Subjective and Cardiac Response to a Social Evaluative Threat Task: Effects of Self-compassion Reappraisal, Gender, and Emotional Awareness

by

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SUBJECTIVE AND CARDIAC RESPONSE TO A SOCIAL EVALUATIVE THREAT TASK: EFFECTS OF SELF-COMPASSION REAPPRAISAL, GENDER, AND EMOTIONAL AWARENESS

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This dissertation sought to explore the utility of a self-compassion reappraisal strategy in a social evaluative task in light of a growing literature that links self-compassion with decreased anxiety and self-criticism and increased capacity for self-soothing. Participants' subjective experience of anxiety and cardiac reactivity was assessed throughout the task. Individual differences in emotional awareness (attention to and clarity of emotions) were also assessed given hypotheses that higher emotional awareness would facilitate participants' benefit from the self-compassion cognitive reappraisal instructions. Participants randomly assigned to the reappraisal group received instructions on how to cultivate self-compassion towards their experience whereas the control group received no emotion regulation instructions. Participants gave a spontaneous 3-minute speech on their personality strengths and weaknesses and were told that a panel of trained observers would provide feedback on their performance. Hypotheses were partially supported. Women showed attenuated anxiety when given the self-compassion reappraisal instructions, but only when they were high in emotional clarity. Men showed adaptive cardiac reactivity prior to the speech when high in emotional clarity, independent of group assignment. Finally, prior to receiving feedback, the results were two-fold: participants who were high in attention to their emotions and in the self-compassion reappraisal group, or low in attention to emotions and in the control group, showed the most adaptive cardiac responding. The notion that high emotional awareness is a precondition for adaptive emotion regulation is explored alongside divergent findings (i.e., low emotional awareness is protective in the absence of emotion regulation instructions). Overarching theoretical and clinical implications are discussed.
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Subjective and Cardiac Response to a Social Evaluative Threat Task: Effects of Self-Compassion Reappraisal, Gender, and Emotional Awareness

Introduction

Emotions are thought to serve an adaptive function for humans, helping us to learn from our experiences, stay safe, and to cope adaptively across situations (Frijda, 1986; Izard, 1991; Lazarus, 1991; Tomkins, 1962). Emotion regulation encompasses those behaviours and strategies that humans enlist to manage subjective and physiological experiences, thereby promoting controlled emotion expression and successful interpersonal interactions in day-to-day living (Gross, 2007). The study of emotion regulation is a broad field and is of paramount importance in increasing our understanding of how people manage their emotions in order to promote adaptive functioning across contexts in the face of life’s challenges. Stressful situations can elicit negative emotions (Lazarus & Folkman, 1984) and in turn, these emotions can affect mental and physical functioning and well-being. Although some individuals ‘bounce back’ from life’s stressors relatively unaffected, others struggle to recover from the emotional impact of experiencing an unpleasant situation, or worse, exacerbate their stress through rumination or self-criticism. Insight regarding how individuals might best cope with negative emotions is particularly important considering that difficulty regulating negative emotions is thought to underlie the etiology of several diagnosable mental disorders, including anxiety, depression, substance abuse and eating disorders (as reviewed in a comprehensive meta-analysis by Aldao, Nolen-Hoeksema, & Schweizer, 2010).

People utilize a variety of emotion regulation strategies in an effort to change, manage, or control the way that stimuli in the environment affect their response or reaction. Gross (1998a; 2002) has conceived the ‘modal model’ of emotion regulation as a framework for organizing and
studying individuals’ responses to strong feelings as they arise temporally along the emotion-generative process. The model is composed of five families of emotion regulation strategies, four of which are deemed antecedent-focused because they would occur prior to the emotional impact of the eliciting stimulus or event: situation selection, situation modification, attentional deployment and cognitive change. Situation selection entails approach or avoidance of people, places, or events for the purpose of regulating emotion, whereas situation modification are those efforts that people make to control the elements of a situation to modify its emotional impact. Attentional deployment pertains to the degree to which aspects of the emotion-eliciting situation are focused upon: for example, distraction or avoidance involves turning attention and engagement away from emotion-eliciting stimuli (Thiruchselvam, Blechert, Sheppes, Rydstrom, & Gross, 2011) whereas rumination is focusing intensely on the emotional stimulus in an effort to solve the problem (Papageorgiou & Wells, 2003). Finally, cognitive change strategies, such as cognitive reappraisal, involve changing one’s thoughts about a potential emotion-eliciting stimulus in order to reduce its emotional impact (Gross, 1998b; 2007; Lazarus & Alfert, 1964).

The fifth and final type of emotion regulation strategy is response modulation, which encompasses those attempts to regulate the experience of emotion after the stimuli or event has occurred. Examples of this type of regulation are acceptance, the welcoming of thoughts and emotions non-judgmentally in the present moment (Hayes, Strosahl, & Wilson, 1999), and emotional suppression via the inhibition of the experiential aspect of the emotion-eliciting stimulus (Campbell-Sills, Barlow, Brown, & Hofmann, 2006) or the stifling of the behavioural signs or facial expression of the emotion (Gross & Levenson, 1993).

Researchers have experimentally manipulated participants’ emotional experience in controlled laboratory conditions in order to assess the efficacy of different strategies on reducing
negative emotions. For example, they have instructed individuals to employ one or more emotion regulation strategies in an emotionally arousing context, and then assessed their respective utility in attenuating emotional arousal (Braams, Blechert, Boden, & Gross, 2012; Campbell-Sills et al., 2006; Hofmann, Heering, Sawyer, & Asnaani, 2009). Webb, Miles, and Sheeran (2012) conducted a comprehensive meta-analysis on the effectiveness of various emotion-regulation strategies employed in real-time on subjective, behavioural and physiological outcomes, in contrast, other reviews have relied on self-reported use of emotion-regulation strategies to assess their relation to psychopathology (Aldao et al., 2010). One benefit of studying highly specified emotion regulation strategies in real time is removing the retrospective bias introduced when participants use scale measures to rate themselves on the frequency with which they use various emotion regulation strategies.

Another benefit of experimental manipulations in the study of emotion regulation is the opportunity to gauge the utility of various regulatory strategies using multiple levels of analysis. Emotions generate arousal which can be indexed by participants’ subjective ratings of various feelings, as well as their physiological reaction and recovery from the arousal-eliciting event or stimuli (Al'Absi et al., 1997; Bosch et al., 2009; Kreibig, 2010). Subjective ratings such as anxiety ratings are widely used as a measure of participants’ success at employing emotion regulation strategies in studies involving threat or fear induction (Egloff, Schwerdtfeger, Schmukle, & Burns, 2006). In turn, physiological measurements such as heart rate offer complementary or contradictory information regarding individuals’ physical stress response or internal reaction in emotion-eliciting situations (Kreibig, 2010). Of the autonomic measures used to index physiological responding to emotion-inducing stimuli or paradigms, heart rate was found by Kreibig (2010) to be the most commonly reported in the emotion regulation literature.
Heart rate is controlled by the autonomic nervous system, which drives physiological responding to the environment via its two subdivisions: the parasympathetic and sympathetic nervous systems. The parasympathetic division, indexed by cardiac vagal tone (i.e. respiratory sinus arrhythmia), is thought to be responsible for restoring and maintaining homeostasis (Porges, 1995; 2007). Vagal tone, mediated by the vagus nerve, regulates heart rate via the vagal “brake” (Porges, 2001). The brake slows heart rate in the absence of environmental challenge or threat, but withdraws to support increased heart rate when active coping is required. The sympathetic division is responsible for mobilizing resources and upregulating metabolic output (e.g., fight-or-flight response). Taken together, the two branches of the autonomic nervous system antagonistically contribute to heart rate regulation to promote adaptive physiological regulation of stress in emotion-eliciting contexts (Kreibig, 2010). Threat reactions are accompanied by an autonomic nervous system response, typically characterized by increased heart rate, which enables a range of rapid responses to threat (Porges, 1995; Thayer & Lane, 2000). In response to moderate stress, heart rate increases accompanied by vagal withdrawal typically are considered more adaptive than those driven by sympathetic activation (Beauchaine, 2001; Porges, 1995; 2007; Thayer & Brosschot, 2005; Thayer & Lane, 2000). Relative to the time frame for a sympathetic response, the vagal brake can be engaged or disengaged more rapidly, allowing for greater autonomic flexibility. Thus, short-lived autonomic nervous system responding is expected among individuals better able to adapt to an emotion-eliciting context or stimuli in contrast to other patterns like the chronically elevated baseline and blunted reactivity evidenced in those with generalized anxiety disorder (Thayer, Friedman, & Borkovec, 1996), although a host of factors affect people’s cardiac reactivity in the face of stress (Allen, Kennedy, Cryan,
Dinan, & Clarke, 2014; Hughes, 2007; Lévesque, Moskowitz, Tardif, Dupuis, & D'antono, 2010; O'Donnell, Brydon, Wright, & Steptoe, 2008).

Given that subjective and physiological indices of emotion frequently do not systematically co-vary (Campbell & Ehlert, 2012; Egloff et al., 2006; Kreibig, 2010; Mauss, Levenson, McCarter, Wilhelm, & Gross, 2005), the present study used a multi-method approach to investigate the efficacy of a cognitive change emotion regulation strategy in a social stress paradigm. The utility of a self-compassion reappraisal strategy was of particular interest. Self-compassion has recently emerged from the Eastern practice of meditation as a useful way to understand how humans relate to their own experiences with self-kindness, mindfulness, and common humanity (Neff, 2003b). More research is needed outside of meditational studies, however, to determine the scope of its efficacy as a potential cognitive emotion regulation strategy in vivo. In the text that follows, I will provide an overview of cognitive reappraisal as an emotion regulation strategy before detailing the current research on the psychological benefits of self-compassion. Finally, I will argue that self-compassion is a cognitive reappraisal strategy worth exploring, particularly in the context of social evaluative threat.

**Cognitive Reappraisal Emotion Regulation Strategies**

A burgeoning literature supports the notion that changing one’s thoughts about an emotion-eliciting stimulus or event can alter the intensity of the feeling experienced, as well as the physiological stress response, thereby promoting a more desirable adaptation or response to the event (Drabant, Gross, Mcrae, Manuck, & Hariri, 2009; Gross, 2002). In fact, the notion that changing thoughts influences bodily reactions and emotional responding for the better forms the basis for cognitive-behavioural therapy (Beck, Rush, Shaw, & Emery, 1979), and is supported empirically as a method of decreasing functional impairment induced by emotion-provoking
thoughts or experiences (Gross, 1998b; Hofmann et al., 2009). Reappraisal is the process of reconsidering or changing one’s initial appraisal of an event or stimulus so that the incited emotional reaction is altered in impact or perceived manageability. As mentioned earlier, cognitive reappraisal is considered to be an antecedent-focused strategy of emotion regulation, according to Gross’ process model of emotion regulation (Gross, 1998b; 2007), because reframing the way one views an event or stimuli alters the impact of the emotion experience before it is fully realized. For example, pictures from the International Affective Picture System (Lang, Bradley, & Cuthbert, 2005) are often studied for their provocative, emotion-eliciting nature, as are emotion-inducing video clips. Reappraisal strategies showing efficacy in down-regulating negative reactivity in response to these stimuli include downplaying the seriousness of the stimulus, imagining a happy ending, considering the picture as a scene from a movie, among others (Gross, 1998a; Thiruchselvam et al., 2011).

**Cognitive reappraisal of social evaluative threat.** Cognitive reappraisal as an emotion regulation strategy for in vivo social evaluative threat tasks has yielded less consistent results. Social evaluative threat occurs when an aspect of the self is vulnerable to negative judgment. For example, such vulnerability occurs when one’s abilities, competencies or personality on which social image or self-esteem might be based are evaluated by others (e.g., presentations at work, public speaking); or in contexts with the potential for rejection (e.g., interviews, first dates) (Dickerson & Kemeny, 2004). One well-validated social evaluative threat task is the Trier Social Stress Test (TSST; Kirschbaum, Pirke, & Hellhammer, 1993), which asks that people present a speech and perform mental math aloud in front of a neutral evaluative panel. Although the TSST is widely studied, (Allen et al., 2014; Bosch et al., 2009; Breines et al., 2014; Brown, Weinstein, & Creswell, 2012; Gruenewald, Kemeny, Aziz, & Fahey, 2004; Lam, Dickerson, Zoccola, &
Zaldivar, 2009), few studies have found evidence that social evaluative threat is easily regulated. In one notable exception, Hofmann, Heering, Sawyer, and Asnaani (2009) studied the effect of reappraisal instructions on participants’ subjective and physiological response to an impromptu speech. Hofmann and colleagues instructed participants to “Take a realistic perspective on this task, by recognizing that there is no reason to feel anxious. Please realize that the situation does not present a threat to you. Regardless of what occurs during this task or how anxious you appear, it is just an experiment, and there are no negative consequences to be concerned with.” In this study, the reappraisal instructions served to lessen participants’ cardiovascular reactivity and subjective anxiety in response to an impromptu speech task, especially in comparison to participants instructed to suppress their emotions or to accept their emotions.

Studies examining how high levels of trait cognitive reappraisal relate to performance in social evaluative threat tasks have also reported mixed findings. A commonly used trait-level measure of emotion regulation assesses self-reported frequency of use and effectiveness of various emotion regulation strategies in day-to-day life (Gross & John, 2003). Using this approach, Lam, Dickerson, Zuccola, and Zaldivar (2009) studied trait emotion regulation strategies in relation to cortisol reactivity in a evaluative speech paradigm and found that even those with high trait-level reappraisal did not show attenuated physiological cortisol reactivity in response to the speech. Using similar methodology, Egloff, Schwerdtfeger, Schmukle and Burns (2006) found that trait reappraisal did not affect cardiac physiology in a social evaluative speech task although participants with higher spontaneous reappraisal evidenced decreased anxiety and negative affect.

According to Social Self Preservation Theory, threats to the social self (i.e., when one’s social esteem, status and acceptance are questioned) predict a specific host of psychological and
physiological stress responses (Dickerson, Gruenewald, & Kemeny, 2004). Psychologically, the potential threat to social image decreases self-esteem and begets feelings of shame, a self-conscious emotion experienced when the self is at risk of judgment as inadequate or inferior (Gilbert, 2011). Shame is thought to occur when one’s perception of negative social evaluation is transformed into negative evaluation of a core aspect of the self, leading to anxiety and negative affect. According to the Social Self Preservation Theory, the physiological consequences of social threat include heightened HPA-axis responding with increased cortisol release leading to increased cardiac reactivity, in addition to pro-inflammatory responding. In a meta-analysis of over 200 laboratory-based studies of acute psychological stressors, Dickerson and Kemeny (2004) found that tasks containing social-evaluative and uncontrollable elements, such as false performance feedback, resulted in the largest stress responding. The review also found that the magnitude of physiological responding was related to the type and intensity of the social evaluative threat, as well as factors related to the individual (i.e., level of self-reported shame) and social milieu in which the threat occurs (i.e., the number of audience members). Given that a primary human motivation for affiliation, connection and safety, is vulnerable to disruption in the context of negative social evaluation, social evaluative threat paradigms provide a salient context for studying the utility of cognitive reappraisal as an emotion regulation strategy on psychological and physiological stress responding. In light of a growing literature that regards self-compassion as a means to decrease shame and anxiety and increase feelings of affiliation, the potential applicability of using self-compassion cognitive reappraisal instructions as a means to reappraise a social evaluative task was of specific interest in the current study.
Self-compassion as a Cognitive Reappraisal Strategy for Social Evaluative Threat

Self-compassion is a recent construct in psychological research (Neff, 2003b) even though its roots are derived from ancient Eastern tradition of Buddhism. According to Neff’s definition, self-compassion is comprised of three components: self-kindness, mindfulness, and common humanity (Neff & Lamb, 2009). Neff emphasizes that to practice self-kindness one should aim to be supportive and understanding toward oneself in instances of pain or failure rather than being harshly self-critical. To practice mindfulness, emotions are held in conscious, non-judgmental awareness rather than labeled, over-identified with or ruminated upon. Finally, with the construct of common humanity, the notion of connectedness is embraced in perceiving one’s experiences as part of the larger human experience rather than as separating and isolating oneself from others. Taken together, those who practice self-compassion theoretically experience positive outcomes derived from greater self-support, acceptance and social togetherness than counterparts lower in self-compassion who tend to self-criticize, ruminate or seek solitude in the face of real or perceived personal failures (Allen & Leary, 2010; Gilbert & Procter, 2006; Neff, 2003a; 2008; Neff, Kirkpatrick, & Rude, 2007a; Terry & Leary, 2011).

