The role of self-criticism and self-compassion in social anxiety

by

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Abstract

Social Anxiety Disorder (SAD) produces significant suffering and functional impairment for millions of people worldwide. Current gold-standard treatments for SAD (e.g., Cognitive Behavioural Therapy; CBT) are effective, but there are still a considerable number of individuals who do not respond adequately to these treatments. As such, there remain gaps in our knowledge about what maintains this disorder and what alternative treatments might exist. In order to address these gaps, this thesis set out to investigate the role of self-criticism and self-compassion in social anxiety. More specifically, I aimed to determine whether these self-attitudes might contribute to the maintenance of social anxiety, and if so, through what mechanisms these relationships might function. Furthermore, I examined for whom self-compassion might be effective when compared with cognitive restructuring in the treatment of social anxiety.

The thesis begins with a review of the literature on self-criticism and self-compassion, which demonstrates that these self-attitudes are risk and protective factors, respectively, for numerous psychological problems. I then review the specific literature on mediators and report evidence for various constructs such as negative self-beliefs and activation of the soothing system. I also review literature on the moderators of self-compassion, finding some evidence for constructs such as self-criticism and fear of self-compassion.

In my first study, I conducted a three-wave longitudinal study over seven months in a general community sample (N = 506), testing whether self-criticism and self-kindness prospectively predicted social anxiety through indirect effects mediated by negative self-beliefs (as well as self-criticism for self-kindness). I did not find support for any of these models, but concluded that there may have been insufficient variance to detect such mediational effects. In my second study, I administered a brief two-week online experimental

study comparing self-compassion with cognitive restructuring in a sample with clinical levels of social anxiety across five assessment points (N = 119). I found that both interventions led to significant decreases in trait social anxiety which persisted at the final five-week follow-up assessment. No differences between the treatment conditions were found for social anxiety outcomes. Similarly, there were no measures that differentially mediated the effect of treatment condition on social anxiety. Furthermore, I did not find support for the models proposed in Study 1, this time tested in a context of greater variance. I also did not find support for a theory-driven mediational model of self-compassion affecting social anxiety through the activation of the soothing system. Notably, neither self-criticism nor fear of self-compassion moderated the effect of the interventions. One exploratory moderator which did show a significant effect was baseline social anxiety as measured by the Social Phobia Inventory (SPIN). However, this effect appeared to moderate just the trajectory of social anxiety between groups, rather than final outcomes, and was the only significant moderator finding in the context of a large number of analyses.

Integrating these findings and the wider literature, I suggest that self-attitudes may not be important maintenance factors of social anxiety. Furthermore, I propose that self-compassion may be a viable alternative treatment to cognitive restructuring for social anxiety, but suggest that unique aspects of self-compassion may not be responsible for reductions in social anxiety symptoms. I also propose a range of future research avenues to advance knowledge in the area of self-attitudes and SAD.

Declaration

I certify that this thesis does not incorporate without acknowledgment any material previously submitted for a degree or diploma in any university; and that to the best of my knowledge and belief it does not contain any material previously published or written by another person except where due reference is made in the text.

Signed 

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Chapter One – Social Anxiety, Self-Criticism, and Mental Health

1.1 Introduction

The Problem of Social Anxiety

Although many people experience moments of social anxiety, some people have such marked fear of social situations that they meet criteria for Social Anxiety Disorder (SAD). Approximately one million Australians (4.2%) and 20 million Americans (7.4%) fall into this category in terms of 12-month prevalence rates (Crome et al., 2015; Kessler, Petukhova, Sampson, Zaslavsky, & Wittchen, 2012). In terms of lifetime prevalence, the numbers are closer to two million in Australia (8.4%), and 35 million in the USA (13.0%) (Crome et al., 2015; Kessler et al., 2012). People with SAD fear that their behaviour will lead to scrutiny, or that any exhibition of their anxiety symptoms will lead to negative evaluation (American Psychiatric Association, 2013). Unlike those who occasionally experience social discomfort, those with SAD either avoid social situations altogether or endure them while suffering from intense anxiety. Moreover, the distress of SAD permeates into other important life domains of sufferers such as work and physical health. SAD is associated with lower employment rates, less household income, and higher levels of drug dependency (Patel, Knapp, Henderson, & Baldwin, 2002). People with SAD are also more likely to be single, unmarried, or divorced (Fehm, Pelissolo, Furmark, & Wittchen, 2005). Furthermore, there is a high level of psychiatric comorbidity in SAD, with more than 60% of those with the disorder having at least one comorbidity (Acarturk, de Graaf, Van Straten, Ten Have, & Cuijpers, 2008; Crome et al., 2015). SAD also frequently occurs with other prevalent disorders. For example, people with a diagnosis of Major Depressive Disorder (MDD) are 2.9 to 6.0 times more likely to also have a diagnosis of SAD compared to those without MDD (Szafranski, Talkovsky, Farris, &

Norton, 2014). Given the distress and impairment resulting from SAD, an understanding of the factors that maintain this debilitating disorder is imperative.

What Maintains Social Anxiety?

Numerous factors have been proposed to maintain social anxiety. These range from the biological (e.g., high threat sensitivity) to the environmental (e.g., early childhood experiences of bullying; Rapee & Heimberg, 1997). In regards to maintenance[1] models of SAD that have most informed psychological treatment, the cognitive-behavioural models of Clark and Wells (1995) and Rapee and Heimberg (1997) have received the most attention. I describe each model individually and then identify the commonalities most relevant to this thesis.

Clark and Wells' model emphasizes four maintenance factors of social anxiety: 1) negative thoughts about social situations, 2) negative self-image, 3) safety behaviours, and 4) worry and rumination. In this model, the negative thoughts largely relate to the perceived probability and cost of social mishaps occurring (e.g., "everyone will laugh at me, and it will be horrible"). As these negative thoughts exaggerate the predicted probability and cost of negative social events, they elicit symptoms of anxiety. Clark and Wells (1995) also propose that during social encounters people with social anxiety pay excessive attention to images in their minds of how they imagine they appear to others. This elevated self-consciousness maintains symptoms of anxiety for two primary reasons: 1) the negative self-image is inaccurate and exaggerated (e.g., they imagine their hands are violently shaking when actually there is just a mild tremor), and 2) the excessive amount of attention invested into monitoring this negative self-image detracts from attention on the social interaction itself

[1] 'Maintenance' in this thesis refers to an ongoing causal effect, which can be distinguished from an effect that caused the initial onset of a problem (e.g., trauma). In other words, I am interested in 'ongoing' causes rather than 'original' causes. Moreover, I acknowledge the existence of other definitions of maintenance, such as an effect that maintains current levels of variables of interest.

which can actually worsen their social performance. Common safety behaviours include avoiding eye contact and minimizing self-expression during social interactions. These safety behaviours perpetuate anxiety because they prevent socially anxious individuals from learning that the probability and cost of social mishaps is lower than they estimate. For example, an individual might refrain from sharing an opinion because of a prediction that others will react with scorn. By refraining from sharing opinions, the individual does not learn that the likelihood of people reacting in this way is actually very low. Safety behaviours can also maintain anxiety because they may worsen actual social performance. Someone who is feeling anxious and inhibiting self-expression can come across as cold and rude to others. The fourth maintenance factor of this model refers to the tendency of socially anxious individuals to worry *before* social situations (e.g., think about all the things that could go wrong) and ruminate *after* social situations (e.g., recall everything that did go wrong). This repetitive negative thinking reinforces the negative self-beliefs of people with SAD and thus perpetuates anxiety.

Rapee and Heimberg's model of social anxiety has many similarities with Clark and Wells' model. Rapee and Heimberg also focus on the role of negative thoughts about the probability and cost of social mishaps. In particular, this model emphasizes cognitions regarding the perceived discrepancy between: 1) how a socially anxious individual performs, and 2) the standards of social performance that others hold. That is, people with SAD believe that others have high standards of social performance and that they do not meet these standards. Central to Rapee and Heimberg's model is also the concept of a negative self-image. This negative self-image is described as a mental representation of the self, and is one vehicle through which socially anxious individuals perceive a discrepancy between how they perform versus how others expect they should perform. One difference between the two models is that Rapee and Heimberg propose that this mental self-representation is informed

not only by internal cues (e.g., feeling one's own hand shaking), but also by external cues pertaining to threat in the environment. These external threat cues relate to perceived negative evaluation (e.g., someone yawning or frowning) and can impair social performance because attentional resources are focused on unhelpful stimuli. A further difference between the models is that Rapee and Heimberg place less emphasiz on the maintaining role of safety behaviours compared to Clark and Wells. Rapee and Heimberg also place less emphasiz on the role of worry and rumination, although these processes have been acknowledged in more recent updates of their model (Heimberg, Brozovich, & Rapee, 2014).

Self-Attitudes in Social Anxiety

One common thread between the two major models of SAD is a recognition of the extreme degree to which socially anxious individuals scrutinize themselves. In their attempts to avoid negative evaluation, people with social anxiety monitor their social performance, manage their impression, and hold themselves to standards they rarely meet. Given this level of scrutiny, it is clear that socially anxious individuals hold an attitude toward themselves that is likely to be self-critical. Although this self-critical attitude is embedded within the major models of social anxiety, thus far it has not commonly been the explicit focus of research.

Self-Criticism and Mental Health

The meaning of "clinical" or "maladaptive" self-criticism is intuitive and, as such, few researchers have sought to precisely define the construct. Rather, much research on self-criticism has focused on identifying the role of this construct in other psychological problems such as depression and perfectionism (e.g., Blatt, 2004), but rarely do researchers offer a specific definition of the construct. Some definitions put forward have been overly broad and vague, defining self-criticism as a dispositional tendency or broad personality construct (e.g., Ishiyama & Munson, 1993; Thompson & Zuroff, 2004). Other research has lacked a precise definition, but has described important features of clinical self-criticism. For example,

Gilbert, Clarke, Hempel, Miles, and Irons (2004) argue that self-criticism involves contempt or hatred expressed towards the self. This description is consistent with research that has more precisely described self-criticism, where the construct has been defined as "a form of negative thinking that devalues the self" (Smart, Peters, & Baer, 2016, p. 2), and "a self-evaluative process…[of a] harsh, contemptuous, and hostile manner" (Shahar, Szsepsenwol, et al., 2015, p. 1). The common theme between these definitions is the harshness and punitiveness involved.

In a clinical context, a more comprehensive definition of self-criticism is helpful. The dictionary definition of "criticism" tends to have two meanings: One that relates to "the expression of disapproval of someone or something on the basis of perceived faults or mistakes" (Oxford Online Dictionary), and another that relates to the process of evaluating or analysing a piece of work (e.g., literature). The clinical meaning of self-criticism is clearly closer to the first definition, but even this definition may not quite capture the perniciousness of clinical self-criticism. For example, it is conceivable that disapproval could be expressed in quite a balanced and helpful way; a parent might express disapproval that their child failed an exam because they did not study enough. But the devil is in the detail. *How* is this criticism expressed? One parent might reprimand their child by saying: "It wasn't helpful for you to avoid doing your homework because it led to your failing the exam". In contrast, another parent might say: "It was stupid of you to avoid doing your homework and that makes sense because you are a stupid child". In both cases, disapproval of a mistake was expressed, but in only one case was the criticism pernicious. As per the described research, this perniciousness or punitiveness is at the heart of the clinical meaning of self-criticism. In this thesis, when the phrase "self-criticism" is used, it refers to self-criticism of a harsh, punitive or devaluing nature.

Historically, self-criticism has been conceptualized as a component of both depression and perfectionism (Blatt, 1995, 2004). However, recent research has seen self-criticism conceptualized as a distinct transdiagnostic process linked with a multitude of mental health related factors. In terms of disorders, several studies have found that clinical participants have higher self-criticism compared to healthy controls across a range of disorders such as *MDD* and *eating disorders* (Ehret, Joormann, & Berking, 2015), *Social Anxiety Disorder* (Iancu, Bodner, & Ben-Zion, 2015; Werner et al., 2012), and *Post-Traumatic Stress Disorder* (Harman & Lee, 2010). Moreover, self-criticism has been shown to relate to a number of psychiatric symptoms including depression (Cox, Clara, & Enns, 2009; Pinto-Gouveia, Castilho, Matos, & Xavier, 2013), anxiety (Castilho, Pinto-Gouveia, Amaral, & Duarte, 2014), binging (Boone, Vansteenkiste, Soenens, Van der Kaap-Deeder, & Verstuyf, 2014; Duarte & Pinto-Gouveia, 2017; Duarte, Pinto-Gouveia, & Ferreira, 2014; Feinson & Hornik-Lurie, 2016; Palmeira, Pinto-Gouveia, Cunha, & Carvalho, 2017), body dissatisfaction (Dunkley, Masheb, & Grilo, 2010; Ferreira, Pinto-Gouveia, & Duarte, 2014), stress (Luyten et al., 2011; Mandel, Dunkley, & Moroz, 2015), social anxiety (Lazarus & Shahar, 2018; Shahar, Doron, & Szepsenwol, 2015), hoarding (Chou et al., 2018), chronic fatigue (Kempke et al., 2013), chronic pain (Kempke, Luyten, Van Wambeke, Coppens, & Morlion, 2014), shame (Duarte, Ferreira, & Pinto-Gouveia, 2016; Kelly & Carter, 2013), and suicidality (Campos, Besser, & Blatt, 2013; Campos, Holden, Baleizão, Caçador, & Fragata, 2018; Falgares et al., 2017; O'Connor & Noyce, 2008). Self-criticism has also been associated with risk factors for the development of psychological problems including self-harm (Gilbert et al., 2010), fear of compassion (Joeng & Turner, 2015), fear of happiness (Gilbert et al., 2012), hazardous drinking (Skinner & Veilleux, 2016), interpersonal problems (Dinger et al., 2015; Kopala-Sibley, Zuroff, Russell, Moskowitz, & Paris, 2012), maladaptive overgeneralization (Thew, Gregory, Roberts, & Rimes, 2017), self-consciousness (Kopala-Sibley, Zuroff,

Russell, & Moskowitz, 2014), and stress reactivity (Hawley, Zuroff, Brozina, Ho, & Dobson, 2014). Furthermore, self-criticism is negatively related to numerous factors that protect against psychological problems such as therapeutic alliance (van der Kaap-Deeder, Smets, & Boone, 2016), therapeutic outcome (Marshall, Zuroff, McBride, & Bagby, 2008), self-efficacy (Michl, Handley, Rogosch, Cicchetti, & Toth, 2015; Stoeber, Hutchfield, & Wood, 2008), positive affect (Gilbert et al., 2008b), goal progress (Powers, Koestner, Lacaille, Kwan, & Zuroff, 2009; Powers, Koestner, Zuroff, Milyavskaya, & Gorin, 2011; Powers, Milyavskaya, & Koestner, 2012), and romantic relationship quality (Lasri & Shahar, 2012).

Some research demonstrates that self-criticism correlates with symptom change in psychological interventions. As an example, Chui, Zilcha-Mano, Dinger, Barrett, and Barber (2016) randomized 149 adults with MDD into three intervention groups: active medication, supportive expressive therapy, or placebo pill. Across all conditions, reductions in self-criticism were associated with reductions in depressive symptoms. Similarly, Lowyck, Luyten, Vermote, Verhaest, and Vansteelandt (2017) found that changes in self-critical perfectionism correlated with decreases in symptomatic distress in a psychodynamic intervention for in-patients with personality disorders. Recently, Deming et al. (2018) examined the effects of a compassion meditation intervention on depressive symptoms in a sample of low-income African Americans who had recently attempted suicide. Although variables were only measured at two time points, the researchers used path analysis to demonstrate that the intervention successfully reduced depressive symptoms and that this reduction was mediated by self-criticism.

Other research suggests that self-criticism can predict future levels of psychopathology, which has mainly been observed in the area of depression. For example, a review of studies using student samples found a consistent weak-to-moderate effect of self-criticism predicting future levels of depression (McIntyre, Smith, & Rimes, 2018). This

effect has also been found in non-student clinical samples (Dunkley, Sanislow, Grilo, & McGlashan, 2009). Prospective relationships have also been demonstrated in other studies in which self-criticism has predicted future binging (Boone et al., 2014), suicidality (Campos et al., 2018), fatigue and pain (Kempke et al., 2013), and goal progress (Powers et al., 2011). Currently, the research on the prospective relationship between self-criticism and anxiety remains unclear. In their review on student samples, McIntyre et al. (2018) did not find that self-criticism predicted future levels of anxiety. These findings contrast with other research on female adolescents which demonstrates that self-criticism successfully predicted the first onset of nearly all depressive and anxiety disorders (Kopala-Sibley, Klein, Perlman, & Kotov, 2017). Clearly, more research is required in this area utilising more diverse samples (a comprehensive review of self-criticism and social anxiety is reported in Chapter 3).

Among the burgeoning research on self-criticism, certain studies have explored the mechanisms through which self-critical thinking might impact on psychopathology. In terms of the relationship between self-criticism and depression, past research has found evidence for a mediating role of stress sensitivity (Luyten et al., 2011), interpersonal sadness sensitivity (Mandel et al., 2018), perception of negative social support (Dunkley et al., 2009), low self-esteem (Moroz & Dunkley, 2015), and fear of self-compassion (Joeng & Turner, 2015). For the relationship between self-criticism and eating disorder dimensions, mediational evidence exists for shame (Kelly & Carter, 2013), psychological need frustration (Boone et al., 2014), and lower therapeutic alliance (van der Kaap-Deeder et al., 2016). There is also evidence that depression mediates the link between self-criticism and non-suicidal self-injury (Baetens et al., 2015), while brooding rumination mediates the self-criticism-suicidality relationship (O'Connor & Noyce, 2008). Furthermore, evidence suggests that the relationship between self-criticism and goal progress is mediated by factors such as self-efficacy (see Powers, 2012). Mechanistic research on self-criticism is still in its infancy and

questions remain about what mediators might explain the relationship between self-critical thinking and other psychiatric symptoms. Although there appears to be a relationship between self-criticism and social anxiety, to date we only have a modest understanding of what might explain this relationship (possible mediators of these relationships are proposed in Chapter 4).

1.2 Conclusion

Overall, there is a robust relationship between self-criticism and mental health, with some evidence suggesting that this relationship may be causal. If this relationship does exist, then it raises the question of whether alternative, more adaptive attitudes toward the self are associated with more optimal mental health. One such alternative attitude is *self-compassion*. Chapter 2 documents the relationship between self-compassion and mental health in general, setting the stage for later chapters, which critically evaluate evidence for a relationship between self-compassion and social anxiety specifically.

Chapter Two – Self-Compassion and Mental Health

2.1 Introduction

The Meaning of Compassion and Self-Compassion

Although compassion has only recently begun to receive attention in the West, it has been a focus of study for thousands of years in certain Eastern traditions such as Buddhism. Several definitions have been put forward for compassion. Goetz, Keltner, and Simon-Thomas (2010, p. 351) define the concept as: “the feeling that arises in witnessing another's suffering and that motivates a subsequent desire to help”. Similarly, Gilbert (2009, p. 13) defines compassion as a “deep awareness of the suffering of another coupled with the wish to relieve it”. Recently, Strauss et al. (2016) reviewed various models of compassion in order to propose an integrated definition involving five elements: 1) being aware of suffering; 2) recognizing the universality of suffering; 3) empathizing with the person suffering; 4) tolerating distressing feelings; and 5) feeling motivated to alleviate the suffering. Compassion can be thought of in directional terms whereby it is possible for the feeling to be directed outwards (i.e., compassion towards others) or inwards (i.e., self-compassion). In the last 10 years, research on compassion has primarily focused on *self*-compassion and its relationship with mental health. This research has generally used Neff’s (2003) conceptualization of the construct which overlaps with some elements of the Strauss et al. definition. Neff (2003) defines self-compassion as a combination of self-kindness (as opposed to self-criticism), a feeling of connection with humanity (rather than a feeling of isolation), and mindfulness (rather than over-identification with negative symptoms).

Self-Compassion and Mental Health

The study of self-compassion has increased to such an extent that several reviews of this construct have been conducted in recent years. The first major review was a meta-analysis conducted by MacBeth and Gumley (2012) which investigated the relationship between self-compassion and several important forms of psychopathology including depression, anxiety, and stress. Fourteen eligible studies were examined, and a large effect size between self-compassion and psychopathology was demonstrated. In a systematic review (N = 28) specifically focusing on eating disorder symptoms, Braun, Park, and Gorin (2016) found consistent evidence that self-compassion protects against poor body image and disordered eating. Self-compassion has also been reviewed in the context of positive mental health. Across 79 samples, Zessin, Dickhäuser, and Garbade (2015) found evidence for a moderate relationship between self-compassion and positive aspects of wellbeing such as life satisfaction and happiness.

Given the increase in intervention studies using self-compassion, systematic reviews have also begun to address the question of whether active training in compassion can improve mental health. Recently, Kirby, Tellegen, and Steindl (2017) conducted a meta-analysis of compassion-based interventions. An examination of the protocols of the studies reveals that of the 21 randomized controlled trials evaluated, five had a minimal focus on self-compassion (i.e., had a greater focus on compassion *towards others*), six had a moderate focus, and ten were conducted where the major focus was on self-compassion. Overall, the meta-analysis found that compassion-based interventions had moderate effect sizes for outcomes including depression, anxiety, psychological distress, and wellbeing. These findings are consistent with a systematic review by Leaviss and Uttley (2015) who specifically reviewed the evidence for Compassion Focused Therapy (CFT; Gilbert, 2009), one of the primary compassion-based approaches. The authors included a wider range of study designs (randomized controlled

trials, case studies, case series, and observational studies) and found consistent evidence for the efficacy of CFT. In particular, the authors suggest that CFT may be suitable for mood disorders and people high in self-criticism.

Results of newer randomized controlled trials continue to support the notion that self-compassion can be used to improve wellbeing. A recent study randomized a large unselected sample of general community participants (N = 242) into guided self-help for CFT or waitlist control (Sommers-Spijkerman, Trompetter, Schreurs, & Bohlmeijer, 2018). The nine-week intervention resulted in superior outcomes for the CFT group at post-intervention and three-month follow-up across a range of measures such as positive mental health, depression, anxiety, and stress. Longer term follow-up at nine-months demonstrated that benefits of increased positive emotions and reduced stress were maintained for the CFT group. In summary, there is considerable evidence to believe that self-compassion relates to mental health, and that it is a trainable skill that can be used to improve wellbeing and reduce suffering. As the research on this construct continues, it is important to turn our attention toward related questions such as: “how and for whom does self-compassion work?”.

Process-Based Research

The field of clinical psychology is currently experiencing a major push towards understanding the processes underlying successful interventions (see Hayes & Hofmann, 2017). Numerous arguments exist for the importance of this focus of study. For example, a greater understanding of underlying processes should increase the efficacy of psychological interventions by facilitating the identification of the most effective components of these interventions, which can then be intensified (Kazdin, 2007). Additionally, elucidation of these processes can contribute to efforts in making psychological interventions more generalizable and conducive to usage in different environments. Central to the study of underlying processes are the concepts of moderation, mediation, and mechanisms of change.

Mediators and Mechanisms of Change

A mediator is a variable that has a relationship to a predictor and an outcome variable. Mediation is said to occur in a sequence whereby an independent variable (e.g., an intervention) predicts a mediator, and the mediator in turn predicts an outcome variable (Kazdin, 2007). While the concept of mechanisms of change subsumes the concept of mediation, these concepts are actually distinct; "all mechanisms are mediators but not all mediators are mechanisms" (Kraemer, Wilson, Fairburn, & Agras, 2002, p. 878). It is possible for a construct to be a mediator without being a mechanism of change. Establishing a mechanism of change requires a greater number of criteria to be met because this concept involves more specificity and reflects a causal process. A mediator may simply be a proxy for other more important variables. A mechanism of change, on the other hand, is a variable that actually explains *how* the independent variable led to a change in the outcome variable; the process responsible for the change. For example, a psychological intervention might lead to a reduction in social anxiety which is mediated by greater frequency of socialising. However, the underlying process responsible for this symptom change may actually be a reduction in safety behaviours. In this case, socialising is a mediator but it is not a mechanism of change.

The distinction between a mediator and a mechanism of change can be further understood by comparing the criteria typically used to establish the existence of each. To establish simple mediation, the following criteria have typically been used: 1) the independent variable predicts the dependent variable, 2) the independent variable predicts the proposed mediator, and 3) the mediator predicts the dependent variable after controlling for the independent variable[2] (Baron & Kenny, 1986). Comparably, one perspective is that to establish a construct as a mechanism of change, the following criteria have typically been

[2] Although it is acknowledged that newer and more widely accepted perspectives argue that these criteria are outdated and it is not actually necessary to establish the existence of direct effects as a prerequisite for the existence of an indirect effect (see Hayes & Rockwood, 2017).

used: 1) a strong association between the three variables, 2) a specific mediational effect (i.e., no multiple mediators), 3) a consistent mediation effect, 4) a mediational effect that is demonstrated through experimental manipulation, 5) temporal precedence of change in the mediator before change in the outcome, 6) a graded effect of the mediator on the outcome, and 7) the mediating effect is plausible and coherent (Kazdin, 2007). Clearly, a mechanism of change requires many more criteria to be met. However, while a mediator does not necessarily infer an underlying process, the study of mediation is seen as an important first step in understanding mechanisms of change. Another important first step is to consider relevant theories which inform researchers of potential mediators.

Theoretically Informed Mechanisms of Change in Self-Compassion

Currently, there is minimal discussion of mechanisms of change in the theoretical literature on compassion. This absence may indicate the position of theorists that compassion *itself* is the underlying process which has a direct effect on mental health. For example, in Neff's (2003) model, it may simply be the case that self-kindness, mindfulness, and a feeling of connection with humanity directly affect wellbeing. Consistent with this idea, many empirical studies have examined compassion itself as a mediator between mental health-related variables. For example, self-compassion has been found to mediate the impact of Mindfulness Based Cognitive Therapy on depression (Kuyken et al., 2010). However, a discussion of mechanisms is not entirely absent in the theoretical literature of compassion.

The most widely studied compassion-based intervention is Compassion Focused Therapy (CFT; Gilbert, 2009). This intervention is based on a model that draws from numerous fields of study such as evolutionary psychology, neuroscience, and attachment theory. According to the model, humans have evolved to possess three major self-regulative psychophysiological systems: the threat system (associated with threat-based feelings such as anxiety), the drive system (associated with drive-based feelings such as motivation), and the

soothing system (associated with soothing-based feelings such as warmth and security). These systems work in unison and optimal functioning of a human (or any mammal) is associated with balanced activation between the systems. Based on this model, psychopathology occurs when there is an over-activation of the threat and drive systems, and an under-activation of the soothing system. The primary goal of CFT, therefore, is to bring these systems into balance by learning to stimulate the soothing system. Crucially, the main clinical strategy for activating the soothing system is the practice of compassion (Gilbert, 2009). In other words, although not made explicit, CFT proposes that the central mechanism through which compassion influences mental health is the activation of the soothing system, which is associated with feeling safe, secure, and content (Gilbert, 2010). The CFT model also proposes numerous skills and attributes of compassion (e.g., distress tolerance, sympathy, and compassionate behaviour) which may themselves represent underlying change processes. An important question is to what extent these proposed mechanisms of change have been empirically evaluated.

So far, only one review has evaluated the mediators through which self-compassion affects mental health. This review focused specifically on the mechanism of *emotion regulation*, defined as automatic and cognitive processes that influence emotions (Inwood & Ferrari, 2018). The authors found that emotion regulation mediated the relationship between self-compassion and several outcomes such as depression, general stress, and post-traumatic stress symptoms. However, this review was limited due to its specific focus on emotion regulation which resulted in a small sample size of studies reviewed ($N = 5$). Furthermore, the review did not evaluate the degree to which theoretical mechanisms have been researched, nor did it comprehensively evaluate the extent to which the mediational studies can infer true mechanisms of change. Given the growth in self-compassion research, there is a need for a

review that integrates a wider range of mediator studies and comments on the aforementioned issues.

