Measurements. Psychophysiological measurements, specifically SCL, was collected throughout strategy implementation to assess if there were significant differences between the strategies in the amount of reduction in physiological arousal after the social anxiety induction, as compared to the control condition. SCL was measured using a *Biopac MP150* system and *AcqKnowledge 3.9.1* software, and was sampled continuously at a rate of 200 Hz. Participants’ nondominant hands were swabbed with rubbing alcohol before being connected to the psychophysiological equipment to ensure consistent recording quality. SCL was recorded using two Biopac 2.5 cm x 4.5 cm disposable electrodes placed on the palmar region of the distal phalanges of the first and second fingers of the participant’s nondominant hand. Deep breath tests were performed and waveforms of the recorded SCL data were visually inspected to ensure that the equipment was functioning properly. Baseline data were recorded for a period of 3 minutes, and then SCL was continuously recorded until strategy completion. Data were cleaned manually to remove movement artifact.

SCL was chosen as the psychophysiological measure because, unlike other autonomic nervous system responses such as heart rate, it is a pure representation of sympathetic activity and is a commonly used index of anxiety states (Dawson, Schell, & Fillion, 2007). It has been

found that the sweat produced by the eccrine sweat glands in the palms of the hands increase during the performance of an anxiety-inducing task (Fatolitis, Andrasik, & Higgins, 2008). Specific to rumination, Sigmon and colleagues (2000) have found that a rumination induction was associated with increased SCL in both individuals with low or high anxiety sensitivity. Fowles (1980) stated that electrodermal activity, which includes SCL, is influenced primarily by activation of the behavioural inhibition system. This system is involved in responding to punishment, passive avoidance, and frustrative nonreward, and is perceived as an anxiety system. Dawson and colleagues (2007) suggest that the SCL should be the psychophysiological measurement of choice if one is examining reactions to situations that elicit anxiety in which no active avoidance behaviour can occur.

Manipulation Check (designed for use in this study). The manipulation check (see Appendix A) was administered to ensure that the experimental manipulation was successful. Participants were asked to rate the degree to which the rationale of the strategy seemed logical, how well they thought it would work for themselves and in general, and the degree to which they attempted to follow the instructions for the strategy. Responses were made on a 5-point Likert scale, with answers ranging from 0 (*not at all*) to 4 (*extremely*). The experimenter also asked participants to give examples of thoughts they had about their speech performance during the strategy implementation period and how they approached these thoughts, in order to assess whether they used the strategy correctly.

Procedure

Participants completed the study individually in the laboratory, over two sessions. The first session took approximately 2 hours, while the second session took approximately 30 minutes. A timeline of study measure administration is presented in Table 2.

Table 2

Timeline of Study Measures

	Baseline	Prestrategy*	Post-strategy	1-day Follow-up
<i>Social Phobia Inventory (SPIN)</i>	√			
<i>Personal Report of Confidence as a Speaker (PRCS)</i>	√			
<i>Depression Anxiety Stress Scales (DASS-21)</i>	√			
<i>SCID-I (Social phobia section only)</i>	√			
<i>Social Probability and Cost Questionnaire (SPCQ)</i>	√			√
<i>Self-Beliefs Related to Social Anxiety Scale (SBSA)</i>	√			√
<i>Kentucky Inventory of Mindfulness Skills (KIMS)</i>	√			√
<i>Experiences Questionnaire (EQ)</i>	√			√
<i>Positive and Negative Affect Schedule-State Version (PANAS-S)</i>	√	√	√	
<i>Visual Analogue Scale (VAS) of State Anxiety</i>	√	√	√	
<i>PEP Measure (current)</i>		√	√	√
<i>PEP Measure (average over past two days)</i>				√
<i>Psychophysiological measurements (SCL)</i>	√	√	√	

*Prestrategy measurements were administered after the speech task (PEP induction).

Baseline Measures. Upon arrival to the first laboratory session, participants read and signed an informed consent agreement (see Appendix B) and completed a demographics questionnaire (see Appendix C). They completed the SPIN (Conner et al., 1999), PRCS (Paul, 1966), and DASS-21 (Lovibond & Lovibond, 1995). Participants also completed the SPCQ (originally developed by Foa et al., 1996, and modified by McManus et al., 2000), SBSA (Wong & Moulds, 2009), KIMS (Baer et al., 2004), and EQ (originally developed by Teasdale, 2002, and further developed by Fresco et al., 2007). It is notable that the KIMS (Baer et al., 2004) and EQ (originally developed by Teasdale, 2002, and further developed by Fresco et al., 2007) may have both measured decentering, as the KIMS contains the subscales of observing and describing, which may simply be different names to refer to the ability to observe one's thoughts as just thoughts. Participants then completed the PANAS-S (Watson et al., 1998) and VAS for state anxiety. The experimenter administered the social phobia section of the SCID-I (First et al., 1996). Next, participants' nondominant hands were swabbed with alcohol to ensure consistent psychophysiological recordings, and the psychophysiological equipment measuring SCL was set up. After testing to ensure that the equipment was recording properly, baseline readings were measured for a period of 3 minutes.

PEP Induction. Participants were then asked to give an impromptu 3-minute speech without time for preparation on either nuclear power, corporal punishment in schools, mandatory seat belt laws, abortion, or public versus private healthcare systems (adapted from Hofmann, Newman, Ehlers, & Roth, 1995), in front of a video camera, the experimenter, and an observer. They were told that the experimenter's supervisor, who is a psychologist, would be later watching the speech recording in order to evaluate it on various performance dimensions (e.g., spoke clearly, appeared confident, speech well-organized). All participants voluntarily

completed the entire 3-minute speech task. This served as the social anxiety induction in order to elicit PEP of the event.

Prestrategy Measures. Participants completed the PANAS-S (Watson et al., 1998), VAS for state anxiety (which asked for their highest anxiety rating during the speech), and PEP Measure (adapted from Edwards et al., 2003).

Training and Strategy Implementation. Participants were randomly assigned to the control, cognitive restructuring, or mindfulness condition. In the control condition, participants were told that it is often helpful to keep thinking about their performance on a past event, in this case the speech task, in order to habituate to any negative thoughts they might be having about it. They were then encouraged to continue to think about their speech performance, even if they had to repeat some of the same thoughts. Participants were instructed to think about their speech performance for a total of 15 minutes, separated into two 7.5-minute exercises. Participants were prompted throughout the exercise to “continue to think about how they performed on the speech” in order to keep their attention focused on the task. The experimenter then asked participants what they were thinking about after each exercise, in order to assess for the presence of PEP. The duration of the control condition was approximately 20 minutes. See Appendix D for the control script.

In the cognitive restructuring condition, participants were told that they were going to learn a strategy that may be useful when they find themselves having negative thoughts about an event that has happened in the past, such as the speech task. They were given psychoeducation about the relationship between thoughts, physical sensations, and emotions, and were taught to identify and challenge their cognitions. Participants were taught how to complete a seven-column thought record (Antony & Norton, 2009), and then completed one specific to their

thoughts about their speech performance, with guidance from the experimenter. In order to complete this thought record, participants were asked to verbalize their anxious or negative thoughts, evidence for and against the thoughts, and an alternative or balanced thought; and the experimenter wrote these statements down. The cognitive restructuring condition was approximately 40 minutes in duration. See Appendix E for the cognitive restructuring strategy script.

In the mindfulness condition, participants were also told that they were going to learn a strategy that may be useful when they find themselves thinking about negative experiences or having negative thoughts, in this case about the speech task. They were then told what mindfulness is, and were encouraged to notice and accept their thoughts in the present moment, without trying to change them. They were encouraged to be open, nonjudgmental, and not to react to their thoughts; but rather, just to notice that they are there and to accept them. They completed a 3-minute, guided, audio-recorded exercise focused on noticing their breathing in the present moment, in order to understand and practice the concepts of mindfulness. Participants then completed a 7-minute, guided, audio-recorded mindfulness exercise that encouraged them to notice and accept their *thoughts* about their speech performance (adapted from Roemer & Orsillo, 2009). Participants were then taught how to apply the mindfulness strategy to emotions, based on a script created by Erisman and Roemer (2010). Participants completed a 7-minute, guided, audio-recorded mindfulness exercise that encouraged them to notice and accept their *emotions* about their speech performance (adapted from Roemer & Orsillo, 2009). Finally, participants completed a 7-minute, guided, audio-recorded mindfulness exercise that encouraged them to notice and accept both their thoughts and emotions about their speech performance. The duration of the mindfulness condition was approximately 40 minutes. The experimenter then

asked participants about their experience, in order to check for understanding of and compliance with the mindfulness strategy. See Appendix F for the mindfulness strategy script.

Poststrategy Measures. After the training and strategy implementation period, participants completed the PANAS-S (Watson et al., 1998), VAS for state anxiety, and the PEP Measure (adapted from Edwards et al., 2003).

Follow-Up Session. The following day, participants returned to the laboratory and completed two PEP Measures (adapted from Edwards et al., 2003) – one that assessed the degree to which they were currently experiencing various thoughts and the distress it caused, and the other that assessed the degree to which they experienced the thoughts on average, over the past two days, and the distress it caused. They then completed the following questionnaires: SPCQ (originally developed by Foa et al., 1996, and modified by McManus et al., 2000), SBSA (Wong & Moulds, 2009), KIMS (Baer et al., 2004), and EQ (originally developed by Teasdale, 2002, and further developed by Fresco et al., 2007). Participants were asked questions to see if they had knowledge about the hypotheses of the study, were provided with a written debriefing form (see Appendix G), and were encouraged to ask questions about the study, anxiety, or the optional treatment resources provided.

Results

Preliminary Analyses

The independent and dependent variables were assessed for the presence of outliers, which were defined as z -score values greater than an absolute value of 3.29 (Tabachnick & Fidell, 2007). Using this criterion, five data points were classified as outliers. Two of these extreme data points were replaced by the next most extreme values in order for the z -score to be within the acceptable range. The other three extreme data points were removed (i.e., all three

VAS state anxiety scores from one participant) as they were not believed to be representative of the state anxiety of an individual who scored highly on measures of social anxiety and fear of public speaking. The main variables of interest were assessed for normality by examining skewness and kurtosis values, and it was found that these variables approximated a normal distribution. Means and standard deviations of scores on the SPIN, PRCS, and DASS-21, separated by study condition, are presented in Table 3. One-way analysis of variance (ANOVA) indicated that there were no significant differences between study conditions on the SPIN, PRCS, and DASS-21; and were therefore not used as covariates in the subsequent analyses (Tabachnik & Fidell, 2007). Total scores on the SPIN in the current study ($M = 41.00$, $SD = 11.33$) were similar to the total scores of other studies that used a clinical sample of treatment-seeking individuals (e.g., $M = 41.1$, $SD = 10.2$, Connor et al., 2000; $M = 44.8$, $SD = 14.5$; Antony et al., 2006). This indicates that the sample used in the current study was comparable to a clinical sample on the extent to which participants feared various social situations.

Table 3

Means and Standard Deviations of the SPIN, PRCS, and DASS-21, Separated by Study

Condition

	Control	Cognitive Restructuring	Mindfulness
	(<i>n</i> = 25)	(<i>n</i> = 25)	(<i>n</i> = 24)
SPIN	36.80 (10.50)	43.92 (11.80)	42.33 (10.81)
PRCS	23.25 (3.81)	24.75 (4.10)	23.61 (3.62)
DASS-21 (Depression Subscale)	13.76 (9.97)	16.68 (11.26)	19.00 (10.70)

Note. SPIN = *Social Phobia Inventory*; PRCS = *Personal Report of Confidence as a Speaker*; DASS-21 = *Depression Anxiety Stress Scale* (21-item version).

Manipulation Check

The manipulation check revealed that there were no significant differences between conditions related to: how well participants thought the strategy would work for them before they tried it ($M = 1.58$, $SD = .95$; between “a little bit” and “somewhat”), how well they thought the strategy would work in general (i.e., for other people experiencing negative thoughts) ($M = 2.18$, $SD = .83$; “somewhat”), and the degree to which they tried to follow the strategy instructions ($M = 2.84$, $SD = .78$; between “somewhat” and “very much”). However, there were significant differences between conditions on how logical participants found the explanation for the strategy they learned, $F(2, 71) = 5.60$, $p = .006$, with participants reporting that the cognitive restructuring explanation seemed more logical than the control condition ($p = .006$, $d = .88$), and that the mindfulness explanation seemed more logical than the control condition ($p = .037$, $d = .68$). It is notable that participants in the control condition still rated the strategy on how logical the explanation seemed as between “somewhat” and “very much” ($M = 2.36$, $SD = .86$), while participants in the cognitive restructuring condition rated it as “very much” ($M = 3.00$, $SD = .58$), and those in the mindfulness condition rated it between “somewhat” and “very much” ($M = 2.88$, $SD = .68$).

Although participants reported trying to follow the strategy instructions, some individuals in the control (12%) and mindfulness conditions (29%) reported becoming distracted while engaging in the exercises that encouraged them to think about their speech performance. A minority of participants in the control condition (16%) reported engaging in positive self-talk during the exercises. Two participants in the mindfulness condition (8%) reported reflecting upon previous memories unrelated to the speech (i.e., about a previous partner and childhood experiences) during the third 7-minute mindfulness exercise.

To ensure that the speech task was successful at inducing PEP, the data were examined to determine whether all participants reported at least a minimal amount of PEP after the speech. Indeed, all participants scored at least a 10 on the negative subscale of the *PEP Measure* (adapted from Edwards et al., 2003).

Between-Group Differences at Baseline

One-way ANOVAs were conducted in order to assess for baseline differences between study conditions on the dependent variables. Significant differences were found on baseline scores on the KIMS awareness subscale, $F(2, 71) = 3.14, p = .049$, with participants in the cognitive restructuring condition ($M = 34.28, SD = 4.84$) scoring significantly higher than those in the control condition ($M = 31.52, SD = 4.25; p = .049, d = .61$). Significant differences were also found at baseline on the EQ decentering subscale, $F(2, 68) = 8.66, p < .001$, with participants in the cognitive restructuring condition ($M = 29.54, SD = 5.67$) scoring significantly lower as compared to the control condition ($M = 34.12, SD = 4.10; p = .006, d = .94$), and those in the mindfulness condition ($M = 28.50, SD = 5.10$) also scoring significantly lower than those in the control condition ($p = .001, d = 1.24$). As well, significant differences were found on the PEP distress subscale at prestrategy, $F(2, 71) = 3.84, p = .026$, with participants in the cognitive restructuring condition ($M = 36.68, SD = 14.48$) scoring higher as compared to the control condition ($M = 27.04, SD = 13.11; p = .025, d = .71$). Baseline differences on mindfulness and decentering were controlled for in hypothesis 5, which examined whether changes in the four cognitive processes predicted decreased PEP. Differences on PEP distress at prestrategy were accounted for by conducting a repeated-measures ANOVA to examine changes on PEP distress across time from pre to poststrategy. No other significant differences were found at baseline on any other dependent variables.