Trait self-compassion as a resiliency factor. Those higher in self-compassion appear to embrace greater connectedness with their own feelings and with the human condition in general, showing less self-criticism and avoidance of feeling in the face of their own struggles (Neff & McGehee, 2010). Moreover, other research groups have shown that higher reported levels of self-compassion predict higher quality of life indicators in those recovering from anxiety and depression (Van Dam, Sheppard, Forsyth, & Earleywine, 2011) and decreased experiential avoidance of trauma reminders for those with post-traumatic stress disorder, fostering healing in the aftermath of trauma exposure (Thompson & Waltz, 2008). Higher self-compassion has also
been shown to aid students in the face of academic stress (Neely, Schallert, Mohammed, Roberts, & Cheng, 2009) and those for whom binge eating is a barrier to weight loss goals (Adams & Leary, 2007).

In the face of social stress, self-compassion may constitute a particularly effective strategy for aiding people in coping with the situation at hand. Fear of negative social evaluation compels men and women alike to regulate their emotions (e.g., trying to hide nervousness or to ‘calm-down’) in order to optimize performance or to achieve goals, such as making a good first impression or presenting well for a job interview. Indeed, it is well-documented that people experience negative emotions and anxiety in the face of social evaluation (Het, Rohleder, Schoofs, Kirschbaum, & Wolf, 2009; Wright, Tunstall, Williams, Goodwin, & Harmon-Jones, 1995). Moreover, mounting evidence supports the notion that higher self-compassion is protective in evaluative situations where one might be particularly prone to harsh self-judgment in the face of struggle or failure. In line with this reasoning, Werner and colleagues (2012) found that those with symptoms of social anxiety disorder, characterized by intense fear of negative social evaluation and high levels of self-criticism, reported significantly lower self-compassion than healthy controls. Moreover, less self-compassion was related to higher fear of evaluation in the group with social phobia. This research lends credence to the notion that self-compassion is protective against social anxiety and helps individuals adaptively cope with social stress.

**Self-compassion training and associated outcomes.** Several compassion-training programs have been developed and are demonstrating beneficial effects, suggesting that self-compassion can be taught. Johnson and O’Brien (2013) had shame-prone students write about three experiences of shame on separate occasions over one week and randomly assigned students to one of three conditions: a self-compassionate writing response group, utilizing instructions
similar to Leary, Tate, Adams, Allen, and Hancock (2007) to promote self-kindness, common humanity and mindful awareness, an expressive writing response control group, or a no written response control group. They found that participants in the self-compassion group reported less shame and negative affect than those in the expressive writing control group, and at follow-up two weeks later, participants in the self-compassion condition continued to show reduced shame-proneness (medium effect) and depressive symptoms (small-medium effect size) relative to control groups, which showed no significant changes. Participants in the self-compassionate response condition showed a trend level decrease in rumination at follow-up, which lends preliminary support to the notion that brief self-compassion training decreases maladaptive cognitive coping in situations of perceived shame or inadequacy. Moreover, participants that were more shame-prone also showed greater gains in self-compassion at follow-up than their less shame-prone counterparts, regardless of trait self-compassion, suggesting that training self-compassionate attitudes is especially useful for those prone to experiencing shame, a significant vulnerability factor associated with mental illness (Gruenewald et al., 2004; Kim, Thibodeau, & Jorgensen, 2011).

Research by Gilbert’s group (Gilbert, 2009; Gilbert & Procter, 2006) has found that trait-like self-compassion can be cultivated through Compassionate Mind Training (CMT), a compassion-focused therapy considered to be a form of cognitive-behavioural therapy, that helps clients to develop a sense of warmth and emotional responsiveness toward themselves during the therapeutic process using approaches like visualization, self-kindness and developing self-compassionate behaviours. The CMT group therapy approach, delivered over 12, two-hour sessions, was designed specifically for clinical populations suffering from high levels of self-criticism and shame. Gilbert and Proctor (2006) found promising results in their pilot study,
although effect sizes were not reported and a control condition was not offered. They found that CMT reduced anxiety, depression, shame and self-criticism, and increased individuals’ capacity to self-soothe, in a group-based CMT intervention with hospital day treatment patients.

Neff and Germer (2013) developed a more general intervention for clinical and non-clinical populations: an 8-week self-compassion and mindfulness group called Mindful Self-Compassion (MSC) that taught both formal meditation practice (i.e., sitting meditation) as well as informal self-compassion practices, like motivating oneself as one would a friend, for example, through encouragement and support rather than self-deprecation (i.e., according to the tenets of the ‘common humanity’ facet of self-compassion). Relative to wait-list control group, the program was found to be effective at increasing participants’ self-compassion (large effect size), and mindfulness, personal well-being, and compassion for others (all medium effect sizes), and decreasing self-reported depression (large effect size) and anxiety (medium effect size). These effects endured for at least 1 year after program completion (Neff & Germer, 2013).

Jazaieri and colleagues (2012) developed a 9-week compassion cultivation training (CCT) program focused on fostering all three domains of compassion – compassion for others, receiving compassion from others, and self-compassion. The study found that participants showed increased compassion in all three domains compared to the waitlist control group (all large effect sizes), as well as increased mindfulness (large effect) and happiness (medium effect), and decreased worry (large effect) (Jazaieri et al., 2014). In a follow-up study with the same group, Jazaieri et al. (2014) investigated whether CCT affected specific emotion regulation strategies, since CCT encourages participants to avoid suppressing emotions, and rather to experience them with warm-heartedness and a wish to see suffering attenuated in others. Compared to the waitlist control group, the CCT group reported reduced use of expressive
suppression (large effect size), however there were not group differences in self-reported use of cognitive reappraisal (small effect size). The authors argued that this lack of influence on participants’ use of cognitive reappraisal in day-to-day life was due to CCT’s focus on the suffering of others and not one’s own reactivity to the plight of self or others.

**Applicability of self-compassion to in vivo social threat tasks.** Those higher in self-compassion appear to embrace their own feelings and experiences with more openness to growth and less self-criticism and avoidance of struggle or negative emotion. To this end, Leary and colleagues (2007) investigated in a series of studies how trait self-compassion related to people’s reactions to various unpleasant experiences in the social domain. Leary and colleagues found that those higher in trait self-compassion endorsed less negative emotion across tasks designed to elicit uncomfortable emotions: a social situation eliciting feelings of ‘awkwardness,’ reception of unflattering feedback on performance, and recalling past undesirable social actions. In one study of the series, Leary and colleagues found that encouraging participants to reflect on a personally relevant event with self-kindness, common humanity, and mindful acceptance worked to induce state self-compassion, and participants reported less negative affect than participants in the control condition. Effect sizes were not reported. Taken together, those with higher self-rated self-compassion not only reported fewer negative feelings and endorsed a more compassionate view towards their perceived struggles and inadequacies, they also accepted their own role in the negative events more fully than those lower in self-compassion, which Leary and colleagues ascribed to lower ego-defensiveness in those with higher self-compassion (i.e., being more vulnerable to and accepting of their own errors or mishaps).

Two other research groups have sought to understand whether specific training in compassion, rather than self-reported trait level of self-compassion, would bolster ability to cope
psychologically and physiologically with social evaluative threat in vivo. These studies yielded inconsistent results. In the first study, Pace and colleagues (2009) investigated the effect of a 6-week compassion-meditation intervention on participants’ neuroendocrine, immune, and behavioural responses to social stress, compared to a health discussion control group, in the Trier Social Stress Test (TSST; Kirschbaum et al., 1993). The TSST is a standardized social stress task in which participants present a speech and perform mental math aloud in front of an evaluative panel. In the procedure employed by Pace et al. (2009), the compassion group met for an hour twice a week over 6 weeks, approximating 12 hours of training in addition to at-home practice assignments. The training drew on several contemplative practices including that of mindful awareness of unexamined thoughts and bodily sensations, and compassion meditation toward self and others with a focus on increasing altruism. Participants randomized to the health discussion control group also committed to 12 hours of class time, learning about various topics related to the physical and mental health of college students, with weekly at-home self-improvement papers to enhance engagement. The study found no main effect of the compassion meditation group on participants’ immune or HPA-axis stress response in the TSST, or their behavioural distress scores on a mood scale, relative to the control group. However, within the compassion group, a dose-dependent effect was found when high and low meditation practice groups were compared. A median split was used to divide the compassion group into a high and low practice group based on the mean number of meditation practice sessions per week. Those in the high practice group showed significantly attenuated immune system response (large effect size) and behavioural distress ratings (large effect size) in the TSST compared to those who were in the low-practice group, suggesting that commitment to meditation practice was important for experiencing stress-buffering benefits of meditation in an evaluative threat task.
In the second study, Arch and colleagues (2014) investigated whether a brief self-compassion meditation intervention would affect women’s psychobiological responses to the TSST, compared to a placebo group (an attention control) and a no-training control condition. The brief self-compassion training consisted of self-administered, audio-recorded 10-minute meditations each day for 5 days prior to the TSST paradigm. Meditations were focused on cultivating self-kindness and acceptance toward the self and others. The study found that women in the self-compassion training group showed attenuated self-reported anxiety, decreased sympathetic nervous system (salivary alpha-amylase) reactivity, and more adaptive parasympathetic cardiac response (respiratory sinus arrhythmia) relative to both control groups. All effect sizes were small. Arch and colleagues argued that the focused self-compassion training increased women’s adaptive physiological emotion regulation to social evaluative threat and attenuated the subjective experience of anxiety by reducing their defensiveness (in line with the findings Leary et al., 2007).

Both Pace et al. (2009) and Arch et al. (2014) focused on compassion practices drawn from loving-kindness (metta) from the Theravada Buddhist tradition and mind-training (lojong) from Tibetan Buddhism (Dalai Lama, 2001; Lutz, Brefczynski-Lewis, Johnstone, & Davidson, 2008). However, important methodological differences between the studies provide insight on the divergent pattern of findings regarding the utility of compassion training as an intervention for social evaluative threat. First, Arch and colleagues used brief, targeted self-compassion training (rather than general compassion-meditation approach used by Pace et al.), along with their instruction that, “the rest of the study is challenging, to help you prepare for this challenge, we’re having you listen to a recording,” with the additional instruction to “focus and concentrate fully on the recording.” This prompt may well have cued participants to draw on the self-
compassion meditation training to regulate social stress successfully, in contrast to the more general approach used by Pace and colleagues that did not specifically link the compassion-meditation to the social stress paradigm. Second, although Pace et al. found no group effect for the compassion-meditation training on participant’s social-evaluative threat responding, within the intervention group, participants who practiced meditation more frequently also showed greater benefit. Individual differences might have played an important role in level of engagement for some participants, thereby enabling them to more readily practice and apply the skills taught in the self-compassion meditation training to the stressor relative to their low-practicing counterparts. Finally, Pace et al. used a mixed gender sample whereas Arch et al. used an all-female sample. Given the mixed literature regarding the effects of gender on self-compassion (Neff & McGehee, 2010; Neff, Kirkpatrick, & Rude, 2007a; Neff, Rude, & Kirkpatrick, 2007b), emotional awareness (Barrett, Lane, Sechrest, & Schwartz, 2000), and use and frequency of emotion regulation strategies (Nolen-Hoeksema, 2012), it stands to reason that gender-related differences could contribute to the conflicting pattern of findings.

**Summary of self-compassion literature.** Self-compassion (Neff, 2003a) may engender psychological benefits including the capacity to not over-identify with one’s thoughts or emotions when personal struggle or failure occurs, to be kind and open-hearted towards one’s own experience, and to embrace that suffering and failure is part of the human condition. In turn, self-compassion protects against the negative impact of self-judgment, isolation and rumination that might fester when individuals are not able to embrace their experience mindfully and with self-kindness. Several compassion-training interventions have met with considerable success, with participants reporting decreased shame (Johnson and O’Brien, 2013), reductions in self-reported anxiety, depression, shame and self-criticism, and increased capacity to self-soothe
(Gilbert & Procter, 2006), and increased self-compassion, mindfulness, personal well-being and compassion for others, with findings persisting at 1-year follow-up (Neff & Germer, 2013). However, findings are mixed regarding the applicability of applying previous compassion-focused meditation practice to social stress experienced in vivo. Pace and colleagues (2009) found little effect of a 6-week cognitive-based compassion-meditation intervention on participants’ neuroendocrine, immune, or behavioural responses to the TSST relative to control, except a dose-dependent effect of the intervention on immune functioning and subjective distress which yielded large effect sizes. In contrast, Arch and colleagues (2014) recently found that their brief meditation training in self-compassion enabled women to show decreased anxiety and adaptive physiological stress responding in the TSST, albeit with small effect sizes. Both Pace et al. and Arch et al. examined the effect of self-compassion training as a meditation practice over several days, with Pace et al. drawing on a wider range of concentrative and mindfulness practices and both teaching lojong practices and metta. The rigorous experimental designs employed utilizing random assignment and various types of control groups (Pace et al., 2009) lends credence to the conclusions drawn in both studies of self-compassion meditation and in vivo social stress responding. However, the divergent effect sizes support that further study in this area of research is required to better understand factors that affect the utility of self-compassion interventions in social stress paradigms.

The current study. The effect of using self-compassion as an immediate cognitive change type intervention has not previously been studied. Cognitive change emotion regulation strategies such as reappraisal are antecedent-focused and thus, by definition, are implemented prior to the emotion-eliciting event and expected to mitigate the subjective and physiological impact of the event (Gross, 1998b; 2007). Moreover, research is required to investigate factors
that might influence the efficacy of self-compassion reappraisal instructions as applied to social stress tasks. Previous research indicates that gender-related differences or other pre-existing individual differences may explain why some individuals more effectively practice compassion meditation, and thus gain greater benefit from the practice than others. Therefore, the goal of the present study was to provide targeted self-compassion *cognitive reappraisal* instructions (i.e., not meditation practice) and to assess whether individual differences in emotional regulation skills and/or gender affect individuals’ ability to use the intervention to attenuate their subjective and/or physiological stress response in a social evaluative threat paradigm.

**Individual Differences and Emotion Regulatory Capacity**

Over the last few decades, there has been particular interest in how individual differences relate to emotion regulation competencies, in particular, the impact of how people attend to, understand, and regulate their subjective emotional experience (Barrett, Gross, Christensen, & Benvenuto, 2001; Gohm & Clore, 2000; Mennin, Holaway, Fresco, Moore, & Heimberg, 2007). Berking and colleagues (2008) have posited that adaptive emotion regulation requires skills in both emotion awareness and compassionate self-responding, in addition to the ability to actively modify such emotions and to show acceptance and tolerance for negative emotions. They have posited the ‘adaptive coping with emotions’ (ACE) model, which synthesizes aspects of well-studied theories of emotion regulation (Gratz & Roemer, 2008; Gross, 1998b). Adaptive emotion regulation is thought to be influenced by 9 specific emotion regulation skills: a) the ability to be consciously aware of emotions, b) identify emotions and c) accurately interpret emotion-related body sensations, d) understand the prompts of emotions, e) support oneself self-compassionately in stressful situations, f) modify negative affect in order to feel better, g) accept emotions, h) tolerate negative emotions, and i) face emotionally distressing challenges in order to pursue goals
and meet situational demands. According to the ACE model, self-compassionate responding is a specific skill that theoretically facilitates f, g, h, and i. Moreover, individual differences like the capacity for emotional awareness are theorized to be precursory skills to emotion modification, acceptance and tolerance in order to meet goals. Consistent with the ACE model, a burgeoning literature has begun to study the ways in which emotion regulation skills like awareness of emotions relate to mental health or illness processes (Berking & Wupperman, 2012; Boden, Bonn-Miller, Kashdan, Alvarez, & Gross, 2012).

**Emotional awareness.** In this vein, some researchers have focused on alexithymia, defined as difficulty identifying and conveying emotions and an externally oriented cognitive style (Sifneos, 1973). Other theorists have explored the construct of emotional intelligence, defined by an individuals’ ability to perceive, use, understand and manage emotions (Salovey & Grewal, 2005; Salovey & Mayer, 1990). Palmieri, Boden and Berenbaum (2009) explored the construct of emotional awareness and argued that it is best captured by two distinct underlying facets: attention to emotions and clarity of emotions. Attention to emotions is theorized to index the degree to which individuals monitor and value emotional cues, and is thought to precede emotional clarity, the ability to identify, describe, and understand one’s own emotional experiences (Gohm & Clore, 2000; Pennebaker, 1995). Palmieri et al. (2009) developed improved subscales for measuring attention to and clarity of emotions by drawing items from other well-validated scales measuring alexithymia and emotional intelligence.