Moderation

Also central to the study of underlying processes is the concept of moderation. In cross sectional research, a moderator is a third variable that alters the strength or direction of the relationship between an independent variable and a dependent variable (Baron & Kenny, 1986). In randomized controlled trials, moderation has a more specific meaning, generally referring to pre-randomization variables that differentially affect the outcome of one intervention versus another (Kraemer, Wilson, Fairburn, & Agras, 2002). In treatment research, moderators can be distinguished from "non-specific predictors" that affect outcomes equally for all interventions. Importantly, moderators can inform questions such as for whom and under what conditions certain interventions are more effective. For example, in anxiety disorders, some evidence suggests that CBT is superior to Acceptance and Commitment Therapy (ACT) for people with moderate levels of baseline anxiety sensitivity, whereas ACT may be superior to CBT for people with comorbid mood disorders (Wolitzky-Taylor, Arch, Rosenfield, & Craske, 2012). Hence, a knowledge of moderators can provide information about which individuals will benefit most from which interventions. Furthermore, in the same way that mediation can inform potential mechanisms of change, cross-sectional (i.e., simple) moderators can inform potential treatment-moderators.

Theoretically Informed Moderators of Self-Compassion

Theoretically, compassion-based approaches tend to be implicitly or explicitly aimed towards people with high shame and high self-criticism (e.g., Gilbert & Procter, 2006). Those high in shame and self-criticism may have more success using self-compassion because of the greater emphasiz on positive affect which activates the soothing system. For these people, 'logic-based' approaches such as CBT may not successfully activate the soothing system and

elicit feelings of reassurance (Gilbert & Procter, 2006). In other words, high shame and high self-criticism should moderate the relationship between self-compassion and mental health. Additionally, there are other constructs which may influence the efficacy of self-compassion, such as a fear of compassion. Gilbert (2014) explains that certain people have an aversion to the practice of compassion because it can trigger distressing associations, such as traumatic childhood memories. In a compassion-based intervention, these people may actually fare worse than those who do not fear compassion, unless their fears are explicitly addressed (as is the case in CFT; see Gilbert, 2014). In summary, there appears to be a theoretical basis for the moderating influence of self-criticism, shame, and fear of compassion in the domain of compassion-based treatment.

To my knowledge, three reviews have shed light on moderators of the impact of self-compassion, although it should be noted that this was a secondary research question to primary research questions of the reviews, namely that of the relationship between self-compassion and mental health. In their meta-analysis, Macbeth and Gumley (2012) found no moderating effect of clinical status (clinical versus non-clinical participants), student status (students versus non-student participants), gender, nor age, when examining mainly cross-sectional studies. Reviewing outcomes related to positive mental health using meta-analytic approaches, Zessin, Dickhauser, and Garbade (2015) found that gender and self-esteem were simple moderators of the influence of self-compassion on overall wellbeing and cognitive wellbeing respectively, whereas age showed no such effect. In a narrative review of CFT intervention studies, Leaviss and Uttley (2015) showed evidence for several treatment moderators. They found that self-compassion interventions had greater benefits for those higher in connectedness (defined as a moderately maladaptive form of dependency) and avoidant attachment style. Additionally, they found somewhat conflicting evidence for self-criticism. In one study reviewed, those high in self-criticism and receiving self-compassion

had better outcomes (Kelly et al., 2009), but in another study, those high in self-criticism fared no better than their low-self-criticism counterparts (Shapira & Mongrain, 2010. Thus, support for the theoretically-driven moderators of self-compassion are mixed. However, there remains a need for a more comprehensive review to address the question of what moderates the impact of self-compassion, and such a review would benefit from investigating a wider range of studies and examining moderators that have been identified on theoretical grounds. Although this question has been partially addressed by earlier reviews, one of these reviews is now relatively outdated (Macbeth & Gumley, 2012), while the others focused only on interventions (Leaviss & Uttley, 2015) or a narrow range of outcome variables (Zessin, Dickhauser, & Garbade, 2015). Given the exponential increase in self-compassion research in recent years, an updated narrative review of moderators is required.

The Current Review

Given the evidence base, it seems fair to conclude that self-compassion is beneficial for mental health. However, we remain far from being able to confidently answer questions about how self-compassion affects mental health, and for whom this intervention is most suitable. Such questions are important given the current push towards understanding underlying processes of successful interventions. In order to address these questions, the following review: 1) describes the evidence base for a number of moderators and mediators in the relationship between self-compassion and mental health, 2) evaluates the degree to which theoretical mediators and moderators have been examined, and 3) evaluates the degree to which empirical mediators are plausible mechanisms of change.

2.2 Method

Search Strategy

Studies were identified using PsychINFO, Pubmed, Web of Science, Scopus, and Google Scholar. Additional studies were identified by examining reference lists (see Figure 1 for Consort Diagram). Various search terms were then employed for each concept including mediation (e.g., mediat*, mechanism), moderation (e.g., moderat*, predict*), self-compassion (e.g., compass*) and mental health (e.g., psychopath*, anxiety, depress*). Studies were included if the following criteria were met: 1) represented a peer reviewed study (i.e., not a chapter), 2) in English language, 3) included appropriate analysis of mediation/moderation, 4) examined self-compassion (i.e., not compassion towards others), 5) had an outcome variable related to mental health (i.e., not physical health), 6) reported quantitative measurement of key constructs, and 7) not used in a previous review.

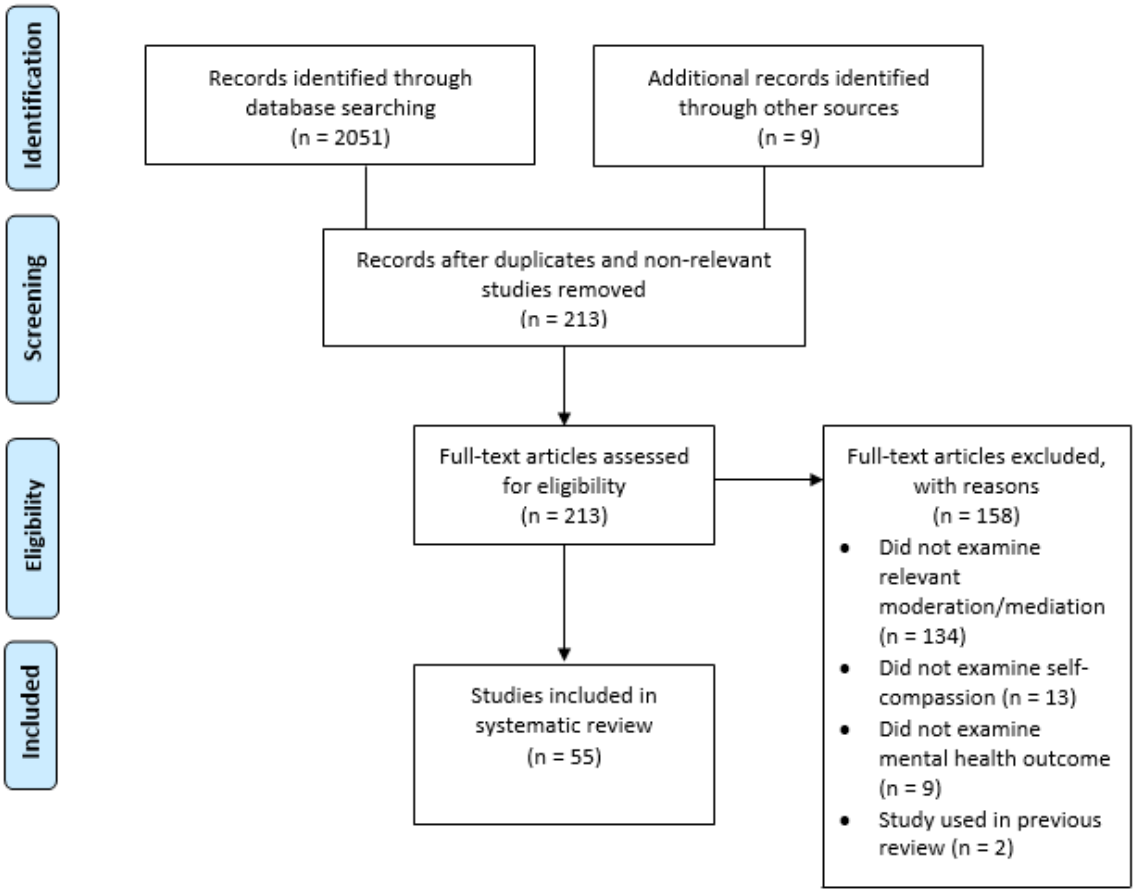

Figure 1. PRISMA flow diagram of study selection.

For the mediation studies, information is presented in Appendix A with key data extracted, and is expanded upon in this narrative review. Appendix A includes a measure of the validity of the mediator/s in each study as possible mechanisms of change. This measure was adapted from Kazdin's (2007) seven criteria for establishing a mechanism of change. In this chapter, the following criteria were used: 1) specificity of the mediator (i.e., there were not multiple significant mediators, or if there were, the relative strength of these mediators was statistically examined); 2) experimental manipulation of self-compassion or mediator; 3) demonstration of temporal precedence of change in mediator before change in outcome variable; 4) demonstration of gradient in the effect of the intervention such that greater dosages of the intervention are associated with increased activation of mediator, which in turn is associated with increased change in the outcome variable; and 5) the mediator is plausible

and coherent such that there is a theoretical description of how it is responsible for the change in outcome variable. Studies received a score of one (met the criteria) or a zero (did not meet criteria or information not available) for each criterion for a maximum of five possible points on the measure of mechanism of change validity (MCV). Given the number of mediators considered, for this review I organized and reported the mediators under specific categories when summarizing the findings (e.g., repetitive negative thinking, emotional regulation, etc.).

For the moderator studies, Appendix B summarizes the key extracted data from the reviewed studies. Assessment of these findings included integrating information about observed patterns in the data, distinguishing between non-specific predictors and moderators, and evaluating the extent to which the moderators examined had theoretical underpinnings. Notably there was less research on moderators relative to investigations of mediators.

2.3 Results

General Mediation Findings

A wide range of mediators, outcome variables, and measures were examined in studies, with a narrower range of measures for self-compassion used. The majority (n = 28) of studies met the specificity criterion by examining one mediator in isolation, or by comparing the relative strength of multiple mediators. Very few studies experimentally manipulated self-compassion or the mediator (n = 7). Most of the experimental studies included a control group, but only one was an RCT (Montero-Marín et al., 2018). Notably, none of the studies met the timeline or gradient criteria. Although some of the controlled experimental studies included repeated measures of the mediator and outcome variable (e.g., Deming et al., 2018), they did not demonstrate that a change in the mediator preceded a change in the outcome variable. Rather, they showed that there was a covariance between these variables. Similarly, no studies demonstrated that differential dosages of self-

compassion led to corresponding changes in the mediator and outcome variable. Nearly all studies (n = 36) provided a plausible and coherent rationale for the mediational model under examination. However, it should be noted that there was significant variance in the quality of these rationales. Some studies relied primarily on presenting empirical evidence of an association between the key constructs (e.g., Lloyd, Muers, Patterson, & Marczak, 2018) rather than providing a precise explanation of the theoretical causal relationships as others did (e.g., Wadsworth et al., 2018). More specific findings are now discussed.

Repetitive Negative Thinking

Repetitive negative thinking (RNT) is a transdiagnostic cognitive process that often precedes or follows a negative event (McEvoy, Thibodeau, & Asmundson, 2014; Wadsworth et al., 2018). The most common forms of RNT are worry and rumination. Given that self-compassion is particularly useful in the context of difficult situations (e.g., following a perceived failure; Neff, 2003), it may provide a healthier alternative to RNT (Raes, 2010). Eight studies examined RNT and found significant mediation across several outcome variables where self-compassion was associated with lower RNT, and RNT was in turn associated with better mental health. The most common outcome variable was depression (n = 5; Johnson & O'Brien, 2013; Krieger, Altenstein, Baettig, Doerig, & Holtforth, 2013; Lenferink, Eisma, de Keijser, & Boelen, 2017; Raes, 2010; Wadsworth et al., 2018), followed by anxiety (n = 2; Raes, 2010; Wadsworth et al., 2018), with other variables such as anger, grief, and posttraumatic stress also examined. One study found that RNT was not a significant mediator when examining romantic jealousy (Tandler & Peterson, 2018), while another longitudinal study found that changes in RNT did not mediate the relationship between changes in positive aspects of self-compassion (self-kindness, common humanity, and mindfulness) and both depression and anxiety (Wadsworth et al., 2018). Most of the studies used a nonclinical sample apart from one which examined participants with a

diagnosis of current major depressive episode (Krieger et al., 2013), and another which looked at individuals receiving psychological treatment for a range of problems (Wadsworth et al., 2018). Only one of the RNT studies was experimental (Blackie & Kocovski, 2018). Two other studies showed that two constructs involved in RNT, negative automatic thoughts and self-criticism, mediated the relationship between self-compassion and a number of mental health outcomes (Arimitsu & Hofmann, 2015; Johnson et al., 2018). In particular, Johnson et al. (2018) found that a six-session compassion-based meditation intervention resulted in a reduction in depression, and that a decrease in self-criticism predicted this reduction. Moreover, the indirect effect of self-criticism on depression was more than four times higher in the compassion group compared to the control (general support) group. However, only two assessment points were included and therefore temporal precedence is impossible to establish. Standardized regression coefficients of the indirect effect of RNT on various outcomes ranged from -0.02 (CI_{95} = -0.01 to -0.04) to -0.16 (CI_{95} = -0.09 to -0.25; Fresnic & Borders, 2017).

Emotion Regulation

Emotion regulation refers to the ability to modify the frequency and intensity of one's own negative emotions (Diedrich, Burger, Kirchner, & Berking, 2017). Similar to RNT, emotion regulation is considered a transdiagnostic construct involved in various psychological disorders (Aldao, Gee, De Los Reyes, & Seager, 2016). Eleven studies examined emotion regulation and generally found that self-compassion predicted better emotion regulation, which in turn predicted better mental health outcomes. A wide variety of outcome variables were examined with some consistency for stress (n = 4; Bluth & Blanton, 2014; Finlay-Jones, Rees, & Kane, 2015; Gouveia, Carona, Canavarro, & Moreira, 2016; Lloyd et al., 2018) and depression (n = 2; Diedrich et al., 2017; Montero-Marín et al., 2018). Other outcome variables that did not show consistency included PTSD symptoms

(Barlow, Goldsmith Turow, & Gerhart, 2017), posttraumatic growth (Wong & Yeung, 2017), personal improvement (Zhang & Chen, 2016), life satisfaction (Bluth & Blanton, 2014), and bingeing (Webb & Forman, 2013). Three studies examined the specific emotion regulation skill of mindfulness, which refers to a non-judgemental and accepting form of awareness (Kabat-Zinn, 1994). All three studies found a mediating effect of this construct. Other studies included broad measures of emotion regulation but performed specific analyses on the subscales. Lloyd et al. (2018) found that dysfunctional coping, but not emotion-focused coping, mediated the relationship between self-compassion and caregiver burden. Using an online experimental study, Zhang and Chen (2016) found that acceptance but not forgiveness mediated the effect of a self-compassion on personal improvement, although within-person changes in these variables were not assessed. In a clinically depressed sample, Diedrich et al. (2017) found that only one of eight emotion regulation subscales (emotional tolerance) remained a significant mediator of the effect of self-compassion on depression, after controlling for comorbidities. In the only randomized controlled trial (RCT) of this review, Montero-Marin et al. (2018) recruited participants with fibromyalgia and demonstrated that psychological flexibility mediated the effect of condition (attachment-based compassion therapy versus relaxation control) on numerous outcomes including depression and anxiety. However, the study design did not account for temporal precedence of change in mediator before change in the outcome variables. Standardized regression coefficients of the indirect effect of emotion regulation ranged from -0.05 (CI_{95} = -0.10 to -0.01; Webb & Foreman, 2013) to 0.26 (CI_{95} = 0.19 to 0.33; Wong & Yeung, 2017).

Negative Affect

Four studies found that self-compassion consistently predicted lower negative affect which in turn predicted better mental health outcomes (Breines, Toole, Tu, & Chen, 2014; Johnson & O'Brien, 2013; Kelliher-Rabon, Sirois, & Hirsch, 2018; Lincoln, Hohenhaus, &

Hartmann, 2013). The only exception to this pattern of results was guilt which was found to be a non-significant mediator (Johnson & O'Brien, 2013). Negative affect in the form of shame was observed in two studies which examined outcome variables of depression (Johnson & O'Brien, 2013) and disordered eating (Breines et al., 2014) respectively. Another study found that depression mediated the relationship between self-compassion and suicidal behaviour in a cross-sectional study of undergraduates (Kelliher-Rabon et al., 2018). In an experiment that compared a brief self-compassion intervention with a neutral control, Lincoln, Hohenhaus, and Hartmann (2013) found that state negative affect (fear, anger, sadness, shame) mediated the effect of the compassion condition on state paranoia. However, although the mediation analysis controlled for earlier levels of negative affect and paranoia, it did not determine whether changes in negative affect preceded changes in paranoia. Standardized regression coefficients of the indirect effect of negative affect ranged from -0.03 (CI_{95} = -0.04 to -0.02) to -0.06 (CI_{95} = -0.08 to -0.04; Johnson & O'Brien, 2013).

Interpersonal Factors

Three studies found that self-compassion predicted improved interpersonal outcomes which in turn predicted better mental health. The specific interpersonal mediators examined included perceived marital problems (Baker & McNulty, 2011), interpersonal competence (Bistricky et al., 2017), and willingness to forgive (Tandler & Petersen, 2018). Respective outcome variables examined included marital satisfaction, PTSD symptoms, and romantic jealousy. All mediational analyses demonstrated significance, although the mediating role of perceived marital problems was only significant for men high in conscientiousness (i.e., moderated mediation). Each study demonstrated good specificity, however, only one was experimental (Study 3; Baker & McNulty, 2011). Although none of the studies used a clinical sample, Bistricky et al. (2017) did use a sample of trauma-exposed individuals. Standardized

regression coefficients of the indirect effect of negative affect ranged from -0.05 (CI_{95} = -0.09 to -0.01; Bistricky et al., 2017) to -0.08 (CI_{95} = -0.20 to -0.01; Tandler & Peterson, 2018).

Protective and Risk Factors

Fourteen studies used mediators that could be broadly classified as risk or protective factors. Generally, these studies found that self-compassion predicted reductions/increases in risk/protective factors respectively, which in turn predicted better mental health. However, one exception was a study in which the total negative effect of self-compassion on depression was actually suppressed by the mediator of contingent self-worth (a type of irrational belief; Stephenson, Watson, Chen, & Morris, 2017). Examples of protective factors that were significant mediators include positive attitudes to ageing (Brown, Bryant, Brown, Bei, & Judd, 2016), self-regulatory efficacy (Dowd & Jung, 2017), personal intelligence (Mowlaie, Mikaeili, Aghababaei, Ghaffari, & Pouresmali, 2017), perceived competence (Neff, Hsieh, & Dejitterat, 2005), perceived connection with humanity (a subscale of the Self-Compassion Scale; Neff, 2003), unconditional self-acceptance (Webb & Forman, 2013), hope (Yang, Zhang, & Kou, 2016), and a sense of coherence (i.e., the ability to understand, manage, and derive meaning from life experience; Ying, 2009). Examples of risk factors that significantly mediated outcomes included negative self-appearance processing (i.e., in relation to body image; Andrew, Tiggemann, & Clark, 2016), negative attitudes to ageing (Brown et al., 2016), negative aspects of self-compassion (Dundas, Svendsen, Wiker, Granli, & Schanche, 2016), fear of failure (Neff et al., 2005), irrational beliefs (Stephenson et al., 2017), and negative cognitive style (Zhou, Chen, Liu, Lu, & Su, 2013). Non-significant mediation was observed for positive attitudes to psychological growth (Brown et al., 2016) and self-regulatory efficacy (Dowd & Jung, 2017). Although self-esteem significantly mediated the relationship between self-compassion and depression (Johnson & O'Brien, 2013), it failed to mediate the effect of self-compassion on paranoia (Lincoln et al., 2013). Some consistency

was found for the outcome variables of depression (*n* = 6; Brown et al., 2016; Dundas et al., 2016; Johnson & O'Brien, 2013; Stephenson et al., 2017; Ying, 2009; Zhou et al., 2013) and anxiety (*n* = 2; Neff et al., 2005; Stephenson et al., 2017). Other outcome variables included body appreciation (Andrew, Tiggemann, & Clark, 2016), paranoia (Lincoln et al., 2013), worry (Mowlaie et al., 2017), positive affect (Petrocchi, Ottaviani, & Couyoumdjian, 2017), bingeing (Webb & Forman, 2013), and life satisfaction (Yang et al., 2016). Nine of these studies met the specificity criteria. Very few studies examining risk/protective factors as mediators were experimental (*n* = 2; Lincoln et al., 2013; Petrocchi et al., 2017). Furthermore, none of these studies used a clinical sample. Standardized regression coefficients of the indirect effect of negative affect ranged from -0.11 (CI_{95} = -0.19 to -0.03; Webb & Foreman, 2013) to 0.33 (CI_{95} = 0.23 to 0.43; Yang, Zhang, & Kou, 2016).

Moderation

In summary, sixteen studies were included for review as they tested for moderation of the effect of self-compassion on mental health outcomes (see Appendix B). Several study designs were used, including cross-sectional (*n* = 6; Baker & McNulty, 2011; Bluth & Blanton, 2015; Bluth, Campo, Futch, & Gaylord, 2017; Hwang, Kim, Yang, & Yang, 2016; Yang et al., 2016), longitudinal (*n* = 1; Baker & McNulty, 2011), uncontrolled experiment (*n* = 1; Finlay-Jones, Xie, Huang, Ma, & Guo, 2018), controlled experiment (*n* = 6; Arch, Landy, & Brown, 2016; Baker & McNulty, 2011; Diedrich, Grant, Hofmann, Hiller, & Berking, 2014; Harwood & Kocovski, 2017; Lincoln et al., 2013; Przezdziecki & Sherman, 2016), and randomized controlled trial (*n* = 2; Kelly & Carter, 2015; Sommers-Spijkerman et al., 2018). Hence only eight studies were in a position to examine treatment moderators, as opposed to simple moderators or baseline predictors. A range of moderator and outcome variables were examined, and only two studies used a clinical sample (Diedrich et al., 2014; Kelly & Carter, 2015). The findings are now discussed.

In terms of demographic moderators, age and gender were the main variables evaluated. Five studies examined age with three studies (two using an adolescent sample), finding that for older participants there was a stronger cross-sectional relationship between self-compassion and mental health outcomes including depression and anxiety (Bluth & Blanton, 2015; Bluth et al., 2017; Hwang et al., 2016). Of the four studies examining gender (Bluth & Blanton, 2015; Bluth et al., 2017; Sommers-Spijkerman et al., 2018; Yang et al., 2016), only one found a simple moderating effect, whereby the relationship between self-compassion and anxiety was stronger for adolescent boys (Bluth et al., 2017). Only one study examining demographic moderators was in a position to evaluate treatment moderators and this study did not find any significant effects (Sommers-Spijkerman et al., 2018).

One article included in this review examined the moderating role of conscientiousness in a series of four studies. Across cross-sectional, longitudinal, and experimental study designs, Baker and McNulty (2011) demonstrated consistently that the relationship between self-compassion and adaptive interpersonal variables (e.g., motivation to correct interpersonal mistakes) was stronger for men high in conscientiousness. In a controlled experiment (Study 3), there was an interaction between condition (self-compassion versus self-criticism) and conscientiousness, representative of a treatment moderator. However, the control condition was not an active placebo or comparative treatment.

Several studies evaluated the potential moderating effect of protective factors including self-compassion[3] (Arch et al., 2016; Przezdziecki & Sherman, 2016), non-attachment (Arch et al., 2016), as well as self-reassurance, positive mental health, positive affect, and gratitude (Sommers-Spijkerman et al., 2018). The only psychological strength that was a significant moderator was non-attachment, defined as a lack of fixation on outcomes

[3] To clarify, these studies examined the continuous variable of self-compassion as a moderator of the relationship between intervention (self-compassion vs. control) and outcome.

(Arch et al., 2016). In a controlled experiment with repeated measures, non-attachment moderated the effect of condition such that those with higher non-attachment in the self-compassion group had better outcomes on state anxiety compared to the attentional control group (Arch et al., 2016). However, like Baker and McNulty (2011), the control group utilized was not a comparative treatment.

Psychiatric symptoms were also examined as potential moderators. These included social anxiety (Arch et al., 2016; Harwood & Kocovski, 2017), anxiety, depression, stress, and negative affect (Diedrich et al., 2014; Sommers-Spijkerman et al., 2018). The moderating effect of social anxiety was conflicting, with one study showing that those higher in social anxiety receiving self-compassion had better outcomes on anticipatory anxiety (Harwood & Kocovski, 2017), while another showed those higher in social anxiety in a self-compassion intervention had less optimal outcomes (Arch et al., 2016). Both of these studies were controlled experiments. Depression also showed an inconsistent pattern, with one study finding a significant moderating effect of baseline depression on the effect of self-compassion (versus cognitive reappraisal condition) on state depression, with a non-significant trend towards better outcomes for those higher in baseline depression in the self-compassion group (Diedrich, Grant, Hofmann, Hiller, & Berking, 2014). In contrast, the authors found no moderating effect when comparing self-compassion and an acceptance-based intervention. Additionally, an RCT of CFT showed no moderating effect of depression (Sommers-Spijkerman et al., 2018). The same RCT found no moderating effect of anxiety, stress, and negative affect.

Several risk factors were also tested for possible moderating effects. Maladaptive perfectionism and self-criticism were not found to moderate the effect of self-compassion interventions (Finlay-Jones et al., 2018; Sommers-Spijkerman et al., 2018). Rumination demonstrated inconsistency in that its effect was non-significant using state anxiety as an

outcome variable, but using a physiological outcome variable of anxiety (salivary alpha-amylase), rumination moderated the effect of self-compassion such that those lower in rumination in the self-compassion group had worse outcomes compared to the control groups (Arch et al., 2016). A controlled experiment examining the effect of self-compassionate imagery on paranoia found a moderating effect, such that those with higher psychosis proneness had better outcomes in the self-compassion condition compared to the neutral control condition (Lincoln, Hohenhaus, & Hartmann, 2013). In a randomized controlled trial of participants with binge eating disorder, Kelly and Carter (2015) compared the effects of three conditions: 1) food planning plus self-compassion; 2) food planning plus behavioural strategies; 3) waitlist control. The authors found that fear of self-compassion moderated the effect of condition on eating disorder pathology, such that those with greater fear of self-compassion in the self-compassion group had worse outcomes than those lower in this trait. Given the comparison between active treatments, this finding represents a genuine treatment moderator.

2.4 Discussion

This review synthesized the empirical research on mediators and moderators of self-compassion in order to answer the question: how and for whom does self-compassion work? A systematic review of the literature on mediators between self-compassion and mental health identified several potential mechanisms of change. These include repetitive negative thinking (RNT), emotion regulation, negative affect, interpersonal factors, and a range of other risk/protective factors. However, the strength of evidence for these mediators to be classified as mechanisms of change was weak. Most studies performed poorly when evaluated using a measure of mechanism of change validity based on Kazdin's (2007) criteria. Notably, relatively few studies used an experimental study design, and no studies

were able to demonstrate temporal precedence of a change in mediator before a change in the outcome variable. Several other broad limitations were also apparent as now outlined.

First, a number of the mediator categories lack conceptual clarity. In particular, emotion regulation, interpersonal factors, and risk/protective factors are very broad concepts that could include a myriad of sub-components. Negative affect is more specific than the aforementioned categories, but it still lacks clarity in terms of which particular negative affect might be involved. RNT was the only mediator category with sufficient conceptual clarity. The problem of conceptual ambiguity also lends to the problem of conceptual overlap. For example, common conceptualizations of emotion regulation and compassion *both* involve an awareness of suffering, tolerance of difficult emotions, and readiness to confront distressing situations (e.g., Diedrich et al., 2016; Strauss et al., 2016). These conceptual overlaps suggest that at least some subscales of self-compassion and emotion regulation may not have sufficient discriminant validity. As such, emotion regulation may not represent a valid mechanism of change between self-compassion and mental health. Future research should investigate specific forms of emotion regulation and explicitly differentiate these from self-compassion.