Hypotheses Testing

Mean scores and standard deviations for the dependent variables across time, separated by study condition, are reported in Table 4.

Table 4

Means and Standard Deviations for Dependent Variables across Time, Separated by Study

Condition

Measure		Control (<i>n</i> = 25)	Cognitive Restructuring (<i>n</i> = 25)	Mindfulness (<i>n</i> = 24)
PEP degree	Prestrategy	30.48 (11.41)	36.46 (11.30)	33.87 (8.99)
	Poststrategy	24.56 (12.19)	21.33 (12.41)	21.52 (8.86)
	1-day Follow-up	19.36 (10.78)	17.29 (10.42)	20.52 (8.80)
PEP distress	Prestrategy	27.21 (13.36)	36.58 (14.78)	33.18 (9.29)
	Poststrategy	19.79 (13.40)	18.37 (12.97)	19.32 (10.73)
	1-day Follow-up	15.75 (11.37)	15.08 (11.02)	17.00 (11.81)
Average PEP degree	1-day Follow-up	21.36 (11.60)	19.17 (10.46)	21.73 (9.26)
Average PEP distress	1-day Follow-up	18.68 (12.54)	17.96 (10.53)	20.05 (11.63)
PANAS-S (positive)	Baseline	21.96 (6.22)	22.50 (7.03)	24.05 (5.93)
	Prestrategy	19.67 (5.50)	21.08 (5.27)	21.05 (6.18)
	Poststrategy	19.17 (6.51)	24.71 (7.45)	24.05 (6.46)
PANAS-S (negative)	Baseline	18.25 (6.24)	19.88 (7.61)	20.91 (7.76)
	Prestrategy	23.46 (7.81)	27.88 (9.08)	27.57 (7.60)
	Poststrategy	16.33 (5.66)	15.17 (5.97)	14.74 (4.94)
VAS (state anxiety)	Baseline	43.00 (21.85)	51.40 (18.54)	51.71 (26.29)
	Prestrategy	71.63 (21.67)	83.36 (22.25)	83.17 (16.15)
	Poststrategy	27.08 (20.73)	24.96 (22.58)	22.71 (17.62)

Note. PEP = Postevent processing; PANAS-S = *Positive and Negative Affect Schedule* (state version); VAS = visual analogue scale.

Hypothesis 1a. Hypothesis 1a proposed that participants in the cognitive restructuring condition, as compared to the control condition, would report less PEP (both degree and associated distress) from pre to poststrategy, as well as from poststrategy to follow-up. To test this hypothesis, planned contrasts were conducted based on the *a priori* hypotheses. A 2 (condition: control, cognitive restructuring) by 2 (time: prestrategy, poststrategy) repeated measures ANOVA was performed on the dependent variables. Then, a 2 (condition: control, cognitive restructuring) by 2 (time: poststrategy, 1-day follow-up) repeated measures ANOVA was performed on the dependent variables.

For PEP degree, as assessed by the *PEP Measure* degree subscale (adapted from Edwards et al., 2003), there was a significant interaction between condition and time, $F(1, 47) = 13.49, p = .001, \text{partial } \eta^2 = .22$. Participants in the cognitive restructuring condition reported a 15.5 point reduction of PEP degree, while those in the control condition reported a 6.1 point reduction of PEP degree (Figure 1). From poststrategy to 1-day follow-up, no significant interactions were found between condition and time.

For distress associated with PEP, as assessed by the *PEP Measure* distress subscale (adapted from Edwards et al., 2003), there was a significant interaction between condition and time, $F(1, 47) = 12.31, p = .001, \text{partial } \eta^2 = .21$. Participants in the cognitive restructuring condition reported an 18.5 point reduction of PEP distress, while those in the control condition reported a 7.8 point reduction of PEP distress (Figure 2). From poststrategy to 1-day follow-up, no significant interactions were found between condition and time.

Hypothesis 1b. Hypothesis 1b proposed that participants in the cognitive restructuring condition, as compared to the control condition, would report improved state affect after strategy implementation. To test this hypothesis, a 2 (condition: control, cognitive restructuring) by 2

(time: prestrategy, poststrategy) repeated measures ANOVA was performed on the dependent variables.

For positive affect, as assessed by the *PANAS-S* positive subscale (Watson et al., 1998), there was a significant interaction between condition and time, $F(1, 46) = 6.55, p = .01, \text{partial } \eta^2 = .13$. Participants in the cognitive restructuring condition reported a 3.63 point increase in positive affect, while those in the control condition reported a .46 point decrease in positive affect (Figure 3).

For negative affect, as assessed by the *PANAS-S* negative subscale (Watson et al., 1998), there was a significant interaction between condition and time, $F(1, 46) = 8.47, p = .006, \text{partial } \eta^2 = .16$. Participants in the cognitive restructuring condition reported a 12.7 point decrease in negative affect, while those in the control condition reported a 6.9 point decrease in negative affect (Figure 4).

For state anxiety, as assessed by the VAS, there was no significant interaction between condition and time. However, it is notable that the findings approached significance, $F(1, 47) = 3.90, p = .054, \text{partial } \eta^2 = .08$. Participants in the cognitive restructuring condition reported a 58.4 point decrease in state anxiety, while those in the control condition reported a 44.5 point decrease in state anxiety (although this finding was not significantly different).

Hypothesis 2a. Hypothesis 2a proposed that participants in the mindfulness condition, as compared to the control condition, would report less distress associated with PEP from pre to poststrategy. To test this hypothesis, planned contrasts were conducted based on the *a priori* hypotheses. A 2 (condition: control, mindfulness) by 2 (time: prestrategy, poststrategy) repeated measures ANOVA was performed on the dependent variables. Then, a 2 (condition: control,

mindfulness) by 2 (time: poststrategy, 1-day follow-up) repeated measures ANOVA was performed on the dependent variables.

For PEP degree, there was a significant interaction between condition and time, $F(1, 45) = 7.64, p = .008, \text{partial } \eta^2 = .15$. Participants in the mindfulness condition reported a 12.3 point reduction of PEP degree, while those in the control condition reported a 6.1 point reduction of PEP degree (Figure 5). From poststrategy to 1-day follow-up, no significant interactions were found between condition and time.

For distress associated with PEP, the interaction between condition and time was not significant; however it did approach significance, $F(1, 45) = 3.85, p = .056, \text{partial } \eta^2 = .08$. Participants in the mindfulness condition reported a 13.4 point reduction of PEP distress, while those in the control condition reported a 7.8 point reduction of PEP distress (although this finding was not significantly different). From poststrategy to 1-day follow-up, no significant interactions were found between condition and time.

Hypothesis 2b. Hypothesis 2b proposed that participants in the mindfulness condition, as compared to the control condition, would report improved state affect after strategy implementation. To test this hypothesis, a 2 (condition: control, mindfulness) by 2 (time: prestrategy, poststrategy) repeated measures ANOVA was performed on the dependent variables.

For positive affect, there was a significant interaction between condition and time, $F(1, 44) = 4.97, p = .03, \text{partial } \eta^2 = .10$. Participants in the mindfulness condition reported a 3.0 point increase in positive affect, while those in the control condition reported a .46 point decrease in positive affect (Figure 6).

For negative affect, there was a significant interaction between condition and time, $F(1, 45) = 8.48, p = .006, \text{partial } \eta^2 = .16$. Participants in the mindfulness condition reported a 12.8

point decrease in negative affect, while those in the control condition reported a 6.9 point decrease in negative affect (Figure 7).

For state anxiety, there was a significant interaction between condition and time, $F(1, 46) = 5.20, p = .03, \text{partial } \eta^2 = .10$. Participants in the mindfulness condition reported a 60.5 point decrease in state anxiety, while those in the control condition reported a 44.5 point decrease in state anxiety (Figure 8).

To assess whether there were differences between conditions on PEP at 1-day follow up, a one-way ANOVA was conducted on the *Average PEP Measure* (i.e., average PEP over the past two days; adapted from Edwards et al., 2003) and indicated that there were no significant main effects of condition on PEP degree or distress.

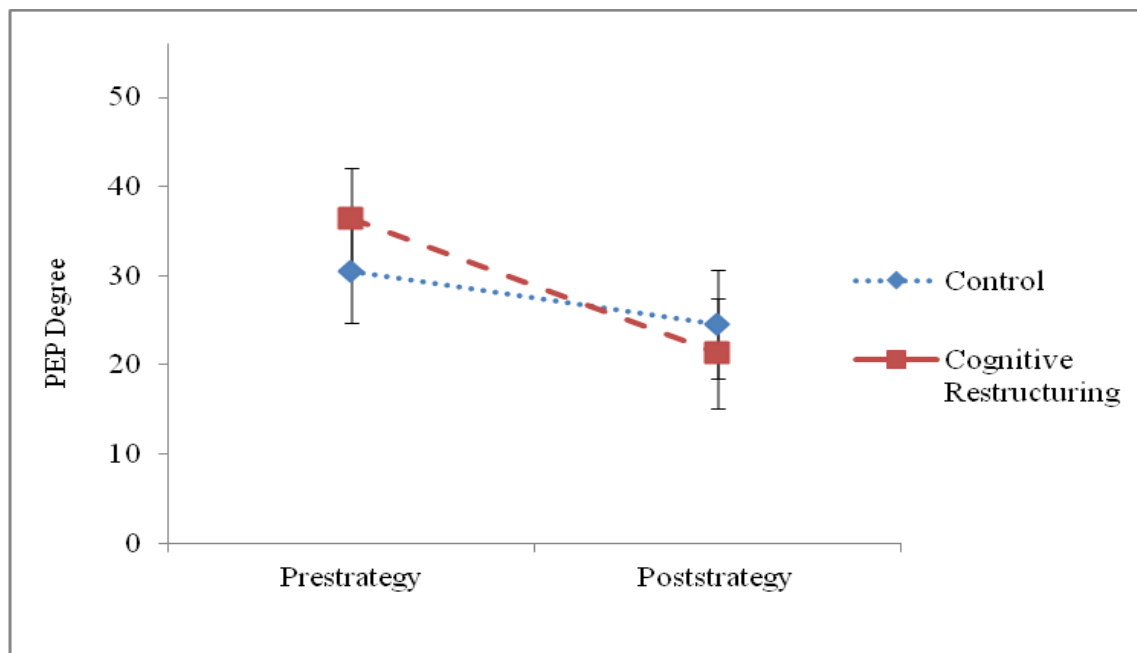


Figure 1. PEP degree from pre to poststrategy for cognitive restructuring versus control condition.

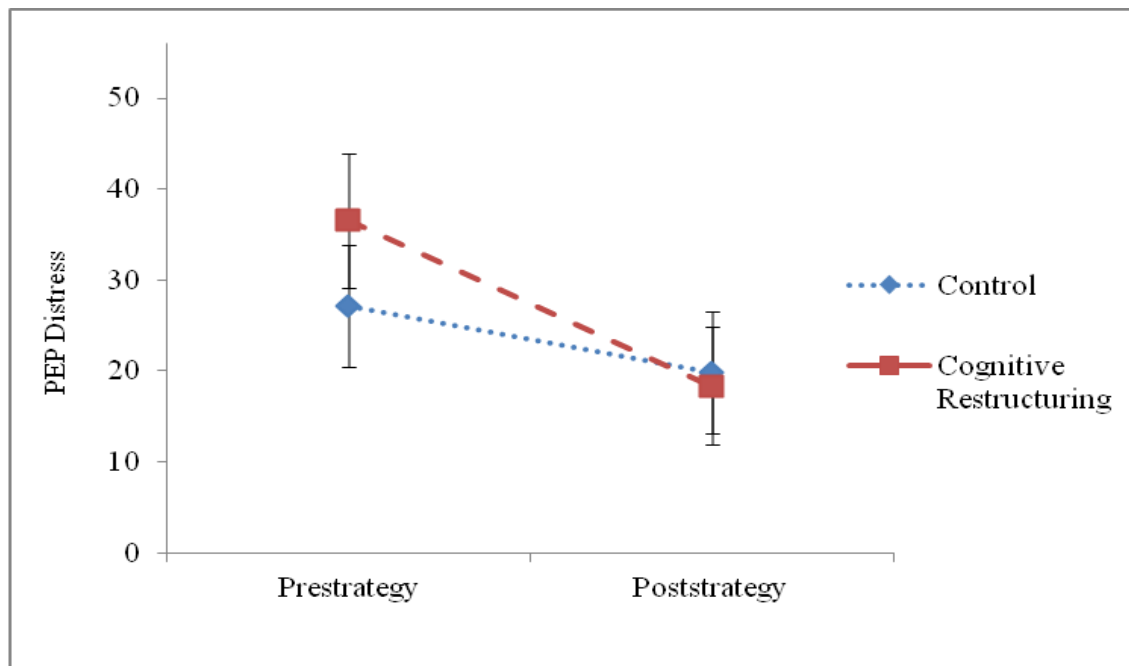


Figure 2. PEP distress from pre to poststrategy for cognitive restructuring versus control condition.

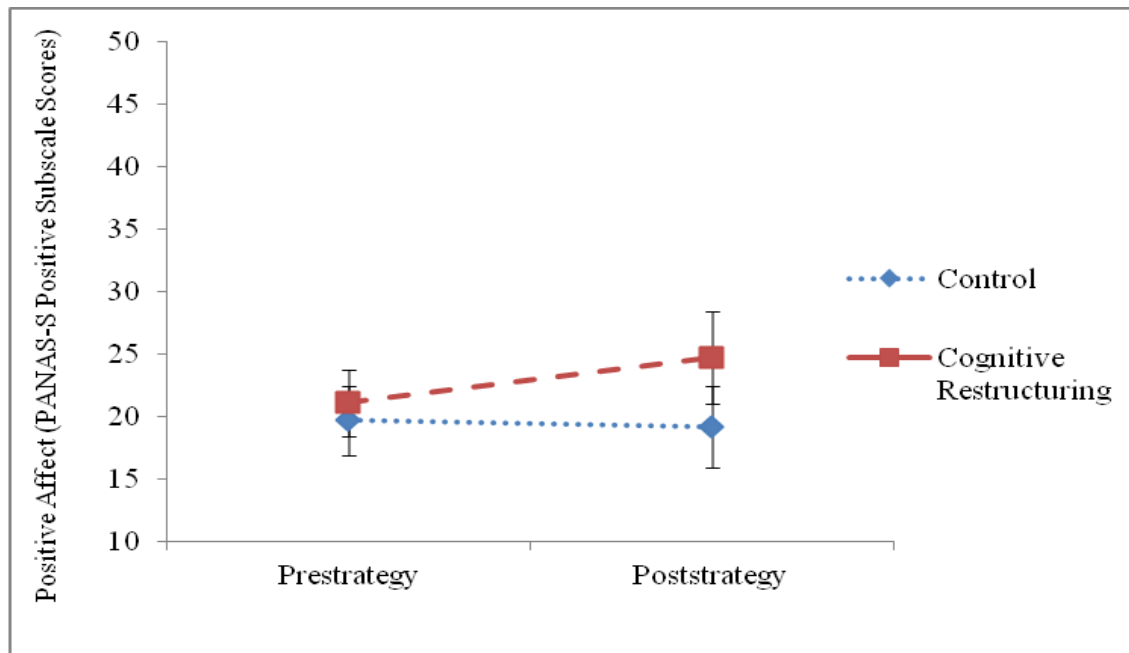


Figure 3. Positive affect from pre to poststrategy for cognitive restructuring versus control condition.