Gilbert and colleagues (2012) have suggested that accessing self-compassion for one’s own experience is difficult without the foundational capacity to attend to, distinguish and understand one’s own emotions. They investigated the relationships between emotional processing variables, capacity for mindfulness, and participants’ ability to experience
compassion for self, and found that fear of compassion for self was related to higher self-criticism and alexithymic traits, as well as difficulties with mindfulness. Mindfulness, one of the core aspects of self-compassion according to Neff (2003b), is the capacity to be aware of thoughts and feelings that arise, with willingness to observe these without becoming overwhelmed, avoidant or suppressive toward the experience. This study suggests that utilizing self-compassion training would be difficult in the absence of the capacity to attend to and understand one’s emotions in the first place.

Consistent with their theorized ACE model, recent work by Berking et al. (2012), using both a non-clinical student sample and an inpatient sample, found support for the notion that several skills are implicated in successful emotion regulation and adaptive coping. These include emotional awareness and accurate identification and understanding of emotional triggers, using sensations to identify emotions, and openness and compassion towards facing ones’ feelings when distressed. In both samples, the findings indicated that the efficacy with which participants were able to modify their negative emotions (according to self-report) mediated the association between each aforementioned emotion-regulation skill and symptom level. The exception was in the case of the skill of accepting/tolerating negative emotions, which was associated with lower symptom profile even when its effects on emotion modification were controlled. Given that the ability to accept and tolerate negative emotions was independently, negatively associated with symptom level, Berking et al. (2012) argued that fostering these skills in therapy would be an important intervention goal regardless of the clients’ emotion modification skills. In contrast, Berking and colleagues highlight that skills like emotional awareness are ‘auxiliary’ emotion regulation skills in the sense that they are only useful to the extent that they help to modify negative emotions and/or accept and tolerate these emotions. There is a clear need to further
study how skills such as emotional awareness relate to individuals’ capacity to use adaptive emotion regulation strategies like cognitive reappraisal in order to modify or tolerate negative emotions.

Vine and Aldao (2014) recently addressed the importance of foundational emotional awareness skills for therapeutic outcomes. They found that deficits in emotional clarity were independently related to multiple symptom profiles including depression, social anxiety, borderline personality, binge eating, and alcohol use, and that each symptom type was mediated by a disorder-specific pattern of emotion regulation deficits. Consistent with a growing literature base (Barrett et al., 2001; Mennin et al., 2007), the researchers suggested that difficulty with emotional clarity has ‘transdiagnostic relevance’ for the downstream regulation of affective states. Taken together, this research underscores the clinical utility of teaching clients with a variety of mental health difficulties to identify and understand emotions prior to other interventions.

In line with the notion that emotional awareness may represent an important precursory skill to negative emotion modification, Boden, Bonn-Miller, Kashdan, Alvarez and Gross (2012) investigated whether emotional clarity, one facet of emotional awareness, and cognitive reappraisal, a well-researched emotion regulation strategy (Hofmann et al., 2009; Webb et al., 2012; Werner & Gross, 2010) would interact to predict posttraumatic stress disorder (PTSD) symptom severity in a sample of military Veterans seeking treatment for PTSD, using self-report measures to assess all constructs. After accounting for attention to emotions, the first facet of emotional awareness (Palmieri et al., 2009), and for positive affect, the study found that emotional clarity (the second facet) and cognitive reappraisal significantly predicted PTSD symptom severity. More specifically, individuals who used cognitive reappraisal most frequently
showed lower impairment only if they were high in emotional clarity. The results indicated that the benefit of cognitive reappraisal as an emotion regulation strategy for PTSD symptoms in this population occurred only when veterans had higher emotional clarity. Boden and colleagues (2012) argued that higher emotional clarity may have provided veterans a basis for better understanding the situations in which cognitive reappraisal was an effective emotion regulation strategy. Consistent with the focus of the current study, Boden et al. argued that that interventions in this population may be improved by focusing on increased emotional clarity at the outset of treatment in order to promote successful use of emotion regulation strategies like cognitive reappraisal to modify negative emotions (Berking et al., 2012), or by further improving emotion regulation strategies (i.e., cognitive reappraisal) in those who already evidence high emotional clarity.

**Gender.** Gender-related differences might also play a role in predicting if self-compassion reappraisal influences social evaluative threat responding in a social stressor. Women have been found to experience emotions more intensely in everyday settings than men (Gohm, 2003; Hess et al., 2000; Tobin, Graziano, Vanman, & Tassinay, 2000) as well as to rate emotion-eliciting stimuli as more negative than men in experimental settings (Bianchin & Angrilli, 2012; Bradley, Codispoti, Sabatinelli, & Lang, 2001; Codispoti, Surcinelli, & Baldaro, 2008; Gard & Kring, 2007; Hillman, Rosengren, & Smith, 2004; Kelly, Forsyth, & Karekla, 2006). Barrett and colleagues (2000) have argued, however, that differences in emotionality between the genders are explained by women’s consistently higher complexity and differentiation of emotional experiences relative to men rather than differences in emotional reactivity per se. In diverse samples varying in age, education, socioeconomic status and culture, women consistently were found to demonstrate higher emotional awareness than men, even
when verbal intelligence was controlled (Barrett et al., 2000). These findings support a stable, generalizable effect of gender on knowledge of emotional experience, although it is not clear if this foundational skill enables women to better utilize emotion regulation strategies in day-to-day living. In a meta-analysis on the role of gender in emotion regulation and psychopathology, Nolen-Hoeksema (2012) found that women report using most emotion regulation strategies more frequently than do men, including reappraisal and problem-focused coping as well as less adaptive strategies like avoidance, distraction, and rumination. In line with the findings of Barrett and colleagues, men’s relative lack of attention to and understanding of their emotions might contribute to their less frequent attempts to employ emotion regulation strategies (Nolen-Hoeksema, 2012).

Interestingly, however, some past studies have found a small difference in reported self-compassion favoring men (Neff, 2003a; Neff & McGehee, 2010; Neff & Vonk, 2009), although others have found no difference (Neff, Kirkpatrick, & Rude, 2007a; Neff, Rude, & Kirkpatrick, 2007b). In contrast, studies have suggested that gender might be an important factor in social anxiety disorder (Faravelli et al., 2000; Turk et al., 1998), but others have not found differences between men and women related to social anxiety (Lampe, Slade, Issakidis, & Andrews, 2003; Schulz, Alpers, & Hofmann, 2008; Werner et al., 2012). Finally, there has been a lack of consistency in gender-driven patterns of autonomic nervous system responding to emotion-eliciting stimuli or in response to acute stress, with several studies demonstrating no differences in physiological reactivity (Kelly et al., 2006; Kelly, Tyrka, Anderson, Price, & Carpenter, 2008; Sgoifo et al., 2003). However, one study found neural differences between the genders (McRae, Ochsner, Mauss, Gabrieli, & Gross, 2008). When participants were asked to use reappraisal for a negatively valenced photo, self-reported negative affect as well as efficacy of reappraisal were
consistent between the genders. However, men showed less blood flow to prefrontal regions that are associated with reappraisal, and greater blood flow to the amygdala, implicated in emotional responding, compared to women during reappraisal items but not during unregulated negative picture items. Thus, despite similar perceived experiences between the genders, based on the neural discrepancies between men and women the authors speculated that men might employ cognitive regulation with greater efficiency relative to women given men’s lower engagement of the prefrontal area. In addition, women showed greater blood flow to the ventral striatum, implicated in reward-related processing, when using reappraisal to regulate negatively valenced pictures. The authors argued that women might be transforming negative affect into positive affect, given that neural activity in the ventral striatum has been linked to increased self-report of positive affect. Overall, McRae and colleagues reasoned that on one hand, men may expend less cognitive effort to utilize reappraisal automatically, while women may be transforming negative affect into positive affect during the emotion regulation items.

On the whole, given potential gender-related differences in emotional awareness favouring women, in self-compassion potentially favouring men, and inconsistent findings on social anxiety as well as the nature of the relationship between gender and autonomic reactivity in acute stress paradigms, gender was considered an important predictor to include given the exploratory nature of the current study.

The Present Study: Summary, Objectives and Hypotheses

Summary. Overall, a growing literature base indicates that emotion regulation deficits are implicated in the development and maintenance of mental health difficulties (Aldao et al., 2010; Mennin & Fresco, 2009; Werner & Gross, 2010). Difficulties managing negative emotions adaptively (i.e., chronic use of suppression or avoidance) have been related to psychopathology
(Aldao et al., 2010; Gross, 1998b), although one form of emotion down-regulation, cognitive reappraisal, has gained support as a healthy and effective approach for reducing the impact of an event or stimulus on mood by actively thinking about the event in a different way (Gross, 2002). In the face of social evaluative threat, self-compassion may constitute a particularly effective cognitive reappraisal strategy, but this has not been previously studied. Individual differences may influence the degree to which participants are able or willing to learn and utilize a self-compassion reappraisal to reduce subjective or physiological distress. As such, in the current study, the relationships among trait self-compassion, social anxiety, emotional awareness (attention to and clarity of emotions), gender, and reappraisal group assignment were examined in relation to participants’ outcome measures (i.e., subjective experience and physiological reactivity) in a social evaluative paradigm to understand for whom a self-compassion reappraisal may be most efficacious.

**Objectives.** To assess if individual differences such as gender or emotional awareness might influence the ability to utilize a targeted self-compassion cognitive reappraisal, participants completed measures of emotional awareness prior to a social evaluative threat task. Participants were randomly assigned to the intervention condition or to the control condition to ensure that between-group differences were not a result of systematic bias or confounding variables. The intervention group received self-compassion reappraisal instructions prior to the social evaluative threat, i.e., to cultivate self-compassion towards oneself and one’s experience as a means to reappraise the stressful experience of the task. Participants assigned to the control group received no emotion regulation instructions. All participants were then asked to give a spontaneous 3-minute speech on what they considered to be the strengths and weaknesses of their character. In order to provoke anxious arousal, participants were told that a panel of trained...
observers was evaluating their speech via video camera feed and that they would receive performance feedback from the evaluative panel in order to improve the impression they make when public speaking. Participants’ subjective ratings of anxiety and physiological arousal (i.e., heart rate) were assessed prior to, during, and following the speech and performance evaluation feedback, in concert with other self-ratings at the end of the task (i.e., self-rated level of compassion and self-criticism regarding their speech).

This investigation was exploratory in nature because of the relative paucity of research addressing the impact of emotion regulation skills, like emotional awareness variables, and efficacy of emotion regulation strategies, like cognitive reappraisal, in in vivo social stress tasks. Furthermore, given that self-compassion has not been used as a cognitive reappraisal strategy previously in the literature, its impact on participants’ subjective and physiological experience compared to those in the control group was systematically investigated. Moreover, in light of the study by Boden et al. (2012) whereby veterans who were high in emotional clarity were better able to use cognitive reappraisal to regulate strong emotions, it was expected that higher emotional awareness would facilitate participants’ benefit from cognitive reappraisal in the form of lessened anxious arousal and cardiac reactivity in the current study. Trait levels of self-compassion and social anxiety were also considered predictors, considering the likelihood that they would relate to the degree to which participants could use the self-compassion reappraisal to alleviate subjective or physiological arousal in the social evaluative paradigm. It was plausible that because women may be higher in emotional awareness (Barrett et al., 2000), female participants might yield greater benefit from the reappraisal instruction; therefore, gender also was used as predictor in the present study.
Hypotheses.

1) Subjective response to the social evaluative threat task

a. Anxiety: It was anticipated that the self-compassion cognitive reappraisal strategy would attenuate participants’ subjective experience of anxiety in the 1) anticipation of speech phase and 2) anticipation of observer feedback phase as compared to the control group. Trait social anxiety and self-compassion were also tested as predictors of participants’ anxiety response to the paradigm. Moreover, participants with higher emotional awareness were expected to yield greater benefit from the self-compassion reappraisal instructions, thereby showing lower anxiety, than their counterparts low in emotional awareness. Given that women consistently report a higher level of emotional awareness, it was possible that women would attain greater benefit from the reappraisal instructions relative to men; therefore gender was also tested as a predictor.

b. Performance-related self-report ratings: Participants in the self-compassion reappraisal group were expected to rate themselves as more self-compassionate and less self-critical of their performance than participants in the control group. It was also expected that participants receiving the self-compassion reappraisal would endorse higher willingness to complete a second speech due to decreased ego-defensiveness. Trait social anxiety and self-compassion were also tested as possible predictors of participants’ subjective ratings. Given the mixed findings on self-compassion and gender, with some studies finding men more likely to rate themselves as self-
compassionate than women, the effect of gender on participants’ subjective
ratings of self-compassion and self-criticism regarding speech performance
were also examined.

2) **Cardiac response to the social evaluative threat task**: It was hypothesized that the
self-compassion cognitive reappraisal strategy would attenuate participants’ cardiac
reactivity (i.e., degree of change in heart rate between baseline and anticipation) in
the 1) anticipation of speech phase and 2) anticipation of observer feedback phase
relative to that of the control group. Trait social anxiety and self-compassion were
also tested as possible predictors of participants’ cardiac reactivity. No specific
hypotheses were offered regarding the effect of gender on participants’ cardiac
reactivity given the inconsistent literature regarding gender differences in autonomic
responding to social evaluative threat. However, since women consistently report a
higher level of emotional awareness, the relationship between reappraisal group
assignment, gender and attention to and clarity of emotions were tested in relation to
participants’ cardiac reactivity.

**Methods**

**Participants**

Participants were recruited from the Research Experience Program participant pool at
Stanford University and Foothill College in California, USA. Subsequent to pilot testing \( n = 5 \),
84 participants (42 men, \( M_{age} = 20.67 \) years, \( SD_{age} = 2.97 \)) completed a battery of questionnaires
online prior to their laboratory visit. The study sample consisted of 82 individuals who were able
to attend the laboratory visit; two participants were unable to be reached for scheduling. Nine
participants were excluded from the final sample due to inconsistent protocol adherence \( n = 1 \),
lack of deception during the task \((n = 6)\), and poor command of English such that the speech task could not be completed \((n = 2)\). The final sample included \(N = 73\) participants, 39 women \((n = 20\) in the self-compassion reappraisal group and \(n = 19\) in the control group) and 34 men \((n = 17\) in each group). This sample was composed of the following ethnicities: Caucasian \((43.53\%)\); Asian-American \((22.35\%)\); Hispanic \((14.12\%)\); African-American \((4.71\%)\); and participants whom endorsed themselves as ‘Other’ \((15.29\%)\). All participants signed informed consent prior to participation. They received course credit or $25 for participation. This study was approved by the Stanford University Institutional Review Board.

**Measures**

**Hardware.** In total seven physiological channels were recorded using Mindware BioLab (Mindware Inc., Ghanna, OH) at a rate of 500 Hz in a continuous mode of collection. Heart rate was recorded via electrocardiogram from three standard ECG electrodes placed in the inverted triangle configuration by this author.

**Software.** E-Prime, a psychological experiment design and data collection software program, was used to format the current psychological study. Through E-Prime software (Psychology Software Tools, Inc, Pittsburgh, Pennsylvania), subjective rating questions were administered to participants and their encoded data were stored for later transfer into the Statistical Package for the Social Sciences (SPSS) data analysis program. E-Prime was also used to insert markers into the physiological data to indicate the participants’ phase of the study as they moved through the experiment. To analyze the physiological data, the Autonomic Nervous System Laboratory program (ANSLAB; Wilhelm & Peyk, 2005) was used to clean, organize and derive measures of heart rate (HR) from the raw ECG data.
Individual difference scales. All scale measures were administered using WebRemark version 3.0. Participants completed several individual difference measures in addition to those described below as part of a larger study that will not be further discussed in the current dissertation.