Another limitation of mediational research on self-compassion is the lack of theory-informed models. Although most studies in this review did provide a plausible and coherent rationale for the proposed mediation, no studies examined the central mechanism of change described in Gilbert's (2010) model of compassion: the activation of the soothing system. Future research should investigate this construct as a mediator, given its emphasiz in the compassion literature. Although no measure exists currently that explicitly measures this construct, there are several available measures which are consistent with Gilbert's (2010) description of the feelings and cognitions associated with the soothing system (see Gilbert et al., 2008a; Gilbert et al., 2009).

A further recommendation for future research is to distinguish between positive and negative aspects of self-compassion. All non-experimental studies in the current review used Neff's (2003) measure of self-compassion, the Self-Compassion Scale (SCS), which recently has been criticized for its lack of factor validity. Specifically, some research has not found sufficient evidence that the scale's subscales load onto an overarching latent factor of "self-compassion" (López, Sanderman, Smink, Zhang, van Sonderen, et al., 2015). Instead, several studies have found better evidence for a two-factor solution that distinguishes between the positive (self-kindness, mindfulness, common humanity) and negative (self-judgement, over-identification, isolation) subscales (Coroiu et al., 2018; Costa, Marôco, Pinto-Gouveia, Ferreira, & Castilho, 2016). Use of a measure such as the SCS with a questionable higher-order factor may be problematic because the negative subscales of the SCS have conceptual overlap with other negative indicators of mental health such as self-criticism and social isolation. This overlap may actually account for significant portions of variance in the relationship between self-compassion and other psychological factors. For this reason, a number of studies have begun to investigate positive and negative aspects of self-compassion separately, with several included in this review (e.g., Dundas et al., 2016). In this review, one study found that the positive versus negative aspects of self-compassion yielded different mediational results (see Wadsworth et al., 2018). As such, future research needs to continue separating these differing elements of self-compassion.

Results of this review found sixteen studies that evaluated potential moderators in the relationship between self-compassion and mental health. With some exceptions, demographics were generally not found to moderate the effect of self-compassion, a finding that is consistent with Macbeth and Gumley (2012), but somewhat inconsistent with Zessin, Dickhauser, and Garbade (2015). However, the latter review focused on a narrow range of outcome variables related to positive mental health, whereas MacBeth and Gumley focused

on ‘negative’ mental health in the form of anxiety, depression, and stress. Notably, two studies that used an adolescent sample found a significant interaction between self-compassion and age, suggesting that older adolescents benefit more from this self-attitude. Future research could investigate further whether older adolescents are particularly suitable for self-compassion, especially when compared with other active treatments such as CBT.

Numerous putative protective factors were examined for moderation with only non-attachment showing a significant effect (Arch et al., 2016). In relation to this finding (and others), future research could utilize active treatment control groups in order to gauge whether those with higher non-attachment reap greater benefits from self-compassion versus other treatments. It was noteworthy that self-compassion itself did not demonstrate a significant moderating effect in two studies (Arch et al., 2016; Przezdziecki & Sherman, 2016). This finding is inconsistent with past suggestions that self-compassion may be particularly suitable for those lacking in this ability (Arch et al., 2014; Leary, Tate, Adams, Allen, & Hancock, 2007). As such, self-compassion may be suitable for people regardless of their baseline levels on the trait, but more research addressing this topic is clearly needed.

Most psychiatric symptoms did not show a moderating effect including anxiety, stress, and negative affect. Relevant to this thesis, inconsistent results were identified for social anxiety, where one study showed that those higher in social anxiety had more optimal outcomes (Harwood & Kocovski, 2017), whereas another showed that those low in social anxiety had more optimal outcomes (Arch et al., 2016). However, some caution is required when interpreting these studies because their designs differed considerably. In particular, Arch et al. did not report on the level of social anxiety in their sample, and so it is unclear how the mean and variance on this variable compared to the sample of Harwood and Kocovski (2017). Additionally, Harwood and Kocovski did not use repeated measures, and thus did not assess changes in the main variables, whereas Arch et al. did. Similarly,

differences in sample and study design might account for why a moderating effect of depression was found in the study of Diedrich et al. (2014) but not in the study of Sommers-Spijkerman et al. (2018). Diedrich et al. used a clinical sample of adults (current MDD diagnosis) with a controlled experimental design, whereas Sommers-Spijkerman et al. used a general community sample with a randomized controlled trial design. It is possible that the moderating effect of psychiatric symptom severity is present only in samples with elevated or clinical levels of the relevant symptoms.

Several risk factors for psychopathology were examined, with psychosis proneness, rumination, and fear of self-compassion demonstrating some significant moderating effects. These studies showed that self-compassion may be particularly helpful for people high in psychosis proneness and rumination, but low in fear of self-compassion. Interestingly, self-criticism was not found to moderate the effect of self-compassion on numerous mental health outcomes in a RCT design (e.g., depression, anxiety, stress, positive and negative affect; Sommers-Spijkerman et al., 2018), which is consistent with one study that found no moderating effect of self-criticism in relation to depression and happiness (Shapira & Mongrain, 2010), but inconsistent with another that observed self-criticism moderated the effect of self-compassion on smoking frequency (Kelly, Zuroff, Foa, & Gilbert, 2010). Additionally, this finding is inconsistent with major theories of self-compassion (e.g., Gilbert & Procter, 2006) that propose self-compassion as particularly useful for people high in self-criticism and shame. However, similar to psychiatric symptom severity, self-criticism may be a moderator that is only present in clinical samples due to floor effects. Importantly, both Shapira and Mongrain (2010), and Sommers-Spijkerman et al. (2018) used a general community sample. Although Kelly et al. did not use a clinical sample either, they did use participants with cigarette addiction, and mental illness is elevated among this population (Prochaska, Das, & Young-Wolff, 2017). Future research should continue to examine self-

criticism as a possible moderator of self-compassion. Moreover, the theoretically informed moderator of shame needs to be included in future self-compassion investigations. This construct has thus far been neglected despite featuring prominently in theoretical discussions of the rationale for self-compassion. As outlined, future research should also examine the moderating role of self-criticism and shame using clinical samples.

In terms of relevance to clinical practice, three articles stand out. The first is by Baker and McNulty (2011) who demonstrated a consistent effect across four studies of conscientiousness moderating the impact of self-compassion on interpersonal variables among men. These findings suggest that self-compassion may be of particular utility to men high in conscientiousness who present with relationship difficulties. Unfortunately, in their research, self-compassion was not compared to another active treatment. Thus, it is unclear whether men high in conscientiousness simply do better on any intervention targeting relationship difficulties. The second is the study by Diedrich et al. (2014) who showed a non-significant trend towards self-compassion being more effective than cognitive reappraisal for participants with higher levels of baseline depression (i.e., treatment moderation). The same result was not found for self-compassion versus an acceptance-based intervention. Larger scale trials making similar comparisons between interventions should be conducted in order to determine whether this moderating effect becomes significant with greater power. The third study of clinical relevance is by Kelly and Carter (2015) who found that fear of self-compassion was a treatment moderator that differentially predicted outcomes between conditions. Specifically, those high in fear of self-compassion had worse outcomes in the self-compassion group relative to those who received a behavioural intervention to reduce binging, and no intervention. Fear of self-compassion is a moderator that is particularly pertinent in the field. If self-compassion is being argued to be helpful for those who are self-critical, it seems quite important to better understand if there are subtypes of clients who on

the surface might appear to be good candidates for this treatment approach, but in fact might be at risk of poor outcomes. This research needs to incorporate comparator interventions that are not simply placebo.

This review is limited by several factors. First, as described earlier, the number of quite varied mediators examined made it difficult to allocate these mediators into discrete and concrete categories, which poses subsequent challenges in drawing clear conclusions from the findings. Moreover, the variance in mediator models and study designs makes it difficult to compare effect sizes between the observed indirect effects, and some of these studies did not actually report an indirect effect (i.e., they reported individual model paths separately). Second, there were only a small number of studies available that examined moderators of self-compassion, and an even smaller number that examined treatment moderators specifically. Due to these two limitations, it was not possible to conduct a meta-analysis of the studies, which would have proved fruitful in terms of providing a quantitatively rigorous assessment of the constructs under study.

2.5 Conclusion

Self-compassion appears to be a psychologically desirable and trainable skill. This review examined the question of how and for whom self-compassion works to improve mental health. Preliminary evidence suggests that self-compassion may act through a number of different mechanisms of change, particularly RNT. Moreover, there are numerous potential treatment moderators, with fear of self-compassion showing the most promise. More research is required to expand on the knowledge that has accrued in this area, and to prioritize the use of theoretically informed processes of change. Related to this endeavour, the next chapter reports on Study 1, conducted to test the longitudinal relationship between self-kindness (one component of self-compassion) and social anxiety with respect to possible mediation through

negative self-beliefs and self-criticism. This study was designed to rigorously examine the temporal relationship between self-attitudes and social anxiety (given the majority of research to date has been cross-sectional), and to further the study of the mechanisms through which these relationship might occur.

Chapter Three – The Prospective Role of Self-Criticism, Self-Kindness, and Negative Self-Beliefs in Social Anxiety

3.1 Introduction

Having established that self-criticism is a risk factor for poor mental health (as reviewed in Chapter 1), in this chapter I review the specific relationship between self-criticism and social anxiety. Given that self-compassion represents a healthier alternative to self-criticism (as reviewed in Chapter 2), I also examine the relationship between self-kindness (a component of self-compassion) and social anxiety (a more detailed review of self-compassion and social anxiety will be undertaken in Chapter 4). In this chapter I propose several mediational models through which self-criticism and self-kindness might impact on social anxiety, and test these models using a longitudinal observational study design[4].

Self-Criticism and Social Anxiety Disorder

As outlined in Chapter 1, self-criticism refers to an attitude of relating to the self that is harsh, devaluing, and punitive. The impact of self-criticism may be understood through the cognitive model of psychology (e.g., Beck, 2011), as a form of unhelpful thinking which can result in negative feelings such as anxiety. On a biopsychological level, the impact of self-criticism can be discerned through its activation of the "threat system" which produces symptoms such as anxiety (Gilbert & Proctor, 2006). Previous research has proposed that self-criticism is a key maintenance factor of social anxiety (e.g., Cox et al., 2004). As described in Chapter 1, although the cognitive models of social anxiety do not explicitly identify self-criticism as a maintenance factor, they do describe people with SAD as

[4] This chapter has been adapted to a journal manuscript format and is currently under review (Stevenson, Chen, Fairweather-Schmidt, Mattiske, & Nixon, manuscript under review).

subjecting themselves to a wide range of scrutiny (e.g., monitoring their self-image, managing their impression, etc.), which naturally corresponds with a self-critical attitude. Moreover, self-criticism features implicitly in these models as it is consistent with descriptions of the cognitive components of social anxiety (i.e., negative internal dialogue such as "that was such a stupid thing to say"; Heimberg, Brozovich, & Rapee, 2014). Such negative internal self-talk is itself considered a maintaining factor because it can result in physical and behavioural symptoms of anxiety. Additionally, self-criticism can be a central feature of rumination (Smart, Peters, & Baer, 2016), where post-event rumination is considered an important social anxiety maintenance factor (e.g., Hofman, 2007). Surprisingly, although self-criticism implicitly features in models of SAD, its role in maintaining SAD has not been emphasized or extensively studied. Should self-criticism be found to play an influential role, it has potential to represent a specific target for therapeutic interventions.

Empirical Research on Self-Criticism and Social Anxiety

Empirically, research suggests that socially anxious individuals are highly self-critical. For example, in a clinical sample, Cox et al. (2000) found that the level of self-criticism in individuals with SAD was almost three times greater than the level of self-criticism reported by individuals with panic disorder. Cox and colleagues (2004) also showed that self-criticism remained significantly associated with lifetime prevalence of SAD – even after controlling for current emotional distress, neuroticism, lifetime histories of mood, anxiety, and substance use disorders. In another cross-sectional study using a sample of individuals with SAD, only self-criticism predicted social anxiety symptomology, whereas self-esteem, dependency, and self-efficacy made little contribution (Iancu , Bodner, Ben-Zion, 2015). Further, Cox , Walker, Enns, and Karpinski (2002) identified that reductions in

self-criticism were significantly associated with reductions in social anxiety during a cognitive behavioural intervention for SAD.

Consistent with suggestions by Cox et al. (2004), these results may well indicate that self-criticism contributes to the maintenance of social anxiety. However, as research on self-criticism and social anxiety has yet to thoroughly examine this *prospectively*, it may be that self-criticism is simply an outcome of social anxiety, rather than a maintaining factor. Indeed, some evidence exists for this explanation. Although studied in the context of perfectionism, Gautreau and colleagues found that self-critical perfectionism did not longitudinally predict social anxiety in a non-clinical sample, rather, social anxiety accounted for severity of later self-critical perfectionism (Gautreau , Sherry, Mushquash, & Stewart, 2015). Such evidence challenges the assertion that self-criticism leads to the persistence of social anxiety, although clearly replication is needed. In addition, self-critical perfectionism is a broader construct that subsumes self-criticism. Potentially, there are components of self-critical perfectionism that suppress the specific effect of self-criticism. Investigating self-criticism specifically (rather than as perfectionism more broadly) is important given that self-criticism has been identified by some researchers as the most pernicious component of perfectionism (e.g., Dunkley, Zuroff, & Blankstein, 2006). The precise role of self-criticism in social anxiety has yet to be investigated longitudinally. Furthermore, the study by Gautreau and colleagues did not control for the stable trait-like components of the aforementioned variables, a practice which has been strongly recommended in recent methodologically-focused commentaries (e.g., Hamaker et al., 2015). Clearly, there is a need for longitudinal studies to further elucidate whether self-criticism contributes to the maintenance of social anxiety.

Mediators in the Relationship between Self-Criticism and Social Anxiety

To date, the relationship between self-criticism and social anxiety has been examined only in terms of direct effects, rather than assessing possible indirect effects. Of particular interest is whether self-criticism exerts its effect on social anxiety through other variables that represent key elements within existing models of SAD. One possibility is that self-criticism influences negative self-beliefs (e.g., "I am inadequate"), which have been identified as a crucial maintaining factor of SAD in both *cognitive* models (in the form of self-esteem; Clark & Wells, 1995) and *evolutionary* models (in the form of perceived inferiority; Gilbert, 2001) of social anxiety. Specifically, it is possible that the relationship between self-criticism and social anxiety is mediated by negative self-beliefs. Although this relationship has not been examined in the context of social anxiety, it has been explored in the context of other disorders. For example, in a sample of participants with binge eating disorder, Dunkley and Grilo (2007) found that low self-esteem partially mediated the relationship between self-criticism and depressive symptoms. Moroz and Dunkley (2015) also found that low self-esteem (along with experiential avoidance) fully mediated the relationship between self-critical perfectionism and depression in a nonclinical sample of adults. Negative self-beliefs such as low self-esteem may mediate the relationship between self-criticism and depressive symptoms because self-criticism perpetuates a gap between the ideal and actual self which maintains global negative self-beliefs (Hamachek , 1978; Moroz & Dunkley, 2015). Consistent with this idea, Gilbert (2005) argues that persistent self-criticism can reinforce negative self-beliefs such as perceived inferiority to others. Given that negative self-beliefs are a central maintenance factor in both depression and SAD, it is possible that negative self-beliefs also mediate the relationship between self-criticism and social anxiety. That is, self-criticism may strengthen or maintain the negative self-beliefs of socially anxious individuals. Of course, the relationship between these constructs is likely to be reciprocal; negative self-

beliefs will trigger self-criticism, but this thesis is concerned with the process beginning with self-criticism.

Self-Kindness and Social Anxiety

Should self-criticism be found to be an important maintenance factor in social anxiety, it would suggest that the attitude that one holds towards the self is a critical component of the disorder. Therefore exploring alternative, more adaptive, ways to relate to the self is of both conceptual and practical interest. One alternative to self-criticism when faced with perceived failure is to respond with self-kindness. There has been an accumulating literature on this domain in recent years. Self-kindness is defined as a way of relating to the self that involves being kind and understanding toward oneself in situations of pain or failure, and is seen as a key component of the broader construct of self-compassion (Neff, 2003). As described in Chapter 2, self-compassion has a robust relationship with mental health, and as reviewed in Chapter 4, self-compassion (along with self-kindness) appears to have an inverse relationship with social anxiety.

Mediators in the Relationship between Self-Kindness and Social Anxiety

Similar to literature on self-criticism, there is limited research on the relationships between self-kindness and other variables in the context of social anxiety, particularly variables that represent important elements of SAD models. One possibility is that, analogous to self-criticism, the relationship between self-kindness and social anxiety is also mediated by negative self-beliefs. Responding to perceived failures with self-kindness, rather than self-criticism, may weaken the negative self-beliefs that are involved in the maintenance of social anxiety (i.e., low self-esteem and perceived inferiority). As such, the impact of self-kindness on social anxiety may be understood through multiple mediation paths, whereby self-kindness reduces self-criticism which in turn lowers negative self-beliefs. Examining these indirect effects may also help to clarify previous research which has demonstrated mixed

findings in terms of the relationship between self-kindness and social anxiety (discussed in Chapter 4).

The Current Study

I used a longitudinal design in order to examine the role of self-criticism and self-kindness in social anxiety. Furthermore, I investigated the proposed mediating role of negative self-beliefs, in the form of self-esteem and perceived inferiority. Self-kindness (rather than self-compassion) was examined for conceptual and practical reasons. Conceptually, mindfulness, another positive component of self-compassion, has already been shown to be associated with social anxiety (e.g., Goldin & Gross, 2010). At a practical level, given the longitudinal design of the current study, I wanted to minimize participant burden by having a modest questionnaire battery.

In summary, I employed a longitudinal design across three assessments approximately 3-months apart in an unselected nonclinical sample. I hypothesized that self-criticism would predict future changes in social anxiety symptoms, and that the criticism-social anxiety relationship would also be mediated by negative self-beliefs. Furthermore, I hypothesized that self-kindness would predict future changes in social anxiety symptoms, and that this relationship would be mediated by both self-criticism and negative self-beliefs.

3.2 Method

Participants and Procedure

Five hundred and six adults (300 females) from the general population participated in the study. They ranged in age from 18-71 years with a mean age of 30.43 years (*SD* = 10.33), with 82.7% Caucasian/white. The inclusion criterion determined that participants must be aged 18 or older. The study was conducted via an online questionnaire that was advertised on a broad range of online forums (e.g., Reddit, Gumtree, www.socialanxietysupport.com) with

the study advertised as an investigation into the role of self-evaluation in social anxiety and its cognitive, behavioural and emotional processes. Participants interested in being involved in the study followed a link from an advertisement to the web-based questionnaire (administered using Qualtrics™). Participants provided online consent after reading the on-screen study information statement. Participants did not receive any reimbursement for participation. The project was approved by the university research ethics committee.

At Time 1 (first assessment), participants were informed that the study was longitudinal and were invited to provide their email addresses if they wished to participate in future assessments. Of the 506 participants who completed the first assessment, 434 provided their email addresses (with the emails of 5 participants either incomplete or not functional). Time 2 and 3 assessments were emailed at approximately 3-month intervals after Time 1. This time interval was chosen based on similar study designs and to maximize retention (e.g., Gautreau et al., 2015). Participants completed Time 2 on average 101.29 (*SD* = 15.28) days after Time 1, and Time 3 on average 119.25 (*SD* = 8.89) days after Time 2. Participants were sent an email and survey link at the commencement of each time point, with a maximum of two reminder emails sent for those who had not yet completed the assessment. Of the 429 participants who provided data and a valid email address at Time 1, 296 participants provided complete data at Time 2 (69%), and 239 participants (56%) provided data at Time 3.

Measures

Self-Criticism. The Inadequate Self and the Hated Self subscales of the Forms of Self-criticizing/Attacking and Self-Reassuring Scale (FSCRS) (Gilbert et al., 2004) were used. The total scale has 22 items that are rated on a scale ranging from 0 (*not at all like me*) to 4 (*extremely like me*). A factor analysis by Gilbert et al. suggests that the self-critical factor (distinguished from the self-reassurance factor) can be separated into two sub-factors: one with 9 items that focuses on feeling inadequate called “Inadequate Self” (e.g., “There is a part

of me that puts me down"), and one with 5 items that focuses on stronger feelings of disgust and hatred called "Hated Self" (e.g., "I have become so angry with myself that I want to hurt myself"). Following previous research (e.g., Gilbert, Baldwin, Irons, Baccus, & Palmer, 2006), I combined the Inadequate and Hated Self subscales to reflect the construct *self-criticism* (higher scores indicating greater criticism). The FSCRS has robust psychometric properties, for example, Cronbach α of .90 for the Inadequate Self subscale and .86 for the Hated Self subscale (Gilbert et al., 2004). Research has also demonstrated good test-retest reliability for both Inadequate Self (r = .72) and Hated Self (r = .78) subscales within a 4-week interval (Castilho, Pinto-Gouveia, & Duarte, 2015). The FSCR scale has also shown adequate convergent and discriminant validity when examined with the Levels of Self-Criticism Scale (Gilbert et al., 2004; Thompson & Zuroff, 2004). In the current sample, the Cronbach α of self-criticism was .90 at Time 1, .91 at Time 2, and .90 at Time 3. More specifically, the Cronbach α of the Inadequate Self subscale was .91 at Time 1, .92 at Time 2, and .91 at Time 3, and the Cronbach α of the Hated Self subscale was .86 at Time 1, .87 at Time 2, and .85 at Time 3.

Self-Kindness. The Self-Kindness subscale of the Self Compassion Scale (SCS; Neff, 2003) was used and consists of 5 items rated on a 5-point scale ranging from 1 (*almost never*) to 5 (*almost always*). For example, "I'm kind to myself when I'm experiencing suffering". Scores range from 5 to 25 whereby higher scores indicate greater self-kindness. Research (Neff, 2003) demonstrates that the SCS has strong convergent and discriminant validity when compared with other self-attitude measures such as the Rosenberg Self-Esteem Scale (Rosenberg, 1965), the Self-Determination Scale (Sheldon, 1995), and the Berger Self-Acceptance Scale (Berger, 1952). In addition, there is evidence that the Self-Kindness subscale of the SCS has robust test-retest reliability (r = .88 within a 3-week interval; Neff,

2003; Neff et al., 2007). In the current sample, the Cronbach α of Self-Kindness was .88 at Time 1, .91 at Time 2, and .91 at Time 3.

Negative self-beliefs. Negative self-beliefs were measured using the Social Comparison Scale (Allan & Gilbert, 1995) and the Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965). The 11-item Social Comparison Scale measures perceptions of the self in comparison to others on 10-point scales which are anchored on each end by bipolar descriptors such as *unattractive-attractive* and *weak-strong*. One additional item was added in the current study (boring-interesting) because it was deemed relevant to individuals with social anxiety. Descriptors cover judgements concerned with social rank, attractiveness, and belongingness. Participants are required to report where on the scale they are ranked in comparison to others. In the standard scoring of this scale, lower scores indicate greater perceptions of inferiority. In the current study, however, scores were reversed to ease interpretability of findings such that higher scores indicate greater perceptions of inferiority. The Social Comparison Scale has been used across both clinical and non-clinical populations and shows good psychometric properties such as strong reliability (see Allan & Gilbert, 1995; Gilbert & Allen, 1998). In the current sample, the Cronbach α of the Social Comparison Scale was .87 at Time 1, 0.93 at Time 2, and .93 at Time 3. The Rosenberg Self-Esteem Scale is one of the most widely used measures of self-esteem, comprising 10 items that are answered on a 4-point scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*). Total scores range from 10 to 40 where higher scores indicate higher levels of self-esteem. Similarly to the Social Comparison Scale, scores were reversed to ease interpretability such that higher scores indicate lower self-esteem. The Cronbach α of the Rosenberg Self-Esteem Scale was .93 at Time 1, 0.94 at Time 2, and .93 at Time 3.

Social anxiety symptoms. The Social Phobia Scale (SPS; Mattick & Clarke, 1998) and the Social Interaction Anxiety Scale (SIAS; Mattick & Clarke, 1998) were used to assess

participants' levels of anxiety around social performance and interaction. Mattick and Clarke (1998) developed the two 20-item self-report measures as companion measures to assess fear of being scrutinized in social situations (SPS) and fear in social interaction situations (SIAS). Generally, these scales are administered together and treated as subscales of a larger measure of social anxiety (e.g., Safren, Turk, & Heimberg, 1998). Both the SPS and SIAS are measured on a 5-point rating scale ranging from 0 (*not at all characteristic or true of me*) to 4 (*extremely characteristic or true of me*). For example, "I get nervous that people are staring at me as I walk down the street" (SPS), and "I get tense if I meet an acquaintance in the street" (SIAS). Potential scores range from 0 to 80 in both scales. Previous research has utilized both of these scales in order to identify those who meet clinical criteria for SAD (above 33 for the SIAS using the full 20-item scale; above 23 for the SPS; Heimberg et al., 1992). The SPS and SIAS both demonstrate excellent internal consistency (α = .94; Mattick & Clarke, 1998) and good convergent validity (r = .54 and .74) respectively, with the Social Avoidance and Distress Scale (Watson & Friend, 1969). For the SPS, Cronbach α was .95 at Time 1, .95 at Time 2, and .96 at Time 3. For the SIAS, Cronbach α was .97 at Time 1, .97 at Time 2, and .96 at Time 3.

Depression. The Depression subscale of the Depression Anxiety Stress Scale (DASS-21; Lovibond & Lovibond, 1995) was used to measure symptoms of depression. The subscale was included as depression has high comorbidity with SAD (e.g., Ohayon & Shatzberg, 2010) and in order to provide relevant clinical descriptive data about the sample. The DASS-21 is the abbreviated version of the original 42-item DASS, and is a common tool used for measuring depressive symptoms (Antony, Bieling, Cox, Enns & Swinson, 1998). The depression subscale has 7-items rated on a 4-point Likert-type rating scale ranging from 0 (*did not apply to me at all*) to 3 (*applied to me very much, or most of the time*). The total

score is then doubled in order to be consistent with DASS-42 norms. In the current sample, the Cronbach α of depression subscale were .94 at Time 1, .94 at .Time 2, and .94 at Time 3.

Data Analysis

Primary mediation analyses were conducted using structural equation modelling (SEM). SEM is an effective method to study longitudinal mediation because it allows multiple equations to be estimated simultaneously, which in turn facilitates the assessment of direct and indirect effects (Bollen & Noble, 2011). Specifically, the current study utilized cross-lagged panel analysis to address the proposed hypotheses. Recently, the traditional cross-lagged panel model (CLPM) has been criticized because it fails to account for stable individual differences (Hamaker et al., 2015). To address this problem, a new model has been proposed called the Random Intercept Cross Lagged Panel Model (RI-CLPM). The RI-CLPM distinguishes between within-person and between-person variance. That is, the model controls for the time-invariant trait-like individual differences (between-person effects) in the observed variables. As such, the RI-CLPM allows more accurate insight into the nature of the relationships between constructs at an *intra*-individual level (see Hamaker et al., 2015 for details). Examining relationships at this level, rather than the inter-individual level, is important for the prevention of inferential errors in regards to cause and effect relationships. Indeed, previous research has demonstrated that a comparison of the CLPM and the RI-CLPM for the same constructs can yield vastly different results (Hamaker et al., 2015).