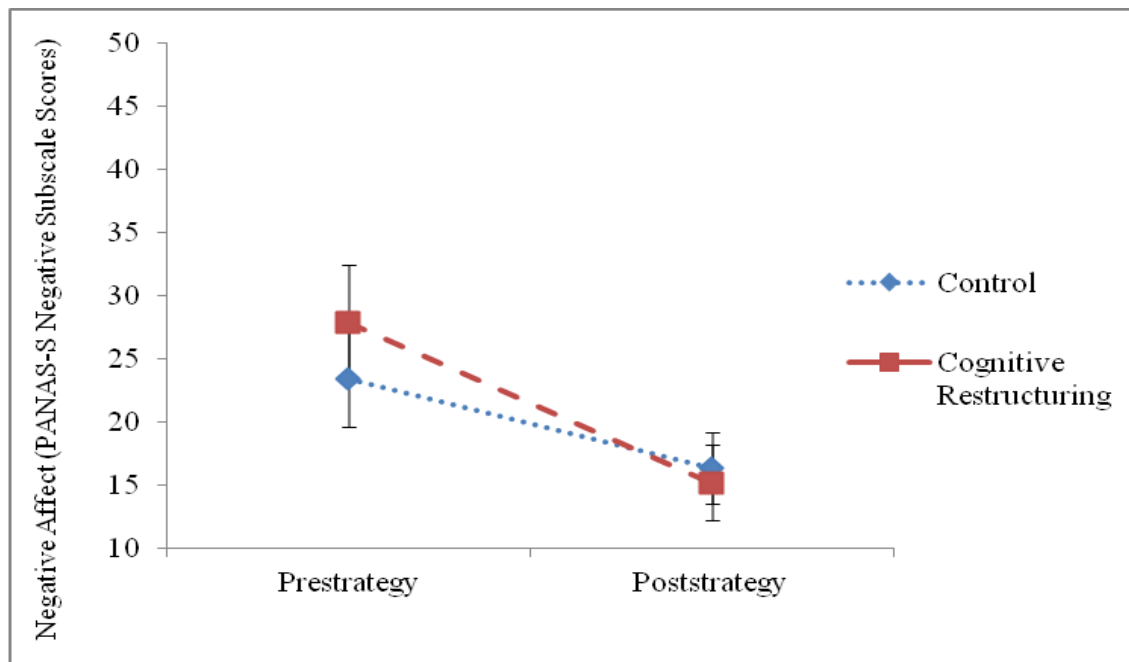


Figure 4. Negative affect from pre to poststrategy for cognitive restructuring versus control condition.

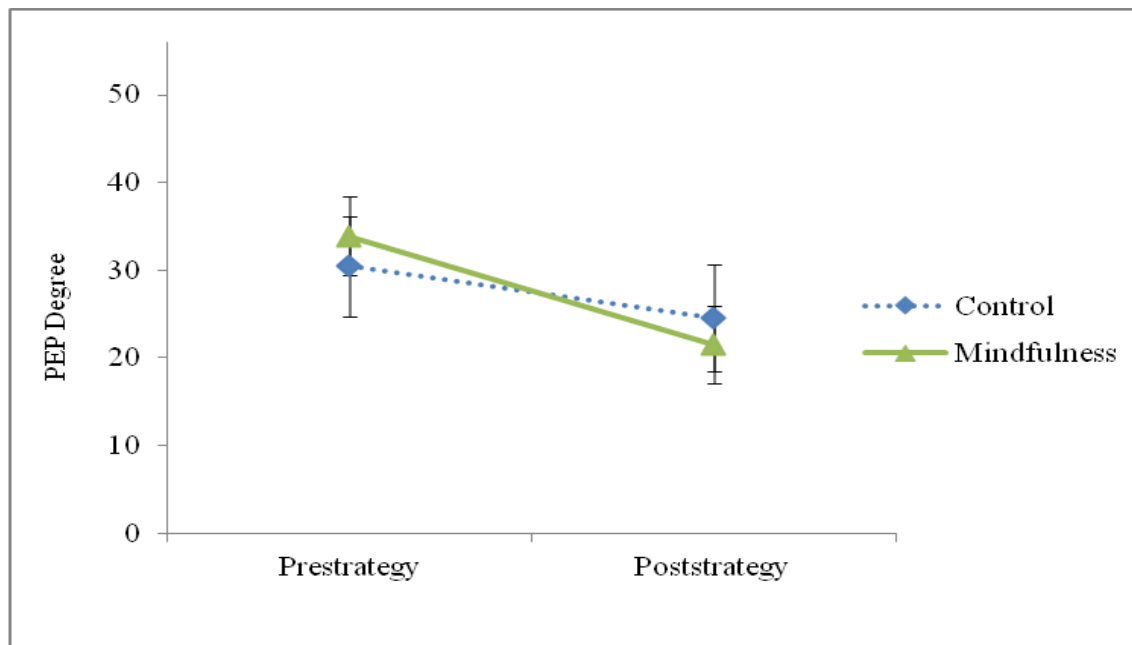


Figure 5. PEP degree from pre to poststrategy for mindfulness versus control condition.

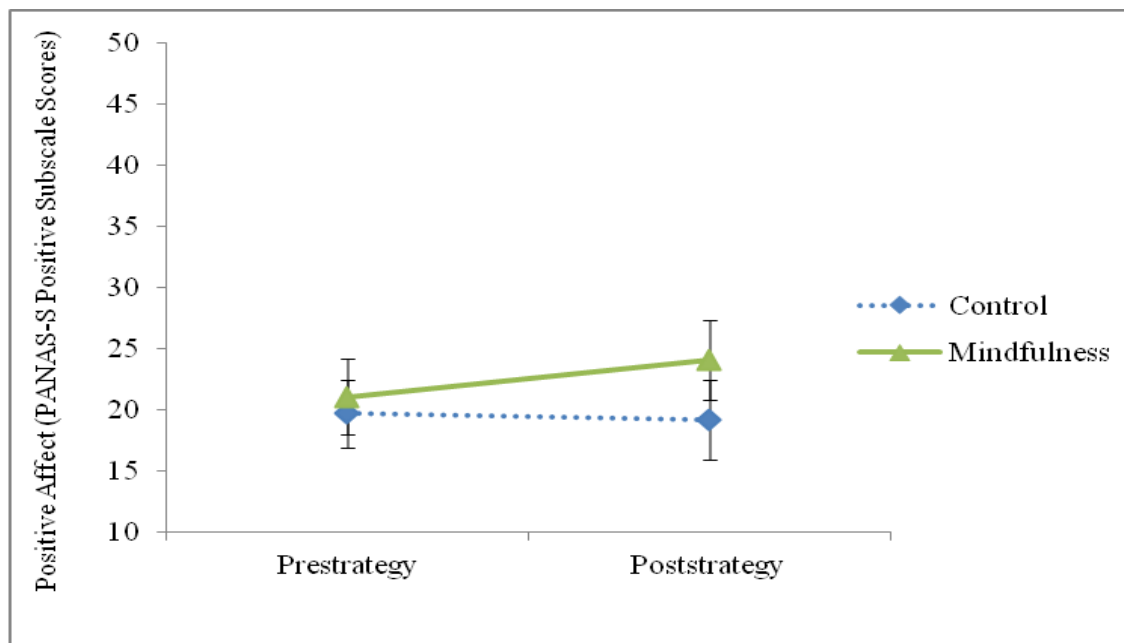


Figure 6. Positive affect from pre to poststrategy for mindfulness versus control condition.

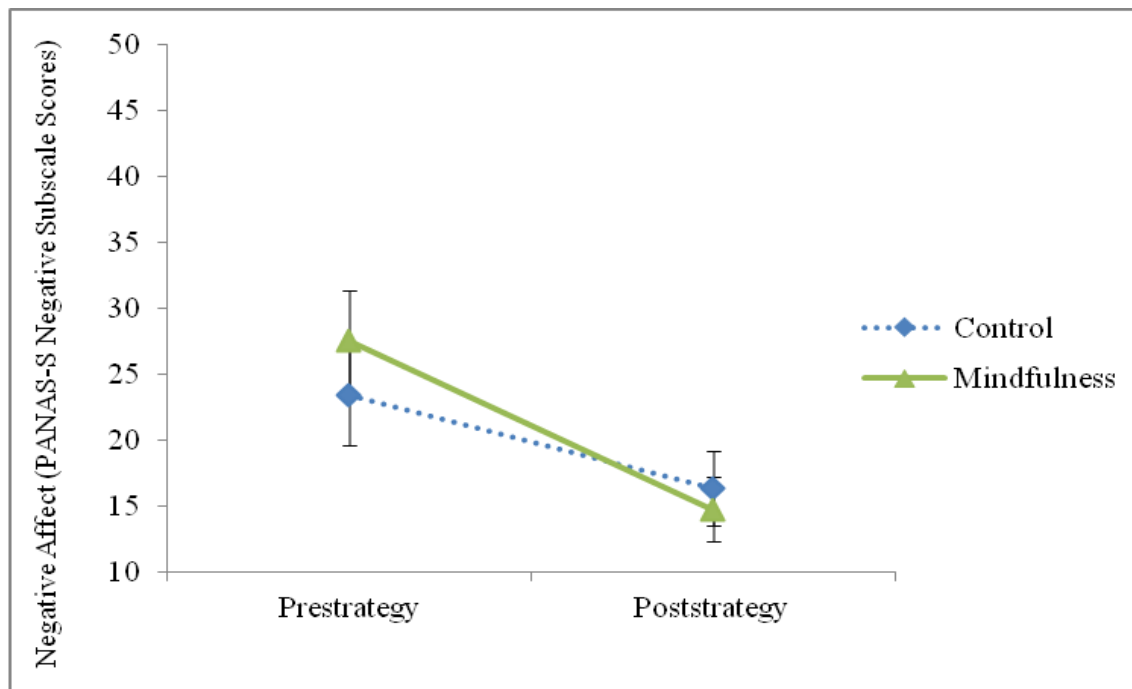


Figure 7. Negative affect from pre to poststrategy for mindfulness versus control condition.

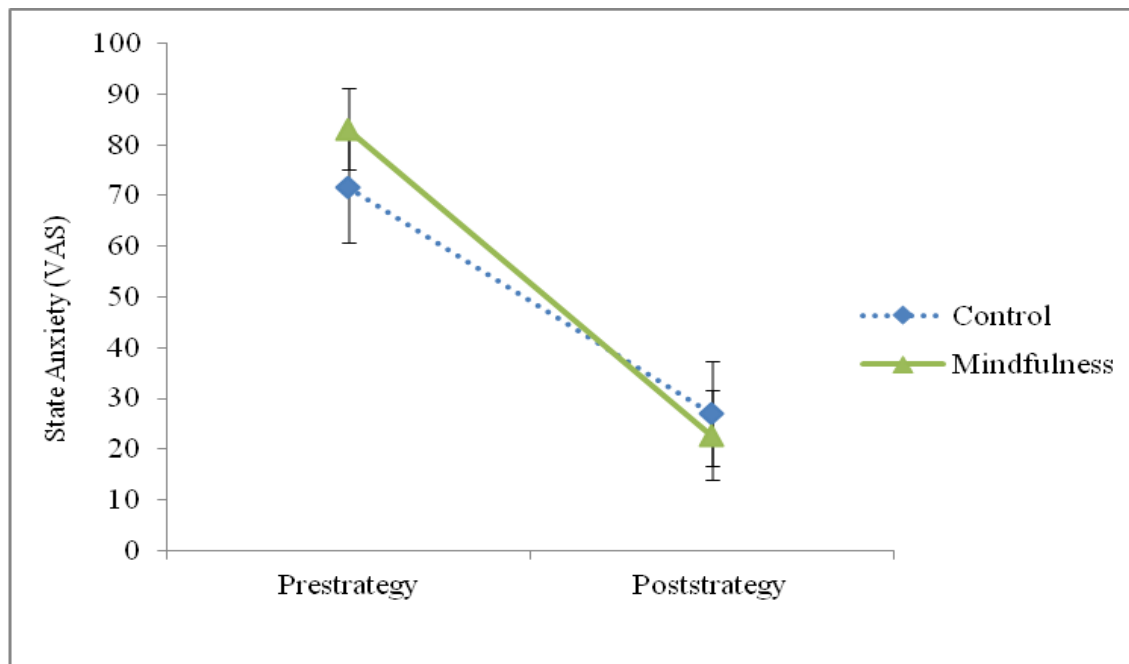


Figure 8. State anxiety from pre to poststrategy for mindfulness versus control condition.

Hypotheses 1c and 2c. Hypotheses 1c and 2c proposed that participants in the cognitive restructuring condition as compared to the control condition, and participants in the mindfulness condition as compared to the control condition, would exhibit greater decreases of SCL at poststrategy. Hierarchical linear modeling (HLM; Raudenbush & Bryk, 2002) was used to determine whether there were significant condition by time interactions (i.e., differences on the rate of decrease of SCL), as well as if there were significant differences between conditions on SCL, while controlling for baseline SCL. For the control condition, SCL was recorded during both of the two 7.5-minute exercises. For the cognitive restructuring condition, SCL was recorded while the participant completed the thought record related to the speech task with assistance from the experimenter, which took approximately 10 to 15 minutes. For the mindfulness condition, SCL was recorded during each of the three 7-minute mindfulness exercises. For all conditions, these periods of time were broken up into 1-minute blocks and mean SCL data values were calculated for each of these blocks. The covariance structure model that was found to be most appropriate for the data was the random intercept and random slope uncorrelated model. HLM analyses indicated that, controlling for baseline SCL, the interaction between condition and time was not significant (i.e., there was no significant difference on the rate of change of SCL between conditions). There was no significant main effect of condition on SCL; however, there was a significant main effect of time on SCL, $F(1, 58) = 46.04, p < .001$, as SCL decreased over time across conditions (Figure 9).