Self-compassion. The Self-Compassion Scale (SCS; Neff, 2003b) is a 26-item scale measure of self-compassion, with items rated on a 5-point Likert type scale ranging from 1 (almost never) to 5 (almost always) across 6 subscales: Self-Kindness (5 items), Self-Judgment (5 items), Common Humanity (4 items), Isolation (4 items), Mindfulness (4 items), and Over-Identified (4 items) (Appendix A). The total score of the SCS, where a higher score indicates a higher level of self-compassion, was used in the current analysis. The coefficient alpha of the scale was .92 among undergraduate students in the original validation study (Neff, 2003b) and in the current sample the coefficient alpha was .91.

Social anxiety. The self-report version of the Liebowitz Social Anxiety Scale (LSAS; Liebowitz, 1987) was used to assess both fear and avoidance with respect to 24 social situations (Fresco et al., 2001), including 11 social interactions (e.g., going to a party) and 13 performance situations (e.g., giving a presentation). Participants rated fear or anxiety on a scale from 0 (none) to 3 (severe) and avoidance ranging from 0 (never, 0%) to 3 (usually, 68-100%). The scale evidenced good psychometric properties and in the present sample the full-scale coefficient alpha was .95.

Attention to emotions. Attention to emotions was measured using 10 items selected as the best representatives of this construct (Palmieri et al., 2009), with 2 items drawn from the Toronto Alexithymia Scale (TAS; Bagby, Parker, & Taylor, 1994a; Bagby, Taylor, & Parker, 1994b) and 8 items drawn from Trait Meta-Mood Scale (TMMS; Salovey et al., 1995). Palmieri
et al. used multidimensional scaling (MDS) and confirmatory factor analysis (CFA) to develop improved subscales for measuring attention to emotions by drawing items from the TAS and the TMMS. The 2 items from the TAS were from the TAS-Externally Oriented subscale, e.g. “I find examination of my feelings useful in solving personal problems”. The other 8 items were drawn from the TMMS-Attention subscale, e.g., “I pay a lot of attention to how I feel”. Items were rated using a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), and scored such that higher scores represented higher attention to emotions. In the research by Palmieri and colleagues (2009), the final scale of 10 items measuring Attention to Emotions had a coefficient alpha of .87, whereas in the current sample the coefficient alpha for this scale was .89.

Clarity of emotions. Clarity of emotions was measured using 13 items derived by Palmieri et al. (2009) as the best representatives of this construct using MDS and CFA. Five items were drawn from the TAS Identifying Feelings subscale (Bagby, Parker, & Taylor, 1994a; Bagby, Taylor, & Parker, 1994b), e.g., “I am often confused about what emotion I am feeling,” and 8 items from the TMMS-Clarity scale (Salovey et al., 1995), e.g., “I can’t make sense out of my feelings.” Items were rated using a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), and scored such that higher scores represented higher emotional clarity. In the research by Palmieri and colleagues (2009), the final scale of 13 items measuring Emotional Clarity had a coefficient alpha of .89, whereas in the current sample the coefficient alpha for this scale was .86.

Procedure

Consent and physiological equipment set up. The individual laboratory visit for each participant was approximately 1 hour in duration. Appendix B contains a graphic depicting the
design of the laboratory visit from beginning to finish. Participants were randomized into one of two conditions, the self-compassion reappraisal group or the control group, prior to arriving at the laboratory. Groups differed only in the instructions they received (see below) and otherwise underwent identical procedures.

Upon arriving at the laboratory all participants were given a letter of information and consent form about the present study entitled ‘Emotion regulation and stress’ (Appendix C). The experimenter explained information contained in the letter including that the participants would be asked to participate in a speech task. Participants were informed that the session would be video recorded, should they consent (Appendix C), and that their physiological responses would be monitored throughout the session. Participants were given the opportunity to sign the consent form after their rights were explained in full. No participants declined to participate.

Participants were then asked to fill out the brief demographic form on the computer. Thereafter, participants were fitted with physiological sensors to measure blood pressure, galvanic skin response, and cardiac measures. These physiological indicators were collected as part of the larger study: only heart rate data was of interest to the current study. Once the participants’ physiological data were being properly measured (as verified by checking the recording monitor) and recorded to a hard-drive, participants were asked to remain still for a few moments so that their baseline physiology could be gauged and the signal checked.

At that time the experimenter explained that all instructions and questions would be presented during the course of the study via the computer program, including notice of when the 3-minute baseline period was over. The experimenter noted that the only exception was when the experimenter needed to explain specific instructions to the participant and that those times would be indicated on the screen with the note, “Please wait for experimenter.” For the duration of the
baseline period the experimenter was outside the study room watching the participant from the control room, an adjacent room, via live feed from hidden cameras.

Reappraisal and speech instructions. After the baseline period of 3 minutes the participant was asked to indicate how he or she was feeling using a brief questionnaire measuring mood. Upon completion the experimenter entered the study room in order to deliver the instructions about the speech. Effort was made to present all instructions in a neutral yet friendly conversational tone. The same experimenter conducted all laboratory visits in an effort to reduce variability in the presentation of the instructions. The following instructions were given to participants, with those instructions given only to the compassion group, or only to the control group, as indicated:

To all participants: Today you will be asked to answer some questions, before giving a 3-minute impromptu speech in front of a video camera. Right now we’re going to have you answer some more questions on the computer. You will know when you are about to begin the speech because I will return at that time. I will enter the room, reveal the video camera, and assign you a topic to speak on. At that point I will leave the room. The computer screen will show when you have 30 seconds left to conclude your 3 minute speech, and will say “finished” when you are to stop speaking. Please speak for the full 3 minutes. You will be given a two-minute resting period after the speech before we move onto other things”.

At this point all participants were asked to summarize their understanding of the procedure so the experimenter could ensure the participant understood the procedure, as well as to correct any misunderstandings. All participants grasped the instructions easily.

Continued: “You should know that your speech will be videotaped and scored in real time by trained observers in the control room. The observer will rate your speech on a variety of rating scales. People generally report that an impromptu speech creates some level of discomfort or even fear for them…”

Compassion group only: “but you know, you can change your thoughts about the situation in order to feel better. Please remember not to aim to mentally prepare for the speech, since you don't know the topic at this time. Instead, remember that many people report feeling nervous about public speaking, I hope you won't be hard on yourself if you do feel nervous. You may notice your feelings as they arise, but try
not to be self-critical of them - anyone in your position would feel the same way you're feeling right now. In fact, it may be helpful to show the same care, or kind regard, for yourself and your feelings throughout this task that you would show a friend of yours if they were the ones participating in this task. By this I mean, for example, you might think to yourself, "I'm going to suck at this", but if it were a friend or close other sitting in that chair instead of you, would you say to them, "I think you're going to suck at this?" (pause in case they say "no"). So all together, these instructions mean that you should try to respond to the way you think and feel throughout this study the way you would respond to a friends' thoughts and feelings if they were the ones participating.”

_Control group only: “but just try your best.”_

Then:

_All participants: “Does this make sense?” (Rephrase as necessary) _
_Compassion group only: “If you feel any discomfort or anxiety as you give the speech just tell yourself that this is to be expected. Do keep in mind your supportive, compassionate stance toward yourself if you feel discomfort about the speech task.”_
_Control group: “Just remember to try your best.”_

The experimenter left and participants were prompted via the computer to rate their level of anxiety on a 9-point Likert-type scale ranging from 1 (_not anxious/not tense_) to 9 (_very anxious/very tense_) each minute for 3 minutes prior to the return of the experimenter. This period of time served as the ‘anticipation period’ for measuring physiological stress prior to the experimenter returning to assign the speech topic.

_Pre-speech questions and speech._ At the end of the anticipatory period prior to the speech task, the experimenter entered the room and revealed a hidden camera by removing a picture frame on the bookshelf that had previously occluded the camera from view. At that point, an audio-recorded confederate experimenter confirmed over intercom that the participant was viewable, and that the observers were ready for the speech to commence, by saying, “We can see you, all set to go”. The experimenter then gave all participants the same instruction:

“We are interested in seeing how people speak about aspects of their personality. For example, often in interviews for positions, people are asked to talk about their character. It is common for people being interviewed to have to discuss strengths and weaknesses of their personality, as they see them. We are interested in examining how people come...
across when describing these aspects of their self. We would like you to go ahead and describe aspects of your strengths and weaknesses, and you will be judged on the way you come across and on the impression that you make. Do you have any questions? The computer will let you know when to begin, please follow the prompts and answer the questions on the computer.”

Participants were told that they would answer a few questions on the computer and that they could subsequently begin the speech when the computer program indicated. As part of a larger study, questions asked included items adapted from the Perception of Speech Performance (PSP) questionnaire (Rapee & Lim, 1992). Upon completion of the questions, participants were asked to begin the speech. The computer showed a screen saying, “speak” for 2.5 minutes, subsequently the screen changed to indicate that there was 30 seconds left in the speaking time. Then, participants stopped speaking at the 3-minute mark in response to a message on the computer saying, “Finished”. Next, the computer prompted participants to rate their average level of anxiety during the course of the speech on a 9-point Likert-type scale ranging from 1 (not anxious/not tense) to 9 (very anxious/very tense).

**Post-speech recovery.** Participants were then asked to sit still for a 2-minute recovery period, as indicated on the computer screen. This period served as the ‘rest and recovery period’ for measuring physiological recovery post challenge. Recall that participants were told at the beginning of the study that they would receive observer feedback based on the impression they made upon completion of the speech task. Again as part of the larger study, participants were also asked questions from the PSP after the conclusion of their speech and the recovery period. Then, participants completed a second rating of how they felt on the brief mood scale. Finally, participants rated themselves on the social skills, friendliness, likeability, warmth, intelligence, and maturity they portrayed during the speech on a 7-point scale (Leary et al., 2007), with 7 being the most positive rating.
Anticipation of feedback. After participants completed the questionnaires via the E-Prime computer program, the experimenter entered the study room in order to deliver instructions about the next phase of the study. The following instructions were given to all participants:

“The observers are just finishing up reviewing your performance in order to provide you with feedback. On average this takes just a few minutes, so just wait for now”

Participants were asked via the computer to rate their level of anxiety, on a 9-point Likert-type scale ranging from 1 (not anxious/not tense) to 9 (very anxious/very tense) each minute for 2 minutes prior to the return of the experimenter. Between the first and second minute the experimenter opened the door of the testing room and said, “it should just be for another moment, I’m sorry for the wait!”. This period of time served as the ‘anticipation of feedback period’ for measuring physiological stress.

Feedback from observers and physiological recovery. The experimenter then entered the room and handed the participant the feedback sheet believed to be from the observers. In actuality, all participants were given a feedback sheet with their assigned participant number at the top and identical neutral feedback ratings (a mix of 3s, 4s, and 5s, as researched by Leary et al., 2007: Appendix D) on the aforementioned domains of social skill, friendliness, likeability, warmth, intelligence, and maturity.

At the moment the participants were given their feedback sheet, their physiological response and recovery was measured for 2 minutes thereafter. This period of 2 minutes is considered the ‘physiological recovery from feedback’ phase. Thereafter, as part of the larger study, participants were given questions to assess their attributions regarding the feedback, again adapted from Leary et al. (2007).
Of importance in the current study, participants were asked to reflect on their subjective experience in terms of the following items: 1) how compassionate they were being toward themselves; 2) how self-critical they were being about their performance; and 3) how favourable they would find doing another speech thereafter for the observers on a 9-point Likert-type scale ranging from 1 (not so) to 9 (extremely). These questions were of interest given that they quantify the degree to which participants felt they benefited from the self-compassion instructions in terms of their performance, relative to the control group. Moreover, the third question provides an indicator of the degree to which the self-compassion reappraisal might translate into a behaviourally based outcome (i.e., increased willingness to perform a second speech). To conclude, participants completed their third and final rating of their mood on the brief mood measure.

**Debrief.** The experimenter then interviewed participants using questions from a deception questionnaire (Appendix E), developed to assess the degree to which participants believed the deception (e.g. that there were observers watching and providing feedback on their speech). At the conclusion of the interview participants were thoroughly debriefed about the procedure of the study. Participants were assured that their speeches were not actually evaluated by observers, as there were no observers present, and that the woman speaking over the intercom was an audio-recording done by a research confederate. Moreover, it was also explained that the performance feedback had been created for the participant in advance of the experiment and in fact, that all participants actually received the same feedback. The debriefing form used and given to participants is included in Appendix F.
Statistical Approach

In the current study, the error rate for each statistical test was set at alpha (α) of .05. An alpha of .05 means that the null hypothesis will be incorrectly rejected (i.e. Type I error) 5 times out of every 100 analyses. According to Howell (2006), Type I error rate is the probability of falsely rejecting a true null hypothesis and therefore concluding that an effect exists when it really does not. Given that the chance of committing a Type I error increases based on the number of statistical tests conducted (Keselman, Miller, & Holland, 2011; Tukey, 1949), however, the potential of Type I error is higher than α = .05 in the current study given that several statistical tests were conducted to address the hypotheses.

A classic solution to controlling for the number of hypotheses tested and the probability of making a Type I error is applying the Bonferroni correction (Fisher, 1935) by dividing alpha by the number of tests conducted. However, this can quickly result in an ultra-conservative alpha rate that is inefficient and costly to the progress of psychological science because of the high resultant rate of null findings. Moreover, too stringent an alpha would result in a higher Type II error rate, that is, incorrectly accepting the null hypothesis when it should, in fact, be rejected in favour of the alternative hypothesis (Howell, 2006). Another answer to the issue of inflated Type I error is ensuring that hypotheses are well established a priori based off the current literature, as a means to justify statistical tests conducted. However, this approach is made more difficult in exploratory research seeking to investigate new ideas or theoretical relationships. Indeed, despite solid theoretical grounding of the current hypotheses (below), the study is still exploratory in nature given that self-compassion as a cognitive reappraisal strategy has not been previously studied. For this reason, analyses pertaining to main effects of the self-compassion reappraisal
were reported at alpha level of .10, with effect sizes reported to qualify the practical significance of the finding.

More recently, researchers have advocated for the importance of using effect sizes, rather than null hypothesis significance testing based on a pre-set alpha, in order to establish the magnitude of relationship between two variables. Stanley and Spence (2014) have advocated for psychological science to shift to a *meta-analytic mindset* whereby individual studies are not thought to provide reliable information about an underlying true effect, but rather are considered to be one of many estimates needed to establish the true underlying reality. Moreover, Cumming (2014) recently argued that null hypothesis significance testing be replaced entirely in favour of *‘the new statistics’*, deriving estimates of results from effect size and confidence interval alone, and using meta-analysis rather than reliance on the current state of null hypotheses significance testing. Cumming highlights benefits of the new statistics: no longer understanding effects dichotomously or as black and white based off the arbitrary assignment of alpha to decide statistical significance, and more broadly, the evolution of psychological science by increasing research integrity.

In light of the arguments put forth by Stanley and Spence (2014) and Cumming (2014), effect sizes are reported in the current study and are used to assist in the interpretation of results alongside null hypothesis significance testing. In the mean time, I believe that the risk of making a Type I error in the current study, given the number of analyses and the constraints of null hypothesis statistical testing, was outweighed by the benefit of better understanding to what extent self-compassion reappraisal aids participants in the context of a social stress task and for whom it works best.
Plan of Analysis

Overview. All data were analyzed for normality of distribution using skewness, kurtosis, and scatter-plots, and descriptive statistics were reported. A multivariate ANOVA was conducted to assess for between-group differences (in group, gender, or group by gender interactions) among participants’ self-report measures of social anxiety, self-compassion, and attention to and clarity of emotions prior to beginning the paradigm. Findings conventionally considered to be at the trend level (i.e., \( p < .10 \)) are reported as such.

Hypothesis 1: Subjective response to the social evaluative threat task

Anxiety. First the correlation of participants’ self-reported anxiety between the first and second anticipatory phases was assessed to determine if the ratings should be aggregated. This would support decreased number of analyses. Next, three regression analyses were conducted to examine whether just group, just gender, or the group by gender product term interacted to predict participants’ level of anxiety in the social evaluative task. Correlations were then used to assess the relationship between anxious arousal and the individual difference measures including self-compassion, as rated on the SCS; social anxiety, as rated on the LSAS; and emotional awareness variables (emotional clarity and attention to emotions) as rated on the subscales derived by Palmieri and colleagues (2009). All predictor variables were centered (Aiken & West, 1991). Thereafter two hierarchical regression analyses were conducted for each individual measure, the first to assess whether group interacted with the individual difference to predict anxiety, and the second to assess whether gender interacted with the individual difference measure to predict anxiety. These regression analyses were conducted with main effects entered in the first step and the two-way interactions in the second step. Finally, one hierarchical regression was conducted for each individual difference measure to assess the possibility of a
three-way interaction with group, gender, or the group by gender product term, with main effects entered in the first step, all two-way interactions in the second step, and the three-way interaction (e.g., group x gender x individual difference measure) in the third step. When the omnibus $F$ was less than $p < .10$, I used Dawson and Richter’s (2006) recommendations regarding simple slopes analyses to graph and interpret the interaction of covariates of interest with group or with gender on participants’ anxiety ratings.