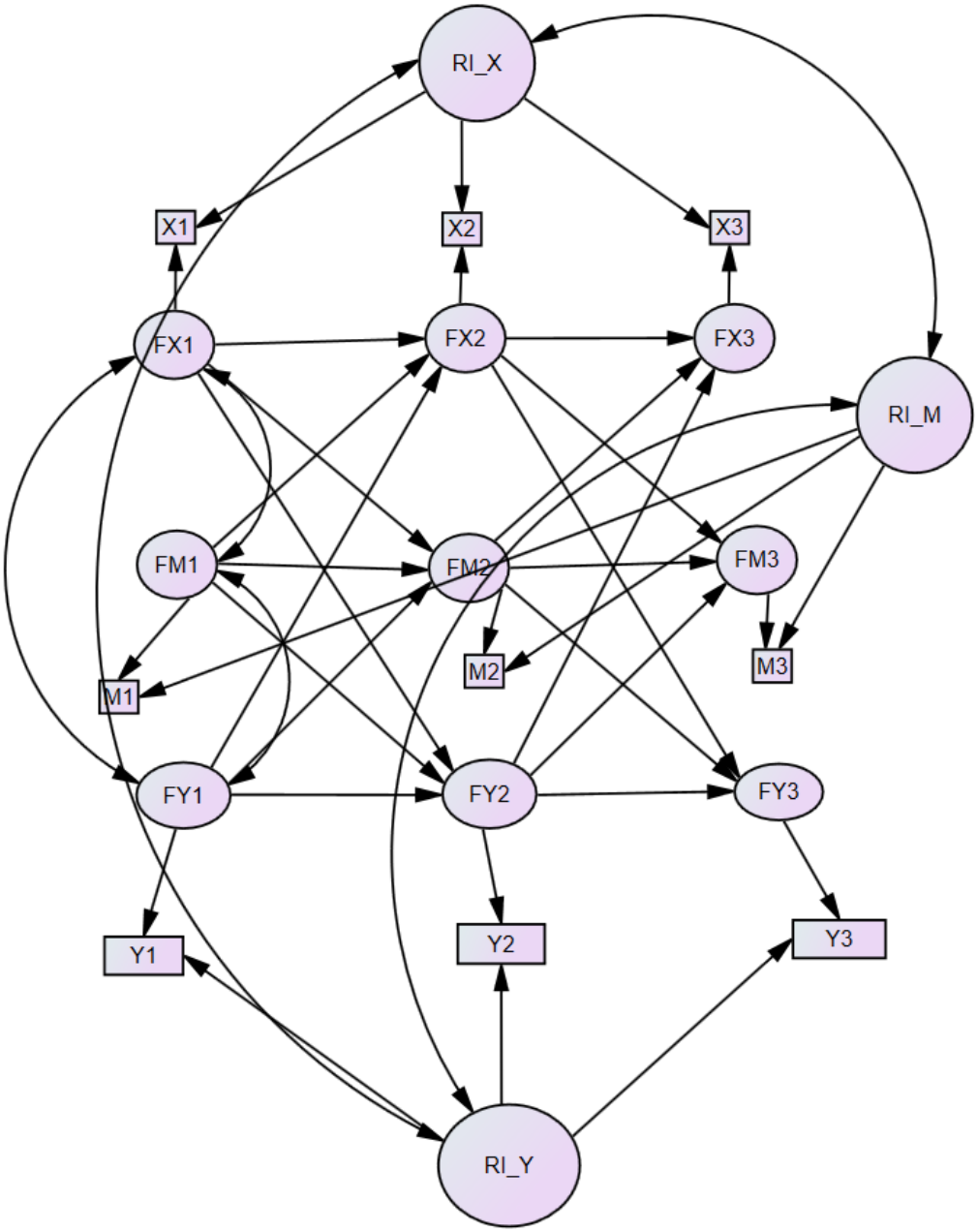

Figure 1. Random-Intercept Cross-Lagged Panel Model (RI-CLPM) for longitudinal mediation.
Note. RI = Random Intercept; X1-X3 = independent variables at each time point; M1-M3 = mediator variables at each time point; Y1-Y3 = outcome variables at each time point; FX1-FX3 = latent independent variables at each time point; FM1-FM3 = latent mediator variables at each time point; FY1-FY3 = latent outcome variables at each time point. Error terms excluded for clarity.

The first step in creating the RI-CLPM was to regress the observed variables onto their own latent factors, with loadings constrained to one. Next, three overarching factors (random intercepts) were created for each construct (factor loadings constrained to one).

These overarching factors represented the stable trait-like differences between individuals, distinct from the within-person processes. As with the traditional CLPM, the parameters of greatest interest in the RI-CLPM are the cross-lagged coefficients which indicate the degree of reciprocal influence between variables. However, in contrast to the CLPM, in the RI-CLPM these coefficients indicate "the degree by which deviations from an individual's expected score on y ... can be predicted from preceding deviations from one's expected score on x ... while controlling for the structural change in y ... and the prior deviation from one's expected score on y" (p. 105, Hamaker et al., 2015). Following Lim, Rodebaugh, Zyphur, and Gleeson (2016), the autoregressive paths between state variables over time were held equal (i.e., the path between T1 and T2 social anxiety was held equal to that of T2 to T3). Similarly, the cross lagged paths between variables were also held equal over time (e.g., the path between T1 self-criticism and T2 social anxiety was held equal to the path from T2 self-criticism to T3 social anxiety). This constraint was imposed because the intervals between assessment points were similar and there were no reasons to expect different effects on T2 variables compared to T3 variables. For example, there was no reason to expect that the effect of T1 self-criticism on T2 social anxiety would be different from the effect of T2 self-criticism on T3 social anxiety. Additionally, this constraint was imposed for model parsimony and in order to maximize the precision of path estimates (Lim et al., 2016).

In order to test for mediation, an indirect effect was calculated by multiplying the parameters for: 1) independent variable to mediator, and 2) mediator to outcome variable. Confidence intervals (95%) for all effects were obtained through 1,000 bootstrap replications, and significance was inferred through the absence of zero in these intervals. All variables were standardized[5] prior to analysis in order to facilitate interpretation (Goldsmith et al.,

[5] Although variables were standardized prior to analysis, results are reported as unstandardized. This was done because calculation of standardized overall effects in this context is excessively complex (E. L. Hamaker, personal communication, October 29, 2018).

2018). For the second hypothesis, due to only three time points being measured, serial mediation was not possible. Consequently, two separate models were examined with Hypothesis 2A using negative self-beliefs as a mediator, and Hypothesis 2B using self-criticism as a mediator. In total, therefore, eight models were evaluated due to separate analysis of the SIAS and SPS, and the two measures used to assess negative self-beliefs. Overall model fit was assessed using root mean square error of approximation (RMSEA), Chi-Square Test of Model Fit, and the Comparative Fit Index (CFI). Analyses were conducted with IBM Statistical Package for the Social Sciences (SPSS) Version 25 (IBM Corp, 2017), and Mplus 3.13 (Muthén & Muthén, 2006), with missing data handled using the Mplus default of full information maximum likelihood estimation.

3.3 Results

A visual inspection of the main variables indicated that the normality assumption was sufficiently met. Data were also screened for outliers using the "Box Plot" function of SPSS. One case was deleted due to excessive invariance in scores indicating disingenuous responses. When detected, outliers were transformed to the next extreme value (Tabachnick & Fidell, 2006). The number of outliers for any given variable ranged from zero to two. Descriptive statistics including the means and standard deviations of the variables used in the models are summarized in Table 1. Using recommendations from Heimberg et al. (1992), the percentage of participants in the clinical range of the SIAS was 50.0% at T1, 48.0% at T2, and 47.7% at T3. For the SPS, the clinical proportion was 46.2% at T1, 42.6% at T2, and 44.3% at T3. For depression (based on DASS-D), at T1, 43.5% of participants were in the normal range, 27.8% mild to severe, and 28.7% severe or extremely severe; at T2, 49.0% of participants were in the normal range, 25.0% mild to severe, and 26.0% severe or extremely

severe; and, at T3 49.2% of participants were in the normal range, 24.4% mild to severe, and 26.4% severe or extremely severe.

Attrition analyses indicated that only baseline self-esteem predicted likelihood of completing T2 and T3 assessments, where lower levels of self-esteem elevated likelihood of drop out, although examination of odds ratios (ORs) associated with this data suggests the clinical meaningfulness of these ratios was minimal (T2: OR = 1.03, CI_{95} [1.00 – 1.06], p = .02; T3 OR = 1.03 CI_{95} [1.01—1.06], p = .01). In general, the results suggested that data were missing at random.

Table 1

Self-criticism, self-kindness, negative self-beliefs, and social anxiety over time.

	Time 1	Time 2	Time 3
M (SD)	*N* = 506	*N* = 296	*N* = 239
Self-criticism	25.53 (13.05)	24.95 (13.08)	24.71 (12.79)
Self-kindness	14.37 (4.08)	14.49 (4.20)	14.87 (4.21)
Perceived inferiority	72.21 (16.78)	72.07 (17.99)	71.91 (18.46)
Poor self-esteem	13.46 (7.03)	13.04 (7.12)	12.63 (6.74)
SPS	25.16 (17.85)	23.77 (16.96)	24.08 (16.82)
SIAS	35.77 (21.55)	35.06 (21.22)	34.87 (20.05)

Note. SPS = Social Phobia Scale; SIAS = Social Interaction Anxiety Scale.

Construct stability

Remembering that my analysis method (RI-CLPM) took into account trait versus state components of each variable, I observed that the majority of variance in the constructs (as estimated in each model) could be attributed to trait components: 62.1-63.7% of the variance

for self-criticism; 74.6-76.9% for perceived inferiority; 54.8-58.5% for self-kindness, 81.7-86.3% for the SIAS; and 70.7-71.2% for the SPS.

Table 2
Summary of Hypothesis 1 autoregressive, cross-lagged, and overall effects.

	b[95% CI]	
	SIAS	SPS
Autoregressive pathways		
Self-Criticism → Self Criticism	0.22 [-0.17, 0.53]	0.21 [-0.22, 0.56]
Perceived Inferiority → Perceived Inferiority	0.30 [-0.12, 0.56]	0.26 [-0.10, 0.54]
Social Anxiety → Social Anxiety	0.17 [-0.57, 0.67]	0.40 [-0.09, 0.81]
Cross-lagged pathways		
Self-Criticism → Perceived Inferiority	0.18 [-0.07, 0.38]	0.25 [-0.09, 0.41]
Self-Criticism → Social Anxiety	0.22 [-0.06, 0.35]	0.15 [-0.16, 0.35]
Perceived Inferiority → Self-Criticism	0.12 [-0.20, 0.43]	0.23 [-0.20, 0.45]
Perceived Inferiority → Social Anxiety	-0.03 [-0.28, 0.25]	-0.27 [-0.52, 0.00]
Social Anxiety → Self-Criticism	0.47 [-0.49, 0.85]	0.36 [-0.09, 0.68]
Social Anxiety → Perceived Inferiority	-0.03 [-0.63, 0.47]	-0.03 [-0.38, 0.30]
Overall effects		
Overall direct effect	0.09 [-0.06, 0.16]	0.09 [-0.12, 0.20]
Overall indirect effect	-0.01 [-0.07, 0.05]	-0.07 [-0.16, 0.02]
Total effect	0.08 [-0.09, 0.16]	0.03 [-0.15, 0.14]

Note. SIAS = Social Interaction Anxiety Scale; SPS = Social Phobia Scale; CI = Confidence Interval. All pathways constrained to be equal from Time 1 to 2 and from Time 2 to 3. *b* refers to unstandardized values.

Do negative self-beliefs mediate the relationship between self-criticism and social anxiety?

In the first model, I tested my first hypothesis as to whether negative self-beliefs mediated the relationship between self-criticism and social anxiety. Initial correlations however revealed that one of the proposed mediators (self-esteem) was highly (negatively) correlated with self-criticism (*r*s > .80 at each time point); due to this multicollinearity I only examined perceived inferiority as a mediator (*r*s < .70 at each time point). As Table 2 shows, contrary to predictions, there was no indirect effect of self-criticism on social anxiety (SIAS, SPS) via perceived inferiority. Furthermore, there was no significant overall direct effect, and no significant auto-regressive or cross-lagged path estimates. In sum, my prediction that

negative self-beliefs (in this case perceived inferiority) would mediate between self-criticism and social anxiety was not supported.

Do negative self-beliefs and self-criticism mediate the relationship between self-kindness and social anxiety?

Testing my second hypothesis (2A), I examined whether negative self-beliefs in the form of perceived inferiority mediated the relationship between self-kindness and social anxiety. The model fits for Hypothesis 2A were as follows: χ^2 (12) = 17.75 (p = .124), *RMSEA* = .03 (p = .913), *CFI* = 1.00 for the SIAS, and χ^2 (12) = 10.08 (p = .609), *RMSEA* = .00 (p = .995), *CFI* = 1.00 for the SPS. However, as Table 3 shows, there was no overall direct or indirect effect (via perceived inferiority) of self-kindness on social anxiety. The only significant effect was the autoregressive path estimate of earlier SPS predicting later SPS. The models for Hypothesis 2B were as follows: χ^2 (12) = 10.30 (p = .590), *RMSEA* = .00 (p = .994), *CFI* = 1.00 for the SIAS, and χ^2 (12) = 9.89 (p = .626), *RMSEA* = .00 (p = .996), *CFI* = 1.00 for the SPS. No effects were significant in this model. Thus, my prediction that self-criticism and negative self-beliefs would mediate between self-kindness and social anxiety was not supported.

Table 3
Summary of Hypothesis 2 autoregressive, cross-lagged, and overall effects.

	b [95% CI]	
Hypothesis 2A	SIAS	SPS
Autoregressive pathways		
Self-Kindness → Self Kindness	0.19 [-0.06, 0.46]	0.19 [-0.21, 0.46]
Perceived Inferiority → Perceived Inferiority	0.32 [-0.13, 0.60]	0.40 [-0.08, 0.64]
Social Anxiety → Social Anxiety	0.22 [-0.54, 0.68]	**0.55 [0.02, 0.81]**
Cross-lagged pathways		
Self-Kindness → Perceived Inferiority	-0.04 [-0.20, 0.19]	-0.01 [-0.19, 0.20]
Self-Kindness → Social Anxiety	-0.15 [-0.26, 0.11]	-0.06 [-0.25, 0.14]
Perceived Inferiority → Self-Kindness	-0.14 [-0.49, 0.21]	-0.23 [-0.55, 0.19]
Perceived Inferiority → Social Anxiety	-0.06 [-0.32, 0.25]	-0.16 [-0.51, 0.05]
Social Anxiety → Self-Kindness	-0.46 [-0.78, 0.57]	-0.16 [-0.47, 0.30]
Social Anxiety → Perceived Inferiority	0.02 [-0.65, 0.50]	0.15 [-0.29, 0.36]
Overall effects		
Overall direct effect	-0.06 [-0.14, 0.04]	-0.04 [-0.16, 0.08]
Overall indirect effect	0.00 [-0.03, 0.04]	0.00 [-0.05, 0.06]
Total effect	-0.06 [-0.14, 0.05]	-0.04 [-0.14, 0.08]
Hypothesis 2B		
Autoregressive pathways		
Self-Kindness → Self-Kindness	0.18 [-0.23, 0.41]	0.13 [-0.26, 0.38]
Self-Criticism → Self Criticism	0.21 [-0.22, 0.47]	0.27 [-0.27, 0.49]
Social Anxiety → Social Anxiety	-0.09 [-0.65, 0.49]	0.57 [-0.09, 0.86]
Cross-lagged pathways		
Self-Kindness → Self-Criticism	-0.20 [-0.35, 0.11]	-0.18 [-0.37, 0.16]
Self-Kindness → Social Anxiety	-0.12 [-0.26, 0.12]	0.00 [-0.18, 0.21]
Self-Criticism → Self-Kindness	-0.27 [-0.51, 0.15]	-0.34 [-0.58, 0.13]
Self-Criticism → Social Anxiety	0.14 [-0.15, 0.28]	-0.08 [-0.28, 0.21]
Social Anxiety → Self-Kindness	-0.15 [-0.69, 0.72]	0.08 [-0.30, 0.52]
Social Anxiety → Perceived Inferiority	0.17 [-0.69, 0.69]	0.08 [-0.23, 0.50]
Overall effects		
Overall direct effect	-0.01 [-0.10, 0.06]	0.00 [-0.14, 0.10]
Overall indirect effect	-0.03 [-0.06, 0.02]	0.02 [-0.04, 0.05]
Total effect	-0.04 [-0.12, 0.05]	0.01 [-0.12, 0.10]

Note. SIAS = Social Interaction Anxiety Scale; SPS = Social Phobia Scale; CI = Confidence Interval. All pathways constrained to be equal from Time 1 to 2 and from Time 2 to 3. *b* refers to unstandardized values. Bold font denotes statistical significance.

3.4 Discussion

This study represents the first occasion that self-criticism, negative self-beliefs, and self-kindness have been examined together in the context of social anxiety. Previous research has not explored this combination of variables using a longitudinal design while controlling for the stable trait-like components of each variable. Neither of the hypothesized mediation models was supported, as self-criticism failed to demonstrate an indirect effect on social anxiety through perceived inferiority, and self-kindness did not demonstrate an indirect effect on social anxiety through perceived inferiority nor self-criticism. These findings are now discussed.

Contrary to my hypothesis, I did not observe either a direct or indirect effect of self-criticism on social anxiety, which is somewhat consistent with the findings of Gautreau et al. (2015). However, in contrast to Gautreau et al., I did not find that social anxiety predicted later self-criticism, which conflicts with the idea that self-criticism may be better viewed as an outcome of social anxiety, as opposed to a contributing factor of the condition. Rather, my findings suggest that in the current data, self-criticism and social anxiety are simply concurrent phenomena that do not share a temporal relationship, whether unidirectional or reciprocal. However, one possible explanation for these null findings is the time interval used, given that the adopted interval for longitudinal research is crucial for observing effects (Maxwell & Cole, 2007). In the context of self-criticism and its relationship with social anxiety, there is no clear guide as to what intervals of observation would show an effect. From a clinical perspective, the effect of a thought on feelings is presumably quite immediate. As such, it is possible that self-criticism could indeed increase social anxiety (or feelings of inferiority), but that the effect of cognition on emotion can only be observed over a shorter time period.

Alternatively, self-criticism and negative self-beliefs might be risk factors for the *development* of social anxiety, but do not contribute to its *maintenance*. Participants in this sample were aged 30.43 years on average, whereas the median age of onset of social anxiety is 15 years (Lijster et al., 2017). By adulthood, self-criticism may have already "done its damage" in contributing to the initial development of social anxiety. As such, the models proposed in the current study may be better investigated in a younger sample. Previous research provides some support for these propositions. For example, in a sample of adolescents, Roitman and Gilboa-Schechtman (2014) found that self-criticism partly mediated the relationship between maternal social anxiety and adolescent social anxiety.

A third explanation for the lack of predictive effect of self-criticism may lie in the stability of certain constructs I examined. For all constructs in this study, the state-like component accounted for less than 50% of variance, with some lower than 20%. This amount of variance in the state-like components of these constructs may have been insufficient to see an effect. That is, the hypothesized relationships may indeed exist, but they may only be visible under certain conditions such as interventions. In order to better evaluate the relationships between the constructs examined in this study, future research should aim to manipulate self-compassion using experimental study designs.

Also contrary to expectation, the predicted mediational effects of negative self-beliefs were not found. These results are inconsistent with research in the area of depression where negative self-beliefs have been found to mediate the relationship between self-criticism (or related constructs) and depressive symptomatology (e.g., Dunkley & Grilo, 2007). Given this inconsistency, it is possible that the role of negative self-beliefs is not equivalent in social anxiety. However, studies demonstrating the mediating role of negative self-beliefs in the context of depression need to be interpreted with caution as they are limited by their cross-sectional design. Incorporating the findings of the current longitudinal study, research is yet

to show that self-criticism predicts future increases in negative self-beliefs. Furthermore, negative self-beliefs did not predict future social anxiety, which conflicts with both cognitive and evolutionary models of this disorder, and other longitudinal research (e.g., van Tuijl, de Jong, Sportel, de Hullu, & Nauta, 2014).

The second hypothesis of the current study was generally not supported as self-kindness did not appear to contribute to social anxiety symptomology either directly or indirectly. These findings add to an existing body of research which currently has little clarity with regards to the role of self-kindness in social anxiety. For example, Werner et al. (2012) found that those with a clinical diagnosis of SAD reported less self-kindness than healthy controls. However, within the SAD group, self-kindness was not associated with severity of social anxiety symptoms. In the current study, self-kindness had a significant negative correlation with social anxiety, but did not prospectively predict social anxiety after controlling for relevant variables (e.g., past levels of both variables and the stable trait-like components of each). It is possible that responding to setbacks and failures with self-kindness, rather than self-criticism, may not actually affect social anxiety or negative self-beliefs. Alternatively, similar to self-criticism, the lack of effect of self-kindness may have been due to issues of timings of assessment, lack of variance, and developmental factors.

Individual differences in the effect of self-kindness may also play a role. Gilbert (2009) argues that the experience of receiving kindness, whether from others or from oneself, can trigger negative emotions in certain people, due to activation of early attachment memories involving unmet needs and unresolved feelings. In support of this perspective, Longe et al. (2010) found that self-reassurance elicited a threat response in participants high in trait self-criticism. Accordingly, there may be certain constructs not included in this study that influence the strength or even direction of the relationship between self-kindness and social anxiety. As reviewed in Chapter 2, one such construct may be fear of self-compassion,

which has shown a moderating effect of self-compassion in the context of intervention research (Kelly & Carter, 2015). Future research should explore this construct and others as potential moderators of the impact of self-compassion on social anxiety.

The current study possessed a number of strengths. It included a reasonable sample size. Although an unselected nonclinical sample was used, a high percentage of participants were in the clinical range on social anxiety measures (approximately 45%), lending some support to the generalizability of findings with respect to individuals with SAD. Importantly, the study involved a longitudinal design accompanied by contemporary analytical techniques that accounted for stable trait-like components of the variables of interest, something not undertaken by prior research in this field.

I acknowledge also the limitations of the study. First, self-kindness alone was investigated rather than the broader construct of self-compassion. It is possible that an integration of self-kindness, mindfulness, and common humanity may create a different causal effect on social anxiety compared with self-kindness alone. Second, there was some attrition between waves. Although there were minimal significant differences between those who dropped out and those who remained in the study in terms of the central variables, there may have been other unmeasured variables which influenced either attrition or the results. Third, the study only employed three time points of data collection which did not allow for testing of more complex models (e.g., sequential entry of multiple mediators). Fourth, although the sample had relatively elevated levels of social anxiety, it was not a clinical sample and so inferences for those with SAD need to be tempered.

3.5 Conclusion

In the past decade, research has increasingly highlighted the potential to reduce suffering by shifting the way we respond to failure from self-criticism to self-kindness. As

part of this movement, new therapy approaches such as Compassion Focused Therapy (e.g., Gilbert & Proctor, 2006) have been developed, with a recent pilot study conducted to gauge the effects of this type of intervention on social anxiety (Boersma, Hakanson, Salomonsson, & Johansson, 2015). However, to date, the relationship between self-kindness/compassion and social anxiety remains unclear, and further investigation into this relationship is required. Perhaps the primary question raised by this study is whether the relationship between self-kindness/compassion and social anxiety is better observed when the former variable is actually manipulated. More specifically, a key question is whether an experimental manipulation of self-kindness/compassion will lead to a reduction in social anxiety. Furthermore, it remains to be seen how self-compassion compares to traditional approaches to social anxiety (e.g., Cognitive Behavioural Therapy), especially in the context of a clinical sample. Chapter 4 describes my second study which addressed these questions.

Chapter Four – The Role of Self-Compassion in Social Anxiety

4.1 Introduction

As described in Chapter 1, Social Anxiety Disorder (SAD) is highly prevalent and associated with significant life impairment. Several meta-analyses indicate that the current gold-standard psychological treatment for SAD, cognitive-behavioural therapy (CBT), is associated with medium to large effect sizes for symptom reduction (Hofmann, Asnaani, Vonk, Sawyer, & Fang, 2012; Hofmann & Smits, 2008; Mayo-Wilson et al., 2014). However, CBT interventions for SAD still have a considerable number of non-responders[6] - on average 55% of clients at post-treatment and 45% at follow-up will not report a meaningful change (Loerinc et al., 2015). As such, there is a need to better understand the factors that influence response to treatment and to investigate alternative therapy approaches. In this chapter, I examine whether increasing self-compassion is a possible alternative method of intervention for SAD. First I describe self-compassion and its relationship with social anxiety, examine possible mediators and moderators of this relationship, and compare self-compassion and CBT approaches within these contexts. Next, I detail an empirical investigation of a brief self-compassion intervention for social anxiety that is compared with a core CBT technique (cognitive restructuring) in a randomized design.

Commonly accepted definitions of self-compassion include relating to the self in a manner that involves self-kindness, mindfulness, and a feeling of connection to the rest of humanity (Neff, 2003), or a sensitivity to suffering in the self, coupled with a motivation to alleviate this suffering (Gilbert, 2010). The first meta-analysis of the association between low

[6] "Response" was defined using a range of different criteria such as significant change from baseline, reliable change index, or falling below the clinical cut-off on a measure. Among the studies reviewed, there was a high amount of variance in how many of these criteria were used.

levels of self-compassion and psychopathology (depression, anxiety, and stress) found a strong relationship between the two, with an average effect size of r = -0.54 (CI_{95} [-0.57, 0.51]; Macbeth & Gumley, 2012). As reviewed in earlier chapters, there has been a significant increase in research investigating the therapeutic benefits of improving self-compassion. A recent meta-analysis of compassion-based randomized controlled trials (N = 21) by Kirby, Tellegen, and Steindl (2017) found evidence for moderate effect sizes in improving outcomes such as depression, anxiety, and psychological distress (Cohen's ds ranging from 0.47 to 0.64).

Although there has been an explosion of interest in self-compassion in the scientific literature, relatively little is known about how the construct relates to social anxiety. Theoretically, self-compassion has face validity as a potential target for intervention given that self-criticism has been implicated in the maintenance of social anxiety (e.g., Cox et al., 2004). Furthermore, certain self-compassion approaches were specifically designed for people high in shame (e.g., Gilbert & Procter, 2006), and the emotion of shame has been strongly implicated in the maintenance of social anxiety (e.g., Gilbert, 2000). I now review the empirical research on self-compassion and social anxiety, beginning with correlational research and progressing to longitudinal and intervention studies.

Initial research in this area found that trait self-compassion showed benefits in socially stressful situations. In two separate studies, Leary, Tate, Adams, Batts Allen, and Hancock (2007) had university students engage in a simple speech task. They found that trait self-compassion was associated with more resilient responses when individuals received neutral feedback from others (Study 3) and when they rated their own performance (Study 4). Although the studies examined a nonclinical sample, the results are relevant because socially anxious people are vulnerable to negatively biased perceptions of their own performances (Hofmann, 2007).

More recent research has incorporated standardized measures of social anxiety in samples of treatment seeking individuals. In a large sample of university students seeking counselling in various regions of the USA (N = 1,609), a large correlation was found between social anxiety and self-compassion (r = -.57; Hayes, Lockard, Janis, & Locke, 2016). In a sample of adults seeking help specifically for social anxiety, Blackie and Kocovski (2017) also found that self-compassion correlated with unhelpful post-event processing (r = -.42), a cognitive construct analogous to rumination, which is a core feature of SAD (Hofman, 2007). Moreover, this correlation remained significant (r = -.30) after controlling for self-esteem, a construct similar to self-compassion.

In the first study to utilize a clinical sample in this area, Werner et al. (2012) compared levels of self-compassion between a group of individuals with a diagnosis of SAD (n = 72) and a group of healthy controls (n = 40). They found that those with SAD reported less self-compassion than the healthy controls (partial $\eta^2 = 0.55$). However, there were some inconsistent findings between different measures of social anxiety. Specifically, within the SAD group, self-compassion was not significantly associated with severity of social anxiety symptoms as measured by the Liebowtiz Social Anxiety Scale (Liebowitz , 1987; r = -.15; CI_{95} [-0.37, 0.08]) and the Social Interaction Anxiety Scale (Mattick & Clarke, 1998; r = -.18; CI_{95} = -0.40 to 0.05). It was, however, associated with fear of both negative (r = -.38) *and* positive (r = -.37) evaluation, which represent cognitive maintenance factors of SAD (Heimberg, Brozovich, & Rapee, 2010). These null findings with respect to the primary measures of SAD are consistent with the findings of my first study. As discussed in Chapter 3, I did not find support for a proposed longitudinal mediational model, as self-kindness (a component of self-compassion) failed to influence social anxiety through an effect on perceived inferiority (or self-criticism), after controlling for the stable trait-like components of each variable. Additionally, the overall direct effect of self-kindness on social anxiety was

nonsignificant. However, as discussed earlier, the lack of effect may have been due to insufficient variance in the state-like components of the constructs of interest. Given this possibility, I suggested that a manipulation of self-kindness/compassion may be necessary to fully test its hypothesized effects on social anxiety.