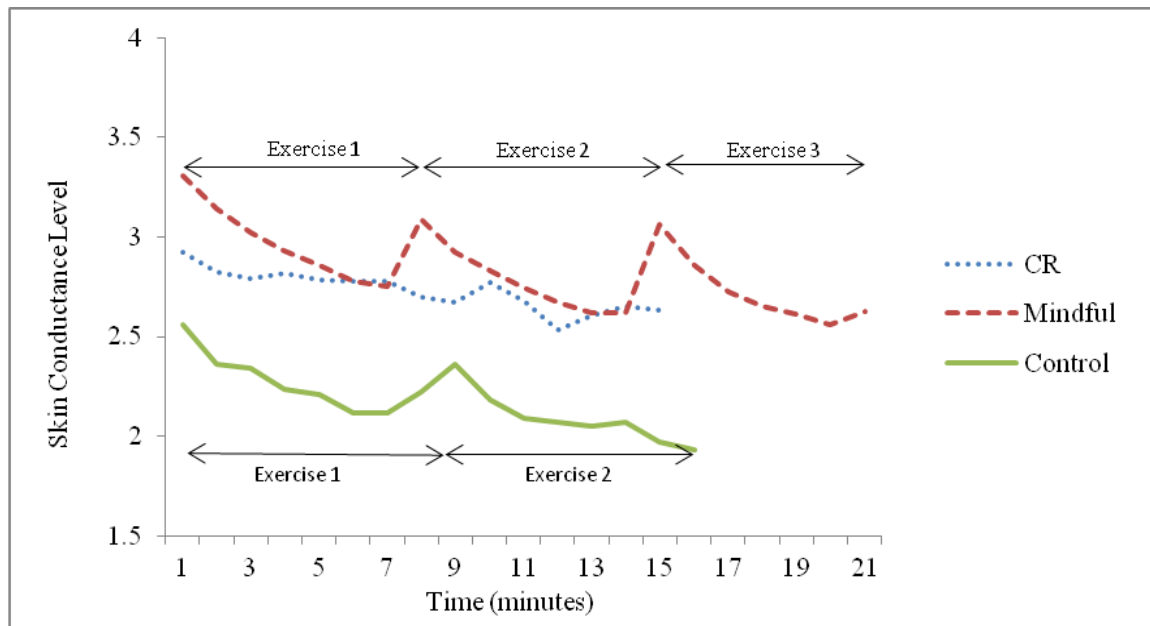


Figure 9. Skin conductance level across time, separated by study condition.

Hypothesis 3. Hypothesis 3 predicted that participants in the cognitive restructuring condition would experience the largest reductions in PEP along with its associated negative effects, followed by those in the mindfulness condition, followed by those in the control condition. To test this hypothesis, a series of 2 (condition: cognitive restructuring, mindfulness) by 2 (time: prestrategy, poststrategy; or poststrategy, 1-day follow-up) repeated measures ANOVAs were performed on the dependent variables. There were no significant interactions between condition and time on PEP degree or distress (both pre to poststrategy, and poststrategy to follow-up), or on state affect.

Hypothesis 4. It was hypothesized that the cognitive restructuring and mindfulness strategies would be associated with changes in different cognitive processes. Specifically, it was predicted that participants in the cognitive restructuring condition would experience decreases in probability and cost biases as well as in maladaptive beliefs, while participants in the mindfulness condition would experience increases in degree of mindfulness and decentering. To test this hypothesis, a series of 3 (condition: control, cognitive restructuring, mindfulness) by 2 (time: baseline, 1-day follow-up) repeated measures ANOVA were performed on the dependent variables. Table 5 displays the mean scores and standard deviations of the cognitive process measures across time, separated by study condition.

Table 5

Means and Standard Deviations for Cognitive Process Measures across Time, Separated by Study Condition

Measure		Control (<i>n</i> = 25)	Cognitive Restructuring (<i>n</i> = 25)	Mindfulness (<i>n</i> = 24)
SPCQ (Probability)	Baseline	52.83 (17.82)	62.52 (22.37)	56.42 (13.57)
	1-day Follow-up	53.17 (17.50)	54.88 (23.04)	55.00 (16.63)
SPCQ (Cost)	Baseline	60.37 (14.58)	67.76 (22.68)	60.50 (16.65)
	1-day Follow-up	59.46 (16.23)	54.64 (22.93)	53.88 (20.34)
SBSA	Baseline	74.96 (29.07)	84.76 (35.35)	82.22 (27.34)
	1-day Follow-up	66.54 (30.91)	67.72 (38.28)	72.42 (25.63)
KIMS	Baseline	119.12 (18.29)	123.88 (16.69)	125.43 (10.02)
	1-day Follow-up	119.24 (16.66)	119.92 (14.27)	121.43 (12.15)
EQ (Decentering)	Baseline	34.12 (4.10)	29.54 (5.67)	28.50 (5.10)
	1-day Follow-up	34.28 (4.79)	31.04 (6.32)	30.45 (5.86)

Note. SPCQ = *Social Probability and Cost Questionnaire*; SBSA = *Self-Beliefs Related to Social Anxiety Scale*; KIMS = *Kentucky Inventory of Mindfulness Skills*; EQ = *Experiences Questionnaire*.

For probability biases, as assessed by the SPCQ probability subscale (originally developed by Foa et al., 1996, and modified by McManus et al., 2000), the interaction between time and condition approached significance, $F(2, 70) = 2.61, p = .081, \text{partial } \eta^2 = .07$. Participants in the cognitive restructuring condition reported a decrease of 7.64 points on scores of probability bias from baseline to follow-up ($p = .004, d = .34$), although again the interaction of the omnibus test was not statistically significant. The main effect of time approached significance, $F(1, 70) = 3.72, p = .058, \text{partial } \eta^2 = .05$, with scores of probability bias decreasing by 2.91 points from baseline to follow-up ($p = .058, d = .16$), but again the main effect of time of the omnibus test was not statistically significant. There was no significant main effect of condition. For cost biases, as assessed by the SPCQ cost subscale (originally developed by Foa et al., 1996, and modified by McManus et al., 2000), there was a significant interaction between time and condition, $F(2, 70) = 3.41, p = .039, \text{partial } \eta^2 = .09$. Follow-up tests revealed that participants in the cognitive restructuring condition decreased their scores on cost biases by 13.12 points from baseline to follow-up ($p < .001, d = .58$; Figure 10). Additionally, participants in the mindfulness condition decreased their scores on cost biases by 6.63 points from baseline to follow-up, although this finding only approached significance ($p = .051, d = .36$). For maladaptive beliefs about the self and others, as measured by the SBSA (Wong & Moulds, 2009), there was no significant interaction between time and condition. There was no significant main effect of condition; however there was a significant main effect of time, $F(1, 69) = 16.84, p < .001, \text{partial } \eta^2 = .20$. Follow-up tests revealed that participants decreased their maladaptive beliefs about the self and others from baseline to follow-up by 11.75 points ($p < .001, d = .38$).

For mindfulness, as assessed by the KIMS (Baer et al., 2004), there was no significant interaction between time and condition. There was no significant main effect of condition;

however there was a significant main effect of time, $F(1, 70) = 4.13, p = .046, \text{partial } \eta^2 = .06$. Follow-up tests revealed that participants reported decreased mindfulness scores by 2.61 points from baseline to follow-up ($p = .046, d = .17$).² For decentering, as assessed by the EQ decentering subscale (originally developed by Teasdale, 2002, and further developed by Fresco et al., 2007), there was no significant interaction between time and condition. There was a significant main effect of condition, $F(2, 68) = 6.70, p = .002, \text{partial } \eta^2 = .17$. Follow-up tests revealed that participants in the control condition scored 3.91 points higher on decentering as compared to those in the cognitive restructuring condition ($p = .017, d = .94$),³ and 4.72 points higher than those in the mindfulness condition ($p = .004, d = 1.24$). There was also a significant main effect of time, $F(1, 68) = 4.56, p = .036, \text{partial } \eta^2 = .06$, with follow-up tests revealing that participants reported an increase in decentering from baseline to follow-up by 1.21 points ($p = .036, d = .21$).⁴

^{2, 3, 4} These findings were no longer significant after a Bonferroni correction was applied, as p was not less than 0.017.

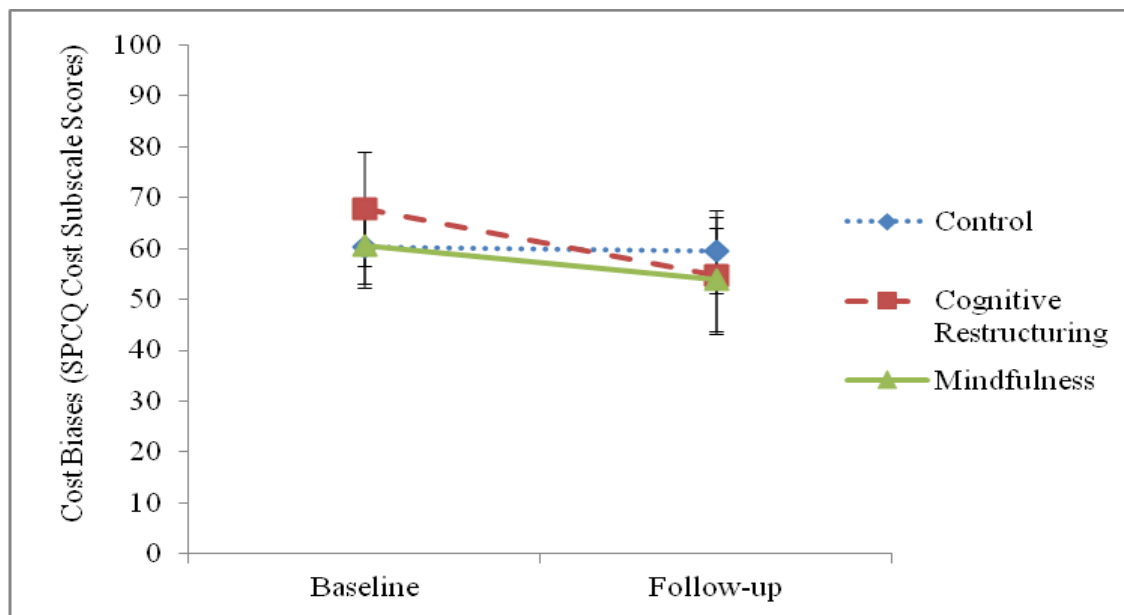


Figure 10. Cost biases across time, separated by study condition.

Hypothesis 5. Hypothesis 5 proposed that greater changes in the cognitive processes would predict reduced PEP at follow-up. To test this hypothesis, hierarchical linear regressions were conducted, controlling for PEP at baseline and the cognitive process at baseline. Degree of PEP at follow-up was entered as the dependent variable first. To examine cost biases, PEP degree at baseline and SPCQ cost subscale at baseline were entered into step 1, and then SPCQ cost subscale at 1-day follow-up was entered into step 2. Analyses indicated that scores on cost biases significantly predicted degree of PEP at follow-up, $\Delta F(1, 67) = 6.30$, $\Delta R^2 = .06$, $\beta = .31$, $p = .015$ (Table 6). This means that cost biases contributes 6.0% of variability in degree of PEP at follow-up, after controlling for PEP at time 1 and cost biases at baseline. Additionally, the overall model was significant, $F(3, 67) = 11.17$, $MSE = 789.43$, $p < .001$, $R^2 = .33$, meaning that these variables, taken together, predict degree of PEP at follow-up at better than chance levels.

To examine maladaptive beliefs about the self and others, PEP degree at baseline and SBSA at baseline were entered into step 1, and then SBSA at 1-day follow-up was entered into step 2. Analyses indicated that scores on maladaptive beliefs significantly predicted degree of PEP at follow-up, $\Delta F(1, 66) = 12.29$, $\Delta R^2 = .10$, $\beta = .44$, $p = .001$ (Table 7). Thus, maladaptive beliefs about the self and others contributed 10.3% of variability in degree of PEP at follow-up, after controlling for PEP at time 1 and maladaptive beliefs at baseline. The overall model was also significant, $F(3, 66) = 17.60$, $MSE = 992.44$, $p < .001$, $R^2 = .44$; therefore, these variables together predict degree of PEP at follow-up at better than chance levels. Examining the subscales of the SBSA, high standards significantly predicted degree of PEP at follow-up, $\Delta F(1, 66) = 7.78$, $\Delta R^2 = .08$, $\beta = .35$, $p = .007$, as did conditional beliefs, $\Delta F(1, 66) = 11.30$, $\Delta R^2 = .09$, $\beta = .41$, $p = .001$, and unconditional beliefs, $\Delta F(1, 66) = 9.56$, $\Delta R^2 = .09$, $\beta = .46$, $p = .003$. No

other cognitive processes (i.e., probability biases, degree of mindfulness, degree of decentering) significantly predicted degree of PEP at follow-up.

To determine which of these two cognitive processes most strongly predicted reductions of PEP degree, cost biases and maladaptive beliefs about the self and others were entered into the hierarchical linear regression together. PEP degree at baseline, SBSA at baseline, and SPCQ cost subscale at baseline were entered into step 1, and then SBSA at 1-day follow-up and SPCQ cost subscale at 1-day follow-up were entered into step 2. Analyses indicated that maladaptive beliefs about the self and others remained a significant predictor over and above cost biases, $\Delta F(2, 64) = 7.29$, $\Delta R^2 = .12$, $\beta = .39$, $p = .021$ (Table 8).

Next, distress associated with PEP was set as the dependent variable. To examine maladaptive beliefs about the self and others, PEP distress at baseline and SBSA at baseline were entered into step 1, and then SBSA at 1-day follow-up was entered into step 2. Analyses indicated that scores on maladaptive beliefs about the self and others significantly predicted PEP distress at follow-up, $\Delta F(1, 64) = 9.93$, $\Delta R^2 = .09$, $\beta = .41$, $p = .002$ (Table 7). Thus, maladaptive beliefs about the self and others contributes 9.0% of variability in PEP distress at follow-up, after controlling for PEP distress at time 1 and maladaptive beliefs at baseline. The overall model was also significant, $F(3, 64) = 15.51$, $MSE = 1152.67$, $p < .001$, $R^2 = .42$, indicating that these variables predict distress associated with PEP at follow-up at better than chance levels. Examining the subscales of the SBSA, high standards significantly predicted PEP distress at follow-up, $\Delta F(1, 64) = 4.78$, $\Delta R^2 = .05$, $\beta = .30$, $p = .032$, as did conditional beliefs, $\Delta F(1, 64) = 8.96$, $\Delta R^2 = .08$, $\beta = .38$, $p = .004$, and unconditional beliefs, $\Delta F(1, 64) = 9.60$, $\Delta R^2 = .09$, $\beta = .47$, $p = .003$. No other cognitive processes (i.e., cost or probability biases, degree of

mindfulness, degree of decentering) significantly predicted distress associated with PEP at follow-up.

Table 6

Summary of Hierarchical Linear Regression for Cost Biases Predicting PEP Degree

Variable	PEP Degree		
	<i>B</i>	<i>SE B</i>	β
Step 1			
PEP Degree at Baseline	.42	.10	.45**
SPCQ (Cost) at Baseline	.08	.06	.14
$R^2 = .27$			
Step 2			
PEP Degree at Baseline	.43	.10	.46**
SPCQ (Cost) at Baseline	-.03	.07	-.05
SPCQ (Cost) at Follow-up	.16	.06	.31*
$\Delta R^2 = .06$			

* $p < .05$, ** $p < .01$

Note. PEP = Postevent processing, SPCQ = *Social Probability and Cost Questionnaire*.