**Performance-related self-report ratings.** Descriptive statistics and inter-correlations were reported. Next, the same series of analyses was repeated as described above but using as the outcome measures participants’ subjective ratings of (1) how compassionate they were being toward themselves; (2) how self-critical they were being about their performance; and (3) how favourable they would find doing a second speech, as the outcome measures.

**Hypothesis 2: Cardiac response to the social evaluative threat task**

A repeated-measures analysis of variance (ANOVA) was conducted to understand participants’ cardiac response to the paradigm. This analysis treated the phases of the study — baseline, anticipation of speech, speech, recovery, feedback anticipation, and feedback recovery — as the within-subjects factor. Repeated measures ANOVAs were used to assess if the reappraisal group, gender, or the group by gender product term interacted to predict change in heart rate between the baseline and speech anticipation phase, or the recovery and feedback anticipation phase. Correlational analyses were then used to explore whether heart rate reactivity data from the speech anticipation phase and the feedback anticipation phase would be aggregated or analyzed separately. Finally, the aforementioned series of analyses was systematically repeated with participants’ cardiac reactivity during the anticipation periods (i.e., change from
baseline to speech anticipation, and from recovery to feedback anticipation) as the outcome variables of interest.

**Results**

**Individual Differences and Main Effects**

Descriptive statistics and intercorrelations between measures of social anxiety, self-compassion, and attention to and clarity of emotions are presented in Table 1. Data were analyzed for normality of distribution using skewness, kurtosis, and scatter-plots, and these analyses showed that the variables were normally distributed. Group assignment was not related to any individual difference measure. There were also no gender differences between men and women on the scale measures, with the exception that women rated themselves as significantly higher on attention to emotions \((M = 4.00, SD = 0.57)\) than men \((M = 3.58, SD = 0.67)\), \(F(1, 69) = 8.28, p < .01, \eta^2_p = .107\) (medium effect size). There was no group by gender interaction on any individual difference measure.

**Subjective Response to the Social Evaluative Threat Task**

**Anxiety ratings in response to the paradigm.** Anxiety ratings were taken during the speech anticipation and the feedback anticipation periods. Participants’ self-reported average anxiety during the speech anticipation phase was highly correlated with their anxiety during the feedback anticipation phase, \(r(73) = .56, p < .001\). As such, for the purposes of exploring how group, gender, and individual differences influenced participants’ anticipatory anxiety, participants’ self-reported anxiety during the speech and feedback anticipation periods was aggregated into one measure of average anticipatory anxiety.

Regression analyses yielded a significant main effect of gender on participants’ anticipatory anxiety, \(R^2 = .05, F(1, 71) = 3.98, p = .05\), accounting for 5.3% of the variance, with
women \( (M = 4.50, \ SD = 1.71) \) rating themselves as experiencing higher anxiety during anticipation than men \( (M = 3.73, \ SD = 1.56) \). However, there were no group, \( F(1, 71) = 1.32, ns, \) or group by gender interaction effects, \( F(1, 69) = 0.39, ns, \) on participants’ aggregate measure of anticipatory anxiety.

Participants with higher anticipatory anxiety rated themselves as significantly lower in self-compassion, \( r(73) = -.24, p = .045 \), and as higher in social anxiety at the trend level, \( r(73) = .23, p = .058 \), than participants who experienced less anticipatory anxiety. However, participants’ emotional awareness (clarity of and attention to emotions) did not relate to the anxiety they reported experiencing during the anticipation periods. See Table 1 for correlations between individual difference variables and anticipatory anxiety.

Table 1. *Descriptive statistics and zero-order correlations.*

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Anticipation Anxiety</td>
<td>4.14(1.67)</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Social Anxiety (LSAS)</td>
<td>30.64(21.79)</td>
<td>-.23*</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Self-compassion (SCS)</td>
<td>3.21(0.63)</td>
<td>-.24*</td>
<td>-.48**</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4. Emotional Clarity</td>
<td>3.76 (0.69)</td>
<td>-.15</td>
<td>-.12</td>
<td>.30*</td>
<td>1</td>
</tr>
<tr>
<td>5. Attention to Emotions</td>
<td>3.80 (0.64)</td>
<td>-.01</td>
<td>.11</td>
<td>-.05</td>
<td>.24*</td>
</tr>
</tbody>
</table>

** \( p < .01 \)
* \( p < .05 \)
* \( p < .10 \)

Hierarchical regression analyses were conducted to assess whether individual difference variables (social anxiety, self-compassion, and attention to and clarity of emotions) interacted with group, gender, or their product term, to predict anticipatory anxiety. One significant regression model emerged involving group, gender, and emotional clarity. See Table 2 for a
summary of findings from this regression. Overall, the first step was marginally significant when testing for the main effects of group, gender, and emotional clarity on anticipatory anxiety, $R^2 = .093, F(3, 69) = 2.36, p = .079$, accounting for 9.3% of the variance in anticipatory anxiety. The inclusion of the two-way interaction terms between group and emotional clarity, gender and emotional clarity, and gender and group did not account for a significantly higher amount of the variance than the predictors alone, $F(3, 66) = 0.80, ns$. However, the inclusion of the three-way interaction term between group, gender, and emotional clarity uniquely predicted 10.1% of the variance in anticipatory anxiety above and beyond the other predictors and two-way interactions, $R^2 = .19, \Delta F(1, 65) = 5.12, p = .027$, with this total model accounting for 18.8% of the variance in anticipatory anxiety (Figure 1).

Simple slope analyses were used to analyze how the interaction of group and gender on anticipatory anxiety was affected by participants’ level of emotional clarity. Two significant slope differences emerged. Firstly, from the perspective of group effects, the simple slopes analyses revealed that group assignment was important for women, $t(39) = 2.50, p = .015$, as women who were high in emotional clarity (i.e., 1 SD above the mean) had attenuated anticipatory anxiety in the self-compassion reappraisal group compared to that experienced by women in the control group. Group assignment did not appear to impact anticipatory anxiety for women with low emotional clarity (i.e., 1 SD below the mean) to the same degree. Taken together, women experienced less anxiety at higher levels of emotional clarity, but only if they were in the self-compassion reappraisal group.

Secondly, considering this interaction from the perspective of gender differences, there was a significant difference between men and women in the control group depending on emotional clarity level, $t(36) = -2.00, p = .05$. Both sexes in the control group reported similar
levels of anticipatory anxiety when they were low in emotional clarity (i.e., 1 SD below the mean). However, men and women in the control group showed a significantly different pattern of anticipatory anxiety at higher emotional clarity levels (i.e., 1SD above the mean), with women in the control group showing heightened anxiety relative to men in this group. Men’s level of anxiety was not affected by emotional clarity in the compassion group or the control group.

No other significant interactions emerged when regression analyses were conducted to assess if individual difference variables interacted with group, gender, or their product term, to predict anticipatory anxiety.

Table 2. Summary of regression analyses for group, gender, and emotional clarity predicting anticipatory anxiety.

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>SE B</th>
<th>β</th>
<th>R²</th>
<th>Δ R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td></td>
<td></td>
<td></td>
<td>.09</td>
<td>.09</td>
</tr>
<tr>
<td>Emotional Clarity</td>
<td>-.35</td>
<td>.28</td>
<td>-.15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group</td>
<td>.41</td>
<td>.38</td>
<td>.12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>-.78</td>
<td>.38</td>
<td>-.24*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 2</td>
<td></td>
<td></td>
<td></td>
<td>.13</td>
<td>.03</td>
</tr>
<tr>
<td>Emotional Clarity</td>
<td>-.60</td>
<td>.42</td>
<td>-.25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group</td>
<td>.63</td>
<td>.53</td>
<td>.19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>-.58</td>
<td>.54</td>
<td>-.17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emotional Clarity x Group</td>
<td>.78</td>
<td>.57</td>
<td>.21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emotional Clarity x Gender</td>
<td>-.30</td>
<td>.60</td>
<td>-.07</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group x Gender</td>
<td>-.47</td>
<td>.77</td>
<td>-.12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 3</td>
<td></td>
<td></td>
<td></td>
<td>.19</td>
<td>.06</td>
</tr>
<tr>
<td>Emotional Clarity</td>
<td>-.98</td>
<td>.45</td>
<td>-.40*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group</td>
<td>.64</td>
<td>.51</td>
<td>.19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>-.64</td>
<td>.53</td>
<td>-.19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emotional Clarity x Group</td>
<td>.17</td>
<td>.68</td>
<td>.46*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emotional Clarity x Gender</td>
<td>.93</td>
<td>.80</td>
<td>.22</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group x Gender</td>
<td>-.50</td>
<td>.75</td>
<td>-.13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emotional Clarity x Group x Gender</td>
<td>-2.65</td>
<td>1.17</td>
<td>-.43*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

** p < .01
* p < .05
v p < .10
**Performance-related self-report ratings.** Descriptive statistics and correlations among performance-related ratings are reported in Table 3. Regression analyses were used to test the main effect of gender and of group in the first step on each of the three performance-related ratings. Another regression was used to test the effect of the group by gender interaction effect in the second step on each rating. There were no main effects of group on participants’ performance-related ratings. However, regression analyses yielded a significant main effect of gender on participants’ response to “Please rate how favourable you would find doing a second speech right now,” with men rating a second speech ($M = 4.56, SD = 2.68$) as significantly more favourable than women ($M = 3.10, SD = 1.60$), $R^2 = .103, F(1,71) = 8.19, p < .01$. This gender difference accounted for 10.3% of unique variance in the rating.
There also was a significant group by gender interaction effect on participants’ response to the prompt “Please rate how self-critical you are being of how you performed,” $R^2 = .11$, $F(1, 69) = 8.24$, $p < .01$, with the interaction accounting for an additional 10.60% of the variance above and beyond that accounted for by group and gender alone (Table 4; Figure 2). Independent samples $t$-tests were used to investigate the effect of group assignment on men and women separately, who appeared to show effects in the opposite direction. For men, the difference in self-criticism ratings between the compassion group ($M = 5.94$, $SD = 2.02$) and the control group ($M = 4.94$, $SD = 1.89$) did not achieve significance, $t(32) = 1.49$, $ns$. In contrast, women in the compassion group ($M = 4.60$, $SD = 2.06$) rated themselves as significantly less critical compared to the women in the control group ($M = 6.11$, $SD = 1.41$), $t(37) = -2.65$, $p < .05$.

Table 3. Descriptive statistics and correlations for performance-related ratings.

<table>
<thead>
<tr>
<th></th>
<th>$M$ ($SD$)</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. How compassionate did you feel toward yourself during the speech?</td>
<td>4.85 (1.65)</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Please rate how self-critical you are being of how you performed</td>
<td>5.38 (1.93)</td>
<td>-.01</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3. Please rate how favourable you would find doing a second speech right now?</td>
<td>3.78 (2.28)</td>
<td>.27*</td>
<td>.004</td>
<td>1</td>
</tr>
</tbody>
</table>

** $p < .01$
* $p < .05$
Table 4. Regression analyses for group and gender predicting self-criticism rating.

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>SE B</th>
<th>β</th>
<th>$R^2$</th>
<th>$Δ R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group</td>
<td>.34</td>
<td>.46</td>
<td>.09</td>
<td>.01</td>
<td>.01</td>
</tr>
<tr>
<td>Gender</td>
<td>.10</td>
<td>.46</td>
<td>.03</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td><strong>.11</strong></td>
<td><strong>.11</strong></td>
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<td></td>
</tr>
<tr>
<td>Group</td>
<td>1.51</td>
<td>.60</td>
<td>.39*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>1.34</td>
<td>.61</td>
<td>.35*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group x Gender</td>
<td>-2.51</td>
<td>.87</td>
<td>-.55**</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

Figure 2. Self-criticism ratings by group and gender.

Correlations between average subjective ratings and individual difference variables are reported in Table 5. Self-reported attention to emotions did not relate to any subjective ratings, and emotional clarity was significantly related only to participants’ self-ratings of compassion.
towards their speech performance, \( r(73) = .24, p = .04 \). However, participants’ level of social anxiety as self-rated on the LSAS, and of self-compassion as self-rated on the SCS, were significantly correlated with participants’ ratings of their own self-compassion about their speech and of how favourable they would find performing a second speech (see Table 5).

Table 5. Correlations between individual differences and subjective ratings.

<table>
<thead>
<tr>
<th></th>
<th>Social Anxiety (LSAS)</th>
<th>Self-compassion (SCS)</th>
<th>Emotional Clarity</th>
<th>Attention to Emotions</th>
</tr>
</thead>
<tbody>
<tr>
<td>How compassionate did you feel toward yourself during the speech?</td>
<td>-.44**</td>
<td>.43**</td>
<td>.24*</td>
<td>.11</td>
</tr>
<tr>
<td>Please rate how self-critical you are being of how you performed</td>
<td>.22*</td>
<td>-.36**</td>
<td>-.12</td>
<td>-.01</td>
</tr>
<tr>
<td>Please rate how favourable you would find doing a second speech right now?</td>
<td>-.34**</td>
<td>.26*</td>
<td>.01</td>
<td>-.01</td>
</tr>
</tbody>
</table>

Hierarchical regression analyses were conducted to assess whether each of the individual difference variables (social anxiety, self-compassion, and attention to and clarity of emotions) interacted with group to predict participants’ subjective ratings. Next, this series of analyses was repeated with gender as a predictor. Finally, a series of hierarchical analyses were conducted with group, gender, and the group by gender product term to assess possible interactions with each individual difference measure, with main effects entered in the first step, two-way interactions in the second step, and the three-way interaction tested in the third step. Two significant regression models emerged when gender was used as a predictor.

Firstly, a significant two-way interaction between gender and self-compassion emerged, \( R^2 = .20, F(1, 69) = 6.16, p = .045 \), accounting for 19.8% of the variance in participants’
subjective rating when asked “Please rate how favourable you would find doing a second speech right now.” Simple slope analyses revealed that men rated the potential of a second speech as significantly more favourable when they were higher in self-compassion (i.e., 1 SD above the mean), $t(34) = 1.86, p = .006$, whereas women’s favourability rating was not impacted by their self-compassion level, $t(39) = 0.19, ns$ (Table 6; Figure 3).

Table 6. *Regression analyses for self-compassion and gender predicting favourability of completing second speech.*

<table>
<thead>
<tr>
<th>Step</th>
<th>$B$</th>
<th>$SE$</th>
<th>$β$</th>
<th>$R^2$</th>
<th>$ΔR^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td></td>
<td></td>
<td></td>
<td>.15**</td>
<td>.15**</td>
</tr>
<tr>
<td>Self-compassion</td>
<td>.78</td>
<td>.40</td>
<td>.22v</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>1.32</td>
<td>.50</td>
<td>.29*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 2</td>
<td></td>
<td></td>
<td></td>
<td>.20*</td>
<td>.05*</td>
</tr>
<tr>
<td>Self-compassion</td>
<td>.19</td>
<td>.49</td>
<td>.05</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>.13</td>
<td>.49</td>
<td>.28*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-compassion x Gender</td>
<td>1.68</td>
<td>.82</td>
<td>.28*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

** $p < .01$  
* $p < .05$  
v $p < .10$  

$p < .10$
Secondly, a significant two-way interaction between gender and social anxiety emerged, $R^2 = .11$, $F(1, 69) = 5.00$, $p = .03$, accounting for 11.4% of the variance in participants’ subjective rating when asked “Please rate how self-critical you are being of how you performed.” Simple slope analyses revealed that women rated themselves as being significantly more self-critical about how they performed when they were higher in social anxiety (i.e., 1 SD above the mean), $t(39) = 3.00$, $p < .01$, whereas men’s self-criticism rating was not impacted by their social anxiety level, $t(34) = -0.07$, $ns$ (Table 7; Figure 4).
Table 7. Regression analyses for social anxiety and gender predicting self-criticism rating.