Consistent with this line of thinking, several studies have manipulated self-compassion in order to gauge its effect on social anxiety. Using a sample of undergraduates with elevated social anxiety (N = 98), Blackie and Kocovski (2018) had participants engage in a short speech task before being randomized into a self-compassion, rumination, or a neutral writing control condition. When participants were assessed one day later, those instructed to complete a brief self-compassionate written letter reported greater willingness to engage in social situations (partial $\eta^2 = 0.07$) and less post-event processing (partial $\eta^2 = 0.11$), compared to the other conditions. However, although the study successfully manipulated self-compassion, it did not measure baseline levels of the dependent variables. Therefore, the results represent between-person rather than within-person differences which limits causal inferences and does not preclude baseline differences accounting for the findings.

A stronger study design was utilized by Arch, Brown, Dean, Landy, Brown, and Laudenslager (2014) who tested whether brief training in self-compassion meditation (four sessions of 10 minutes and one session of five minutes across four days) would reduce anxiety responses in nonclinical female undergraduates when exposed to a social stressor (the Trier Social Stress Test [TSST], Kirschbaum, Pirke, & Hellhammer, 1993). Compared to two control conditions of attention (placebo) and no intervention, the authors found that pre-social stress training in self-compassion reduced anxiety when measured by both physiological and self-report methods. Specifically, after controlling for baseline levels of all variables, those in the self-compassion group had lower sympathetic (salivary alpha-amylase; $\Delta R^2 = 0.05$),

cardiac parasympathetic (d = 0.09), and subjective anxiety (d = 0.11) reactions, but not lower HPA-axis (salivary cortisol; ΔR^2 = 0.00) reactions.

In the only study of its kind to date, one research group has piloted a multi-session self-compassion therapy program for individuals with SAD. Boersma, Hakanson, Salomonsson, and Johansson (2015) tested the effectiveness of this approach in a single case experimental design (N = 6). The authors explored the effect of eight individual sessions of Compassion Focused Therapy (CFT; Gilbert, 2014) on several outcome variables of interest including social anxiety and self-compassion (quantitatively analyzed), as well as shame and self-criticism (qualitatively analyzed). Three of six participants reported clinically significant reductions in social anxiety two to four weeks after the intervention, while five of six reported clinically significant improvements in self-compassion. Shame and self-criticism showed less consistent changes. Although demonstrating some promise, these findings need to be qualified by the limitations of the study design (e.g., small sample size, lack of control group, short follow-up) that prevent strong conclusions from being drawn.

Taken together, there is some evidence to suggest that self-compassion can reduce social anxiety symptoms. However, more research is needed in order to investigate the effects of more extended self-compassion interventions on trait measures of social anxiety within well-controlled designs. Furthermore, given the current push towards understanding the processes through which interventions function (see Hayes & Hofman, 2017), research into how and for whom self-compassion works is also vital. Investigation of both the mediators and moderators of the relationships of interest has the potential to provide some explanation of the mixed findings in the literature to date.

What Are the Key Mediators and Mechanisms of Change of Self-Compassion?

In the following paragraphs, I briefly summarize the key findings from Chapter 2, a review of the theoretical and empirical mediational literature on self-compassion, to give

context to the next section: a review of research on mediators between self-compassion and social anxiety, and an explanation how these mediators might compare to those studied in CBT contexts. In Chapter 2, I introduced the concepts of mediation and mechanisms of change and reviewed theoretical and empirical literature on the mediators through which self-compassion may impact on mental health. To summarize, the primary theoretical mechanism of change is "activation of the soothing system" which is central to Gilbert's (2009) theory of compassion. As described earlier, the soothing system is a biopsychological system which has not been evaluated in previous empirical research. This lack of evaluation may be due to the fact that there currently are no measures which explicitly assess this system. However, there are two measures in existence that are consistent with theoretical descriptions of the subjective experience of the activation of the soothing system: the safe-affect subscale of the Types of Positive Affect Scale (TPAS; Gilbert et al., 2008), and the Social Safeness and Pleasure Scale (SSPS; Gilbert et al., 2009). These measures evaluate the degree to which an individual experiences social safeness (the SSPS), or a particular type of positive affect involving safety, contentedness, warmth, and security (the TPAS). Research has yet to determine whether activation of the soothing system mediates the impact of self-compassion on social anxiety.

My review of the empirical literature found several potential mechanisms of change of self-compassion related to emotion regulation, negative affect, interpersonal factors, and risk and protective factors. The most promising specific mediator was repetitive negative thinking (RNT; i.e., worry and rumination) which showed a relatively consistent effect across several studies and outcome variables. Importantly, one such study involved social anxiety. In the controlled experiment described earlier in this chapter, Blackie and Kocovski (2018) found that the effect of condition (self-compassion versus rumination and neutral writing) on willingness to engage in social situations was mediated by post-event processing (i.e.,

rumination). The study also found support for a second mediational model whereby the effect of condition on post-event processing was mediated by individuals' perception of their performance (specifically, their impression of the quality of the speech they gave). As the authors discussed, these findings suggested that self-compassion may encourage socially anxious individuals to evaluate themselves and their performances in more realistic and positive ways. Hence, two possible mechanisms of change of self-compassion on social anxiety are improved performance perceptions and post-event processing. Additionally, if self-compassion does improve these self-evaluative processes, then it may also affect other forms of RNT such as worry (i.e., anticipatory processing), which may also represent a mechanism of change.

To my knowledge, my first study (Study 1) is the only other empirical investigation of mediators between self-compassion/kindness and social anxiety. When outlining the rationale for that study, I argued that self-compassion weakens negative self-beliefs and replaces self-criticism, which would in turn reduce social anxiety. In other words, I proposed negative self-beliefs (in the form of perceived inferiority) and self-criticism as possible mechanisms of change. As previously discussed, although there was no support for these hypotheses in the longitudinal models that were tested, I recommended that future research should utilize experimental designs in order to more comprehensively test these hypotheses.

If the relationship between self-compassion and social anxiety is mediated by processes such as activation of the soothing system, anticipatory processing, post-event processing, as well as self-criticism, one important question that arises is whether these mediators differ from those thought to drive the positive changes achieved by CBT methods. In relation to anticipatory and post-event processing, differences are unlikely given that these constructs have already been found to mediate the impact of CBT on social anxiety (Brozovich et al., 2015; Goldin et al., 2016; Hedman et al., 2013). Furthermore, although

self-criticism has not been explicitly evaluated as a mediator using appropriate statistical analysis, Cox et al. (2002) using hierarchical multiple regression, provided evidence that change in self-criticism during the course of CBT for social anxiety predicted outcome after controlling for numerous other variables, including baseline social anxiety severity and depression. As such, there is some evidence that self-criticism may mediate the effect of CBT, and moreover, insufficient evidence to hypothesize that self-criticism would act any differently in the context of self-compassion. Similarly, given that activation of the soothing system has not yet been empirically examined as a mediator, it is premature to predict differential effects. Indeed, it has been suggested that the soothing system may be a shared mechanism between CBT and self-compassion, with Gilbert (2009) theorising that the process underlying successful cognitive therapy involves the activation of the soothing system. That is, the relationship between: 1) a healthy alternative thought, and 2) believing/feeling reassured by this thought, is mediated by activation of the soothing system. Accordingly, based on the current state of the literature, there is little reason to hypothesize that the putative mechanism of self-compassion would differ from those of CBT, although this has yet to be explored.

Also of interest is whether the primary mechanisms of change of CBT would be shared with self-compassion. Two primary mediators identified in the CBT literature are probability bias (high perceived probability of negative social events) and cost bias (high perceived social cost of such negative social events; Foa, Franklin, Perry, & Herbert, 1996; Franklin, Huppert, Langner, Leiberg, & Foa, 2005; Hofmann, 2004; McManus, Clark, & Hackmann, 2000; Nelson, Lickel, Sy, Dixon, & Deacon, 2010; Smits, Rosenfield, McDonald, & Telch, 2006; Voncken, Alden, & Bögels, 2006; Wilson & Rapee, 2005). CBT reduces these biases by evaluating the accuracy of negative beliefs through strategies such as cognitive restructuring and behavioural experiments. Similar to the previous mediators

outlined, there is no empirical evidence examining whether probability and cost biases are mechanisms influencing the self-compassion-social anxiety relationship. Theoretically, it is reasonable to expect that self-compassionate approaches would also address these biases, which could involve kindly reassuring oneself that a feared outcome is unlikely, or that things will turn out okay if the feared outcome does occur. In summary, little is known about the similarities and differences in mechanisms of change between self-compassion and CBT, illustrating the need for these issues to be examined. Another research question, perhaps more pertinent, is whether there are individual differences that predict the suitability and efficacy of self-compassion versus other interventions.

What Are the Key Moderators of Self-Compassion?

In Chapter 2, I introduced the concept of moderation which refers to baseline variables that differentially affect the outcome of one intervention versus another (Kraemer et al., 2002). Moderators can inform when and under what conditions particular interventions are most effective. From this perspective, one possible explanation for the empirical inconsistencies in the relationship between self-compassion and social anxiety is that there are individual differences that serve as moderating variables. This has clear implications for investigations of interventions that target self-compassion in the treatment of SAD.

As Chapter 2 discussed, self-compassion-based approaches to address psychopathology were developed specifically for people who were highly self-critical (Gilbert, 2009; Gilbert, 2010, 2014; Gilbert & Procter, 2006). The justification for this development was the argument that traditional CBT approaches (e.g., cognitive restructuring) are less effective for highly self-critical individuals, because these individuals struggle to access their soothing system (Gilbert & Procter, 2006). As argued by compassion-theorists, a better therapeutic approach for people high in self-criticism is self-compassion because of its greater emphasiz on particular types of positive affect (e.g., warmth and security), which

more effectively activates their soothing system (Gilbert & Procter, 2006). If this proposal is accurate, self-criticism should be one moderator that predicts differential outcomes for self-compassion as compared to other treatments such as CBT. So far, however, the empirical support for this proposal is mixed and has not directly compared self-compassion against CBT. For example, one study investigating interventions for smoking reduction found self-criticism to moderate outcomes when self-compassion was compared with the (non-CBT) control group of self-controlling self-talk (focusing on the task at hand; Kelly, Zuroff, Foa, & Gilbert, 2010), but other studies found no effect (compared to control groups of optimism and neutral writing; Shapira & Mongrain, 2010; compared to waitlist control; Sommers-Spijkerman, Trompetter, Schreurs, & Bohlmeijer, 2018). However, none of these studies utilized a clinical sample of any type (i.e., those with anxiety, or depression etc.), thus it is possible that the moderating effect of self-criticism may only be present in higher levels of psychopathology, accounting for some of the null findings. Most importantly and relevant to the current study, research has yet to make a direct comparison between self-compassion and interventions that contain a traditional CBT components (e.g., cognitive restructuring). Such studies are needed to explicitly test the moderating roles of factors proposed by compassion theorists to influence outcomes.

In addition to self-criticism, another theorized moderator of self-compassion is *fear* of self-compassion. A fear of self-compassion is argued to be underpinned by beliefs about potential negative consequences of being kind to the self, such as dropping one's standards and failing to perform (Gilbert, 2011). Alternatively, or perhaps complementarily, Gilbert (2009) argues that the experience of receiving compassion can actually trigger negative emotions in certain people, because compassion can activate early attachment memories involving unmet needs and unresolved feelings. As such, people with invalidating or traumatic backgrounds and disposition may actually fear self-compassion, which could

interfere with the therapeutic benefits of self-compassion strategies or techniques. Only one study has examined the moderating role of fear of self-compassion in the context of a self-compassion intervention. In a randomized controlled trial of participants with binge eating disorder, Kelly and Carter (2015) compared the effects of three conditions: 1) food planning plus self-compassion, 2) food planning plus behavioural strategies to replace binging with healthy alternatives, and 3) waitlist control. The authors found that fear of self-compassion moderated the effect of condition on eating disorder pathology and depression, such that those with higher fear of self-compassion in the self-compassion group had worse outcomes than those lower in this trait. Those in the behavioural strategies group improved irrespective of level of fear of self-compassion. Of relevance to the present thesis is whether fear of self-compassion plays a similar, detrimental moderating role in the relationship between self-compassion and other disorders such as SAD. Additionally, other demographic variables such as gender and age, which have not been shown to moderate self-compassion (MacBeth & Gumley, 2012), should be further examined for the purposes of replication.

In the specific area of social anxiety, only two studies have examined potential moderators of the effect of self-compassion inductions. Arch, Landy, and Brown (2016) extended a study described earlier (Arch et al., 2014) by testing a range of moderators in the context of a brief self-compassion intervention aimed at reducing social stress. These moderators included baseline social anxiety, rumination, self-compassion, and non-attachment, the latter being a Buddhist construct which refers to a sense of equanimity in the face of changing circumstances (Sahdra, Shaver, & Brown, 2010). In regards to the dependent variable of state anxiety, only non-attachment was a significant moderator, such that those with higher non-attachment in the self-compassion group had better outcomes compared to the control groups. In another controlled experiment, Harwood and Kocovski (2017) recruited a group of high and low social anxiety participants using clinical cut-offs on

established measures including the Social Phobia Inventory (SPIN; Connor et al., 2000), and the Social Interaction Anxiety Scale (SIAS; Mattick & Clarke, 1998). They tested the effects of a self-compassion writing induction on anticipatory anxiety, compared with rumination and neutral writing control groups. After inducing anticipatory anxiety, it was observed that for those with high trait social anxiety, there was lower anticipatory anxiety in the self-compassion writing group compared with the control writing group. This difference was not found for participants low in trait social anxiety for whom the self-compassion intervention appeared to reap no benefits, leading the authors to suggest that self-compassion interventions may be particularly effective for socially anxious individuals. These findings conflict with those of Arch et al. (2016) who did not find a moderating effect of baseline social anxiety severity. However, some caution is required when comparing these studies because their designs differed considerably. In particular, Arch et al. did not report on the level of social anxiety in their sample, and so it is unclear how the mean and variance on this variable compared to the sample of Harwood and Kocovski. Additionally, Harwood and Kocovski did not use repeated measures, and thus did not assess changes in the main variables, whereas Arch et al. did. More research is needed in order to determine whether social anxiety severity moderates the effect of self-compassion, particularly when compared with other active treatments such as CBT.

The Current Study

Exploring alternative interventions for social anxiety is a worthy area of study given that a significant percentage of people do not respond to the current gold-standard treatment of CBT. Recently, some research has found that brief inductions of self-compassion can be used to reduce social anxiety symptomatology (e.g., Arch et al., 2014). However, it remains unclear whether longer inductions of self-compassion can result in reductions in social anxiety among those with clinical levels of this disorder. Furthermore, many questions

remain regarding the mechanisms through which self-compassion may affect social anxiety, and for whom such interventions may be suitable.

The current study addressed these issues by conducting a brief two-week intervention study comparing an online self-compassion approach with an active comparison condition, cognitive restructuring. Participants with clinical levels of social anxiety were recruited (*N* = 119) and completed a comprehensive battery of measures including, but not restricted to, indices of social anxiety, self-compassion, and self-criticism. Assessments were conducted at pre-intervention (T1), mid-intervention (T2), post-intervention (T3), 1-week post-intervention (T4) and 6-weeks post-intervention (T5). I hypothesized a main effect of time such that both self-compassion and cognitive restructuring would reduce social anxiety, and based on the literature reviewed earlier, did not anticipate any an overall differential response to intervention (i.e., no simple condition by time interaction). However based on preliminary findings of previous research (e.g., Gilbert & Procter, 2006; Kelly & Carter, 2015), I expected that self-criticism and fear of self-compassion would be important moderators of social anxiety outcome. Specifically, those higher in self-criticism and lower in fear of self-compassion would have greater reductions in social anxiety in the self-compassion group relative to those who received cognitive restructuring. Additionally, in light of the gaps in the literature regarding the mechanisms of change of self-compassion, I conducted exploratory analyses using the mediators in the literature reviewed earlier (cf. Chapters 2-3). Specifically, comparing self-compassion and cognitive restructuring, I investigated the mediational effect of perceived inferiority, self-criticism, anticipatory and post-event processing, probability and cost biases, and activation of the soothing system, as individual mediators. Secondary exploratory mediation analyses using treatment engagement variables were also conducted (e.g., the degree to which participants carried out intervention tasks). Finally, I conducted further longitudinal mediation analyses in order to: 1) replicate models from Study 1 in a

context of greater variance, given the high level of construct stability in Study 1, and 2) test the foundational argument of compassion theorists that self-compassion leads to activation of the soothing system, which in turn leads to a reduced activity in the threat system, which in this study referred to social anxiety.

4.2 Method

Participants

Of the 226 participants screened for the study, 119 met criteria and were randomized to the intervention phase (see Figure 1 for participant flow). The inclusion criteria required that participants were aged 18 or older, living in Australia (in case self-harm risk needed to be addressed), and were not currently receiving weekly or fortnightly therapy for social anxiety. The study was conducted through an online website (www.qualtrics.com) following consultation from past researchers who had used similar study designs. Participants were recruited from various sources including Flinders University and online forums (e.g., Reddit, Gumtree, www.socialanxietysupport.com, www.meetup.com). The study was advertised as an investigation of online self-help strategies that might reduce social anxiety. G-Power (Faul, Erdfelder, Buchner, & Lang, 2009) was used to determine that 50 participants in total were needed to detect a small to medium between-group effect (with α = .05, d = 0.35 and 80% power), based on past similar research (e.g., Shapira & Mongrain, 2010). Given dropout rates for online interventions can be high (e.g., van Ballegooijen et al., 2014), a minimum of 100 participants (50 in each condition) was sought. Recruitment ceased at 119 participants due to PhD candidature timeline and funding constraints.

Of the 119 participants randomized, university students made up 52.1% of the sample. The intervention sample ranged in age from 18-71 years with a mean age of 29.04 (*SD* = 11.65), with 76.5% female, and 69.7% White, 21.8% Asian, and 8.5% of different ethnicities.

The majority of the sample were single (68.1%) and 27.7% were in a relationship (e.g., de-facto or married). The most representative region in which participants lived was South Australia (73.1%), followed by New South Wales (17.6%), with 9.3% from other regions in Australia. Across the sample, the mean score on the screening measure of the Social Phobia Inventory (SPIN; Connor et al., 2000) was 42.71 (*SD* = 8.97). As summarized in Table 1, 50 participants reported having received some form of general therapy in the 12 months preceding the study (48.0% counselling, 44.0% CBT, 8.0% other), with a mean number of sessions of 9.24 (*SD* = 7.95).

Procedure

Participants interested in being involved in the study followed a link from an advertisement to the website (administered using Qualtrics^{TM}). The first page of the website provided information regarding the study and stated that Part One (screening for high social anxiety symptoms) involved a brief questionnaire aimed at determining eligibility for Part Two (intervention). If informed consent was provided, the participant was taken to a page to complete the Social Phobia Inventory (SPIN; Connor et al., 2000). If the participant scored equal to or above the clinical cut-off of 19, they were taken to another page that advised them that they were eligible for Part Two. These participants were asked to input their contact information if they were interested in proceeding to the next stage of the study (a 30-minute phone interview which included diagnostic assessment). Those who scored below the clinical cut-off were taken to a page that informed them that they were ineligible for the study. They were provided with some brief information explaining that the study was seeking a different range of social anxiety, and they were provided with contact details of mental health support services and other online interventions should they be interested in seeking further assistance.

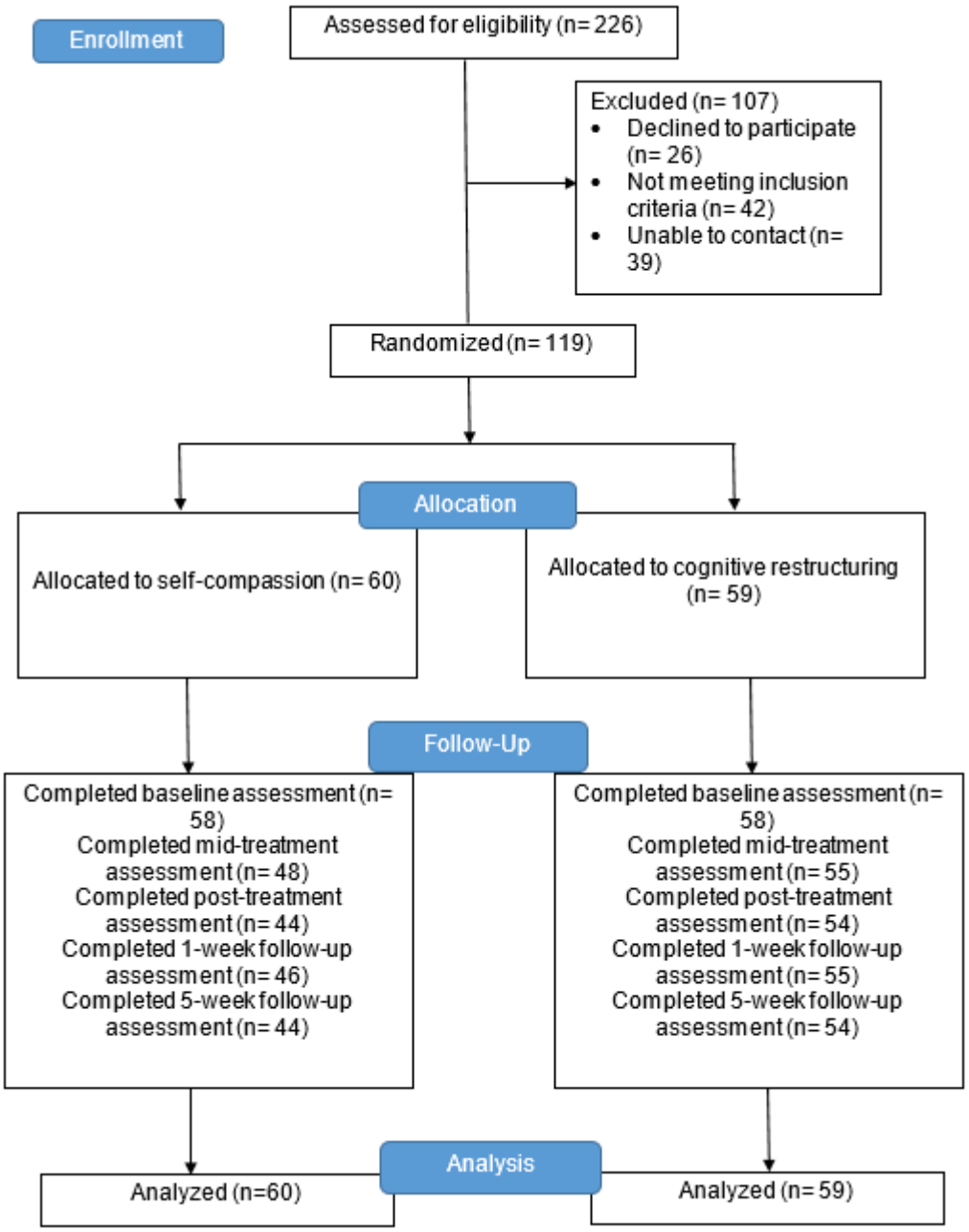

Figure 1. Study flow chart.

Participants who screened positive on the SPIN (i.e., were above the cut-off) then completed a phone interview with the lead researcher which involved confirmation of full eligibility (e.g., risk and current engagement in therapy was assessed), and completion of the MINI International Neuropsychiatric Interview (MINI; Sheehan et al., 1998). Next,

participants were randomized into either cognitive restructuring or self-compassion using block randomization (blocks of four). Participants were emailed a link to the intervention exercises each morning and received a reminder text message each afternoon. There were 14 consecutive days of exercises and five assessments (baseline, mid-treatment at day seven, post-treatment, one-week follow-up, and five-week follow-up). A final phone interview was also completed after the fifth assessment which only involved the SAD section of the MINI. Participants were reimbursed either a $40 Gift Card or course credit (for university participants).

Interventions

Self-compassion. Participants were first given a rationale for the exercises from an evolutionary model of self-compassion (see italicised rationale below; Gilbert, 2010). Instructions for the exercises were based on those used by Shapira and Mongrain (2010) and resources from https://compassionatemind.co.uk. Participants were asked to think about a recent social situation which elicited social anxiety. Then they were instructed to write a letter in which they expressed compassion (e.g., kindness, understanding, and validation) towards themselves (for full script see Appendix D). Participants were told that the task may take 5 to 15 minutes to complete on each occasion. No instruction was given to practice the skill outside of this time.

Rationale for Self-Compassion

In order to understand what causes social anxiety, we need to look at some well-established neuroscientific research. According to this research, humans have evolved to possess 3 primary emotional systems: The 'threat' system, the 'drive' system, and the 'soothing' system. The two systems we are mainly interested in are the threat and soothing systems.

The soothing system evolved to facilitate attachment between infants and caregivers, and it produces feelings such as contentment and social safety. The threat system evolved to protect

the self, and it produces feelings such as anxiety and shame which motivate self-protective behaviour (e.g., fight or flight).

According to this framework, social anxiety can be understood as an imbalance between the threat and soothing systems, whereby the former is over-activated and the latter is under-activated. Importantly, these systems are seen as mutually exclusive, in that the activation of one will deactivate the other. More specifically, the activation of the soothing system down-regulates the threat system and thus reduces negative feelings such as anxiety.

So the question is: How can we activate the soothing system? One approach is through self-compassion, which can be defined as a sensitivity to suffering in oneself, coupled with a motivation to alleviate this suffering. Self-compassion involves treating oneself with kindness, care, warmth, and understanding.

Just as the threat system is sensitive to signals of threat and will activate defensive emotions such as anxiety, your soothing system is sensitive to signals of compassion which will reduce feelings of anxiety.

The next question is: How does one practice self-compassion? One technique is to write a short compassionate letter to oneself regarding a recent distressing event. For this project, you will be thinking about a recent situation in which you experienced social anxiety.

In the letter, you want to try to provide yourself with what you need in order to feel better. This will involve communicating to yourself with kindness and understanding, realising that your distress makes sense. You might imagine what you would say to a friend in a similar situation, and how you would feel toward such a friend. As you write the letter, you might actually visualise having a version of yourself in front of you, and verbalizing the letter you are writing to them. You want the tone of your communication to be warm and friendly, and you might actually hold a half-smile on your face as you're writing. Again, your goal is to activate the soothing system by generating feelings of warmth, contentedness, safety, and security. Write to yourself what you need in order to feel this way.

This is a craft for you to hone. Over the next 2 weeks, you will be practicing these skills on a daily basis. Once per day, you will log on to this webpage using this link, and complete one "compassionate letter" in which you write a letter to yourself regarding a recent situation that caused social anxiety.

To continue, please rate how much you understand this rationale and also how much you believe it can work. Then click proceed in order to move to the next page and practice this skill.

Cognitive restructuring. Participants first read the rationale for the exercises from a cognitive model of social anxiety (see italicised rationale below; Clark & Wells, 1995). For the cognitive restructuring condition, instructions were adapted from Clark and Wells and materials from https://www.cci.health.wa.gov.au/, whereby the participant was asked to identify: 1) a recent social situation that caused social anxiety, 2) some negative automatic thoughts experienced during or after the situation, with common examples provided (e.g., "He'll think I'm an idiot"), 3) evidence supporting the thought, 4) evidence against the thought, with examples provided (e.g., "I have spoken to him before and he didn't say anything negative"), and 5) an alternative evaluation of the situation (e.g., "Maybe I won't have much to say, but that doesn't mean I'm an idiot"; for full script see Appendix E). Participants were told that the task may take 5 to 15 minutes to complete on each occasion, and they were not asked to practice outside of this time.

Rationale for Cognitive Restructuring

How we think affects how we feel. If we think negative thoughts about ourselves, we are likely to experience negative feelings about ourselves. As such, a common cause of social anxiety is negative thoughts regarding our social performance. Other common negative thoughts relate to the perceived likelihood of negative social events, and how bad it would be if these events actually happened.

Given that negative thoughts cause negative feelings, if we change the way we think, then we can change the way we feel. Changing our thinking can be achieved by developing the skill of

identifying negative automatic thoughts and challenging them. We challenge these thoughts by evaluating their validity. In other words, by evaluating how true they actually are.