Table 7

Summary of Hierarchical Linear Regression for Maladaptive Beliefs Predicting PEP, Separated PEP Degree and PEP Distress

Variable	PEP Degree			PEP Distress		
	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β
Step 1						
PEP at Baseline	.41	.09	.45**	.36	.09	.42**
SBSA at Baseline	.09	.03	.28**	.11	.04	.28*
Step 2						
PEP at Baseline	.39	.09	.44**	.30	.09	.36**
SBSA at Baseline	-.00	.04	-.01	.01	.05	.03
SBSA at Follow-up	.14	.04	.44**	.15	.05	.41**

* $p < .05$, ** $p < .01$

Note. PEP = Postevent processing, SBSA = *Self-Beliefs Related to Social Anxiety Scale*.

For PEP degree, $R^2 = .34$ for Step 1, and $\Delta R^2 = .10$ for Step 2; For PEP distress, $R^2 = .33$ for Step 1, and $\Delta R^2 = .09$ for Step 2.

Table 8

Summary of Hierarchical Linear Regression for Cost Biases and Maladaptive Beliefs Predicting PEP Degree

Variable	PEP Degree		
	<i>B</i>	<i>SE B</i>	β
Step 1			
PEP Degree at Baseline	.42	.10	.47**
SBSA at Baseline	.11	.04	.33*
SPCQ (Cost) at Baseline	-.05	.07	-.09
$R^2 = .35$			
Step 2			
PEP Degree at Baseline	.43	.09	.48**
SBSA at Baseline	.04	.05	.11
SPCQ (Cost) at Baseline	-.13	.08	-.23
SBSA at Follow-up	.12	.05	.39*
SPCQ (Cost) at Follow-up	.06	.07	.11
$\Delta R^2 = .12$			

* $p < .05$, ** $p < .01$

Note. PEP = Postevent processing, SBSA = *Self-Beliefs Related to Social Anxiety Scale*, SPCQ = *Social Probability and Cost Questionnaire*.

Discussion

The primary goals of the current study were to examine the efficacy of single session cognitive restructuring and mindfulness strategies on the reduction of PEP and its associated effects, as well as to investigate the cognitive changes involved in these processes.

Efficacy of Strategies on PEP and its Associated Effects

It was predicted that both single session cognitive restructuring and mindfulness strategies would lead to less PEP, improved state affect (including reduced anxiety), and greater reductions in SCL, as compared to the control group. This hypothesis was moderately supported, as participants in the cognitive restructuring condition reported a significant decrease in PEP (both degree and associated distress) and improved affect (but not state anxiety) from pre to poststrategy, as compared to the control group. Similarly, participants in the mindfulness condition reported a significant decrease in PEP (degree but not associated distress) and improved affect (including reduced state anxiety) from pre to poststrategy, as compared to the control group. The strategies did not result in significant reductions in SCL as compared to the control condition.

These findings are consistent with previous research in the area examining single session strategies to decrease the negative effects associated with PEP. Similar to the current study, Rodebaugh and colleagues (2009) also found that for low purposeful engagers, a brief structured writing exercise with cognitive restructuring prompts led to less deterioration of mood as compared to a brief writing exercise with no cognitive restructuring prompts. The results of the current study are also in line with the findings by Cassin and Rector (2011), which found that after a PEP induction, brief mindfulness training and practice led to decreased distress and more positive affect, as compared to the control condition. In both of these studies, no direct measure

of PEP was administered; hence, findings cannot be compared on this variable. In the study by Nilsson and colleagues (2011), cognitive preparation plus audio-recording feedback led participants to have fewer negative evaluations about their speech task and less anxiety about their speech performance, as compared to those who did not receive cognitive preparation. Although the methodology of this study differed from the current study in that participants were asked to listen to and evaluate an audio-recording of their speech, the findings are similar in that the strategies in the current study led to less PEP of the speech task performed in the laboratory.

The current study can be compared to previous research on the efficacy of engaging in analytical versus experiential self-focus after giving a speech for socially anxious individuals, as experiential self-focus appears to be conceptually similar to our mindfulness condition. Wong and Moulds (2012) found that for socially anxious individuals, the analytical and experiential self-focus tasks did not lead to significant differences on anxiety ratings, in contrast to the results of the current study which found that participants in the mindfulness condition reported a significant reduction in state anxiety from pre to poststrategy, as compared to the control condition. Discrepant findings may have occurred as the experiential self-focus task in the study by Wong and Moulds (2012) was much shorter in duration than the mindfulness condition in the current study (7 minutes as compared to 40) and did not include an acceptance or nonjudgmental stance. Nilsson and colleagues (2012) found that participants in the analytical condition reported significantly less neutral thoughts, with no differences between the conditions on the amount of positive thoughts. Unfortunately the results of the current study cannot be compared directly to this study, as we did not include a measure of neutral thoughts.

Although not directly comparable to the study by Rood and colleagues (2012), as it used an unselected adolescent sample that was asked to recall an event that was not necessarily social

in nature, similar findings to the current study were reported. Specifically, Rood et al. (2012) found that participants who engaged in positive reappraisal experienced significantly greater increases in positive affect and decreases in negative affect, as compared to the acceptance, distancing, and rumination conditions. However, the acceptance strategy did not appear to be more efficacious than the rumination or distancing conditions, in contrast to our findings that the mindfulness strategy led to significant benefits over the control group. This may have been due to differences in methodology between the studies. Finally, they found that participants in the rumination condition experienced a significant decrease in negative affect that was similar to that experienced by the acceptance condition. In the current study, there was a significant main effect of time for negative affect, in which all conditions reported decreases in negative affect from pre to poststrategy. In general, previous experimental studies have found beneficial effects of mindfulness or acceptance-based strategies on reducing negative mood, ratings of distress, and discomfort (e.g., Broderick, 2005; Healy et al., 2008; Najmi et al., 2009), similar to the findings in the current study.

Most efficacious strategy. It was predicted that the cognitive restructuring strategy would be more efficacious in comparison to the mindfulness strategy, as the former targets both the content (i.e., degree of negative thoughts) and costs (i.e., distress related to negative thoughts) of the past social situation, while the latter theoretically targets only the relationship to the thoughts (i.e., distress related to negative thoughts). This hypothesis was not supported. The current study did not find any significant differences between the cognitive restructuring and mindfulness conditions across time. In the study mentioned previously, Rood and colleagues (2012) found that using a positive reappraisal strategy after recalling a stressful event was more efficacious than using an acceptance strategy for improving affect, in an unselected adolescent

sample. In contrast, Hofmann and colleagues' (2009) study demonstrated that brief acceptance and cognitive reappraisal strategies were equally efficacious at managing heart rate during a subsequent speech task in comparison to emotional suppression. However, these studies cannot be directly compared, as Hofmann et al.'s (2009) used anxiety ratings and physiological arousal during the speech task as the dependent variables, while the current study used the speech task to elicit PEP and subsequently assessed anxiety ratings and physiological arousal after the speech.

No Differences in Skin Conductance Level between Conditions

It was hypothesized that, as compared to the control condition, participants in both the cognitive restructuring and mindfulness conditions would exhibit greater decreases of SCL at poststrategy. Contrary to this prediction, there were no significant differences between conditions or on the rate of change of SCL between conditions. The only significant main effect found was for time, with SCL decreasing significantly over time for all conditions. It is important to note that comparing these three conditions on SCL may not be prudent or very meaningful, as participants were asked to complete very different tasks in each of the conditions. In the cognitive restructuring condition, SCL was recorded when participants were completing a thought record together with the experimenter. As mentioned earlier, they were not asked to write; however they were expected to verbalize their negative thoughts, evidence for and against the thought, and an alternative thought. This may have been a stressful task for participants to complete in front of the experimenter, especially given that they were socially anxious. More importantly, talking during this condition very likely led to increases in SCL. On the other hand, for participants in the mindfulness and control conditions, SCL was recorded during the mindfulness or PEP exercises, which asked them to sit quietly with their eyes closed or lowered. Participants were explicitly told that the experimenter would turn her attention away from them

and that the video camera was switched off, in order to decrease feelings of self-consciousness. Given these differences in the activities completed during SCL recording, it may not be meaningful to compare the cognitive restructuring condition to the control and mindfulness conditions. Nevertheless, this finding suggests that PEP does not seem to lead to elevated SCL. If this finding is replicated, it is positive information given that research has demonstrated detrimental effects of prolonged psychophysiological activity (e.g., Borghi et al., 1986; Treiber et al., 2001). However, it is possible that better controlled studies will find that PEP does lead to increases in SCL or other psychophysiological measures, given that at least one study has shown increased SCL during rumination (Sigmon et al., 2000).

Cognitive Processes involved in Cognitive Restructuring and Mindfulness Strategies

It was hypothesized that participants in the cognitive restructuring condition would report decreases in probability and cost biases, and reductions in maladaptive beliefs, while participants in the mindfulness condition would report increases in mindfulness and decentering. These hypotheses were minimally supported, as participants in the cognitive restructuring condition reported significantly decreased beliefs about the perceived costs of social situations compared to the control condition, as did those in the mindfulness conditions (although the latter finding only approached significance). Notably, cost biases were assessed using a measure that asked about the perceived consequences of a wide variety of negative social situations, such as being criticized, being clumsy in front of others, or making a mistake in front of a colleague. The findings from the current study indicate that the decreased cost biases generalized from the in-laboratory speech task to other social situations that may occur in everyday life. In fact, a few participants spontaneously commented that the strategies used to challenge anxious and negative thoughts about the speech were very helpful and that they should use the same strategies for

other situations in their daily lives. It is also important to note that participants in the cognitive restructuring condition reported decreased beliefs about the probability of negative social situations occurring in the near future; however this finding only approached significance.

The findings that changes in cost biases, and to some degree changes in probability biases, are involved in cognitive restructuring are in line with previous research. Foa and Kozak (1986) theorized that CBT works by teaching individuals that their feared outcome is not likely to occur, or if it does occur, they are able to cope and the costs are not as high as previously believed. Indeed, research has demonstrated that CBT leads to decreased cost biases (e.g., Foa et al., 1996; Hofmann, 2004; Rapee et al., 2009; Smit et al., 2006; Taylor & Alden, 2008) as well as reduced probability biases (e.g., McManus et al., 2000; Smit et al., 2006; Taylor & Alden, 2008). As mentioned earlier, the literature is equivocal with regards to whether cost biases or probability biases are a more powerful mechanism of change in reducing anxiety and improving successful treatment outcome. Given our findings, it appears that reduced cost biases was more strongly affected by cognitive restructuring than reduced probability biases, given that the former finding was significant, while the latter finding only approached significance. It is possible that the nature of the speech task completed in the current study was more conducive to cognitive restructuring through targeting cost biases, which may have affected the findings. The anxious thoughts that participants generally had related to their speech was that they did not deliver a good speech or looked stupid. Given that there were no consequences of the speech task in the participants' lives (e.g., it did not affect their academic grades), these thoughts were generally easier to challenge by having them think about the consequences of the speech, rather than thinking about the probability that they objectively did not deliver a good speech or looked stupid. Thus, it may be that the stronger findings of reduced cost biases in the cognitive

restructuring condition in the current study were in part due to the use of a speech task that had no consequences.

In contrast to our hypothesis, cognitive restructuring did not lead to significantly greater reductions in maladaptive beliefs as compared to the other conditions. Specifically, there were no changes to maladaptive beliefs related to high standards, or conditional or unconditional beliefs. It may be that more in-depth cognitive restructuring that targets changing unhelpful assumptions, rules, and beliefs are necessary. Also contrary to our predictions, mindfulness did not lead to increases in mindfulness and decentering. In fact, all participants reported a significant *decrease* in state mindfulness from baseline to follow-up. It is unclear why scores on mindfulness decreased over time; however the decrease was only by 2.6 points and represented a small effect size. It may be the case that the modified mindfulness measure did not capture state-like changes as intended. Alternatively, the poor psychometric properties of the KIMS describe and awareness subscales in the current study may have contributed to these unclear findings. It is difficult to compare the results of the current study to that of others that examined possible mediators of mindfulness, as other studies typically use a full course of mindfulness-based treatment.

Thus, it is possible that the single session mindfulness strategy in the current study was not potent enough to have the intended and typical effects of full mindfulness interventions. Mindfulness may be especially difficult to learn, understand, and embody within such a short timeframe. Baer and colleagues (2006) conceptualize mindfulness as a skill that can be improved with practice by means of regular meditation. Research has demonstrated that greater time spent engaging in formal meditation practice is significantly associated with the degree of improvement in psychological well-being and symptom reduction; and this relationship is

mediated by increases in mindfulness (Carmody & Baer, 2008). In the current study, participants engaged in only a few short mindfulness exercises in the laboratory and no homework exercises were assigned. Thus, there likely was not adequate time or practice involved to reap the full benefits that are associated with mindfulness practice, or to experience any changes in mindfulness. Kocovski and colleagues (2013) reported that for 12-week MAGT for social anxiety, there were no changes in mindfulness at midtreatment, but rather the changes occurred from mid to posttreatment.

Similarly, the finding that the mindfulness strategy did not lead to increases in decentering may also be attributed to the same aforementioned reasons. It is possible that mindfulness and decentering are more trait-like characteristics that are not amenable to increase within such a short timeframe.

Cognitive Process Predictors of PEP Reduction

It was predicted that participants who experienced more changes in the cognitive processes of probability and cost biases, maladaptive beliefs, and degree of mindfulness and decentering, as compared to those who experienced less changes, would report less PEP at follow-up. This hypothesis was supported, as decreases in cost biases was a significant predictor of decreased PEP at follow-up. Decreases in maladaptive beliefs about the self and others was also found to be a significant predictor of reduced PEP at follow-up; specifically, changes to high standards, and to conditional and unconditional beliefs, were all significant predictors. When these predictors were entered into the regression analysis together, changes in maladaptive beliefs remained a significant predictor of decreased PEP, over and above changes to cost biases.

The findings from the current study are in line with theories and models of social anxiety, as changes to these cognitive processes are proposed to lead to better treatment outcome. No

known studies have directly examined strategies aimed at reducing PEP and the cognitive processes that serve as predictors of reduced PEP. However, the findings of the current study can be compared to those that have examined predictors of initial PEP after a social situation. Rapee and Abbott (2007) found that perceived negative consequences of the social situation leads to greater initial PEP, and following these findings, the current study indicated that reducing these perceived consequences or cost biases predicted decreased PEP as well. It has also been found that perceptions of one's performance (e.g., Dannahy & Stopa, 2007; Fehm et al., 2007; Rapee & Abbott, 2007), dysfunctional cognitions and self-consciousness (Kiko et al., 2012), and holding a negative self-image during the social situation (e.g., Makkar & Grisham, 2011) predicts initial PEP. It may then follow that noticing and changing the content or the relationship that one has to the perceptions, cognitions, and self-images related to the social situation is what leads to reduced PEP; however, this remains an empirical question.

Given these findings, it may be that the type of strategy is not as important as the driving forces behind it, in the form of cognitive changes that predict reduced PEP. It is possible that targeting the cognitive processes of cost biases and maladaptive beliefs would be most efficacious in leading to decreases in PEP and its associated effects.