<table>
<thead>
<tr>
<th>Step</th>
<th>Variable</th>
<th>B</th>
<th>SE B</th>
<th>β</th>
<th>R²</th>
<th>Δ R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>Social Anxiety</td>
<td>.02</td>
<td>.01</td>
<td>.22*</td>
<td>.05</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gender</td>
<td>.16</td>
<td>.45</td>
<td>.04</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 2</td>
<td>Social Anxiety</td>
<td>.04</td>
<td>.02</td>
<td>.49**</td>
<td>.11*</td>
<td>.06*</td>
</tr>
<tr>
<td></td>
<td>Gender</td>
<td>.16</td>
<td>.44</td>
<td>.04</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Social Anxiety x Gender</td>
<td>-.05</td>
<td>.02</td>
<td>-.37*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**  p < .01
*   p < .05
*   p < .10

Figure 4. Self-criticism rating as related to gender and trait-social anxiety level.

Finally, one significant three-way regression model emerged between group, gender, and attention to emotions on participants’ self-report when they were asked “How compassionate did you feel toward yourself during the speech?” See Table 8 and Figure 5 for a summary of findings.
from this regression. The inclusion of the three-way interaction term between group, gender, and attention to emotions uniquely predicted 6.2% of the variance in self-compassion ratings above and beyond the other predictors entered in step one, and the two-way interactions in step two, with this total model accounting for 14.90% of the variance in participants’ self-rated level of compassion, $R^2 = .15$, $\Delta F(1, 65) = 4.75$, $p = .033$.

Simple slope analyses were used to analyze how the interaction of group, gender and attention to emotions influenced participants’ self-rated self-compassion. There was a marginally significant difference between women in the compassion and the control group, $t(39) = -1.80$, $p = .076$, where the ratings of the women in the control group were not impacted by their level of attention to emotions, $t(19) = .015$, ns, as compared to women in the compassion group whose level of attention to emotions was a significant predictor of their compassion toward themselves, $t(20) = 2.52$, $p = .014$. Women rated themselves as significantly higher on compassion towards themselves during the speech only when they were in the compassion reappraisal group and had higher level of attention to their emotions (i.e., 1 SD above the mean). In contrast, there was no such difference for men. Interpreting the interaction from a gender differences perspective, men and women in the compassion group significantly differed, $t(37) = -2.48$, $p = .016$, with both genders reporting similar levels of compassion when they had high attention to emotions (i.e., 1 SD above the mean), but only women rating themselves as lower in the subjective rating of compassion at a low level of attention to emotions.
Table 8. Regression analyses for group, gender, and attention to emotions predicting self-report on compassion.

<table>
<thead>
<tr>
<th>Step</th>
<th>$B$</th>
<th>$SE$ B</th>
<th>$\beta$</th>
<th>$R^2$</th>
<th>$\Delta R^2$</th>
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</thead>
<tbody>
<tr>
<td>Step 1</td>
<td></td>
<td></td>
<td></td>
<td>.05</td>
<td>.05</td>
</tr>
<tr>
<td></td>
<td>Attention to Emotions</td>
<td>.41</td>
<td>.32</td>
<td>.16</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Group</td>
<td>-.39</td>
<td>.38</td>
<td>-.12</td>
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</tr>
<tr>
<td></td>
<td>Gender</td>
<td>.57</td>
<td>.41</td>
<td>.17</td>
<td></td>
</tr>
<tr>
<td>Step 2</td>
<td></td>
<td></td>
<td></td>
<td>.09</td>
<td>.03</td>
</tr>
<tr>
<td></td>
<td>Attention to Emotions</td>
<td>.90</td>
<td>.57</td>
<td>.35</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Group</td>
<td>-.10</td>
<td>.54</td>
<td>-.03</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gender</td>
<td>.92</td>
<td>.55</td>
<td>.28</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Attention to Emotions x Group</td>
<td>-.16</td>
<td>.64</td>
<td>-.04</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Attention to Emotions x Gender</td>
<td>-.84</td>
<td>.65</td>
<td>-.24</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Group x Gender</td>
<td>-.76</td>
<td>.83</td>
<td>-.20</td>
<td></td>
</tr>
<tr>
<td>Step 3</td>
<td></td>
<td></td>
<td></td>
<td>.15$^*$</td>
<td>.06$^*$</td>
</tr>
<tr>
<td></td>
<td>Attention to Emotions</td>
<td>1.63</td>
<td>.65</td>
<td>.64$^*$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Group</td>
<td>.18</td>
<td>.54</td>
<td>.06</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sex</td>
<td>.98</td>
<td>.54</td>
<td>.30$^\psi$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Attention to Emotions x Group</td>
<td>-1.62</td>
<td>.92</td>
<td>-.45$^\psi$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Attention to Emotions x Gender</td>
<td>-2.14</td>
<td>.87</td>
<td>-.60$^*$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Group x Gender</td>
<td>-.75</td>
<td>.81</td>
<td>-.19</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Attention to Emotions x Group x Gender</td>
<td>2.74</td>
<td>1.26</td>
<td>.55$^*$</td>
<td></td>
</tr>
</tbody>
</table>

$^*$ $p < .05$
$^\psi$ $p < .10$
Cardiac Response to the Paradigm

Overview. A repeated-measures ANOVA was used to examine the time-course of the six phases of the paradigm (baseline, anticipation of speech, speech, recovery, anticipation of feedback, and final recovery) on participants’ cardiac functioning. The analysis yielded a significant effect of phase, $F(2, 157) = 129.76, p < .001, \eta^2_p = .64$ (large effect size) (Figure 6). Overall, the paradigm was successful in eliciting differential cardiac responding as a result of phase. Of interest in the current study was the cardiac reactivity between the baseline and the speech anticipation period (i.e., the first and second data points) and between recovery and the feedback anticipation period (i.e., the third and fourth data points).

Figure 5. Compassion rating towards self as related to gender, group, and level of attention to emotion.
Average cardiac functioning data during the phases of interest (baseline, speech anticipation, recovery, and feedback anticipation) and their relations with individual difference variables are reported for the total sample in Table 9. Participants’ higher initial baseline heart rate was significantly related to higher self-rated social anxiety on the LSAS, \( r(73) = .33, p = .004 \), lower trait self-compassion, \( r(73) = -.34, p = .004 \), and lower emotional clarity, \( r(73) = -.27, p = .022 \). In sum, individual differences in self-compassion, social anxiety, and emotional clarity all related to baseline cardiac functioning.

Participants’ cardiac reactivity in the speech anticipation phase (i.e., change between baseline and speech anticipation) was not related, \( r(73) = .064, ns \), to their cardiac response during the feedback anticipation phase (i.e., change between recovery and feedback anticipation). Thus, participants’ cardiac response was considered separately below in the (1) baseline to speech anticipation phase and the (2) recovery to feedback anticipation phase.
Table 9. *Correlations between cardiac data and individual difference measures.*

<table>
<thead>
<tr>
<th></th>
<th>M (SD)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Baseline HR</td>
<td>75.68 (11.94)</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Speech Anticipation HR</td>
<td>77.54 (12.19)</td>
<td>.92**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Recovery HR</td>
<td>74.80 (12.99)</td>
<td>.93**</td>
<td>.94**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Feedback Anticipation HR</td>
<td>76.96 (11.66)</td>
<td>.91**</td>
<td>.94**</td>
<td>.93**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Social Anxiety (LSAS)</td>
<td>30.64 (21.79)</td>
<td>.33**</td>
<td>.35**</td>
<td>.34**</td>
<td>.26*</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Self-compassion (SCS)</td>
<td>3.21 (0.63)</td>
<td>-.34**</td>
<td>-.35**</td>
<td>-.30**</td>
<td>-.27*</td>
<td>-.48**</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Emotional Clarity</td>
<td>3.76 (0.69)</td>
<td>-.27*</td>
<td>-.19</td>
<td>-.17</td>
<td>-.20</td>
<td>-.12</td>
<td>.30*</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8. Attention to Emotions</td>
<td>3.80 (0.64)</td>
<td>.04</td>
<td>.05</td>
<td>.05</td>
<td>.02</td>
<td>.11</td>
<td>-.05</td>
<td>.24*</td>
<td>1</td>
</tr>
</tbody>
</table>

**p < .01
*p < .05
Speech anticipation. The main effects of group, gender, and the group by gender product term on cardiac reactivity (i.e., heart rate change from baseline to speech anticipation) were assessed using a repeated measures ANOVA. Participants showed a significant increase in heart rate between the baseline ($M = 75.68$, $SD = 11.94$) and the anticipation of speech phase ($M = 77.54$, $SD = 12.19$), $F(1, 69) = 10.35$, $p = .002$, $\eta^2_p = .13$ (medium effect size). The heart rate change between baseline and speech anticipation was independent of group, $F(1, 69) = 0.06$, $ns$, $\eta^2_p = .001$; gender, $F(1, 69) = 0.83$, $ns$, $\eta^2_p = .001$; and the group by gender product term, $F(1, 69) = 0.28$, $ns$, $\eta^2_p = .004$.

To assess whether individual difference variables interacted with group, gender, or their product term to predict cardiac reactivity change scores between baseline and anticipation of speech phases, hierarchical regression analyses were then conducted. A significant two-way interaction between gender and emotional clarity emerged, $R^2 = .11$, $F(1, 69) = 5.14$, $p = .026$, accounting for 10.6% of the variance in cardiac reactivity, and uniquely predicting 6.67% of the variance above and beyond the other predictors. See Table 10 for a summary of findings from this regression (Figure 7a).

Simple slope analyses were used to analyze how the interaction of gender and emotional clarity influenced participants’ cardiac reactivity between baseline and anticipation. These analyses revealed that men showed significantly more cardiac reactivity when they had high levels of emotional clarity (i.e., 1 SD above the mean), $t(34) = 2.85$, $p = .006$, as compared to men with low emotional clarity (i.e., 1 SD below the mean) who showed high, stable heart rate between baseline and anticipation (Figure 7b). In contrast, women’s cardiac reactivity was not impacted by their level of emotional clarity, $t(39) = 0.12$, $ns$, although those with high emotional clarity showed lower heart rate at both time points (Figure 7c). Aiken and West’s (1991)
procedure was used to graphically depict how men and women’s heart rate reactivity between baseline and speech anticipation was impacted by level of emotional clarity (see Figure 7b and 7c).

No other significant interactions emerged when regression analyses were conducted to assess if individual difference variables interacted with group, gender, or their product term, to predict cardiac reactivity between baseline and speech anticipation.

Table 10. Regression analyses for gender and emotional clarity predicting cardiac reactivity during the speech anticipation.

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>SE B</th>
<th>β</th>
<th>R²</th>
<th>ΔR²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emotional Clarity</td>
<td>1.39</td>
<td>.83</td>
<td>.20</td>
<td>.04</td>
<td>.04</td>
</tr>
<tr>
<td>Gender</td>
<td>.28</td>
<td>1.13</td>
<td>.03</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emotional Clarity</td>
<td>.11</td>
<td>.98</td>
<td>.02</td>
<td>.11*</td>
<td>.07*</td>
</tr>
<tr>
<td>Gender</td>
<td>.30</td>
<td>1.10</td>
<td>.03</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emotional Clarity x Gender</td>
<td>3.89</td>
<td>1.72</td>
<td>.32*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p < .05
**p < .01
Figure 7a. Gender and self-reported emotional clarity influenced cardiac reactivity for the speech anticipation phase.
Figure 7b. Emotional clarity affects men’s heart rate between baseline and speech anticipation.

Figure 7c. Emotional clarity does not impact women’s cardiac reactivity between baseline and speech anticipation.
**Feedback anticipation.** Participants’ cardiac reactivity during the feedback anticipation period was assessed using repeated measures ANOVAs. Participants on average showed a significant increase in heart rate between the recovery ($M = 74.80$, $SD = 12.98$) and the anticipation of feedback phase, ($M = 76.95$, $SD = 11.66$), $F(1, 69) = 15.89, p < .001, \eta^2_p = .187$ (large effect size). There also was a trend-level interaction with group assignment, $F(1, 69) = 3.09, p = .08, \eta^2_p = .043$ (small-medium effect size) whereby the control group showed higher heart rate at feedback anticipation relative to the compassion group (Figure 8). The heart rate change between recovery and feedback anticipation was independent of gender, $F(1, 69) = 0.39, ns, \eta^2_p = .006$; and the group by gender product term, $F(1, 69) = 1.60, ns, \eta^2_p = .023$.

![Figure 8. Heart rate change between recovery and feedback based on group assignment.](image-url)
Hierarchical regression analyses were conducted to assess whether individual difference variables interacted with group, gender, or their product term, to predict cardiac reactivity between recovery (the second baseline) and the anticipation of feedback phase. There was a main effect of social anxiety, such that participants with a higher level of self-reported social anxiety on the LSAS had higher cardiac reactivity than those who were lower in social anxiety, $r(73) = -0.27$, $p = .019$, and this accounted for 7.5% of the variance in cardiac reactivity.

A significant two-way interaction between group and attention to emotions emerged, $R^2 = .10$, $F(1, 69) = 4.18$, $p = .045$, accounting for 10.2% of the variance in cardiac reactivity, and uniquely predicting 6.3% of the variance above and beyond group and attention to emotion alone. See Table 11 and Figure 9a for a summary of findings from this regression.

Simple slope analyses were used to analyze how the interaction of group and attention to emotions influenced participants’ cardiac reactivity for the feedback anticipation phase. These analyses revealed that participants in the compassion group showed significantly more cardiac reactivity when they had high levels of attention to their emotions (i.e., 1 SD above the mean), $t(37) = 2.05$, $p = .045$, as compared to those in the compassion group who reported that they pay less attention to their emotions (i.e., 1 SD below the mean). In the compassion group, those with low attention to their emotions also evidenced high, stable heart rate at both recovery and feedback anticipation, whereas participants with higher attention to their emotions showed reduced heart rate at each time point and significantly more cardiac reactivity (slope) between recovery and feedback anticipation (Figure 9b). In contrast, participants in the control group were not impacted by their level of attention to their emotions, $t(36) = -0.83$, $ns$. In other words, in the control group, those with low attention to emotions showed lower heart rate at both recovery and feedback anticipation than those with higher attention to emotions, but cardiac reactivity
(slope) between recovery and feedback anticipation did not relate to level of attention to emotions (Figure 9c). Aiken and West’s (1991) procedure was used to graphically depict how heart rate reactivity between recovery and feedback anticipation was impacted by participants’ level of attention to emotions (Figure 9b and 9c).

No other significant interactions emerged when regression analyses were conducted to assess if individual difference variables interacted with group, gender, or their product term, to predict cardiac reactivity for the feedback anticipation phase.

Table 11. Summary of regression analyses for group and attention to emotions predicting cardiac reactivity during the feedback anticipation.

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>SE B</th>
<th>β</th>
<th>R²</th>
<th>ΔR²</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attention to Emotion</td>
<td>.70</td>
<td>.85</td>
<td>.10</td>
<td>.05</td>
<td>.05</td>
</tr>
<tr>
<td>Group</td>
<td>1.88</td>
<td>1.09</td>
<td>.20</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attention to Emotion</td>
<td>2.45</td>
<td>1.20</td>
<td>.34*</td>
<td>.10*</td>
<td>.05*</td>
</tr>
<tr>
<td>Group</td>
<td>1.89</td>
<td>1.07</td>
<td>.20*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attention to Emotion x Group</td>
<td>-3.41</td>
<td>1.67</td>
<td>-.34*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* *p < .05
* *p < .10
Figure 9a. Group assignment and self-reported attention to emotions influenced cardiac reactivity for the feedback anticipation phase.
Figure 9b. The impact of attention to emotion on heart rate at recovery and feedback anticipation in the self-compassion group.

Figure 9c. The impact of attention to emotion on heart rate at recovery and feedback anticipation in the control group.
Discussion

The purpose of this dissertation was to explore whether self-compassion could be used as a cognitive reappraisal strategy to attenuate subjective and physiological stress responding in a social evaluative stress paradigm. Emotion regulation strategies such as cognitive reappraisal are antecedent-focused and thus, by definition, are implemented prior to response mobilization in an emotion-eliciting event (Gross, 1998b; 2007). Recent research supports that self-compassion may constitute a particularly effective strategy for aiding people in coping with social stress, as those higher in self-compassion appear to embrace greater connectedness with their own feelings and with the human condition in general, showing less self-criticism and avoidance of feeling in the face of their own struggles (Neff & McGehee, 2010). However, the utility of self-compassion applied as a cognitive reappraisal strategy in a laboratory-based stressor has not previously been examined.