One strategy for doing this is to write down the evidence for and evidence against the negative automatic thought. For example, we might have the automatic negative thought: "I humiliated myself at a party". The evidence against this this thought might be the fact that no one laughed at us, people were actually quite interested in talking to us, and one of our friends expressed interest in hanging out tomorrow. The evidence for this thought might be the fact that someone appeared to be judging us while we were talking. By evaluating the evidence for and against a thought, a common experience is for the thought to become less believable. When the thought becomes less believable, we actually feel better.

Another strategy for evaluating our thinking is to categorize the style of unhelpful thinking that we are engaging in. Some of the most common unhelpful thinking styles in social anxiety include:

- *Mind-reading - jumping to conclusions about what people are thinking (e.g., "They think I'm boring")*
- *Black and white thinking - thinking in extreme all-or-nothing terms (e.g., "No one at the party wanted to speak to me")*
- *Fortune telling - predicting the future instead of seeing what happens.(e.g., "If I share my opinion, people will laugh at me")*
- *Personalisation - taking events or other people's' behavior personally or blaming yourself and overlooking other factors (e.g., "They're not talking to me because there's something wrong with me")*
- *Overgeneralization - thinking things like "always" and "never" and overgeneralizing from an isolated event (e.g., "I always humiliate myself at parties")*
- *Demanding - using words like "should," or "must" to make rigid rules about oneself, the world, or other people (e.g., "I shouldn't be as anxious as this")*
- *Disqualifying the positive - discounting positive information or twisting a positive into a negative (e.g., "I didn't have anything interesting to say tonight")*
- *Labelling - putting your whole person into a negative category (e.g., "I'm worthless/a failure")*
- *Catastrophising - jumping to the worst possible conclusion (e.g., "No one is ever going to like me")*
- *Emotional reasoning - listening too much to negative gut feelings instead of looking at objective facts (e.g., "Because I feel like an idiot, people must think I'm an idiot")*
- *Low frustration tolerance - thinking that something is too difficult or overwhelming (e.g., "I can't stand it)*

Some thoughts may actually fit into several of these categories. For example, one thought might involve overgeneralization, personalisation, and mind-reading. The reason why it is helpful to categorize our thoughts is because it can show us how distorted and unhelpful they actually are. In turn, the degree to which we believe in the thought can decrease and we feel better.

Ultimately, the goal is to develop a balanced alternative to the negative automatic thought. A balanced thought is one which takes into account all the evidence, objective information, and alternative viewpoints generated from the thought evaluation process. Here is an example of a balanced thought:

"Although I felt like I humiliated myself at the party, it doesn't mean that I actually did. In fact, when I examined the evidence, there really wasn't much that indicated that this thought was true. The main evidence for the thought that I humiliated myself was actually my presumptions about what others were thinking of me, so I was actually engaging in mind-reading, which is impossible. I can also see that I was catastrophising and fortune telling about how bad parties would be in the future. In reality, I've been to plenty of parties before and while some are uncomfortable, generally they are never as bad as I predict."

This is a craft for you to hone. Over the next 2 weeks, you will be practicing these skills on a daily basis. Once per day, you will log on to this webpage using this link, and complete one "thought diary" in which you evaluate a negative automatic thought from a recent situation.

To continue, please rate how much you understand this rationale and also how much you believe it can work. Then click proceed in order to move to the next page and practice this skill.

Measures

Diagnostic Interview Assessment. Clinical diagnoses were determined using the MINI International Neuropsychiatric Interview – English Version 7.0.2 for DSM-5 (MINI; Sheehan et al., 1998). Administered sections included Major Depressive Episode, Manic and Hypomanic Episodes, Panic Disorder, Agoraphobia, Social Anxiety Disorder, Obsessive Compulsive Disorder, Posttraumatic Stress Disorder, Alcohol Use Disorder, Substance Use

Disorder, Anorexia Nervosa, Bulimia Nervosa, Binge Eating Disorder, and Generalized Anxiety Disorder. The MINI has demonstrated sound reliability and validity (Pettersson et al., 2018; Sheehan et al., 1998) and is a widely used instrument. Having received training in conducting the MINI from working as an independent assessor on a PTSD treatment trial, I completed all of the assessments. Due to limited funding, only a small random sample of pre- and post-treatment MINIs (~10%) were selected for inter-rater reliability analyses. For pre-treatment MINIs, kappa coefficients were as follows: 1.00 for full or sub-threshold SAD diagnosis, between 0.74 and 1.00 for other anxiety disorders, between 0.41 and 0.52 for mood-related diagnoses, between 0.62 and 1.00 for bipolar-related diagnoses, 0.62 for OCD, 0.78 for eating disorder, and 1.00 for substance abuse disorder. Due to a lack of variance in the rater responses for certain diagnoses, kappa coefficients could not be calculated and so raw agreement was calculated as follows: 90% for PTSD and 80% for alcohol use disorder. For post-treatment MINIs, the kappa coefficient for full or sub-threshold SAD diagnosis was 1.00. The correlation between raters for total MINI SAD score (scores could range from 0-6) was r = .95 and r = .99 at pre- and post-treatment respectively.

For assessing Social Anxiety Disorder (SAD), all questions were asked if the participant reported significant anxiety in at least one social situation, rather than progressing to the next module if there was just one negative response which is the normal administration process. This deviation was adopted to provide a more thorough assessment of SAD as it allowed creation of a total score of social anxiety according to the MINI (out of 6) where a score of 6 was defined to indicate a diagnosis of SAD and 5 was considered to reflect sub-threshold SAD (1 symptom short of meeting full criteria). Sub-threshold SAD was assessed given that those who are subthreshold also demonstrate elevated impairment and comorbidity (Fehm, Beesdo, Jacobi, & Fiedler, 2008). Even if participants answered negatively to the first question (“In the past month, did you have persistent fear and significant anxiety at being

watched, being the focus of attention, or of being humiliated or embarrassed or rejected?"), their response would be changed to a "yes" if they responded affirmatively to having *significant* anxiety in at least one social situation (e.g., speaking to authority figures) as per Criteria A in the DSM-5. This was done because the DSM-5 criteria does not make reference to any 1-month period (the chronicity of social anxiety is assessed in a subsequent question of the SAD section in the MINI) and a negative response to this question may actually reflect avoidance of social situations, as opposed to a lack of social anxiety.

Treatment Adherence and Engagement. A number of variables representing treatment adherence and engagement were coded including number of daily exercises completed (out of 14), total amount of minutes spent on exercises (self-report), and total number of words written. Additionally, all of the Self-Compassion letters (in the Self-Compassion condition) and Alternative Thoughts (in the Cognitive Restructuring condition) were coded for level of self-compassion on a 4-point scale (0 = *zero compassion*, 1 = *slight compassion*, 2 = *moderate compassion*, 3 = *high compassion*). Level of self-compassion was determined taking into account how much understanding, warmth, validation, and encouragement was expressed. Due to limited resources, I completed all initial coding and one response per participant (where available) was randomly selected for inter-rater reliability analysis of self-compassion level. Using the original ordinal scale of four levels, the kappa coefficient was low (0.26). As such, the variable was transformed into a binary variable of low (zero or low self-compassion on original scale) or high (moderate or high self-compassion on original scale) self-compassion. Using the transformed variable, the kappa coefficient increased to 0.53. Finally, at the 5-week follow-up assessment, participants were asked to what degree they had continued engaging in the exercises (either in their head or on paper) since the completion of the formal 2-week intervention on a 5-point scale (0 = *not at all*, 1 = *a little*, 2 = *a moderate amount*, 3 = *a lot*, 4 = *a great deal*).

Treatment Credibility. Two items from the Credibility Expectancy Questionnaire (CEQ; Devilly & Borkovec, 2000) were adapted in order to measure treatment credibility. Participants completed these questions immediately after reading their respective intervention rationale on Day One. The items were "At this point, the self-help exercises for social anxiety seem logical", and "At this point, I believe the self-help exercises for social anxiety will successfully reduce my social anxiety symptoms". A 7-point Likert scale was used ranging from 0 (*strongly disagree*) to 7 (*strongly agree*). Only two items were used in order to minimize participant burden. The original scale has demonstrated good internal consistency, test-retest reliability, and construct validity (Devilly & Borkovec, 2000; Smeets et al., 2008). Total Treatment Credibility score was calculated by summing the two items.

Probability and Cost Biases. The Event Probability and Cost Questionnaire (EPCQ; Rapee , Gaston, & Abbott, 2009) was used to measure to the perceived likelihood of negative social events and the perceived consequences should these events occur. The questionnaire presents a set of 13 hypothetical scenarios such as "While you are talking with several people, one of them will leave", and "You will have trouble getting your words out while talking". In relation to the scenarios, participants are asked to rate both the likelihood of the event ("How likely is it, in the near future, that this event will happen to you?") and the degree of distress that the event would cause ("How bad or distressing would it be if this event happened to you?"). The probability and cost of the events was rated on a 5-point scale ranging from 1 (*not at all*) to 5 (*extremely*). Currently, there are few empirically validated measures to assess trait probability and cost biases. As such, the EPCQ was obtained by contacting the primary author of a study in which this measure was created (see Rapee, Gaston, & Abbott, 2009). The EPCQ has demonstrated Cronbach's alphas of .83 for Probability Bias and .89 for Cost Bias, and good construct validity (*r*s = .53, .58 with the SIAS, respectively; Rapee, Gaston, & Abbott, 2009). Over the five assessment points in the

current study, Cronbach's alphas for the Probability Bias subscale ranged from .87 to .92, and for the Cost Bias subscale from .89 to .94.

Fear of Self-Compassion. The Fear of Self-Compassion (FOSC) subscale was used from the Fear of Compassion Scale (Gilbert, McEwan, Matos, & Rivis, 2011). The subscale includes 15-items on a scale from 1 (*don't agree at all*) to 5 (*completely agree*) regarding the degree to which one is afraid of providing oneself with compassion. Example items include "I feel that I don't deserve to be kind and forgiving to myself", and "If I really think about being kind and gentle with myself it makes me sad". Although relatively recently developed, the scale thus far demonstrates good psychometric properties such as discriminant validity between the fear of self-compassion subscale and related constructs like self-compassion (r = -.54; Gilbert et al., 2011). In the current sample, Cronbach's alphas ranged from .92 to .96.

Activation of the Soothing System. The Safe Positive Affect subscale of the Types of Positive Affect Scale (TPAS; Gilbert et al., 2008) and the Social Safeness and Pleasure Scale (SSPS; Gilbert et al., 2009) were used to measure activation of the soothing system. Currently, there is no scale that has been specifically designed to measure the activation of this proposed system. However, the constructs measured by these scales are consistent with theoretical descriptions of the cognitions and feelings associated with the 'soothing system' (e.g., Gilbert, 2009). The TPAS provides a list of 18 feelings and asks participants to rate how characteristic each feeling is on a scale from 0 (*not characteristic of me*) to 4 (*very characteristic of me*). The relevant subscale includes the feelings of safety, contentedness, security, and warmth. The SSPS provides 11 statements (e.g., "I feel content within my relationships") and asks participants to rate the frequency with which they feel that way. The TPAS has demonstrated adequate internal consistency and good test-retest reliability (e.g., r = .77 for the Safe Positive Affect subscale after a 3-week interval; Gilbert et al., 2012; Holden, Kelly, Welford, & Taylor, 2017). The SSPS has been found to possess good internal

consistency, as well as strong construct and discriminant validity (e.g., r = .33 with positive affect; Gilbert et al., 2009; Kelly et al., 2016). Cronbach alphas ranged from .75 to .81 for the Safe Positive Affect Subscale, and .91 to .95 for the SSPS.

Social Self-Compassion. The Social Self-Compassion Scale (SSCS; Flett , 2017) was used to assess levels of self-compassion specifically in the social domain. The scale is derived from the original Self-Compassion Scale but this iteration has slightly adjusted wording. Examples of items include "When I fail to do the right thing in a social situation, I become consumed by feelings of inadequacy", and "I try to be understanding and patient towards myself when I fall short of my social expectations". As the scale has not been published in a peer reviewed journal, there is little research on the psychometric properties of the SSCS. However, when creating the scale, Flett found that the SSCS demonstrated good convergent, discriminant, and incremental validity. For example, the SSCS uniquely predicted constructs related to social anxiety (e.g., fear of negative evaluation) after controlling for the original Self-Compassion Scale. To maintain consistency with the SCS, I also divided the SSCS into both positive (Cronbach alphas ranging from .78 to .87) and negative (Cronbach alphas ranging from .90 to .94) components.

Clinical Levels of Social Anxiety. The eligibility criteria of *clinical* levels of social anxiety was assessed using the established Social Phobia Inventory (SPIN; Connor et al., 2000). The SPIN measures a wide range of social anxiety symptoms including fear, avoidance, and physiological arousal. The total scale has 17-items ranging from 0 (*not at all*) to 4 (*extremely*), with research demonstrating that a total score of 19 is able to distinguish between clinical and nonclinical socially anxious subjects (Connor et al., 2000). Past studies have demonstrated that this scale has high internal consistency, strong construct validity and good test-retest reliability (Antony, Coons, McCabe, Ashbaugh, & Swinson, 2006; Johnson, Inderbitzen-Nolan, & Anderson, 2006).

Anticipatory Processing and Post-Event Processing. At this time no empirically tested measures exist for these constructs specifically in regards to social anxiety, thus two short scales were created based on descriptions of these processes from the major cognitive models of SAD (e.g., Clark & Wells, 1995). The Anticipatory Processing Scale (APS) had 7-items and asked participants to "describe to what degree this type of thinking, feeling, or behaviour is characteristic of you when anticipating a social situation over the past week" and included items such as "I plan and rehearse conversations and behaviours" and "I think about what could go wrong". The Post-Event Processing Scale (PEPS) had 4-items and asked participants to "describe to what degree this type of thinking, feeling, or behaviour is characteristic of you following a social situation in the past week" and included items such as "I think about what happened" and "I think about how anxious I felt". Both scales were scored from 0 (*not at all*) to 4 (*extremely*). Cronbach's alphas ranged from .87 to .93 for the PEPS, and .83 to .92 for the APS.

Self-Criticism. The Inadequate Self and the Hated Self subscales of the Forms of Self-criticizing/Attacking and Self-Reassuring Scale (FSCRS) (Gilbert et al., 2004) were used, as detailed in Chapter 3. Higher scores reflect greater self-criticism. In the current sample, Cronbach's alphas of self-criticism ranged from .94 to .97.

Self-Compassion. The Self Compassion Scale (SCS; Neff, 2003a) was used to assess levels of self-compassion which contains six subscales of Self-Kindness, Self-Judgement, Common Humanity, Isolation, Mindfulness, and Over-Identification. This frequently used scale consists of 26 items rated on a 5-point scale ranging from 1 (*almost never*) to 5 (*almost always*). For example, "I'm kind to myself when I'm experiencing suffering". Typically, after reverse-coding negative items, mean scores are averaged on each subscale and then summed to create an overall self-compassion score. However, recent research has emphasized the need to distinguish between the positive versus negative aspects of the SCS given a lack of factor

validity for the overall self-compassion construct (e.g., Lopez et al., 2015). Therefore, in the current study, no overall total SCS score was calculated. Research demonstrates that the SCS has strong convergent and discriminant validity when compared with other self-attitude measures such as the Rosenberg Self-Esteem Scale (Rosenberg, 1979), the Self-Determination Scale (Sheldon, 1995), and the Berger Self-Acceptance Scale (Berger, 1952; Neff, 2003a, b). In addition, there is evidence that the SCS has robust test-retest reliability (r = .93 within a 3-week interval; Neff, 2003a). For both the positive aspects of self-compassion (PA-SC) and negative aspects of self-compassion (NA-SC), Cronbach's alphas ranged from .90 to .94 over the five assessment points.

Perceived Inferiority. Perceived inferiority was measured using the Social Comparison Scale (Allan & Gilbert, 1995), as detailed in Chapter 3. Higher scores reflect greater perceptions of inferiority. Across the five assessment points, Cronbach's alphas for perceived inferiority ranged from .87 to .94.

Social Anxiety Symptoms. The Social Phobia Scale (SPS; Mattick & Clarke, 1998) and the Social Interaction Anxiety Scale (SIAS; Mattick & Clarke, 1998) were used to assess participants' levels of anxiety around social performance and interaction, as summarized in Chapter 3. Cronbach alphas ranged from .86 to .93 for the SIAS, and from .89 to .95 for the SPS.

Depression. The Depression subscale of the Depression Anxiety Stress Scale (DASS-21; Lovibond & Lovibond, 1995) was used to measure symptoms of depression, as detailed in Chapter 3. Cronbach alphas for depression ranged from .92 to .95.

Data Analysis

All analyses were conducted using the intention-to-treat sample. Baseline differences in socio-demographic and other variables between groups were evaluated with *t* tests or

nonparametric equivalents. The first research question regarding the effectiveness of the interventions on the primary (SIAS and SPS) and secondary outcomes was addressed using linear mixed models (LMM). Mixed modelling is a widely used technique for analysing repeated measures data. It is considered preferable to ANOVAs primarily due to its capacity to utilize all available data (Gueorguieva & Krystal, 2004), which is done through maximum likelihood estimation. In the current study, an unstructured covariance structure was used. The first analysis involved a 2 (group: self-compassion and cognitive restructuring) x 5 (baseline, mid-intervention, post-intervention, 1-week follow-up, and 5-week follow-up) mixed (within-between) design. Reliable and clinically significant change was assessed using a combination of the Reliable Change Index (RCI), with a change exceeding 1.96 (z score) considered significant (Jacobson & Truax, 1991), and a movement from above to below the cut-offs on either the SIAS or SPS[7]. Thus, reliable and clinically significant change was assessed separately for the SPS and the SIAS, and only done for participants who were above cut-offs for the respective measure at baseline. A non-parametric analysis was used to compare the frequency of sub-threshold/full SAD diagnosis at 5-week follow-up. LMM was also used for moderation analyses to test group by time by moderator interactions. If a significant moderation was found, the interaction was graphed either using existing categories for categorical variables, or at the mean and 1 *SD* above or below the mean for continuous variables. Between-group differences (CR vs. SC) of predicted means were examined at each time point at the different levels of the moderator.

[7] Jacobson and Truax (1991) propose three possible ways for operationalizing clinical significance: 1) post-treatment functioning falls two standard deviations beyond mean of dysfunctional population, 2) post-treatment functioning falls within two standard deviations of the mean of the normal population, and 3) post-treatment functioning is closer to the mean level of the normal population than the dysfunctional population. For the RCI, the authors propose that the standardized symptom change from pre- to post-treatment must exceed 1.96 (i.e., z score).

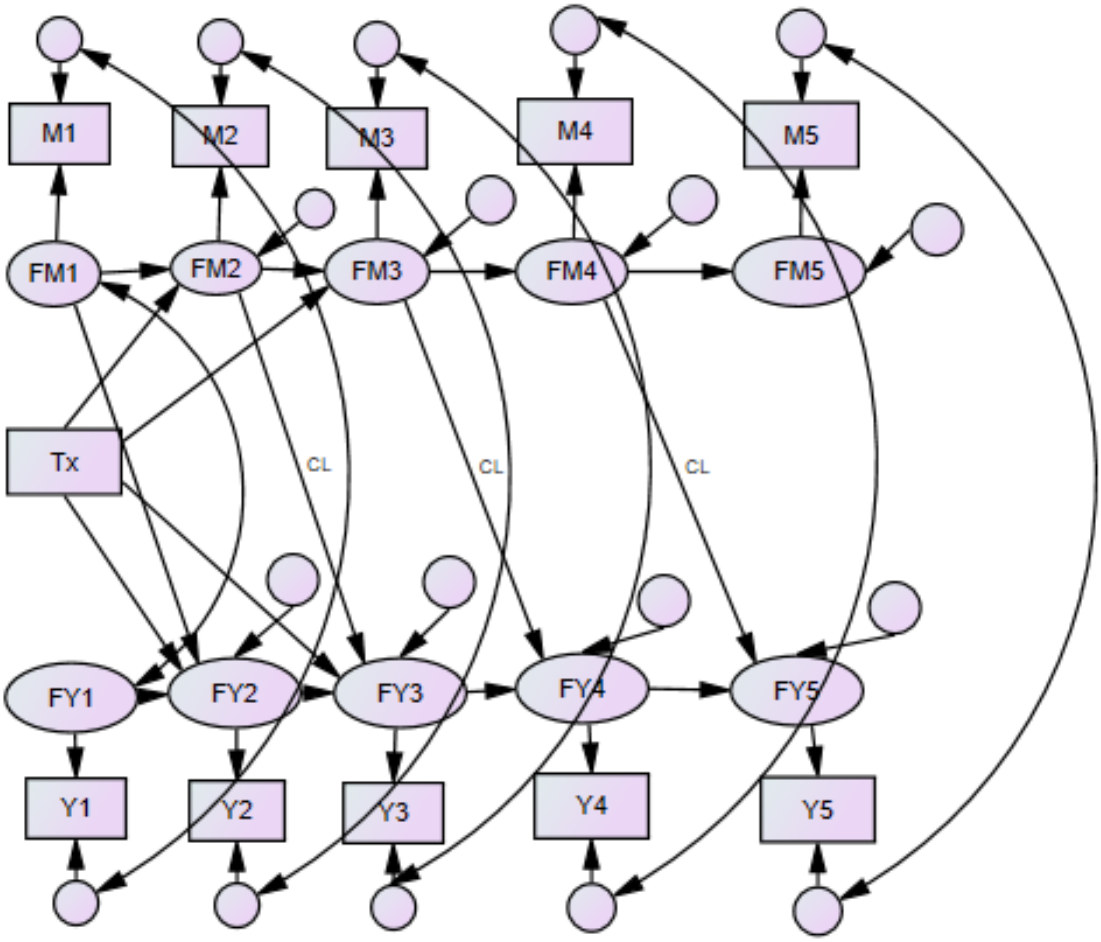

Figure 2. Simplex mediational model with lagged pathways.

Note. Tx = treatment condition; M1-M5 = mediator variables at each time point; Y1-Y5 = outcome variables at each time point; FM1-FM5 = latent mediator variables at each time point; FY1-FY5 = latent outcome variables at each time point; blank variables = error terms; CL = cross-lagged path from mediator to outcome variable.

To evaluate differential mediation between groups, I used SEM in the form of a simplex model with lagged pathways (see Figure 2), as per recent recommendations by Goldsmith et al. (2018). This model was chosen as it is designed for intervention-based longitudinal mediation analysis, and it is conducive to the study of temporal precedence – a major criteria required to establish mediation (Kazdin, 2007). In order to optimize pathway estimation and due to a lack of theoretical justification for doing otherwise, several constraints were placed on the model including: 1) keeping the lagged pathways between

mediator and outcome (see 'CL' in Figure 2) equal over time, 2) keeping mediator and outcome residual variances as equal, and 3) keeping the mediator-outcome residual covariances as equal, and 4) setting treatment paths to be zero for the fourth and fifth measures of the mediator and outcome variable, as the intervention was completed by the third assessment point. The seven mediators (comprising eight measures) selected *a priori* were substituted one by one into the model, making 16 models in total with the two outcome variables of SIAS and SPS. Overall model fit was assessed using root mean square error of approximation (RMSEA), Chi-Square Test of Model Fit, and the Comparative Fit Index. The effect of interest was the overall indirect effect which is calculated by multiplying the parameters for each indirect pathway and summing these together (see Table 9), and using 95% confidence intervals to assess significance. A significant overall indirect effect indicated a difference in mediation between cognitive restructuring and self-compassion.

I used the PROCESS macro (Hayes, 2013) for the more simplistic secondary exploratory analyses that did not involve repeated measurement of the mediators. These analyses examined the mediating role of treatment engagement: total words written and total level of self-compassion coded. Treatment condition was the predictor variable, and T5 SIAS/SPS scores the outcome variables of interest (controlling for baseline levels). Once again, the overall indirect effect was the effect of interest.

In order to replicate Study 1 models, I again used Random-Intercept Cross-Lagged Panel Modelling (RI-CLPM; see Hamaker et al., 2015). The Study 1 models evaluated whether self-criticism had an indirect effect on social anxiety through the mediation of perceived inferiority, and whether self-kindness had an indirect effect on social anxiety through the mediation of perceived inferiority and self-criticism. In Study 1, perceived inferiority and self-criticism were examined in separate models in relation to the indirect effect of self-kindness on social anxiety. In the current study, the greater number of

assessment points afforded the opportunity to both replicate these former models, and also expand on them by testing a four-level sequential model (i.e., self-kindness → self-criticism → perceived inferiority → social anxiety). RI-CLPM was used in order to control for between-person differences, with the overall indirect effect as the primary effect of interest. The individual indirect pathways were specified from Cole and Maxwell (2003, p. 564).

Finally, I examined the central proposition of compassion theorists that self-compassion leads to activation of the soothing system which in turns leads to a deactivation of the threat system. This proposition was tested using RI-CLPM, with positive aspects of self-compassion (PA-SC) as the independent variable, activation of the soothing system as the mediator (safe affect, social safeness and pleasure), and social anxiety (SIAS, SPS) as the outcome variable. For mediation analyses, variables were standardized in order to facilitate interpretation (Goldsmith et al., 2018). Analyses were conducted with IBM Statistical Package for the Social Sciences (SPSS), Version 25 (IBM Corp, 2017) and Mplus 3.13 (Muthén & Muthén, 2006). Interpretation of results was largely driven by effect sizes and confidence intervals (as opposed to statistical significance) as recommended by Cumming (2013).

4.3 Results

Data Screening

All variables were screened for normality, outliers, and missing values. Outliers were transformed by changing the score to be within one unit of the next most extreme value (Tabachnick & Fidell, 2013). Normality was screened by assessing the skewness and kurtosis of all scales. Only depression between T2 to T5 showed substantial (positive) skewness, however transforming these data did not change the pattern of the results and thus raw data is reported throughout.

Table 1
Demographic and diagnostic variables of the ITT sample. Frequency, means, and standard deviations (N = 119).

	SC (*n* = 60)	CR (*n* = 59)	Statistics
Demographics			
Gender (male/female)	15/45	13/46	χ^2 (1) = 0.15, *p* = .70
Age (in years)	30.93 (12.37)	27.12 (10.64)	*t*(115) = -1.81, *p* = .07
Therapy in past 12 months % (n)	40.0 (24)	42.4, (25)	χ^2 (1) = 0.07, *p* = .79
Student (student vs. non-student)	27/33	35/24	χ^2 (1) = 2.45, *p* = .118
DSM-5 diagnoses % (n)			
SAD	85.0 (51)	69.5 (41)	χ^2 (1) = 4.08, *p* = .04
Sub-threshold SAD	3.3 (2)	15.3 (9)	χ^2 (1) = 5.04, *p* = .03
Full or sub-threshold SAD	88.3 (53)	84.7 (50)	χ^2 (1) = 0.33, *p* = .57
MDD (current)	25.0 (15)	23.7 (14)	χ^2 (1) = 0.00, *p* = .97
MDD (past)	58.3 (35)	52.5 (31)	χ^2 (1) = 0.40, *p* = .53
Bipolar (current)	1.7 (1)	0.0 (0)	χ^2 (1) = 0.99, *p* = .32
Bipolar (past)	16.7 (10)	22.0 (13)	χ^2 (1) = 0.55, *p* = .46
Panic (current)	25.0 (15)	25.4 (15)	χ^2 (1) = 0.00, *p* = .96
Panic (past)	50.0 (30)	49.2 (29)	χ^2 (1) = 0.01, *p* = .93
Agoraphobia	26.7 (16)	18.6 (11)	χ^2 (1) = 1.09, *p* = .30
OCD	13.3 (8)	18.6 (11)	χ^2 (1) = 0.63, *p* = .43
PTSD	13.3 (8)	16.9 (10)	χ^2 (1) = 0.30, *p* = .58
Alcohol abuse	30.0 (18)	28.8 (17)	χ^2 (1) = 0.02, *p* = .89
Substance abuse	6.7 (4)	8.5 (5)	χ^2 (1) = 0.14, *p* = .71
Eating disorder	8.3 (5)	8.5 (5)	χ^2 (1) = 0.00, *p* = .98
GAD	36.7 (22)	25.4 (15)	χ^2 (1) = 1.76, *p* = .19

Note: SC = self-compassion; CR = cognitive restructuring; SAD = Social Anxiety Disorder; MDD = Major Depressive Disorder; OCD = Obsessive Compulsive Disorder; PTSD = Posttraumatic Stress Disorder; GAD = Generalized Anxiety Disorder; Student = student status (university student versus non-university student).