Methodological Strengths

A strength of the current study was its experimental design, with socially anxious participants randomly assigned to the cognitive restructuring, mindfulness, or control condition. The inclusion of a control condition was important to take into account the effects of interaction with the experimenter and time (although the control condition was shorter in duration than the other two conditions). A further strength of the control condition was that it was believably framed as learning a "habituation strategy," but in reality encouraged participants to engage in

PEP. Participants in all conditions were told that they would be learning a strategy that may be helpful to use when having negative thoughts about a past social situation, which was important so that participants across all conditions did not differ on the expected outcome of engaging in the strategy. Indeed, the manipulation check demonstrated no differences between conditions on how well participants thought the strategy would work for them and in general; although, participants reported that both the cognitive restructuring and mindfulness explanations seemed more logical than the control condition. However, as mentioned previously, participants in the control condition still rated the strategy on how logical it seemed between “somewhat” and “very much.”

Other strengths of the study included high internal validity, as only one experimenter ran all of the participants and followed the same protocol and script. However, the experimenter personalized the examples and thought records (in the cognitive restructuring condition) according to the participants’ own experiences of social anxiety, similar to what is done in therapy conducted outside of the laboratory. This was done in order to teach the techniques more efficaciously and to increase the external validity of the study. Internal validity was also increased by eliciting PEP in the same way for all participants, by asking them to deliver an impromptu speech in the laboratory in front of a video camera, the experimenter, and an observer. Other studies have asked participants to recall a past distressing social event in order to elicit PEP; however, this method may result in the recall of past events that differ on how long ago they occurred, the type of event (e.g., interaction or performance), and the importance and consequences of the event. A final strength was that SCL measurements were included as a dependent variable in order to assess psychophysiological data in addition to self-report measures.

Limitations and Future Directions

There are some limitations of the current study that should be noted. Firstly, the sample of socially anxious individuals may not have been truly representative, as participants were informed before agreeing to participate that they would have to engage in a 3-minute speech task. Therefore, these participants were willing to engage in this task despite scoring highly on a measure of fear of public speaking. It is unknown how many participants decided not to participate in the study due to the speech task component. Nevertheless, this sample scored highly on social anxiety, with mean scores on the SPIN being almost as high as those reported by clinically diagnosed individuals presenting for treatment (e.g., Connor et al., 2000). It is possible that participants did not know how stressful or the demanding the speech task would be (e.g., no preparation time, on a controversial topic, video-recorded, in front of the experimenter and an observer), and a few participants reported initially thinking that it involved simply reading aloud a preprepared speech. Additionally, eligibility criteria required participants to be high in social anxiety and speech anxiety; hence, results may not generalize to those who are only high in social anxiety without a fear of public speaking. Only 79% of the sample reported symptoms that met criteria for a diagnosis of social anxiety disorder, and results should be replicated in a full clinical sample. It is notable that in the publication of the DSM-5, only minimal changes were made to the diagnostic criteria of SAD (it is specified that the individual may fear showing anxiety symptoms, and examples are given of social situations). Therefore, all of the study participants whose symptoms met criteria for SAD based on the DSM-IV-TR would likely have also had SAD according to the DSM-5. Additionally, the updated DSM does not change the relevance of the current study's findings.

As mentioned previously, the cognitive restructuring and mindfulness strategies taught and practiced were of limited duration and may not have been potent enough to see greater effects in cognitive change. Specifically, they consisted of a single session that was about 40 minutes in duration, with no homework component. It is also unknown how participants coped with their negative thoughts about the speech task (i.e., PEP) in between the two laboratory sessions. It is possible that some participants engaged in distraction, spoke with a family member or friend about the speech, engaged in reassurance-seeking, practiced the strategy they learned, or used a different strategy. Future studies should investigate whether more sessions with assigned homework exercises are required to increase the understanding and generalization of the skills, and to show greater cognitive changes.

Another limitation was the different lengths of the conditions, with the control condition being approximately 20 minutes and the other two conditions being approximately 40 minutes in length. This decision was made because asking participants to repeatedly engage in PEP for more than 15 minutes may have led to increased negative affect, such as boredom, annoyance, or frustration, that is not directly related to PEP. Additionally, if the control condition was too long, participants may have become bored, may have stopped trying to think about their speech performance, and may have engaged in distraction. Another limitation is that the PEP elicited in the study was highly structured and artificial, unlike naturalistic PEP, and was not about a personally meaningful social situation. Future studies should attempt to have participants engage in more natural and spontaneous PEP, over the course of a longer time period, and about a situation that is personally relevant.

It is notable that the control condition encouraged participants to think about their speech performance, which typically led them to engage in PEP. As such, the control condition served

as an iatrogenic rather than an inert condition. The goal of this condition was to have participants engage in PEP in order to compare the efficacy of cognitive restructuring and mindfulness strategies to PEP. Future studies may wish to compare the effects of these strategies to an inert or distraction condition.

Related to the questionnaires used, a few of the items on the *PEP Measure* (adapted from Edwards et al., 2003) were slightly ambiguous. For example, the question “I am thinking about how many mistakes I made” could be rated highly if participants thought they made a lot of mistakes, but it is also possible that participants could have rated it highly if they thought that they did *not* make a lot of mistakes. However, we opted to use this measure as it has been used and validated in previous research, and specifically assessed the degree and distress associated with specific negative thoughts about a speech. Additionally, we were not able to find a suitable state mindfulness questionnaire that has been previously established and validated. The instructions of the *Toronto Mindfulness Scale* (Lau et al., 2006) asks participants to rate the degree to which they agree with each item of the questionnaire related to “what they just experienced.” In the current study, the state mindfulness measure was not administered immediately following a mindfulness meditation exercise, in contrast to what was done in Lau and colleagues’ study (2006); thus, its use in our study was not appropriate. Instead, we chose to use the KIMS (Baer et al., 2004) and modified the instructions slightly to ask about thoughts and behaviours over the past few days (versus what is generally true) to attempt to capture state-like changes in mindfulness. However, this slightly modified version of the KIMS has not been previously validated and the internal consistency on two subscales was poor in the current study. As reported earlier, the alpha coefficients of the describe and awareness subscales were very low, which is not in line with the data reported in the original KIMS study (Cronbach’s $\alpha = .84$,

.83, respectively). This discrepancy may have occurred as we modified the original instructions of the KIMS in attempt to make it a more state-like measure. Finally, between group differences were found at baseline for the KIMS awareness subscale (Baer et al., 2004), decentering as measured by the EQ (Fresco et al., 2007), and the PEP distress subscale (adapted from Edwards et al., 2003), making the results more difficult to interpret. Future studies should aim to use previously validated measures that are sound, and ensure that randomization results in equivalent scores on important dependent variables at baseline.

The follow-up session took place one day after the initial session, and it is possible that this was too short of a timeframe to see robust changes in cognitive processes, especially in mindfulness and decentering. Accordingly, McManus and colleagues (2012) found the majority of changes in beliefs at 1-week follow-up, rather than immediately after the thought record or behavioural experiment strategy implementation. As mentioned previously, Kocovski and colleagues (2013) reported that changes in mindfulness during a 12-week MAGT for social anxiety occurred from mid to posttreatment. It is also possible that the measures of mindfulness and decentering were not state-like enough to capture subtle changes that may occur in such a short timeframe. However, during pilot testing of the study, some participants did not continue to engage in PEP beyond a 1-day period, perhaps because the speech task was not personally meaningful. For this reason a 1-day follow-up period was selected; however, future studies could examine the effects at 2 to 7 days following the initial PEP induction, especially if a personally relevant social situation is used.

It is important to note that these findings are specific to a PEP induction using a speech task and cannot be generalized to other social situations. It would be beneficial for future research to examine PEP related to other types of social situations, such as social interactions.

Future studies could also examine other ways to potentially decrease PEP and its associated effects, such as through targeting negative self-image, decreasing maladaptive self-focussed attention, changing interpretation biases, challenging positive beliefs about PEP, or using behavioural experiments. Additionally, it would be beneficial for future studies to examine and better understand the differences between adaptive and maladaptive PEP.

Clinical and Research Implications

This was the first known study to examine the efficacy a brief cognitive restructuring strategy in comparison to a brief mindfulness strategy for decreasing PEP and its associated effects. As PEP is associated with several negative effects, including more negative thoughts and autobiographical memories, negative affect including increased anxiety, and maladaptive beliefs, it is important to examine the efficacy of short- and long-term strategies for PEP reduction. The current study found beneficial effects of the use of single session cognitive restructuring and mindfulness strategies on reduction of PEP and its associated effects. These preliminary findings suggest that these strategies may be promising to use in a treatment setting. Modifications to the strategies may lead to even greater effects; for example, incorporating more sessions of instruction and practice, or further practice in the form of homework exercises. More work along this avenue of research is important to continue to examine how to decrease PEP and its negative effects in the short-term.

It appears that both cognitive restructuring and mindfulness may be helpful strategies to teach clients when their engagement in PEP is perceived as distressing or is maintaining their social anxiety. Over the course of CBT treatment, if cognitive restructuring has already been taught, clients may be able to quickly adapt this technique to challenge their negative thoughts about past social situations to reduce PEP. Similarly in mindfulness-based approaches, it may be

the case that clients who are already experienced in mindfulness practice may be better able to apply these techniques to change their relationship to their negative thoughts. These remain empirical questions, and results from the current study await further replication in a clinical sample before treatment recommendations can be put forth. As noted earlier, it is important to keep in mind that there were no significant differences between the cognitive restructuring and mindfulness conditions on any of the dependent variables; hence, no conclusions can be put forth regarding the superiority of one strategy over the other.

Related to research implications, there is sufficient evidence for the effectiveness of both CBT and mindfulness-based interventions for SAD; however, less is known about the changes in cognitive processes that predict successful treatment outcome for these treatment modalities. The current study adds to the growing literature that teaching and practicing a brief cognitive restructuring strategy is associated with reductions in cost biases of social situations. The study also highlights the important role of the cognitive processes of cost biases and maladaptive beliefs about the self and others in predicting reduced PEP. Since changes in cost biases and maladaptive beliefs predicted reductions of PEP regardless of the strategy taught, targeting these factors may be the key to reducing PEP. For example, cognitive restructuring could focus on helping clients challenge how bad or distressing they think it is if various negative social situations occurred, or were to occur in the future. Maladaptive beliefs about the self and others (e.g., “I have to appear intelligent and witty”) could also be directly targeted using cognitive restructuring and behavioural experiments. Using a mindfulness approach, clients could be encouraged to notice the thoughts that arise about past social situations without adding on a layer of thoughts or judgments about the cause, meaning, and consequences of these events. Again,

more research is necessary to confirm the findings from the current study in clinical samples before firm treatment implications can be drawn.

General Conclusions

The current study was the first to experimentally examine the effects of single session cognitive restructuring and mindfulness strategies on reducing PEP and its associated negative effects, as well as to investigate the cognitive processes involved. It was found that cognitive restructuring led to decreased PEP (degree and associated distress) and improved affect (but not state anxiety), as compared to the control condition. Mindfulness led to decreased PEP (degree but not associated distress) and improved affect (including state anxiety), in comparison to the control condition. Participants in the cognitive restructuring condition decreased their beliefs about the perceived costs of negative social situations – a finding that seemed to generalize from the cost biases of the in-laboratory speech task to social situations that may occur in everyday life. As well, decreases in cost biases and maladaptive beliefs about the self and others significantly predicted reductions in PEP, with maladaptive beliefs being the strongest predictor. It is notable that single session strategies that were only about 40 minutes in duration, with no homework component, led to these significant changes. These findings suggest that brief cognitive restructuring and mindfulness strategies may be promising avenues for decreasing PEP and its associated effects. Future studies should replicate these findings in a clinical sample so that treatment implications can be put forth.

Appendix A
Manipulation Check

Please select the appropriate response to each of the following questions.

1) How logical did you find the explanation for the strategy?

Not at all	A little bit	Somewhat	Very much	Extremely
0	1	2	3	4

2) Before you tried the strategy, how well did you think it would work for you?

Not at all	A little bit	Somewhat	Very much	Extremely
0	1	2	3	4

3) Before you tried the strategy, how well did you think it would work in general (i.e., how well did you think it would work for other people experiencing negative thoughts)?

Not at all	A little bit	Somewhat	Very much	Extremely
0	1	2	3	4

4) To what degree did you try to follow the instructions for the strategy?

Not at all	A little bit	Somewhat	Very much	Extremely
0	1	2	3	4

Appendix B
Informed Consent Agreement
Ryerson University

Title of Study: Shyness and Thoughts about Social Situations

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.

Investigators: Bethany Gee, MA, Graduate Student, Department of Psychology, Ryerson University
Martin M. Antony, PhD, Professor, Department of Psychology, Ryerson University
Stephanie Cassin, PhD, Professor, Department of Psychology, Ryerson University
Janice Kuo, PhD, Professor, Department of Psychology, Ryerson University

Purpose of the Study: The purpose of this study is to examine how individuals think and feel about social situations.

Description of the Study: The study will involve two laboratory visits to the Psychology Research and Training Centre at Ryerson University, located at 105 Bond Street. The total time commitment for the first session will be approximately 2 hours and 15 minutes, and the second session will be approximately 30 minutes; however some participants may take shorter or longer to complete the study. The second laboratory session will take place 1 day following the first session. If you agree to participate, you will be asked to complete several questionnaires and perform a 3-minute recorded speech task with an observer present. A total of 4 electrodes will be placed on your nondominant hand and near your collar bones, in order to take physiological measurements. This procedure is *not* associated with any pain. You will be randomized into one of three conditions, in which you will be taught: i) a method to habituate to your thoughts, ii) a method to challenge your thoughts, or iii) a method to notice and accept your thoughts.

Confidentiality: Everything you disclose will remain completely confidential among those involved in the study, with the following exceptions, for which we may be required by law to break confidentiality:

- (1) if you intend to harm yourself or someone else;
- (2) if there is reasonable suspicion that a child up to the age of 16 years is at risk of neglect or abuse, we are required by law to report this to the Children's Aid Society;
- (3) if our files are subpoenaed by the courts (records can be opened by a specific court order);
- (4) if a regulated health professional has engaged in inappropriate sexual behaviour toward you or another person and you provide us with the name of this individual, we are obligated to report them to their regulatory body.

This informed consent agreement and all information that you provide will be stored in locked file cabinets at the Psychology Research and Training Centre at Ryerson University. An ID

number, as opposed to your name, will be used on all questionnaires you complete, and in all computer files that contain the data you provide during the study. The data you generate while participating in this study will be kept in a locked file cabinet, separate from this consent agreement and any data that identifies you. Your confidentiality will be protected to the full extent allowed by law. Only group findings will be reported in publications and presentations arising from this research. The data will be destroyed 7 years after the findings have been published.

Potential Risks or Discomforts: There is minimal risk involved if you agree to take part in this study. By signing this form, you understand that you may experience some negative emotions when completing the tasks or slight discomfort when removing the electrodes (similar to removing a Band-Aid). You have the right to refuse or discontinue participation at any time. If you decide to stop participating, you will still be entitled to compensation for your time. However, we ask that you try to complete the study in its entirety, for the benefit of psychological research.