Participants were randomly assigned to the self-compassion reappraisal group or the control group. Participants in the cognitive reappraisal group received instructions prior to the speech regarding how to cultivate self-compassion towards oneself and one’s experience as a means to regulate stress responding. After an anticipatory period, all participants were asked to give a spontaneous 3-minute speech reflecting on the strengths and weaknesses of their character. In order to increase perceived social threat and anxious arousal, participants were told that a panel of trained observers was evaluating their speech via video camera feed and that they would receive performance-based feedback. Social Self Preservation Theory predicts that participants would experience a high level of social evaluative threat in the current public speaking paradigm (Dickerson et al., 2004), thereby providing a salient paradigm to assess the utility of self-compassion reappraisal. In the current study the effect of self-compassion
reappraisal on participants’ anxiety, subjective ratings and cardiac reactivity during the speech
anticipation and feedback anticipation phases were examined. Furthermore, the influence of trait
social anxiety, self-compassion and emotional awareness (attention to and clarity regarding
emotions) were investigated in relation to reappraisal group and gender on participants’ outcome
measures.

**Main Effect of Self-compassion Reappraisal is Equivocal**

The hypothesis that self-compassion cognitive reappraisal would attenuate anxiety was
met with mixed results. Overall, no main effect of reappraisal group was found on participants’
experience of anxiety. As evidenced in other studies of social evaluative threat tasks (Al'Absi et
al., 1997; Beard & Amir, 2009; Lam et al., 2009), one possible explanation for this finding is that
the current task incited anxious arousal that was too intense to be effectively regulated with the
self-compassion reappraisal strategy. Moreover, there were no main effects of reappraisal group
on participants’ endorsement of how compassionate they felt toward themselves during the
speech, how self-critical they were being about their performance, or how favourable they would
find performing a second speech.

In terms of physiological responding, mean change in heart rate over the course of the
paradigm showed the predicted pattern, with cardiovascular activity sharply increasing during
the speech relative to other phases of the study, in line with studies of social evaluative threat.
There were no straightforward group differences in cardiac reactivity between the phases despite
a significant increase in heart rate between baseline and speech anticipation on average. There
was a trend, however, for those in the self-compassion reappraisal group to show attenuated heart
rate reactivity during the feedback anticipation compared to the control group, which yielded a
small effect size.
One explanation for the relative lack of group-based findings is that the self-compassion reappraisal itself was not of sufficient duration or intensity to assist all participants in subjective or physiological regulation. Moreover, cognitive change as an emotion regulation strategy might have proved more efficacious if an alternative reappraisal instruction were employed. For example, instead of encouraging participants to be self-compassionate in the face of the emotion-eliciting paradigm, instructions like those of Hofmann and colleagues (2009) might have worked better to help participants cope. In that study, participants experienced reduced anxiety and cardiac reactivity when instructed to reappraise the speech as non-threatening because it was “just an experiment and there are no negative consequences to be concerned with” (Hofmann et al., 2009). However, this reappraisal strategy has restricted real-world applicability because situations with high social evaluative threat do often have consequences (i.e., job interviews) and therefore, are difficult to reappraise as non-threatening in the face of anxiety. In this view, the aim of the reappraisal instructions in the current study was to have wider applicability to situations including those with real-world consequences. Specifically, participants were instructed to notice their anxious feelings with kindness and mindful awareness and to consider that others would feel the same way in their position (Neff, 2003a). Although the self-compassion reappraisal instructions did not yield unequivocal support for attenuating social evaluative stress responding in the current study, there was evidence to support that individual differences related to participants’ subjective responding over the course of the task.

Consonant with studies finding that female participants rate emotion-eliciting stimuli as more negative than men in experimental settings (Bianchin & Angrilli, 2012; Bradley et al., 2001; Codispoti et al., 2008; Gard & Kring, 2007; Hillman et al., 2004; Kelly et al., 2006), women in the current study reported higher levels of anticipatory anxiety than men, independent
of group assignment. Consistent with their experience of less anxiety, men rated the possibility of performing a second speech more favourably than women independent of group, and this finding was strengthened when trait self-compassion was added to the predictive model. That is, men rated a second speech as even more favourable when they were higher in trait self-compassion, independent of group. As such, it is possible that individual differences played a more important role in bolstering men’s performance-related self-report ratings than did the self-compassion reappraisal strategy.

As expected, women in the current study rated themselves as significantly higher in attention to emotions than did men, consistent with a large literature base (Barrett et al., 2000; Ciarrochi, Caputi, & Mayer, 2003; Ciarrochi, Hynes, & Crittenden, 2005). Women with a higher level of trait social anxiety also rated themselves as significantly more self-critical of their performance. Women’s higher attention to their emotions may have contributed to their insight regarding their own self-critical posture, especially when they were higher in anxiety. In contrast, men’s relative lack of emotional awareness may have negatively impacted their ability to know how to engage the self-compassion cognitive change strategy for emotion regulatory purposes (Nolen-Hoeksema, 2012). A recent review of the literature by Nolen-Hoeksema (2012) supports the notion that women are more likely to use almost all types of emotion regulation strategies more frequently than men. Indeed, women evidence more nuanced understanding of emotions than men (Barrett et al., 2000), and outscore men on performance-based measures using this understanding to apply various emotion regulation strategies contingent on context (Joseph & Newman, 2010). In line with the view that men might have had more difficult benefiting from the reappraisal instructions due to lower emotional awareness, only women in the self-compassion reappraisal group evidenced lower self-criticism ratings, not men. To further
understanding in this regard, the current study explored whether the self-compassion reappraisal emotion regulation strategy would be more effective at attenuating subjective and cardiac outcomes based on gender and emotional awareness level.

**Women Showed Interactive Effects of Emotional Awareness and Reappraisal Group on Subjective Ratings**

In support of this hypothesis, women in the self-compassion reappraisal group evidenced attenuated anticipatory anxiety, but only when they were high in emotional clarity. The reappraisal emotion regulation instructions did not impact anticipatory anxiety for women with low emotional clarity. Thus, a high level of emotional insight toward identifying and discriminating between emotions (Gohm & Clore, 2000; Palmieri et al., 2009) was requisite for women to benefit from the self-compassion reappraisal and show decreased anxiety compared to the control group. Vine and Aldao (2014) posited that lack of emotional understanding translates into confusion regarding possible courses of action or strategies to enlist to meet goals because cognitive resources are taxed trying to understand the distress. The notion that emotional awareness is an important precursor to successful emotion regulation is consistent with theory (i.e., adaptive coping with emotions (ACE) model: Berking et al., 2008) and research by Boden and colleagues (2012) who found that veterans with PTSD benefitted from cognitive reappraisal only if they were high in emotional clarity.

Results indicate that high emotional awareness might be a double-edged sword, however. Women in the control group with high emotional clarity ‘suffered’ high anxiety relative to their male counterparts. One explanation is that women with high levels of emotional awareness might be highly focused on their distress, but struggle to attenuate the anxiety in the absence of an emotion regulation strategy. Meta-analytic data support that when distressed, women are
significantly more likely to ruminate than men (Tamres, Janicki, & Helgeson, 2002). Nolen-Hoeksema (2012) described rumination as a preservative cognitive style involving hyper-focus on the causes and consequences of negative emotions without movement toward resolution. Thus, it is possible that women were more likely to ruminate and that this may have contributed to their poorer management of anxiety in the control group compared to men. Indeed, Nolen-Hoeksema, Wisco and Lyubomisky (2008) argued that high awareness of one’s emotions can become maladaptive when the emotions are not easily managed or disengagement is difficult given situational demands.

Another pattern emerged that paralleled that of women’s anxiety ratings, whereby women with high attention to emotions rated themselves as experiencing significantly more compassion toward themselves when they were in the self-compassion reappraisal group in comparison to women low in attention to emotions. This finding suggests that women low in attention to their emotions were not able to draw on the self-compassionate cognitive reappraisal in order to feel more compassionate toward themselves: only women high in attention to emotions benefitted. Therefore, the self-compassion reappraisal effectively helped women with high attention to their emotions to experience more compassion about their task performance, but women in the reappraisal group with low attention to their emotions reported significantly lower compassion toward themselves. Men’s level of attention to emotions did not relate to their own self-rated compassion. In sum, whereas women showed interactive effects of emotional awareness and reappraisal group on subjective anxiety and self-reported level of compassion, the pattern of results was different for men.
Men showed interactive effects of emotional clarity on cardiac reactivity to speech

Men who indicated higher emotional clarity showed a benefit with respect to cardiac responding in the speech anticipation phase, independent of group assignment. Men with higher emotional clarity showed lower baseline heart rate and increased cardiac reactivity prior to the speech task. In contrast, men with low emotional clarity showed high, stable heart rate at baseline and in response to the anticipatory threat, counter-indicative of adaptive cardiac responding to threat. On the whole, this finding suggests that men higher in emotional clarity evidenced more adaptive cardiac reactivity when anticipating the speech, even though their subjective report of anxiety was not influenced by level of emotional clarity. As compassion group did not interact with emotional clarity to predict coping in men, it is possible that men engaged automatic emotion regulation that was not contingent on group assignment in the current study. Indeed, Nolen-Hoeksema (2012) argued that men engage a range of regulatory activities but that these might differ from the more conscious, verbally oriented regulation that women draw upon. For example, McRae and colleagues (2008) found brain-based evidence to support that men engage reappraisal more automatically and with less conscious effort than women, which could explain the current results.

Interactive effects of emotional awareness and reappraisal group on cardiac reactivity to feedback

After participants disclosed their personal strengths and weaknesses during the speech, they anticipated receiving performance-based feedback from the observers. According to the Social Self Preservation Theory (Dickerson et al., 2004), this social evaluative threat could reasonably be expected to incite higher stress responding than the speaking task alone given that participants were vulnerable to receiving judgment as inadequate or inferior, which is known to
heighten self-conscious emotions like shame (Gilbert, 2011). In light of a growing literature that regards self-compassion as a means to decrease shame and anxiety and increase feelings of affiliation, it was therefore expected that the self-compassion reappraisal would assist participants in attenuating stress responding. Indeed, there was a trend for a group effect on cardiac responding whereby participants in the self-compassion reappraisal group showed lower cardiac reactivity prior to anticipating performance feedback compared to the control group.

Moreover, it was hypothesized that participants higher in emotional awareness might yield greater benefit from the self-compassion reappraisal instructions in the face of this social evaluative threat. In line with this prediction, attention to emotions interacted with self-compassion reappraisal to predict cardiac reactivity in the feedback anticipation phase. Participants in the reappraisal group with high attention to their emotions, and participants in the control group with low attention to their emotions, appeared to show the most adaptive cardiac response to anticipating performance feedback. These two opposing groups achieved the same adaptive pattern of cardiac functioning, both achieving higher level of recovery (i.e., lower baseline heart rate) and lower reactivity to the feedback anticipation. Although it was predicted that those with higher emotional awareness would be better able to utilize the reappraisal instructions to show adaptive cardiac functioning, it was unexpected that the control group with low attention to emotions would show a similar adaptive cardiac response. One explanation is that these two groups achieved the same cardiac outcome through disparate strategies. Whereas participants high in attention to emotions in the self-compassion reappraisal group benefitted from the emotion regulation instructions, those low in attention to emotions but in the control group were ‘left to their own devices,’ so to speak. Due to low attention to emotion, it is possible that they were not actively aware of experiencing anxiety or that they used distraction to manage
arousal, a strategy shown to be efficacious in some studies of evaluative threat (Wong & Moulds, 2011). Alternately, some research on people high in alexithymia have reported that alexithymia may be related to physiological under-arousal and heart rate reactivity that does not differentiate between rest and emotionally challenging tasks (Linden, Lenz, & Stossel, 1996).

In contrast, both the self-compassion reappraisal group with low attention to emotions, and those in the control group with high attention to their emotions, appeared to ‘suffer’ with high stable heart rate across the feedback anticipation. When tasked with the self-compassion reappraisal instructions, those low in attention to emotions may have shown elevated heart rate given that the emotion regulation strategy encouraged them to face their feelings with self-compassion, an inconsistent approach to their typical emotion regulatory style. In contrast, those high in attention to emotions but without an emotion regulation strategy may have struggled to regulate their anxiety in the absence of cues or feeling of control, waiting to receive performance based feedback in an unfamiliar situation (Nolen-Hoeksema et al., 2008; Webb et al., 2012).

**Trait Self-Compassion is Beneficial**

The benefits of high trait self-compassion emergent in the current study were consistent with other studies regarding the psychological benefits of self-compassion. Robust findings were evident for individuals in the present study who had higher *trait* self-compassion, including lower anticipatory anxiety during the task, and lower heart rate at each phase of interest (baseline, speech anticipation, recovery, and feedback anticipation). Moreover, those with high trait self-compassion were also more likely to report being compassionate toward themselves during the speech and less self-critical about their performance, which is in line with Neff’s predictions regarding the psychological resilience of those high in self-compassion (Breines et al., 2014; Neff, 2003a; Neff, Kirkpatrick, & Rude, 2007a; Neff, Rude, & Kirkpatrick, 2007b).
Interestingly, trait self-compassion did not relate, however, to attention to emotions, the degree to which individual’s monitor and value emotional cues. This finding comports with research by Lischetzke and Eid (2003) who found that high attention to emotions benefitted those with high mood regulation ability, but negatively affected well-being of those low in mood regulation. This suggests that, at a minimum, one must place value on emotional cues in order to respond to one’s own experience with openness and self-compassion. Indeed, trait self-compassion positively related to emotional clarity, the ability to identify, describe, and understand one’s own emotional experiences (after attending to them), and negatively related to trait social anxiety. Greater trait self-compassion also related to more openness to performing a second speech, which suggests a lack of ego defensiveness akin to that found by Leary and colleagues (2007). In that study, those with higher self-rated self-compassion not only reported fewer negative feelings and endorsed a more compassionate view towards their perceived social mishaps and inadequacies, they also accepted their own role in the negative events more fully than those lower in self-compassion.

**Lower Baseline Heart Rate is Related to Individual Differences**

In the current study, participants lower in baseline heart rate had significantly higher self-compassion and emotional clarity and lower self-reported social anxiety. Lower baseline heart rate suggests a wider range of physiological adaptability, in that ceiling effects are more likely to occur among those with higher baseline heart rate. The vagus nerve regulates heart rate via the vagal “brake” (Porges, 2001). The brake slows heart rate in the absence of challenge, but when the individual is involved in an activity that requires active coping or response to environmental demands, the vagal brake is withdrawn (i.e., vagal tone is inhibited) to support increased heart rate. Therefore, heart rate acts as a proxy by which to gauge how well one balances between internal demands (i.e., maintaining homeostasis) and response to external challenge (i.e., vagal
withdrawal), in response to an emotion-eliciting stimulus or situation. The pattern of findings in the current study fits with other research that shows that lower social anxiety is related to lower resting heart rate (Davidson, Marshall, Tomarken, & Henriques, 2000), although replication is required for the finding that higher self-compassion and emotional clarity relate to lower baseline heart rate.

**Limitations and Future Directions**

The results of the current study should be considered within the context of some limitations. Firstly, the current study was conducted with a convenience sample of undergraduate students. To extend the generalizability of the results, the study should be replicated with a community sample given that more diverse samples could highlight the differential use of self-compassion as a reappraisal strategy for coping with social stress. Moreover, the equivocal impact of the self-compassion reappraisal on stress responding bears further exploration. Despite hypotheses that a self-compassion reappraisal intervention would attenuate both subjective and physiological reactions to the social evaluative threat task examined in this study, the pattern of results suggested that only some participants were able to utilize the emotion regulation strategy *in vivo*. It is likely that the self-compassion intervention was too weak to induce a self-compassionate state for most participants, except those with high levels of emotional awareness. Indeed, participants in Arch and colleagues’ (2014) study showed decreased subjective distress and adaptive physiological responding in the face of the social evaluative threat task, but practiced self-compassion meditation training for 5 days prior to the stressor. In contrast, participants in the current study only received the brief reappraisal instructions, developed using Neff’s conceptualization of self-compassion (Neff, 2003b), just after learning that they would be performing a speech and receiving feedback. Taken together, it is likely that “practice makes
perfect”, and in the current study, except for participants already high in emotional awareness, the brief self-compassion reappraisal instructions were not utile in the *in vivo* exposure to social evaluative threat without previous training and practice sessions in non-threatening contexts. It is also possible that self-compassion as a cognitive emotion regulation strategy is not as readily accessible to participants in the face of social evaluative threat as compared to self-compassion meditation training that has a greater focus on mind-body awareness and relaxation.