Preliminary Analyses

Baseline demographic and diagnostic characteristics can be seen in Table 1, and Table 2 summarizes self-report measures at baseline. There were relatively few differences between groups, although a higher number of participants in self-compassion met full SAD diagnostic criteria whereas greater numbers of subthreshold SAD participants were seen cognitive-restructuring. However, there were no differences between the groups for those characterized as having full *or* subthreshold SAD (it should also be remembered that subthreshold occurred when an individual was only 1 symptom short of meeting full criteria). Differences in psychological measures were found on the SIAS (higher scores in self-compassion group; d = 0.37) and in terms of positive aspects of social self-compassion (PA-SSC; higher scores in cognitive restructuring group; d = 0.40). As such, mixed model analyses using these constructs as outcome variables ran analyses both before and after controlling for their baseline levels and did not find any difference in results.

Table 2

Self-report psychological variables of the ITT sample. Means, and standard deviations (in parentheses) (N = 119).

	SC (n = 60)	CR (n = 59)	Statistics
SPIN	44.05 (8.67)	41.36 (9.14)	$t(117) = -1.65$, $p = .10$
SIAS	51.39 (12.20)	46.53 (13.48)	$t(115) = -2.04$, $p = .04$
SPS	35.97 (14.09)	33.47 (13.36)	$t(115) = -0.98$, $p = .33$
Self-criticism	32.46 (14.37)	31.78 (11.76)	$t(111) = -0.28$, $p = .78$
PA-SSC	15.01 (3.85)	16.77 (4.57)	$t(115) = 2.17$, $p = .03$
NA-SSC	23.90 (4.46)	22.79 (3.79)	$t(115) = -1.44$, $p = .15$
PA-SC	33.07 (9.22)	34.28 (8.98)	$t(115) = 0.72$, $p = .47$
NA-SC	45.25 (8.57)	44.12 (7.25)	$t(115) = -0.77$, $p = .44$
Post-event processing	10.47 (3.98)	8.98 (4.30)	$t(115) = 0.56$, $p = .06$
Anticipatory processing	18.09 (5.90)	16.34 (5.48)	$t(114) = -1.65$, $p = .10$
Safe positive-affect	6.71 (3.44)	6.76 (3.18)	$t(114) = 0.08$, $p = .93$

Social-safeness	18.48 (9.23)	19.71 (8.84)	$t(114) = 0.73$, $p = .47$
Fear of self-compassion	24.31 (12.35)	26.69 (11.57)	$t(115) = 1.08$, $p = .28$
Depression	17.80 (12.67)	16.21 (10.21)	$t(111) = -0.75$, $p = .46$
Probability bias	39.26 (9.45)	36.66 (9.76)	$t(114) = -1.46$, $p = .15$
Cost bias	45.86 (10.24)	43.78 (9.45)	$t(114) = -1.14$, $p = .26$
Perceived Inferiority	79.25 (15.02)	80.50 (14.47)	$t(115) = 0.73$, $p = .65$

Note. SC = self-compassion; CR = cognitive restructuring; SPIN = Social Phobia Inventory; SIAS = Social Interaction Anxiety Scale; SPS = Social Phobia Scale; PA-SSC = Positive Aspects of Social Self-Compassion; NA-SSC = Negative Aspects of Social Self-Compassion; PA-SC = Positive Aspects of Self-Compassion; NA-SC = Negative Aspects of Self-Compassion.

The cognitive restructuring group completed a significantly greater number of assessments across the study, $t(102) = 2.48$, $p = .02$, $d = 0.49$. There were 10 formal drop-outs[8]: eight in self-compassion and two in cognitive restructuring. This difference approached significance, $\chi^2 (1) = 3.82$, $p = .051$. The majority of these participants ($n = 6$) dropped out by the 4th day of the intervention. Reasons for drop out in the self-compassion condition included: 1) finding the exercises unhelpful ($n = 3$), 2) time commitments ($n = 2$), 3) experiencing anxiety from study reminders, 4) starting a different therapy program, and 5) unspecified. In the cognitive restructuring group, one drop-out participant found the questionnaires too long, and the other did not report a reason. Group comparisons between drop-outs and completers showed no differences on diagnostic variables (ps > .05), but numerous differences on baseline self-report variables (see Table 3), with drop-outs generally demonstrating greater psychopathology and lower treatment credibility ratings. As an indicator of the number of participants who received a substantial dosage of the interventions, 72.3% of the sample completed 11 or more of the 14 total exercises. There was a significant

[8] I.e., participants who explicitly asked to withdraw from the study.

difference in treatment dosage whereby 81.4% in cognitive restructuring completed 11+ exercises compared to 63.3% in self-compassion (χ^2 [1] = 4.82, p = .028).

Table 3

Self-report psychological variables for the ITT sample. Means and standard deviations (in parentheses) (N = 119).

	Drop-outs (n = 10)	Completers (n = 109)	Statistics
SPIN	43.10 (8.54)	42.68 (9.01)	t(117) = -0.141, p = .888
SIAS	52.33 (13.87)	48.70 (12.98)	t(115) = -0.802, p = .424
SPS	34.33 (14.52)	34.75 (13.73)	t(114) = 0.087, p = .931
Self-criticism	42.89 (9.66)	31.22 (12.97)	t(115) = -2.63, p = .010
PA-SSC	12.89 (3.66)	16.16 (4.26)	t(115) = 2.23, p = .027
NA-SSC	25.44 (3.54)	23.18 (4.17)	t(115) = -1.58, p = .116
PA-SC	28.56 (6.89)	34.09 (9.14)	t(115) = 1.77, p = .079
NA-SC	52.00 (5.48)	44.08 (7.81)	t(115) = -2.97, p = .004
Post-event processing	11.50 (4.28)	9.59 (4.18)	t(114) = -1.24, p = .216
Anticipatory processing	19.50 (6.12)	17.05 (5.70)	t(114) = -1.17, p = .245
Safe positive-affect	4.13 (2.47)	6.93 (3.27)	t(114) = 2.37, p = .020
Social-safeness	13.75 (6.07)	19.49 (9.10)	t(114) = 1.75, p = .082
Fear of self-compassion	26.67 (10.76)	25.39 (12.11)	t(115) = -0.31, p = .760
Depression	26.67 (14.63)	16.20 (10.90)	t(115) = -2.69, p = .008
Probability bias	47.63 (8.72)	37.24 (9.36)	t(114) = -3.04, p = .003

Cost bias	51.50 (7.65)	44.32 (9.86)	$t(114) = -2.01$, $p = .047$
Perceived Inferiority	86.22 (10.40)	79.34 (14.92)	$t(115) = -1.35$, $p = .179$
Credibility	6.71 (2.63)	9.98 (2.37)	$t(106) = 3.50$, $p = .001$

Note. SPIN = Social Phobia Inventory; SIAS = Social Interaction Anxiety Scale; SPS = Social Phobia Scale; PA-SSC = Positive Aspects of Social Self-Compassion; NA-SSC = Negative Aspects of Social Self-Compassion; PA-SC = Positive Aspects of Self-Compassion; NA-SC = Negative Aspects of Self-Compassion.

Treatment Credibility, Engagement and Adherence

Table 4 shows that the cognitive restructuring group reported spending significantly more time on exercises, wrote more in the exercises, and completed a greater number of assessments than the self-compassion group. When comparing the level of self-compassion coded in the exercises, the self-compassion group had a significantly greater level. There was also a trend towards participants in cognitive restructuring judging their treatment as more credible at baseline then those in self-compassion.

Table 4

Treatment engagement and adherence differences between groups. Means, standard deviations, effect sizes, and confidence intervals (N = 119).

	SC (*n* = 60)	CR (*n* = 59)	*t* test	Cohen's *d* (CI 95%)
Treatment credibility	9.30 (2.39)	10.24 (2.44)	$t(106) = 0.73$, $p = .050$	0.13 (-0.23, 0.49)
Exercises completed	10.32 (4.94)	11.90 (3.66)	$t(109) = 1.99$, $p = .049$	0.36 (0.00, 0.73)
Self-reported total minutes on exercises	93.55 (59.46)	151.39 (107.95)	$t(117) = 3.63$, $p < .001$	0.67 (0.30, 1.03)
Words written	1497.88 (1060.10)	1974.56 (1095.22)	$t(117) = 2.41$, $p = .017$	0.44 (0.08, 0.81)
Self-compassion level coded	23.28 (14.25)	15.61 (9.13)	$t(101) = -3.50$, $p = .001$	-0.64 (-1.01, -0.27)
Continued practice	3.86 (1.51)	3.75 (1.55)	$t(91) = -0.35$, $p = .726$	-0.06 (-0.42, 0.30)

Note. SC = Self-Compassion; CR = Cognitive Restructuring; Self-compassion level refers to amount of self-compassion coded in exercises; Continued practice variable refers to number of informal practices of exercises since post-treatment and ranges from 2-9.

Mixed Model Analyses

Table 5 demonstrates that as expected no interaction effects were found between treatment group and time on any primary or secondary outcome variables. As predicted there were significant main effects of time, seen for all outcome variables (there was also an unanticipated main effect of group on SPS). Figure 3 plots the mean changes over time for the primary outcome variables. Table 6 displays the between- and within-group effect sizes for the SIAS and SPS. Within-group effect sizes for social anxiety were generally small from baseline to T2 and T3, and medium-sized from baseline to T4 and T5. Between-group differences demonstrated an opposite effect on the SIAS and SPS. For the SIAS at T1, there was a significant between-group difference (higher scores for self-compassion), but this difference was no longer significant by T2 and thereafter. For the SPS at T1, there was no significant between-group difference, but this difference became significant at T4 and thereafter (higher scores for self-compassion). In other words, between-group differences decreased over time for the SIAS and increased over time for the SPS.

Table 5

Estimated marginal means, standard deviations, main effects of group and time, and interaction effects of group by time for all primary and secondary outcome variables.

Group	Variable	T1 *M* (*SD*)	T2 *M* (*SD*)	T3 *M* (*SD*)	T4 *M* (*SD*)	T5 *M* (*SD*)	Time	Group	Time × Group interaction
CR	SIAS	46.53 (13.48)	44.53 (11.67)	39.74 (12.94)	37.62 (13.58)	36.64 (14.34)	$F(4, 97) = 21.66$, $p < .001$	$F(1, 115) = 2.55$, $p = .113$	$F(4, 97) = 0.71$, $p = .589$
SC	SIAS	51.39 (12.20)	46.38 (10.63)	43.67 (13.11)	41.02 (12.96)	40.27 (15.78)			
CR	SPS	33.47 (13.36)	31.09 (12.20)	26.09 (13.60)	23.27 (13.59)	21.63 (14.24)	$F(4, 100) = 14.76$, $p < .001$	$F(1, 111) = 4.07$, $p = .046$	$F(4, 100) = 0.41$, $p = .800$
SC	SPS	35.97 (14.09)	35.04 (14.16)	32.67 (15.42)	29.41 (15.09)	28.13 (16.37)			
CR	S-crit	31.78 (11.76)	29.58 (12.27)	25.98 (13.56)	24.42 (14.80)	23.53 (14.98)	$F(4, 101) = 13.48$, $p < .001$	$F(1, 113) = 0.00$, $p = .993$	$F(4, 101) = 0.40$, $p = .807$
SC	S-crit	32.46 (14.37)	27.56 (14.66)	23.91 (14.51)	22.74 (15.53)	23.13 (14.84)			
CR	PA-SSC	16.76 (4.57)	17.25 (4.16)	17.44 (4.63)	17.58 (4.88)	18.47 (4.46)	$F(4, 99) = 10.68$, $p < .001$	$F(1, 113) = 1.19$, $p = .277$	$F(4, 99) = 1.36$, $p = .253$
SC	PA-SSC	15.07 (3.85)	17.10 (3.63)	17.17 (4.35)	16.83 (4.24)	18.38 (4.15)			
CR	NA-SSC	22.79 (3.79)	21.27 (3.82)	20.87 (4.07)	20.00 (4.50)	19.42 (4.59)	$F(4, 101) = 16.30$, $p < .001$	$F(1, 111) = 0.82$, $p = .368$	$F(4, 101) = 1.93$, $p = .112$
SC	NA-SSC	23.90 (4.46)	22.00 (4.41)	20.87 (4.69)	20.20 (5.36)	20.69 (5.14)			
CR	PA-SC	34.28 (8.98)	36.35 (9.25)	36.43 (8.54)	37.44 (9.46)	37.50 (10.22)	$F(4, 100) = 5.58$, $p < .001$	$F(1, 115) = 0.16$, $p = .688$	$F(4, 100) = 0.55$, $p = .700$
SC	PA-SC	33.07 (9.22)	35.96 (8.30)	37.00 (9.47)	37.13 (8.91)	37.48 (10.02)			
CR	NA-SC	44.12 (7.25)	42.73 (7.76)	41.13 (8.21)	40.25 (8.64)	38.07 (9.97)	$F(4, 99) = 12.33$, $p < .001$	$F(1, 114) = 0.10$, $p = .747$	$F(4, 99) = 0.84$, $p = .502$
SC	NA-SC	45.25 (8.57)	42.50 (8.73)	40.22 (9.31)	40.50 (10.71)	39.27 (10.93)			
CR	PEP	8.98 (4.30)	8.45 (4.12)	7.74 (3.86)	7.47 (4.35)	7.24 (4.51)	$F(4, 99) = 7.36$, $p < .001$	$F(1, 113) = 0.21$, $p = .649$	$F(4, 99) = 1.09$, $p = .366$
SC	PEP	10.47 (3.98)	8.73 (3.73)	7.67 (4.89)	7.37 (4.99)	7.66 (5.42)			

CR	AP	16.34 (5.48)	15.78 (5.12)	14.50 (5.79)	13.13 (6.84)	12.80 (5.85)	$F(4, 98) = 11.12$, $p < .001$	$F(1, 113) = 0.18$, $p = .670$	$F(4, 98) = 1.12$, $p = .349$
SC	AP	18.09 (5.90)	15.71 (6.42)	14.53 (7.17)	13.72 (8.06)	12.95 (8.40)			
CR	Safe-PA	6.76 (3.18)	7.60 (3.35)	7.43 (3.17)	7.81 (3.47)	8.19 (3.25)	$F(4, 100) = 5.60$, $p < .001$	$F(1, 114) = 0.02$, $p = .902$	$F(4, 100) = .22$, $p = .926$
SC	Safe-PA	6.71 (3.44)	7.28 (3.44)	7.60 (3.29)	7.89 (3.68)	8.14 (3.81)			
CR	SSP	19.71 (8.84)	21.80 (8.99)	22.87 (9.86)	23.25 (10.45)	23.98 (10.33)	$F(4, 100) = 6.84$, $p < .001$	$F(1, 112) = 0.25$, $p = .621$	$F(4, 100) = 0.46$, $p = .765$
SC	SSP	18.48 (9.23)	22.23 (8.33)	22.57 (9.14)	23.28 (9.93)	24.61 (9.64)			
CR	FOC	26.69 (11.57)	25.56 (13.54)	22.22 (13.51)	20.89 (15.16)	19.50 (14.62)	$F(4, 98) = 11.03$, $p < .001$	$F(1, 116) = 0.86$, $p = .349$	$F(4, 98) = 0.37$, $p = .832$
SC	FOC	24.31 (12.35)	23.15 (11.98)	20.09 (11.67)	20.00 (12.98)	19.02 (13.41)			
CR	DASS-D	16.21 (10.21)	15.13 (11.62)	12.37 (10.86)	13.09 (11.66)	13.82 (12.26)	$F(4, 99) = 8.51$, $p < .001$	$F(1, 109) = 0.19$, $p = .668$	$F(4, 99) = 1.12$, $p = .353$
SC	DASS-D	17.80 (12.67)	12.79 (11.42)	10.35 (10.03)	10.61 (11.27)	11.91 (11.86)			
CR	Prob-bias	36.66 (9.76)	35.85 (9.49)	33.56 (8.91)	33.11 (10.06)	33.04 (10.10)	$F(4, 98) = 5.14$, $p = .001$	$F(1, 109) = 3.05$, $p = .083$	$F(4, 98) = 0.43$, $p = .850$
SC	Prob-bias	39.26 (9.45)	36.85 (8.91)	36.52 (10.04)	35.85 (10.33)	36.48 (11.32)			
CR	Cost-bias	43.78 (9.45)	40.05 (9.43)	37.20 (10.56)	36.29 (10.80)	35.30 (11.51)	$F(4, 95) = 14.91$, $p < .001$	$F(1, 113) = 2.24$, $p = .137$	$F(4, 95) = 0.21$, $p = .932$
SC	Cost-bias	45.86 (10.24)	42.90 (11.01)	40.57 (11.77)	39.07 (11.36)	38.11 (12.35)			
CR	Inferiority	80.50 (14.47)	74.07 (15.57)	72.02 (15.12)	71.95 (14.65)	69.95 (15.45)	$F(4, 101) = 14.05$, $p < .001$	$F(1, 113) = .02$, $p = .894$	$F(4, 101) = 0.41$, $p = .802$
SC	Inferiority	79.25 (15.02)	74.57 (13.40)	72.93 (15.00)	72.48 (15.26)	71.87 (17.55)			

Note. CR = Cognitive Restructuring; SC = Self-Compassion; Time = main effect of time; Group = main effect of group; Time X group = time by group interaction; SIAS = Social Interaction Anxiety Scale; SPS = Social Phobia Scale; S-crit = Self-Criticism; PA-SSC = Positive Aspects of Social Self-Compassion; NA-SSC = Negative Aspects of Social Self-Compassion; PA-SC = Positive Aspects of Self-Compassion; NA-SC = Negative Aspects of Self-Compassion; PEP = Post Event Processing; AP = Anticipatory Processing; Safe-PA = Safe Positive Affect; SSP = Social Safeness and Pleasure; FOC = Fear of Self-Compassion; DASS-D = Depression; Prob-bias = Probability Bias; Inferiority = Perceived Inferiority.

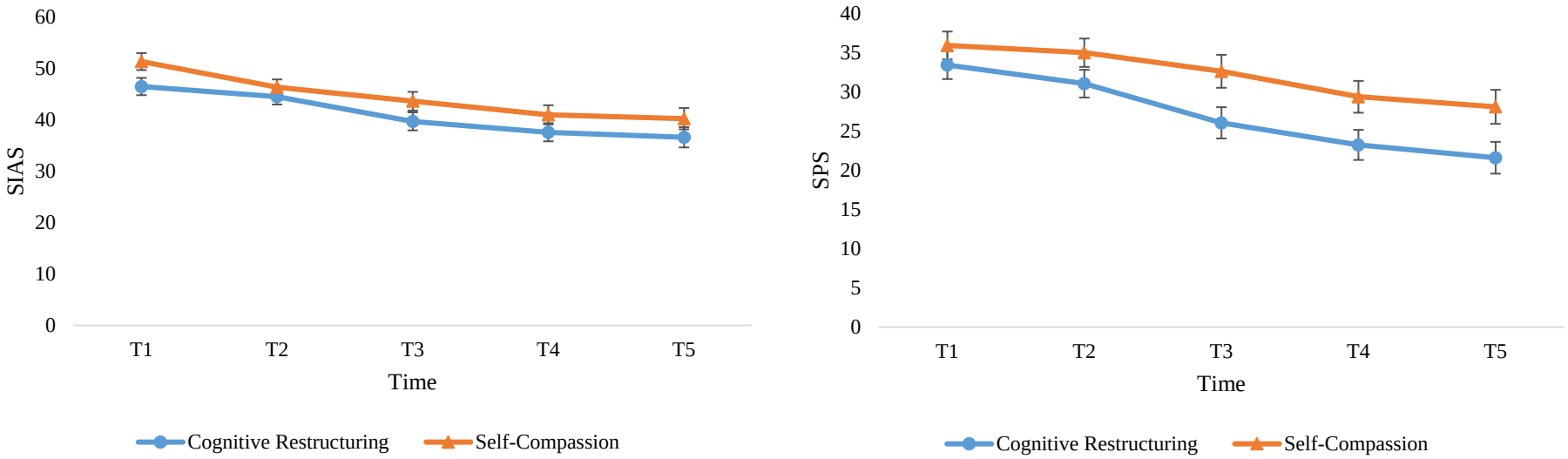

Figure 3. Social Interaction Anxiety Scale and Social Phobia Scale scores by group and time. Error bars reflect standard errors.

Table 6

Within- and between-group pooled effect sizes (Cohen's d*) [and 95% confidence intervals] from pre- to 5-week follow-up on primary measures (N = 119).*

Time	Group	SIAS	SPS
Within-Group *d* from Baseline to Each Follow-Up			
T2	CR	0.18 [-0.18, 0.54]	0.19 [-0.18, 0.55]
	SC	0.39 [0.03, 0.75]	0.06 [-0.30, 0.41]
T3	CR	0.48 [0.11, 0.84]	0.46 [0.09, 0.82]
	SC	0.58 [0.22, 0.95]	0.26 [-0.10, 0.62]
T4	CR	0.67 [0.29, 1.04]	0.69 [0.32, 1.07]
	SC	0.74 [0.37, 1.11]	0.44 [0.08, 0.81]
T5	CR	0.70 [0.33, 1.07]	0.80 [0.42, 1.17]
	SC	0.77 [0.40, 1.14]	0.53 [0.17, 0.90]
Between-Group *d* at Each Assessment [a]			
T1	-	0.38 [0.02, 0.74]	0.19 [-0.17, 0.55]
T2	-	0.20 [-0.16, 0.56]	0.32 [-0.05, 0.68]
T3	-	0.24 [-0.12, 0.60]	0.34 [-0.03, 0.70]
T4	-	0.26 [-0.10, 0.62]	0.39 [0.03, 0.75]
T5	-	0.23 [-0.13, 0.59]	0.38 [0.02, 0.74]

Note. CR = Cognitive Restructuring; SC = Self-Compassion; SIAS = Social Interaction Anxiety Scale; SPS = Social Phobia Scale; T1 = baseline; T2 = mid-treatment; T3 = post-treatment; T4 = 1-week follow-up; T5 = 5-week follow-up.
[a] Positive values reflect that Self-Compassion scores are higher than Cognitive Restructuring Scores.

Clinical Significance of Change and Adverse Outcomes

As summarized in Table 7, no significant differences emerged between conditions in terms of reliable and clinically signficant indices of change. Although only a two-week intervention, approximately 20% of participants in each condition showed a reliable (i.e., statistical) reduction in SAD symptoms between pre-treatment and subsequent assessments.

In terms of adverse outcomes, qualitatively, one dropout from self-compassion reported experiencing significant distress as a result of the exercises. No other significant events were reported. An RCI can be calculated to detect statistically significant worsening for each participant. During the intervention period (pre-post), no participants had adverse outcomes on the SIAS, while on the SPS, nine participants had worsening of symptoms; six in self-compassion and three in cognitive restructuring. No difference in treatment dosage was found between those who experienced adverse outcomes during the intervention versus those who did not, $t(11) = -1.51$, $p = .161$. Examining later assessment points, on the SIAS, adverse outcomes were found for one participant in cognitive restructuring between pre- and 1-week follow-up, and two participants in self-compassion between pre- and 5-week follow-up. For the SPS, worsening of symptoms was observed for four self-compassion participants between pre- and 1-week follow-up, and, one cognitive restructuring and four self-compassion participants between pre-and 5-week follow-up.

Table 7

Frequencies of reliable and clinically significant change between groups with comparison statistics between baseline and follow-ups.

		SIAS			SPS		
		CR	SC		CR	SC	
Time	Measure	% (*n*)	% (*n*)	Comparison	% (*n*)	% (*n*)	Comparison
T3	RCI	18.6 (11)	21.7 (13)	χ^2 (1) = 0.17, *p* = .681	20.3 (12)	20.0 (12)	χ^2 (1) = 0.00, *p* = .963
	Clin status	20.4 (10)	23.6 (13)	χ^2 (1) = 0.16, *p* = .692	27.3 (12)	26.1 (12)	χ^2 (1) = 0.02, *p* = .899
	Both	12.2 (6)	12.7 (7)	χ^2 (1) = 0.01, *p* = .941	20.5 (9)	15.2 (7)	χ^2 (1) = 0.42, *p* = .516
T4	RCI	25.4 (15)	23.3 (14)	χ^2 (1) = 0.07, *p* = .791	30.5 (18)	16.7 (10)	χ^2 (1) = 3.17, *p* = .075
	Clin status	28.6 (14)	25.5 (14)	χ^2 (1) = 0.13, *p* = .721	40.9 (18)	21.7 (10)	χ^2 (1) = 3.86, *p* = .050
	Both	16.3 (8)	12.7 (7)	χ^2 (1) = 0.27, *p* = .602	13.6 (6)	13.0 (6)	χ^2 (1) = 0.01, *p* = .934
T5	RCI	30.5 (18)	30.0 (18)	χ^2 (1) = 0.00, *p* = .952	37.3 (22)	26.7 (16)	χ^2 (1) = 1.54 *p* = .214
	Clin status	34.7 (17)	30.9 (17)	χ^2 (1) = 0.17, *p* = .681	50.0 (22)	40.5 (15)	χ^2 (1) = 2.81 *p* = .094
	Both	18.4 (9)	20.0 (11)	χ^2 (1) = 0.04, *p* = .833	18.2 (8)	17.4 (8)	χ^2 (1) = 0.01, *p* = .922

Note. T3 = post-treatment; T4 = 1-week follow-up; T5 = 5-week follow-up; SIAS = Social Interaction Anxiety Scale; SPS = Social Phobia Scale; CR = Cognitive Restructuring; SC = Self-Compassion; RCI = Reliable Change Index; Clin status = change from above to below cut-off; Both = meeting both RCI and Clin status requirement.

Moderation

Table 8 shows the mixed model results for both *a priori* and exploratory moderator analyses. Contrary to prediction, none of the *a priori* moderators (self-criticism and fear of self-compassion) were statistically significant (i.e., no group by time by moderator interactions were evident). There were 19 potential moderators that were tested as part of a post-hoc exploratory approach. Only one exploratory moderator was significant for the outcome variable of SIAS: baseline SPIN. Figure 4 represents this interaction graphically (using moderator values at the mean, as well as 1 *SD* above and below), although it is acknowledged that this may be a spurious finding given the number of moderators examined. The interaction appeared to be driven by a slightly differential pattern of symptom change between the two treatment conditions in those with relatively low SPIN scores at baseline. At average or higher levels of anxiety as measured by the SPIN, trajectories of those in cognitive restructuring and self-compassion are similar (i.e., no significant between-group differences at any time points). In contrast, for those with lower levels of social anxiety, there was a small baseline difference between groups, $d = 0.36$, CI_{95} [0.001, 0.73], but this difference became non-significant at T2, $d = 0.13$, CI_{95} [-0.23, 0.49], and T3, $d = 0.16$, CI_{95} [-0.20, 0.52]. However, at T4 the groups diverged as CR scores decreased and SC scores increased with a significant between group difference, $d = 0.67$, CI_{95} [0.30, 1.04]. At T5 the groups converged to a small degree with the difference returning to a similar sized discrepancy as was seen at baseline, $d = 0.35$, CI_{95} [-0.01, 0.71]. However, differences between groups were minimal at T5. Most variables explored for moderation were non-specific predictors of outcome.

Table 8

Main effects of moderator, unstandardized betas of main effects of moderator, and time by group by moderator interaction statistics for SIAS and SPS.