Potential Benefits of the Study to You or Others: There may be no direct benefits to you for participating in the study. However, you may derive benefit from the self-assessment, as it may increase your awareness of your own emotions and behaviours. You may also develop a better understanding of research methodology and will be providing researchers with valuable insights.

Voluntary Nature of Participation: Participation in this study is completely voluntary. Your choice of whether 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. Your right to withdraw your consent also applies to our use of your data. If you decide that you do not want us to keep or analyze data that you provide during the course of your participation in this study, please notify us. At any particular point in the study, you may refuse to answer any particular question or stop participation altogether.

Compensation for Participation in the Study: Compensation will be \$10 upon completion of the first laboratory session, and \$25 upon completion of the second session, for a total of \$35.

Questions about the Study: If you have any questions about the research now, please ask. If you have questions about the research later, you may contact Bethany Gee, MA, Graduate Student, Department of Psychology, Ryerson University, 416-979-5000 ext. 2184, bgee@psych.ryerson.ca, or Dr. Martin M. Antony, PhD, Professor, Department of Psychology, Ryerson University, 416-979-5000 ext. 2631, mantony@psych.ryerson.ca.

If you have questions regarding your rights as a human participant in this study, you may contact Toni Fletcher, at 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
416-979-5042

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

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

Participation in Future Research

There is a possibility that members of the Anxiety Research and Treatment Lab will develop new anxiety studies in the future. Please indicate whether or not you agree to be contacted (by email or telephone) to be invited to participate in this future research. Agreeing to be contacted does not obligate you to participate. You are free to turn down any offers to participate in future research, and you are free to withdraw your consent to be contacted at any time.

_____ **Yes, I agree to be contacted regarding participation in future research**

_____ **No, I do not wish to be contacted to participate in future research**

If you agree to be contacted for future projects, please provide the best contact method(s):

Email: _____

Phone: _____

Appendix C
Demographics Questionnaire

Sex:

☐ Female

☐ Male

Age: _____

Relationship Status (please select one):

☐ Single

☐ In a steady relationship

☐ Married

☐ Cohabiting

☐ Separated

☐ Divorced

☐ Widowed

Ethnicity/Cultural Background:

☐ Aboriginal (e.g., First Nations, Métis, Inuit)

☐ Black/Afro-Caribbean/African

☐ White/European

☐ Hispanic/Latin American

☐ Asian (e.g., South Asian, East Asian, Southeast Asian)

☐ Biracial/multiracial

☐ Other (specify _____)

Are you enrolled in an educational program? ☐ Yes

☐ No

If yes, please select one:

☐ Community College

☐ University

- ☐ Adult Education/Continuing Education
- ☐ Other (specify _____)

Field of Study: _____

Education Level (please select one):

- ☐ Did not attend High School
- ☐ Some High School
- ☐ Completed High School/High School Equivalency (GED)
- ☐ Some College/University
- ☐ Completed College/University
- ☐ Some Graduate/Professional School (e.g., Masters or doctoral program, medicine, law)
- ☐ Completed Graduate/Professional School (e.g., Masters or doctoral program, medicine, law)

Employment Status:

- ☐ Not Working
- ☐ Working Part-Time
- ☐ Working Full-Time

If working part-time or full-time, indicate occupation: _____

Annual Family Income (please select one):

- ☐ Less than \$19,000
- ☐ \$20,000 - \$39,999
- ☐ \$40,000 - \$59,999
- ☐ \$60,000 - \$79,999
- ☐ \$80,000 - \$99,999
- ☐ \$100,000 - \$199,000
- ☐ More than \$200,000
- ☐ Don't know

Number of people supported by the family income (including self): _____

Appendix D

Control Script

When you find yourself having negative thoughts about an event that has happened in the past, it is often helpful to keep thinking about these thoughts in order to habituate, or get used to, these negative thoughts. For example, if you find yourself having negative thoughts about the speech you just gave, you can try using this strategy.

An example to demonstrate the process of habituation is when you first walk into a room and you notice a smell – perhaps the smell of perfume or the smell of someone’s lunch. At first the smell is very noticeable, but after a few minutes of being in the room, you get used to the smell, or habituate to it, and do not even notice it anymore. Have you ever had this experience? Another example of habituation is when you hear a loud sound over and over again (such as construction), and at first it is very bothersome and irritating, but after a few minutes you get used to the sounds and hardly even notice them anymore. We will apply this same strategy of habituation to any negative thoughts you may be having about the speech you just gave, by continuing to think about these thoughts in your mind in order to get used to them.

Let’s try this now. Please get into a comfortable position and close your eyes. Now, think about your speech performance. Notice the thoughts that are going through your mind about how you performed on the speech. Continue to think about these thoughts, even if you have to repeat your thoughts. *Prompt, “Continue to think about how you performed on the speech” every 2 minutes, until 7.5 minutes has elapsed.* You may now open your eyes.

How was that exercise? What thoughts about your speech performance did you have?

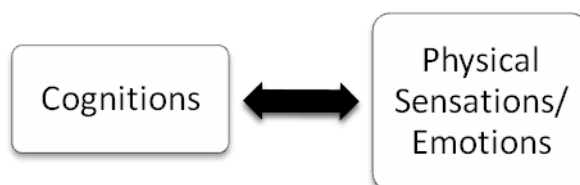
Let’s try the same exercise one more time. Please get into a comfortable position and close your eyes. Again, please think about your speech performance. Notice the thoughts that are going through your mind about how you performed on the speech. Continue to think about these thoughts, even if you have to repeat your thoughts. *Prompt, “Continue to think about how you performed on the speech” every 2 minutes, until 7.5 minutes has elapsed.* You may now open your eyes.

How did that exercise go? What thoughts about your speech performance did you have?

Appendix E

Cognitive Restructuring Script

Now I will be teaching you a strategy called cognitive restructuring that can be useful when you find yourself having negative thoughts about a social event that has happened in the past. For example, if you find yourself having negative thoughts about the speech you just gave, you can try using this cognitive restructuring strategy.



This strategy is based on the idea that our thoughts lead us to feel different physical sensations and emotions. For example, if someone you knew was walking down the street and didn't acknowledge you, what is the very first thought you would have? How would that make you feel? What physical sensations would you feel, perhaps flushed cheeks or a queasy stomach? What if you learned that she didn't have her contacts in and couldn't see you? How would that make you feel? What if you learned that she just found out that her grandmother passed away? Or that she failed her big chemistry exam? Can you now see how different thoughts can lead to different emotions and physical sensations, even for the same situation? Therefore, examining the way that you think is a great way to potentially change some of the negative emotions or physical sensations you may have.

Can you think of a time when you recently felt anxious in a social situation, like speaking in class, a party, or meeting someone new? What physical sensations do you remember? Are there certain physical symptoms that are particularly bothersome to you in social situations? Do you recall what some of your thoughts, assumptions, or predictions were in the situation? If not, what types of thoughts do you typically experience when you feel anxious in social situations? Here is a list of thoughts that may accompany anxiety in social situations (*show list of examples to individual*). Have any of these thoughts crossed your mind when you were feeling anxious?

Examples of thoughts people may have in social situations:

- It is important that everybody likes me
- If my boss doesn't like me, I will get fired
- If I am not liked by a particular person, I am unlikable
- If someone rejects me, I deserve it
- People find me unattractive
- I will look incompetent if I speak to my boss

- People will become angry with me if I make a mistake
- People are untrustworthy and nasty
- People should always be interested in what I say
- People should not look at me the wrong way
- I should be able to hide my anxiety symptoms
- If my hands shake at work, it will be a disaster
- Anxiety is a sign of weakness
- I should not appear anxious
- It is awful to blush, shake, or sweat in front of others
- People can tell when I am anxious
- I will not be able to speak if I am too anxious

For today, I would like to focus on the role of negative thinking and how it can trigger anxiety and help to keep it alive. Let's say you're talking to someone at a party and he/she looks down at his/her watch. What are some different thoughts that you might have in this situation? (*Probe if participant doesn't come up with a range of both negative and neutral/positive thoughts: "Can you think of some other possible interpretations that someone might have in this situation?"*). Let's say that you interpret the person's looking at the watch as a sign that he or she has to be somewhere at a specific time (*or some other neutral thought that the participant has come up with*). How might that influence your feelings in the situation? What emotions would you experience? Now let's consider an opposite interpretation. Let's say that you interpret the person's looking at his/her watch as a sign that you're boring and he or she isn't interested in what you're talking about (*or some other negative thought that the participant has come up with*)? How would that make you feel in the situation?

So you can see that the thoughts that you have in a situation can influence how you feel in that situation. When we are anxious, we are more likely to automatically have negative thoughts about the situation and to view our thoughts as being true. Many of the anxiety-provoking thoughts that we experience can be classified as being one of two main types: (1) probability overestimation and (2) catastrophic thinking.

Probability overestimation involves predicting that a specific negative event is much more likely to occur than it really is. For example, someone who is fearful of going to parties might predict that she/he will make a fool of him/herself at the next party and no one will want to talk to him/her, even though he/she usually does well at parties and talks to a number of different individuals. Or, someone who fears dating may assume that his or her partner is thinking all sorts of negative things (e.g., "wow – is this person ever boring!"), when they likely are not.

Can you think of any examples of probability overestimations in your own life? Are there times when you assumed that something bad was going to happen, that did not end up happening?

Catastrophic thinking (or catastrophizing) involves assuming that if a negative event does occur, the consequences would be terrible and unmanageable. For example, someone who is fearful of talking with others at parties might think "it would be a disaster if I blushed while speaking with others" or "it would be awful if some people thought what I was saying was boring."

When in reality, if the person was to have blushed or some people actually did think she was boring, the consequences would likely not be very bad, and the person likely would be able to cope.

Can you think of any examples of catastrophic thinking in your own life? Are there times when you assumed that a particular outcome would be extremely awful, or unmanageable, or that you would not be able to cope? Are there times when you have coped better with negative social events than you thought you would?

Now we are going to look at ways to challenge or change some of these anxious thoughts.

Often when we are anxious, we tend to automatically notice the negative or threatening aspects of a situation and fail to notice the neutral or positive aspects. For example, you might pay much more attention to the time your friend neglected to return your text message or phone call than all the times that he or she responded quickly, and assume that the lack of response is evidence that your friend is thinking bad things about you. Or, you might take the sleepy person in the front row as evidence that your presentation is boring, even though many others in the audience are alert and paying attention.

One way to challenge your anxious thinking is to examine the evidence. The first step to learning to challenge your anxious thoughts is to recognize that your thoughts are not facts. Instead of assuming that your negative thoughts are true, it is helpful to treat your anxious thoughts as guesses or hypotheses. In the same way that a scientist gathers evidence for his or her hypotheses, you want to examine the evidence to assess the extent to which your thoughts are true. In order to examine the evidence for your thoughts, you can ask the following questions:

1. How do I know for sure that my prediction will come true?
2. What does my past experience tell me about the likelihood of my thoughts coming true?
3. Have there been times when I have experienced anxious thoughts that didn't come true?
4. Are there facts or statistics that can help me to decide whether my prediction is likely to come true?
5. Are there other possible interpretations for this situation?
6. How might another person (who isn't anxious in social situations) interpret the situation?

One other strategy that you can use is to view yourself as close others would, such as a close friend, family member, or partner. Alternatively, what if the tables were turned and a close friend came to you for advice and support after a party? What would you say if your friend said to you "I made a complete fool of myself at the party I went to last night. I couldn't think of anything to say and I'm sure I looked like a complete idiot." It is often much easier to challenge someone else's anxious thoughts than it is to challenge your own. Therefore, one way to cope with your anxious thoughts is by mentally "stepping out" of the situation for a moment. Here are some questions that you can use:

1. What might I say to a close friend or relative who was having the same thought as me?
2. What might a close friend or relative say to me if he or she knew what I was thinking?

A third way to challenge your anxious thinking is to challenge your catastrophic thinking. This involves shifting the focus of your thoughts from how terrible a particular outcome would be to how you might manage or cope with the situation if it were to occur. In many cases you will realize that even if your fear does come true, it won't be end of the world. You will cope with the situation, and your discomfort will pass. One of the most effective ways to overcome your catastrophic thinking is to ask yourself questions like the following:

1. So what?
2. What if my fears actually come true?
3. How can I cope with _____ if it were to occur?
4. Would _____ really be as terrible as I think?
5. Does this really matter in the big scheme of things?
6. Will I care about this a month from now? A year from now?

Looking at the list of strategies that can be used to challenge your anxious thinking, which ones do you think might apply most to your experiences in social situations? Do any of them stand out to you as potentially being helpful?

Generally, the process of challenging anxiety-provoking thoughts involves four steps:

1. Identifying your anxious thought
2. Generating alternative thoughts
3. Examining the evidence
4. Coming to a balanced conclusion

Here is an illustration of how to work through the four steps in the context of a fear of public speaking.

1. Identifying the Anxious Thought

- During my presentation, people will notice my blushing and think that I am strange

2. Generating Alternative Thoughts

- Nobody will notice my blushing
- Only a small number of people will notice my blushing
- People who notice my blushing will think I am feeling hot
- People who notice my blushing will think I am feeling unwell
- People who notice my blushing will think I am feeling a bit anxious
- It is normal to blush sometimes, so people will think nothing of it if they notice me blush

3. Examining the Evidence

Evidence Supporting my Anxious Belief

- I believe that my blushing is very extreme
- In high school people teased me for blushing on a few occasions
- I tend to notice when other people blush

Evidence Supporting my Alternative Beliefs

- I know a lot of people who blush easily and people don't seem to think they are strange
- When I notice other people blushing, I don't think they are strange
- Often people do not seem to have noticed me blush when I ask them if it was noticeable
- When people have noticed my blushing, they haven't tended to treat me differently
- The people in the audience know me well. I can't imagine that their opinions of me would change dramatically based on whether I blush during a single presentation

4. Coming to a Balanced Conclusion

- Some people may notice my blushing, but it's unlikely that they will think I'm strange

A thought record is a tool that can be used to help the process of challenging anxious thoughts. This form can be used whenever you experience anxiety in a social situation. Here is a summary of how to complete a thought record.

How to Complete the *Anxiety Thought Record*

<i>Column</i>	<i>How to Complete</i>
1. Day and Time	▪ Record the date and time when your anxiety episode occurred
2. Situation	▪ Describe the situation that triggered your anxiety. This can be an object, activity, or experience (e.g., a thought, memory, image, or physical feeling)
3. Anxiety-Provoking Thoughts and Predictions	▪ Record any anxiety-provoking thoughts or predictions that were on your mind. What were you afraid might happen?
4. Anxiety Before (0 – 100)	▪ Using a scale ranging from 0 (completely calm) to 100 (completely terrified), rate your anxiety level before you started to challenge your anxious thoughts.
5. Alternative Thoughts and Predictions	▪ Record some alternative beliefs and predictions to counter the thoughts listed in column 3.
6. Evidence and Realistic Conclusions	▪ Record any evidence you can think of to counter your anxiety-provoking thoughts. Based on this evidence, write down a realistic conclusion or prediction.
7. Anxiety After (0 – 100)	▪ Using a scale ranging from 0 (completely calm) to 100 (completely terrified), rate your anxiety level after challenging your anxious thoughts.