In terms of the ecological validity of the current task, the paradigm more closely resembled psychosocial stress experienced in day-to-day living relative to emotion regulation studies using photos or videos as emotion-eliciting stimuli. However, participants may have been cognizant that their performance on the tasks did not have real-life consequences compared to evaluative social stressors in naturalistic settings (i.e., first date, job interview). This type of reappraisal may have reduced perceived social evaluative threat and thereby affected participants’ motivation to apply the emotion regulation strategy. However, this is not likely given that the vast majority of participants believed the manipulation used in the current study. Moreover, experimental social stress tasks have been well-established to be arousing on a subjective and physiological level (Campbell & Ehlert, 2012; Kirschbaum et al., 1993).

Participants were asked to rate their anxiety level each minute during the speech anticipation and feedback anticipation phases and some have argued that continuous ratings require attentional resources that would otherwise be honed-in on regulating emotions as directed (Drabant et al., 2011). Thus, it would be advantageous in future studies to add retrospective rating methods into the task procedure. Moreover, it would be telling to have participants complete scale measure such as the Emotion Regulation Questionnaire (Gross & John, 2003) to assess to what degree participants thought they employed different emotion regulatory strategies.
in order to cope with the stressor. This would allow for increased understanding of how participants with low attention to their emotions, for example, coped with the social evaluative threat prior to receiving feedback in the current study.

**Clinical Implications and Summary**

Considering that difficulty regulating negative emotions is thought to underlie the etiology of several diagnosable mental disorders (Aldao et al., 2010; Mennin & Fresco, 2009; Werner & Gross, 2010), insight regarding how individuals might best cope with negative emotions is essential. Moreover, research has indicated that deficits in emotional awareness are implicated in the development and maintenance of psychopathology (Berking & Wupperman, 2012; Vine & Aldao, 2014) and therefore represent an important therapeutic target (Berking et al., 2012). The current study sought to address the relative paucity of research regarding the interaction of emotion regulation skills, like emotional awareness variables, and efficacy of emotion regulation strategies, like cognitive reappraisal, in *in vivo* social stress tasks. The effect of using self-compassion as an immediate *cognitive change* type intervention has not previously been studied.

Results indicated that the efficacy of self-compassion reappraisal at attenuating subjective and physiological stress responding was context dependent, helping women with high emotional awareness to experience less anxiety, self-criticism, and increased compassion toward themselves. There were no group effects specific to men. It is possible that women with higher emotional awareness derived greater benefit from the self-compassion reappraisal because it served to attenuate rumination or feelings of shame. Shame-proneness and ruminative coping are both tendencies that women are more vulnerable to engage in relative to men (Tamres et al., 2002), thus women in the current study might have particularly benefitted from embracing a self-
compassionate stance in the face of social evaluative threat. Indeed, other research has found that self-compassionate writing in response to shame-evoking memories resulted over time in decreased shame-proneness and ruminative coping in a largely female sample (Johnson & O’Brien, 2013). Another possible explanation is that women found the self-compassion reappraisal instructions more accessible to employ given their propensity to represent emotional experiences linguistically and to engage conscious, language-based self-reflective strategies in comparison to men, who are more likely to utilize automatic, behavioural emotion management (Barrett et al., 2000).

There was a small effect of the self-compassion reappraisal buffering cardiac reactivity in response to anticipating performance-based feedback. Although this finding lends credence to the notion that those utilizing the compassion reappraisal were better able to cope physiologically with the threat of receiving socially relevant feedback, this effect merits further study given the small effect size. However, a meta-analysis by Webb, Miles and Sheeran (2012) on the efficacy of various emotion regulation strategies and moderators of their utility found that participants were better able to regulate their emotional responses to pictures and films and poorer at regulating the receipt of performance feedback. Thus, despite the small effect size of the finding that participants in the self-compassion group had a more adaptive response in the feedback anticipation, it is promising in light of research supporting the difficulty of regulating negative emotions in this context.

The clinical utility of self-compassion as a reappraisal strategy appears to be largely contingent on individual’s level of emotional awareness. This finding is in line with work by Berking and colleagues (2008) who found that the efficacy of cognitive-behavioural therapy for depressive symptoms was improved by training in emotion regulation skills including learning to
be aware of emotions and the antecedents of emotions (sensations, cognitions, motivational impulses), as well as non-judgmental labeling of emotions. This suggests that the downstream success of cognitive change strategies on negative emotion regulation is affected by the degree to which individuals’ monitor and value emotional cues, and understand the nature of their own emotional experience, in the first place.

Across participants, attention to emotions interacted with group to predict cardiac reactivity prior to receiving performance-based feedback such that participants who were high in attention to their emotions and in the self-compassion reappraisal group showed adaptive cardiac reactivity. Thus, for individuals already high on emotional awareness, self-compassion cognitive reappraisal ought to be considered an important tool for the regulation of acute social evaluative threat. However, participants with low attention to emotions and in the control group also showed adaptive responding, which indicates that without precursory emotion regulatory skills, assignment to control group is more advantageous than receiving instructions on how to generate self-compassion toward your own experience. This result supports the notion that in the absence of high trait self-compassion (Leary et al., 2007) or intensive training in self-compassion meditation (Arch et al., 2014), foundational emotion regulation skills are essential to the utility of self-compassion reappraisal in vivo. Results of the current study are encouraging, although future research should focus on continued study of moderators that affect the degree to which participants benefit from self-compassion reappraisal prior to application in a therapeutic context or with a clinical sample.

More broadly, research supports that the meditation component to self-compassion training is well-suited to helping individuals increase their core levels of trait self-compassion (Arch et al., 2014; Jazaieri et al., 2012; Neff & Germer, 2013). A burgeoning evidence-base
supports that higher trait self-compassion is related to lower levels of psychopathology and positive psychological functioning (Leary et al., 2007; MacBeth & Gumley, 2012; Neff, 2003a; Neff, Kirkpatrick, & Rude, 2007a; Neff, Rude, & Kirkpatrick, 2007b). Indeed, in the current study higher trait self-compassion related to lower anticipatory anxiety, adaptive heart rate level, higher self-rated compassion and lower self-criticism regarding performance over the course of the social evaluative task. Taken together, developing trait self-compassion appears to be a worthwhile endeavor, and in the context of social evaluative threat, activation of a self-compassionate stance holds promise as an emotion regulation strategy alongside foundational emotion regulation skills such as emotional awareness.
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Appendices

Appendix A: Self-Compassion Scale

**HOW I TYPICALLY ACT TOWARDS MYSELF IN DIFFICULT TIMES**

Please read each statement carefully before answering. To the left of each item, indicate how often you behave in the stated manner, using the following scale:

<table>
<thead>
<tr>
<th></th>
<th>Almost never</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Almost always</th>
</tr>
</thead>
</table>

1. I’m disapproving and judgmental about my own flaws and inadequacies.
2. When I’m feeling down I tend to obsess and fixate on everything that’s wrong.
3. When things are going badly for me, I see the difficulties as part of life that everyone goes through.
4. When I think about my inadequacies, it tends to make me feel more separate and cut off from the rest of the world.
5. I try to be loving towards myself when I’m feeling emotional pain.
6. When I fail at something important to me I become consumed by feelings of inadequacy.
7. When I'm down and out, I remind myself that there are lots of other people in the world feeling like I am.
8. When times are really difficult, I tend to be tough on myself.
9. When something upsets me I try to keep my emotions in balance.
10. When I feel inadequate in some way, I try to remind myself that feelings of inadequacy are shared by most people.
11. I’m intolerant and impatient towards those aspects of my personality I don't like.
12. When I’m going through a very hard time, I give myself the caring and tenderness I need.
13. When I’m feeling down, I tend to feel like most other people are probably happier than I am.
14. When something painful happens I try to take a balanced view of the situation.
15. I try to see my failings as part of the human condition.
16. When I see aspects of myself that I don’t like, I get down on myself.
17. When I fail at something important to me I try to keep things in perspective.
18. When I’m really struggling, I tend to feel like other people must be having an easier time of it.
19. I’m kind to myself when I’m experiencing suffering.
20. When something upsets me I get carried away with my feelings.
21. I can be a bit cold-hearted towards myself when I’m experiencing suffering.
22. When I’m feeling down I try to approach my feelings with curiosity and openness.
23. I’m tolerant of my own flaws and inadequacies.
24. When something painful happens I tend to blow the incident out of proportion.
25. When I fail at something that’s important to me, I tend to feel alone in my failure.
26. I try to be understanding and patient towards those aspects of my personality I don’t like.
## Appendix B: Study Design

<table>
<thead>
<tr>
<th>Timeline of study elements</th>
<th>Consent &amp; Physiological Equipment Setup</th>
<th>Baseline</th>
<th>Emotion Regulation instructions</th>
<th>Anticipation Countdown</th>
<th>Speech instructions</th>
<th>Speech</th>
<th>Rest and Recovery</th>
<th>Anticipation of Feedback</th>
<th>Feedback given and Recovery from Feedback</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 min</td>
<td>3 min</td>
<td>3 min</td>
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| Cardiac Markers            |                                       |          |                                  |                        |                     |        |                  |                              |                                          |

| Anxiety Ratings           |                                       |          |                                  |                        |                     |        |                  |                              |                                          |

| Subjective ratings        |                                       |          |                                  |                        |                     |        |                  |                              |                                          |
# Appendix C: Research Consent Form - Emotion Regulation and Stress

**STANFORD UNIVERSITY - Research Consent Form**

**Protocol Title:** Emotional learning, emotion regulation, and social anxiety  
**Protocol Director:** Jens Blechert, Ph.D., Postdoctoral Fellow  
**IRB Approval Date:** 3/15/10   **IRB Expiration Date:** 2/25/11

### FOR QUESTIONS ABOUT THE STUDY, CONTACT: Jens Blechert, Ph.D.

**DESCRIPTION:** You are invited to participate in a research study of emotion regulation and stress. We will ask you to complete several online questionnaires and an experimental task administered in the laboratory. During this task you may be asked to speak about a controversial topic in front of a camera while being evaluated. You might also receive feedback about your performance on the speech. In addition, we ask for your consent to obtain physiological measures of your heart rate, blood pressure, pulse, respiration, body activity, muscle activity, and sweat gland activity. These measures involve placement of surface electrodes, are totally safe and do not involve any physical discomfort. These sensors will be placed on your hands and on your upper body, which will involve lifting up your shirt. We would also like to video-tape you, and will ask for your consent to do so below.

**RISKS AND BENEFITS:** The risks associated with this study are: (1) tiredness from participating in study tasks, (2) mental discomfort caused by the speech and from answering questions about your experiences, emotions, and beliefs in questionnaires, and (3) small risk of minor skin irritation from sensor application. WE CANNOT AND DO NOT GUARANTEE OR PROMISE THAT YOU WILL RECEIVE ANY BENEFITS FROM THIS STUDY. However, the information gained from this study may potentially benefit other people with social anxiety and depression. **TIME INVOLVEMENT:** Your participation in this experiment will take approximately 1.5 hrs.

**PAYMENTS:** You will receive 1.5 experiment credits towards your course requirement or $20.

**PARTICIPANT’S RIGHTS:** If you have read this form and have decided to participate in this project, please understand your participation is voluntary and you have the right to withdraw your consent or discontinue participation at any time without penalty or loss of benefits to which you are otherwise entitled. You have the right to refuse to answer particular questions. Your identity will be kept as confidential as possible as required by law. Your research records will be identified only by a unique code number. Information about the code will be kept in a secure location and access limited to research study personnel. The results of this research study may be presented at scientific or medical meetings or published in scientific journals. However, your individual privacy will be maintained in all published and written data resulting from the study.

Contact Information: If you have any questions, concerns or complaints about this research study, its procedures, risks and benefits you should ask the Protocol Director, Jens Blechert, Ph.D. 530-902-9003 / jens.blechert@stanford.edu, 450 Serra Mall Jordan BLDG 420, Stanford, CA, 94305. You should also contact him at any time if you feel you have been hurt by being a part of this study.

Independent Contact: If you are not satisfied with how this study is being conducted, or if you have any concerns, complaints, or general questions about the research or your rights as a participant, please contact the Stanford Institutional Review Board (IRB) to speak to someone independent of the research team at (650)-723-5244 or toll free at 1-866-680-2906.

You can also write to the Stanford IRB, Stanford University, Stanford, CA 94305-5401. The extra copy of this consent form is for you to keep.

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**Signature of Adult Participant**

**Date**
As part of this research project we want to make a videotape recording of you, in which you are identifiable, while you are participating in the experiment. We would like you to indicate your agreement for this tape to be used by checking the boxes below. You are free to check “yes” or “no” and your response will in no way affect your compensation for participating. In any use of this videotape, your name would NOT be identified. If you select “yes”, your videotape will be destroyed when the entire study is completed.

I give consent for the videotape to be studied by the research team for use in the research project.
Yes____            No___

I have read the above description and give my consent to participate according to the terms specified above.

SIGNATURE_________________________ DATE_________________
Appendix D: Example of Observer Feedback Performance Ratings

Participant ID: 52

Performance Ratings

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Appendix E: Deception Questionnaire

Debriefing interview and form handout instructions:

Participant Number: _____

1. I was wondering what you think the study is about?

2. Sometimes in psychology studies, things are not always as they seem. Was there anything about this study that maybe struck you as not being what I told you it was?

   IF they seem to indicate YES, they had some doubts – follow up until you have a good understanding using appropriate probes: e.g:

   At what point during the study did these thoughts occur to you? (get them to expand)

   If you had to put a number on it, between 0 (no doubts) to 10 (very serious doubts), regarding the study being about what I said it was about, where would you be? (Rephrase as necessary)

   IF they say NO to this question, press further (to #3) ->

3. Did any part of the study bring up suspicions for you?

4. How many observers would you say were evaluating you?

Then do deception debrief using the handout sheet.
Appendix F: Debriefing Form – Emotion Regulation and Stress

Debriefing Form - Emotion regulation and stress

We thank you for participating in this study. We must make a confession and offer an apology. We used deception with respect to two aspects of the study: (1) the informed consent form stated that you would be evaluated while doing the speech - this in fact was only partially true. We might evaluate the speech after completion of the study using the video recordings, but today there were no observers present in the control room evaluating you; and (2) we gave you feedback about your speech that was arbitrary and not at all valid. In fact, all participants received the same feedback (performance at the 32nd percentile). We sincerely apologize for this deception and offer the following explanation.

This study was designed to examine how different reappraisal styles affect emotional responses to the speech stressor and the failure feedback. Thus, there were two core questions that we tried to answer by using deception in the study design. First, is it possible to decrease physiological and subjective responses during a stressful speech? Second, what happens if participants learn that they did not do it as well as they might have expected and believe that they failed on the task? The second question is of key importance because it tests if reappraisal of the speech stressor was successful, and if the manipulation could buffer participants’ reaction to failure feedback. Importantly, perception of failure can play a crucial role in mental disorders like social phobia or depression, so understanding how to change interpretation of perceived failure might inform treatment approaches. We would also like to emphasize the fact that since this is an ongoing project it is greatly appreciated if you do not discuss the details of the study with any of your friends or acquaintances. Furthermore, we would also like to emphasize that all data will be kept strictly confidential and will only be viewed by scientific personnel that are thoroughly familiar with rules and regulations regarding confidentiality as articulated by the American Psychological Association.

If you have any questions, concerns or complaints about this research study, its procedures, risks and benefits, or alternative courses of treatment, you should ask the Protocol Director, Jens Blechert, Ph.D (jens.blechert@stanford.edu, 530 902 9003). You should also contact him at any time if you feel you have been hurt by being a part of this study.

Independent Contact: If you are not satisfied with how this study is being conducted, or if you have any concerns, complaints, or general questions about the research or your rights as a participant, please contact the Stanford Institutional Review Board (IRB) to speak to someone independent of the research team at (650)-723-5244 or toll free at 1-866-680-2906. You can also write to the Stanford IRB, Stanford University, Stanford, CA 94305-5401.