Now let's go through an example of how you can use a thought record to challenge your own anxiety in social situations. Let's use the situation of the speech you just completed in the laboratory. *Guide participant through completing the thought record.*

Do you have any questions for me about cognitive restructuring or using the thought record?

Appendix F

Mindfulness Script

Now I will be teaching you a strategy called mindfulness that can be useful when you find yourself having negative thoughts about a social event that has happened in the past. For example, if you find yourself having negative thoughts about the speech you just gave, you can try using this mindfulness strategy.

Adapted from Lizabeth Roemer and Susan M. Orsillo (2009).

Definition of Mindfulness

Mindfulness is paying attention in the present moment, with openness and curiosity, instead of judgment. We often focus on things other than what is happening in the moment – worrying about the future, thinking about the past, focusing on what is coming next, rather than what is right in front of us. And it is useful that we can do a number of things without paying attention to them. However, sometimes it is helpful to bring our attention, particularly a curious and kind attention, to what we are doing in the moment.

The best way to understand mindfulness is to practice it, so let's do that now. For the next few minutes, we will do a mindfulness exercise geared at bringing your awareness to the present moment, and to your own breath. In a minute I will ask you to close or lower your eyes, but just to let you know, while you do this exercise I will turn my attention away from you so that you do not have to feel self-conscious.

Exercise No. 1 (3 minutes) - Being Mindful of Breath

We will now complete the 3 minute exercise.

Adapted from Lizabeth Roemer and Susan M. Orsillo (2009).

Begin by sitting upright but comfortably, either closing or lowering your eyes. Notice the way you're sitting on the chair. Notice where your body is touching the chair. And then gently shift your awareness to your breath, without attempting to change it in any way. Notice how the air enters your body, where it travels, and how it leaves your body. Notice the parts of your body that move as you are breathing. Notice where you feel the breath in your body. It may be in your nostrils, the back of your throat, your chest, or your belly. Just gently allow your awareness to rest in this place where you feel your breath. (long pause) Each time your mind wanders, notice that, and gently bring your awareness back to the place you feel your breath. Notice the in-breath and the out-breath. (pause) And just continue to bring your awareness back to your breath again... and again ... for the next several moments. (~1 min. pause) Now gently bring your focus back to the way you're sitting on your chair. And when you're ready, open your eyes.

Discussing the mindfulness of breath exercise

If you've never tried mindfulness before, you've just completed your first practice. The exercise you just completed involved being mindful of your breath. How did you find it? Were there any challenges associated with completing the exercise? (Give participant a chance to provide his or her own challenges before supplying examples from the following list).

- For instance, maybe you noticed that your mind was wandering quite a bit, or maybe you felt self-conscious about your breathing. Maybe you felt anxious or uncomfortable, or restless and impatient, or maybe you felt like you weren't doing the exercise properly.

So you see that even a short mindfulness exercise can show us how busy our minds are. It may even show us our tendency to worry, be anxious, or criticize ourselves. Mindfulness practice can be extended to working with your thoughts which can be especially helpful with anxiety or negative thinking. You would do this by observing your thoughts, in a similar manner to the breath awareness exercise you just practiced.

Mindfulness of thoughts

Can you think of any examples from your own life when you find yourself doing things without paying attention to what you are doing, which we call doing things on “autopilot?” What sorts of things do you find yourself thinking about during these times? *(If participant cannot think of an example, ask about tasks such as driving, walking, doing the dishes, etc.).*

On the other hand, sometimes we do pay close attention to what we are thinking and feeling and we become very critical of our thoughts and feelings and we try to either change them or distract ourselves because this critical awareness can be very painful. For example, we might notice while we are talking to someone new that our voice is shaky, or we aren't speaking clearly, and think, “I'm such an idiot! What is wrong with me? If I don't calm down, this person will never like me!” Can you think of any examples from your own life when you find yourself being very critical of your thoughts or feelings? *(If participant cannot think of an example, ask about situations such as job interviews, meeting someone for the first time, going on a date, etc.).*

Being mindful falls between the two extremes of either not paying attention to what we are doing or thinking at all, or paying too much attention and being critical. Mindfulness falls somewhere in between, and involves paying attention to what is happening inside and around us, seeing events and experiences as what they are, and allowing things we can't control to be as they are while we focus our attention on the task at hand. Mindfulness is accepting your thoughts as they are, and without judgment. For example, when talking to someone new we might notice those same changes in our voice and take a moment to reflect and notice, “My voice is shaking,” accept this, and gently bring our attention back to the person and our conversation. This second part of mindfulness, not being judgmental, but rather accepting, and not trying to change our thoughts can be especially hard. Oftentimes when people first start doing mindfulness exercises, they notice that they are having judgmental thoughts and become upset at themselves for having these thoughts. However, if this happens, simply notice these judgmental thoughts, and see them as just thoughts.

So, to summarize, being mindful of your thoughts involves 2 parts:

Being Aware – Be aware of your thoughts. Stay in the moment and observe the here and now, rather than focusing on the past or the future.

Being Nonjudgmental – Notice your thoughts, and try not to judge them. Instead, be compassionate and kind towards your thoughts.

Tips – If you find yourself judging your thoughts, notice these judgmental thoughts. Try to see your thoughts as just thoughts; and not as facts. If you find yourself becoming distracted, notice that you have become distracted, and bring your awareness back to your thoughts.

Give client the handout of this summary and have them read it over for a few minutes. Ask them if they have any questions. Ask them to summarize back their understanding of mindfulness in their own words.

Again, the best way to understand mindfulness is to practice it, so let's do that now. Mindfulness takes lots of practice, just like building up any skill does, and there's no such thing as doing it perfectly. What matters most is that you try to be aware of your thoughts in the moment, and try not to judge them. This will be a 7 minute exercise.

Exercise No. 2 (7 minutes) - Being Mindful of Thoughts

For this exercise, I would like you to think about your performance on the speech you gave earlier. Use the mindfulness strategy to notice any *thoughts* that you may be having about your speech performance. Try to simply observe these thoughts, and accept them as they are. The recording will guide you through this exercise. During the silences, please continue to be mindful of your thoughts. Please get into a comfortable position, and close or lower your eyes.

Adapted from Lizabeth Roemer and Susan M. Orsillo (2009).

Begin by noticing the way you are sitting. Noticing where your body touches the chair. Then gently bringing your awareness to your breath. Noticing where you feel it in your body. Noticing the sensations as you inhale and exhale.

As your awareness settles on this moment, noticing your thoughts and memories that arise that relate to your speech. Acknowledging the thoughts as they pass through your mind – as they arise and unfold over time.

Bringing your attention to any self-critical thoughts you are having. And as best you can, observing them for a moment either as words on leaves floating down a stream or as words projected on a movie screen. Although you may feel a pull to judge those thoughts, change their content, or push them away, as best as you can just acknowledging their presence and allowing them to be as they are.

Just noticing your experience and bringing a sense of curiousness and compassion to what you are experiencing. Staying with any thoughts and images that pull your attention and observing them just as they are. Bringing compassion to yourself for experiencing these thoughts and images.

When you are ready, bringing your awareness again to your breath and the present moment before you open your eyes.

How did you find that exercise? What thoughts did you notice you were having? Do you have any questions before we move on?

Now that you have practiced being mindful of your thoughts, let's turn to your emotions and physical sensations.

Being Mindful of Emotions and Physical Sensations

Adapted from Erisman & Roemer (2010).

One of the hardest times to be mindful is when we are experiencing a strong emotion, like fear, or sadness, or joy. In those moments, we often want to either hold onto the emotion or get rid of it, rather than allowing it to rise and fall naturally. And sometimes it feels like we can make emotions stay or make them leave, but other times we may find that trying to make an emotion stay makes it leave even faster, while trying to get rid of it keeps it hanging around. Emotions can give us important information about our lives, a particular situation, or the way someone we care about is responding to us. So it can be useful for us to notice the emotions we are having, as they happen, rather than judging them or trying to change them. We can bring the same kind of awareness you just practiced to any emotional experience, noticing what we feel in our bodies, and just letting that experience happen without getting caught up in it. Our feelings will change on their own when we let them be, rather than seeing them as bad or good or something to be changed.

Oftentimes when we are feeling strong emotions such as anxiety, sadness, or joy, we also feel different physical sensations in our bodies. For example, when we feel sad, sometimes we feel heavy, as though there is a great weight on our shoulders; or when we feel anxious, our heart rate speeds up, and we become sweaty, shaky, and tense.

What do you normally do when you feel an emotion such as anxiety? What types of thoughts usually run through your head when you feel anxious? What types of physical sensations or changes in your body do you notice when you are anxious? In order to be mindful of your feelings, I would like you to try to just notice and be aware of your emotions and physical sensations, as they are happening. Try not to judge these feelings as good or bad, and try not to change these feelings. Just notice what you are feeling in your mind and in your body, and let those feelings happen naturally.

So, to summarize, being mindful of your emotions and physical sensations involves 2 parts:

Being Aware – Notice the emotions and physical sensations you are having, as they happen.

Being Nonjudgmental – Try not to judge your emotions or physical sensations as good or bad, and try not to change them. Just let the experience of your feelings happen.

Tips – If you find yourself judging your feelings, notice these judgmental thoughts. Gently turn your attention back to the emotions and physical sensations you are having. If you find yourself becoming distracted, notice that you have become distracted, and bring your awareness back to your feelings.

Give client the handout of this summary and have them read it over for a few minutes. Ask them if they have any questions. Ask them to summarize back their understanding of mindfulness in their own words.

This is also something that is easier to experience than it is to describe. Let's do another exercise to give you a sense of what I'm describing. This will be a 7 minute exercise.

Exercise No. 3 (7 minutes) - Being Mindful of Emotions and Physical Sensations

For this exercise, I would like you to think about your performance on the speech you gave earlier. Use the mindfulness strategy to notice any *emotions* and *physical sensations* that you may be having about your speech performance. Try to simply observe these feelings, and accept them as they are. The recording will guide you through this exercise. During the silences, please continue to be mindful of your feelings. Please get into a comfortable position and close or lower your eyes.

Adapted from Elizabeth Roemer and Susan M. Orsillo (2009).

Begin by noticing the way you are sitting. Noticing where your body touches the chair. Then gently bringing your awareness to your breath. Noticing where you feel it in your body.

Noticing the sensations as you inhale and exhale.

As your awareness settles on this moment, allow your memory of the speech to arise. Picture yourself in the situation, noticing what you can see, the sounds you hear. Then bring awareness to feelings in your body, noticing any tightness in your body. You may notice your chest is tight, or your shoulders are hunched, or you have a pit in your stomach. Just noticing whatever sensations you have in your body during this time.

As you continue to breathe into your body remembering this time, noticing the physical sensations in your body, you may also notice emotions that arise. You may notice many emotions, or only a general state of distress. You may observe that the sensations in your body are connected to an emotional state. Whatever you notice, just allowing all of these experiences to unfold. Noticing any urges to respond to your experience and any desire to avoid your feelings.

Just continue paying attention to your experience, bringing curiousness and compassion to whatever you are noticing. Observing what happens to you when you are feeling strong emotions, without altering or judging your experience. Just noticing the way these emotions feel in your body. Noticing any time you are trying to alter or judge your experience and just letting go, refocusing on the experience and the sensations in your body. Noticing any efforts to push feelings away or efforts to hold on to feelings. Seeing how those efforts affect your breath and the sensations in your body. And continuing to breathe and allowing your experience to unfold while you remember your speech. Observing how your feelings change or ways they don't change.

And then gently bringing your attention away from your memory and back to your breath and to the present moment before you open your eyes.

How did that exercise go for you? What emotions did you notice you were experiencing? What physical sensations did you notice you were having? Do you have any questions before we move on?

Let's try one last exercise. This time, I would like you to put everything together, and be mindful of your thoughts, emotions, and physical sensations. This will be a 7 minute exercise.

Exercise No. 4 (7 minutes) – Being Mindful of Thoughts and Feelings

Again, I would like you to think about your performance on the speech you gave earlier. Use the mindfulness strategy to notice any *thoughts and feelings* that you may be having about your speech performance. Try to simply observe these thoughts and feelings, and accept them as they

are. The recording will prompt you every so often to continue to notice and accept your thoughts and feelings about your speech performance. During the silences, please continue to be mindful of your thoughts and feelings. Please get into a comfortable position and close or lower your eyes.

The recording prompts once at the beginning, and then every minute:

- Continue noticing your thoughts and memories that arise that relate to your speech*
- Noticing your emotions and physical sensations that unfold over time*
- Being present with your thoughts in the moment*
- Being accepting and compassionate towards your thoughts about the speech and any feelings that come up*
- Bringing your attention to any self-critical thoughts you are having, observing them for a moment either as words on leaves floating down a stream or as words projected on a movie screen*
- Continue bringing your awareness to your thoughts in this moment*
- Being present with your emotions about the speech and any physical sensations you may be having*
- Allowing any thoughts or feelings that occur to naturally rise and fall, without trying to hold on to them or get rid of them*
- Continuing to be aware of the feelings going through your mind and body*
- Noticing your experience and bringing a sense of curiousness and compassion to your thoughts*
- Letting the memory go and bringing your awareness again to your breath and the present moment before you open your eyes*

How did you find that exercise? What thoughts and feelings did you notice?

Do you have any questions about any of the exercises or about mindfulness in general?

Appendix G Debriefing Form

Social anxiety is characterized by an intense fear of social or performance situations in which an individual might be embarrassed or humiliated. One factor that is thought to maintain social anxiety is postevent processing, which is the process of engaging in a detailed review of one's performance after a social situation, and is generally negative in character. The main purpose of this study was to examine the efficacy of a brief, single session strategy to decrease postevent processing and its associated negative effects in individuals high in social anxiety. Specifically, a cognitive restructuring strategy was compared to a mindfulness strategy (and both were compared to a control condition in which there was no active strategy). Cognitive restructuring involves learning to notice, identify, and challenge the validity of one's thoughts; while mindfulness involves noticing, accepting, and not judging one's thoughts. Secondly, the purpose of this study was to examine which cognitive processes change as a result of each of these strategies. Specifically, we were interested to see whether there were changes in: beliefs about the likelihood or costs of an event occurring, beliefs about the self and others, the ability to see one's thought as just a thought, and the degree of mindfulness.

If you are currently experiencing psychological distress and would like to discuss your concerns in a safe and confidential environment, some mental health resources can be found at the following link: <http://www.martinantony.com/anxiety-referrals>

- Click on "Canada" (or "United States" or "International") on the left side of the screen, then select your province and city.

If you are interested in a self-help book on social anxiety, the following books are recommended:

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

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

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