	SIAS			SPS		
	M.E. of Moderator	*b*	Time × Group × Moderator	M.E. Moderator	*b*	Time × Group × Moderator
S-crit	$F(1, 111) = 35.56$, $p < .001$	0.33	$F(4, 97) = 0.87$, $p = .483$	$F(1, 105) = 35.11$, $p < .001$	0.38	$F(4, 97) = 1.10$, $p = .362$
FOC	$F(1, 111) = 17.18$, $p < .001$	0.32	$F(4, 96) = 0.84$, $p = .505$	$F(1, 107) = 27.95$, $p < .001$	0.45	$F(4, 98) = 0.97$, $p = .426$
AP	$F(1, 109) = 26.90$, $p < .001$	0.91	$F(4, 95) = 0.10$, $p = .981$	$F(1, 102) = 25.86$, $p < .001$	0.85	$F(4, 97) = 0.05$, $p = .996$
Age	$F(1, 109) = 0.31$, $p = .579$	-0.23	$F(4, 94) = 0.21$, $p = .931$	$F(1, 105) = 0.79$, $p = .377$	-0.25	$F(4, 97) = 0.26$, $p = .905$
Cost-bias	$F(1, 104) = 45.85$, $p < .001$	0.79	$F(4, 93) = 1.22$, $p = .309$	$F(1, 102) = 47.03$, $p < .001$	0.68	$F(4, 97) = 0.37$, $p = .830$
Cred	$F(1, 108) = 6.91$, $p = .010$	-1.08	$F(4, 89) = 2.30$, $p = .064$	$F(1, 104) = 0.76$, $p = .387$	-0.87	$F(4, 94) = 1.57$, $p = .190$
Diagnosis	$F(1, 114) = 19.84$, $p < .001$	3.04	$F(4, 95) = 0.97$, $p = .430$	$F(1, 110) = 36.38$, $p < .001$	3.22	$F(4, 98) = 1.09$, $p = .364$
DASS-D	$F(1, 117) = 26.96$, $p < .001$	0.37	$F(4, 100) = 0.34$, $p = .848$	$F(1, 112) = 25.73$, $p < .001$	0.51	$F(4, 101) = 1.06$, $p = .381$
Gender	$F(1, 121) = 1.22$, $p = .271$	1.49	$F(4, 101) = 0.67$, $p = .612$	$F(1, 117) = 1.73$, $p = .191$	8.03	$F(4, 105) = 1.03$, $p = .394$
Inferiority	$F(1, 109) = 86.49$, $p < .001$	0.64	$F(4, 96) = 1.92$, $p = .113$	$F(1, 110) = 22.75$, $p < .001$	0.54	$F(4, 98) = 2.16$, $p = .079$
MDD	$F(1, 117) = 13.90$, $p < .001$	11.99	$F(4, 98) = 0.94$, $p = .447$	$F(1, 98) = 11.95$, $p = .001$	12.89	$F(4, 99) = 1.38$, $p = .245$
NA-SC	$F(1, 108) = 33.45$, $p < .001$	0.62	$F(4, 96) = 0.09$, $p = .985$	$F(1, 105) = 22.70$, $p < .001$	0.53	$F(4, 98) = 0.23$, $p = .924$
NA-SSC	$F(1, 107) = 37.70$, $p < .001$	1.24	$F(4, 96) = 0.61$, $p = .654$	$F(1, 105) = 31.84$, $p < .001$	1.03	$F(4, 97) = 0.65$, $p = .628$
PA-SC	$F(1, 109) = 20.95$, $p < .001$	-0.55	$F(4, 94) = 0.27$, $p = .895$	$F(1, 108) = 9.34$, $p = .003$	-0.42	$F(4, 96) = 0.74$, $p = .570$
PA-SSC	$F(1, 116) = 16.15$, $p < .001$	-1.25	$F(4, 96) = 0.92$, $p = .456$	$F(1, 114) = 9.10$, $p = .003$	-1.23	$F(4, 98) = 0.29$, $p = .886$
PEP	$F(1, 110) = 23.03$, $p < .001$	1.47	$F(4, 95) = 0.41$, $p = .803$	$F(1, 105) = 35.98$, $p < .001$	1.86	$F(4, 97) = 0.52$, $p = .720$
Prob-bias	$F(1, 115) = 52.51$, $p < .001$	1.06	$F(4, 97) = 1.89$, $p = .119$	$F(1, 110) = 39.30$, $p < .001$	0.95	$F(4, 99) = 0.55$, $p = .701$
Safe-PA	$F(1, 108) = 18.50$, $p < .001$	-1.6	$F(4, 94) = 0.54$, $p = .709$	$F(1, 107) = 8.94$, $p = .003$	-1.54	$F(4, 97) = 0.47$, $p = .761$
SPIN	$F(1, 110) = 17.58$, $p < .001$	0.28	$F(4, 100) = 4.24$, $p = .003$	$F(1, 107) = 23.65$, $p < .001$	0.23	$F(4, 101) = 1.11$, $p = .356$
SSP	$F(1, 107) = 35.68$, $p < .001$	-0.53	$F(4, 94) = 0.78$, $p = .544$	$F(1, 108) = 6.03$, $p = .016$	-0.3	$F(4, 96) = 0.91$, $p = .464$
Therapy	$F(1, 115) = 5.28$, $p = .023$	8.07	$F(4, 95) = 0.82$, $p = .517$	$F(1, 112) = 0.28$, $p = .596$	2.85	$F(4, 99) = 1.59$, $p = .184$

Note. M.E. of Moderator = main effect of moderator; *b* = unstandardized beta of main effect of moderator; SIAS = Social Interaction Anxiety Scale; SPS = Social Phobia Scale; S-crit = Self-Criticism; FOC = Fear of Self-Compassion; AP = Anticipatory Processing; Age = age of

participants in years; Cred = treatment credibility; Diagnosis = number of DSM-5 diagnoses; DASS-D = Depression; MDD = diagnosis of Major Depressive Disorder; PA-SSC = Positive Aspects of Social Self-Compassion; NA-SSC = Negative Aspects of Social Self-Compassion; PA-SC = Positive Aspects of Self-Compassion; NA-SC = Negative Aspects of Self-Compassion; PEP = Post Event Processing;; Safe-PA = Safe Positive Affect; SSP = Social Safeness and Pleasure; Prob-bias = Probability Bias; Inferiority = Perceived Inferiority; Therapy = received therapy in past 12 months.

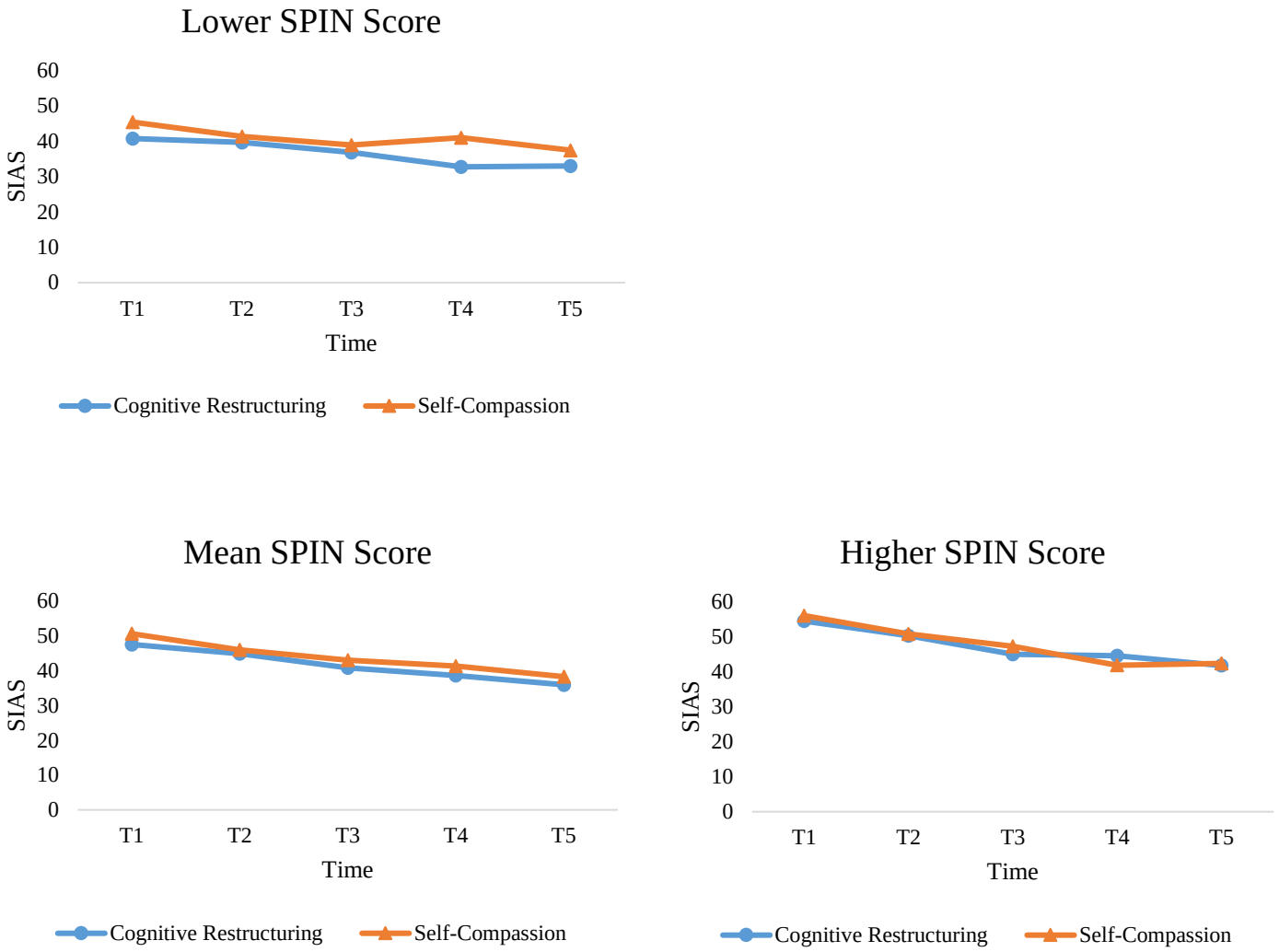

Figure 4. Group by Time interaction for SIAS at varying levels of baseline SPIN severity (mean of SPIN and 1 *SD* above and below).

Differential Mediation

Table 9 shows there were no significant overall indirect effects from the primary mediation analyses. Specifically, none of the proposed mediators differentially mediated the relationship between treatment condition (self-compassion versus cognitive restructuring) and social anxiety (SIAS, SPS). In relation to the exploratory analyses of treatment engagement using PROCESS (remembering the two groups differed in level of engagement), for the SIAS, the indirect effect of number of words written was non-significant, b = 0.18, SE = 0.40, CI_{95} [-0.47, 1.14], as was the indirect effect of coded levels of self-compassion, b = -1.22, SE = 1.33, CI_{95} [-4.15, 1.06]. Similarly, for the SPS, the indirect effect of number of words written was non-significant, b = 0.34, SE = 0.52, CI_{95} [-0.58, 1.56], as was the indirect effect of level of self-compassion, b = -1.84, SE = 1.45, CI_{95} [-4.90, 0.79].

Table 9

Mediation model fit indices, and overall direct and indirect effect estimates of treatment group on outcome variables of SIAS and SPS for T5.

	SIAS					SPS				
	Model χ^2	RMSEA [90% CI]	CFI	Direct [95% CI]	Indirect [95% CI]	Model χ^2	RMSEA [90% CI]	CFI	Direct [95% CI]	Indirect [95% CI]
Inferiority	58.05 [a]	0.07	0.98	0.03	0.02	39.18 [a]	0.02	1.00	0.11	0.02
	df = 38	[0.03, 0.10]		[-0.09, 0.13]	[-0.02, 0.07]	df = 38	[0.00, 0.07]		[-0.02, 0.23]	[-0.02, 0.06]
	p = .020	p = .203				p = .417	p = .818			
Self-crit	100.35	0.12	0.95	0.03	-0.01	98.16	0.12	0.95	0.12	-0.01
	df = 37	[0.09, 0.15]		[-0.10, 0.14]	[-0.04, 0.03]	df = 37	[0.09, 0.15]		[-0.02, 0.25]	[-0.04, 0.03]
	p < .001	p < .001				p < .001	p < .001			
AP	90.02 [a]	0.12	0.94	0.01	-0.02	87.62	0.11	0.95	0.10	-0.03
	df = 38	[0.09, 0.14]		[-0.11, 0.12]	[-0.08, 0.02]	df = 37	[0.08, 0.14]		[-0.02, 0.20]	[-0.09, 0.03]
	p < .001	p < .001				p < .001	p = .001			
PEP	105.73 [a]	0.12	0.93	0.01	-0.03	83.18 [a]	0.10	0.95	0.09	-0.03
	df = 38	[0.01, 0.15]		[-0.11, 0.11]	[-0.09, 0.02]	df = 38	[0.07, 0.13]		[-0.03, 0.20]	[-0.10, 0.02]
	p < .001	p < .001				p < .001	p = .004			
Prob-bias	62.15	0.08	0.98	-0.01	0.02	56.36	0.07	0.98	0.08	0.02
	df = 37	[0.04, 0.11]		[-0.12, 0.10]	[-0.02, 0.05]	df = 37	[0.03, 0.10]		[-0.03, 0.19]	[-0.03, 0.07]
	p = .006	p = .071				p = .022	p = .209			
Cost-bias	121.91 [a]	0.14	0.93	-0.01	0.02	91.83	0.11	0.95	0.06	0.03
	df = 38	[0.11, 0.16]		[-0.12, 0.10]	[-0.02, 0.07]	df = 37	[0.08, 0.14]		[-0.03, 0.16]	[-0.03, 0.10]
	p < .001	p < .001				p < .001	p < .001			
Safe-PA	71.39	0.09	0.96	0.01	-0.01	54.09	0.06	0.98	0.10	-0.01
	df = 37	[0.06, 0.12]		[-0.11, 0.12]	[-0.04, 0.02]	df = 37	[0.02, 0.10]		[-0.03, 0.22]	[-0.03, 0.02]
	p < .001	p = .013				p = .035	p = .238			
SSP	79.59	0.10	0.96	0.02	0.00	53.08	0.06	0.99	0.10	0.00
	df = 37	[0.07, 0.13]		[-0.11, 0.12]	[-0.03, 0.04]	df = 37	[0.01, 0.10]		[-0.03, 0.23]	[-0.02, 0.03]
	p < .001	p = .006				p = .042	p = .231			

Note. T5 = 5-Week Follow-Up Assessment; Model χ^2 = Chi-Square Test of Model Fit; RMSEA = Root Mean Square Error of Approximation; CFI = Comparative Fit Index; CI = confidence interval; Direct = overall unstandardized direct effect; Indirect = Overall unstandardized indirect effect; Inferiority = Perceived Inferiority; Self-crit = Self-Criticism; AP = Anticipatory Processing; PEP = Post-event Processing; Prob-bias = Probability Bias; Safe-PA = Safe Positive Affect; SSP = Social Safeness and Pleasure.
[a] Model adjusted due to initial negative residual variance by fixing problem variable residual variance to zero.

Given that treatment condition did not demonstrate any differential indirect effects on social anxiety, further exploratory analyses were conducted excluding the effect of treatment condition. These analyses were done in order to examine whether the constructs originally proposed as mediators were responsible for changes in social anxiety irrespective of treatment condition. Accordingly, two-level RI-CLPM was conducted in order to examine the cross-lagged relationships between the predictors and social anxiety. Only the SIAS was used to measure social anxiety in these models as the random intercept for the SPS consistently produced a negative residual variance[9]. Consequently, there were eight models in total which generally showed good model fits: χ^2 (33) ranged from 30.57 (p = .589) to 54.62 (p = .010); *RMSEA* ranged from 0.00 (p = .892) to .075 (p = .126); and *CFI* ranged from 0.98 to 1.00. The reverse cross-lagged relationships from social anxiety to the predictors were also examined. As seen in Table 10, these analyses showed that only cost bias and anticipatory processing prospectively predicted SIAS. Examining the reverse cross-lagged relationships, the SIAS predicted changes in perceived inferiority, anticipatory processing, post-event processing, probability bias, and cost bias.

Table 10
Summary of path estimates for two-level RI-CLPM.

	b [95% CI]
Perceived Inferiority → Social Anxiety	0.07 [-0.12, 0.23]
Self-Criticism → Social Anxiety	0.31 [-0.09, 0.47]
Anticipatory Processing → Social Anxiety	**0.30 [0.07, 0.41]**
Post-Event Processing → Social Anxiety	0.10 [-0.01, 0.35]
Probability Bias → Social Anxiety	0.09 [-0.08, 0.28]
Cost Bias → Social Anxiety	**0.34 [0.01, 0.49]**
Safe Positive Affect → Social Anxiety	-0.11 [-0.24, 0.02]
Social Safeness/Pleasure → Social Anxiety	-0.17 [-0.45, 0.03]

Note. Social anxiety was measured by Social Interaction Anxiety Scale; CI = Confidence Interval. All pathways constrained to be equal from Time 1 to 2 and from Time 2 to 3. *b* refers to unstandardized values. Estimates in bold denote significance.

[9] This was the case in all RI-CLPM analyses.

Replication of Study 1 Models

Tables 11 and 12 show the results for the replication of Study 1 models, which showed good fit: χ^2 (75) = 98.49 (p = .036), *RMSEA* = .05 (p = .445), *CFI* = 0.99 for Model 1; χ^2 (75) = 80.40 (p = .314), *RMSEA* = .03 (p = .864), *CFI* = 1.00 for Model 2A; and χ^2 (75) = 94.42 (p = .064), *RMSEA* = .05 (p = .550), *CFI* = 0.99 for Model 2B. Estimates of the amount of variance accounted for by trait-components were: 9.2-14.6% for self-criticism; 60.7-71.6% for perceived inferiority; 47.6-49.8% for self-kindness, 28.9-50.1% for the SIAS – considerably lower than in Study 1. In line with Study 1 findings, there were no overall direct or indirect effects of self-criticism and self-kindness on the SIAS. The autoregressive paths were significant for all constructs except perceived inferiority indicating that earlier within-person changes positively predicted later within-person changes on the same constructs. The only cross-lagged path to demonstrate a consistent effect was from the SIAS to perceived inferiority which was significant and positive across all models. The four-level sequential mediation also showed good model fit: χ^2 (134) = 161.17 (p = .055), *RMSEA* = .04 (p = .717), *CFI* = 0.99. Consistent with the results of the three-level models, this model found that the overall indirect effect of self-kindness on SIAS through perceived inferiority and self-criticism sequentially was non-significant[10], b = 0.00, CI_{95} [-0.003, 0.002].

[10] This result was consistent when using Positive Aspects of Self-Compassion and Positive Aspects of Social Self-Compassion as independent variables in separate models.

Table 11
Summary of Study 1 Model 1 autoregressive, cross-lagged, and overall effects with SIAS as outcome variable.

	b [95% CI]
Autoregressive pathways	
Self-Criticism → Self Criticism	**0.71 [0.27, 0.93]**
Perceived Inferiority → Perceived Inferiority	0.00 [-0.18, 0.29]
Social Anxiety → Social Anxiety	**0.39 [0.19, 0.67]**
Cross-lagged pathways	
Self-Criticism → Perceived Inferiority	0.16 [-0.11, 0.40]
Self-Criticism → Social Anxiety	0.29 [-0.11, 0.45]
Perceived Inferiority → Self-Criticism	0.04 [-0.24, 0.32]
Perceived Inferiority → Social Anxiety	0.08 [-0.18, 0.31]
Social Anxiety → Self-Criticism	0.15 [-0.07, 0.32]
Social Anxiety → Perceived Inferiority	**0.22 [0.05, 0.35]**
Overall effects	
Overall direct effect	0.21 [-0.02, 0.44]
Overall indirect effect	0.01 [-0.01, 0.11]
Total effect	0.23 [-0.02, 0.45]

Note. Model 1 = Self-Criticism → Perceived Inferiority → Social Anxiety; SIAS = Social Interaction Anxiety Scale; CI = Confidence Interval. All pathways constrained to be equal from Time 1 to 2 and from Time 2 to 3. *b* refers to unstandardized values. Bold font denotes statistical significance.

Table 12
Summary of Study 1 Model 2 autoregressive, cross-lagged, and overall effects with SIAS as outcome variable.

Model 2A	*b* [95% CI]
Autoregressive pathways	
Self-Kindness → Self Kindness	**0.24 [0.08, 0.40]**[a]
Perceived Inferiority → Perceived Inferiority	-0.01 [-0.17, 0.22]
Social Anxiety → Social Anxiety	**0.36 [0.20, 0.70]**[a]
Cross-lagged pathways	
Self-Kindness → Perceived Inferiority	-0.13 [-0.24, 0.00]
Self-Kindness → Social Anxiety	-0.07 [-0.22, 0.05]
Perceived Inferiority → Self-Kindness	-0.14 [-0.34, 0.07]
Perceived Inferiority → Social Anxiety	0.07 [-0.12, 0.26]
Social Anxiety → Self-Kindness	**-0.17 [-0.33, -0.02]**[b]
Social Anxiety → Perceived Inferiority	**0.19 [0.05, 0.35]**[a]
Overall effects	
Overall direct effect	-0.01 [-0.06, 0.00]
Overall indirect effect	0.00 [-0.03, 0.00]
Total effect	-0.01 [-0.08, 0.00]
Model 2B	
Autoregressive pathways	
Self-Kindness → Self-Kindness	**0.23 [0.07, 0.42]**[a]
Self-Criticism → Self Criticism	**0.76 [0.31, 0.96]**[a]
Social Anxiety → Social Anxiety	**0.41 [0.24, 0.63]**[a]
Cross-lagged pathways	
Self-Kindness → Self-Criticism	0.01 [-0.14, 0.10]
Self-Kindness → Social Anxiety	-0.06 [-0.18, 0.06]
Self-Criticism → Self-Kindness	-0.04 [-0.26, 0.16]
Self-Criticism → Social Anxiety	0.30 [-0.07, 0.46]
Social Anxiety → Self-Kindness	**-0.21 [-0.37, -0.04]**[b]
Social Anxiety → Perceived Inferiority	0.15 [-0.05, 0.33]
Overall effects	
Overall direct effect	-0.01 [-0.05, 0.01]
Overall indirect effect	0.01 [-0.05, 0.04]
Total effect	0.00 [-0.08, 0.04]

Note. Model 2A = Self-Kindness → Perceived Inferiority → Social Anxiety; Model 2B = Self-Kindness → Self-Criticism → Social Anxiety; SIAS = Social Interaction Anxiety Scale; CI = Confidence Interval. All pathways constrained to be equal from Time 1 to 2 and from Time 2 to 3. *b* refers to unstandardized values. Bold font denotes statistical significance.
[a] Significant effect was also found using both Positive Aspects of Self-Compassion and Positive Aspects of Social Self-Compassion as independent variables in separate models.
[b] Significant effect was not found using both Positive Aspects of Self-Compassion and Positive Aspects of Social Self-Compassion as independent variables in separate models.

Further Exploratory Mediation

In order to evaluate the foundational arguments of compassion theorists, I tested whether positive aspects of self-compassion exerted an impact on social anxiety through an indirect effect on the soothing system (safe positive affect; social safeness and pleasure). The two models showed good fit: χ^2 (75) = 89.23 (p = .125), *RMSEA* = .04 (p = .682), *CFI* = 0.99, using safe positive affect as the mediator; and χ^2 (75) = 83.37 (p = .238), *RMSEA* = .03 (p = .550), *CFI* = 1.00 using social safeness and pleasure as the mediator. Estimates of the amount of variance accounted for by trait-components was: between 41.0-46.0% for positive aspects of self-compassion; 42.5% for safe positive affect; 56.9% for social safeness and pleasure; and between 49.1-57.9% for the SIAS. As Table 13 demonstrates, there were no significant overall direct or indirect effects. Only the autoregressive pathways showed consistent significant effects.

Table 13

Summary of autoregressive, cross-lagged, and overall effects for longitudinal mediation of self-compassion predicting social anxiety through activation of the soothing system.

Model 1	*b* [95% CI]
Autoregressive pathways	
Self-Compassion → Self-Compassion	**0.35 [0.17, 0.59]**[a]
Safe Positive Affect → Safe Positive Affect	**0.21 [0.01, 0.40]** [a]
Social Anxiety → Social Anxiety	**0.36 [0.22, 0.71]**[a]
Cross-lagged pathways	
Self-Compassion → Safe Positive Affect	0.06 [-0.17, 0.23]
Self-Compassion → Social Anxiety	-0.03 [-0.22, 0.13]
Safe Positive Affect → Self-Compassion	0.03 [-0.15, 0.17]
Safe Positive Affect → Social Anxiety	-0.10 [-0.22, 0.04]
Social Anxiety → Self-Compassion	-0.13 [-0.30, 0.02]
Social Anxiety → Safe Positive Affect	-0.13 [-0.32, 0.04]
Overall effects	
Overall direct effect	-0.01 [-0.12, 0.03]
Overall indirect effect	0.00 [-0.03, 0.01]
Total effect	-0.01 [-0.13, 0.04]
Model 2	
Autoregressive pathways	
Self-Compassion → Self-Compassion	**0.38 [0.18, 0.54]**[a]
Social Safeness and Pleasure → Social Safeness and Pleasure	**0.35 [0.18, 0.76]**[a]
Social Anxiety → Social Anxiety	**0.26 [0.13, 0.52]**[a]
Cross-lagged pathways	
Self-Compassion → Social Safeness and Pleasure	0.16 [0.00, 0.32]
Self-Compassion → Social Anxiety	-0.01 [-0.16, 0.14]
Social Safeness and Pleasure → Self-Compassion	**0.19 [0.05, 0.43]**[b]
Social Safeness and Pleasure → Social Anxiety	-0.17 [-0.39, 0.03]
Social Anxiety → Self-Compassion	-0.06 [-0.22, 0.07]
Social Anxiety → Social Safeness and Pleasure	-0.03 [-0.23, 0.11]
Overall effects	
Overall direct effect	0.00 [-0.05, 0.02]
Overall indirect effect	-0.02 [-0.12, 0.00]
Total effect	-0.02 [-0.14, 0.02]

Note. Model 1 = Self-Compassion → Safe Positive Affect → Social Anxiety; Model 2 = Self-Compassion → Social Safeness and Pleasure → Social Anxiety; Self-Compassion = Positive Aspects of Self-Compassion; Social Anxiety = Social Interaction Anxiety Scale; CI = Confidence Interval. All pathways constrained to be equal from Time 1 to 2 and from Time 2 to 3. *b* refers to standardized values. Bold font denotes statistical significance.

[a] Significant effect was also found using Positive Aspects of Social Self-Compassion as independent variables in separate model.

[b] Significant effect was not found using both Positive Aspects of Social Self-Compassion as independent variables in separate model.

4.4 Discussion

In the context of the emerging focus on using self-compassion techniques in the treatment of psychopathology, this study examined whether a brief two-week self-compassion intervention could reduce social anxiety among participants with clinical levels of symptoms. In addition, this study investigated how self-compassion might operate to influence social anxiety (i.e., mediators) and for whom this approach might be most useful (i.e., moderators). The study also represented the first occasion that the potential effectiveness of self-compassion for reducing social anxiety was directly compared with an established method for treating social anxiety, cognitive restructuring. I first discuss the findings of the study, especially in light of a number of null findings, before suggesting avenues of future research.

The results showed that both self-compassion and cognitive restructuring appeared to reduce trait social anxiety on established measures (the SIAS and SPS) over the five assessment points, acknowledging that the design did not include a no-treatment control. At the final assessment (five-week follow-up), approximately one fifth of the participants had achieved both reliable and clinically significant change. No interaction effects between group and time were found, indicating that there were no significant differences in rate of change between the groups on either of the primary outcome variables (SIAS, SPS). Similarly, on secondary outcome measures, both conditions demonstrated reductions on measures relevant to social anxiety and no interactions were observed.

These main findings are consistent with past research which has shown that self-compassion interventions can reduce important characteristics of social anxiety, whether they be actual symptoms (e.g., Boersma et al., 2015) or related phenomenology such as unhelpful post-event processing (Blackie & Kocovski, 2018). As such, the current study extends knowledge drawn from previous research that has either been based on shorter experimental

studies, or longer uncontrolled designs. In regards to the secondary outcomes, it was interesting to note that the groups did not differ in their effect on any aspect of self-compassion (i.e., positive and negative aspects of social self-compassion, positive and negative aspects of standard self-compassion). Given the emphasiz on self-compassion in the self-compassion condition, a difference in outcome between groups on these variables would have been expected. In light of these findings, it may be that CBT is just as effective as compassion-based strategies at increasing trait self-compassion, which would question some of the foundational claims of compassion theorists.

In line with the main findings, there was no evidence that mediators of outcome differed by treatment approach. This lack of differential mediation is inconsistent with one previous study (see Blackie & Kocovski, 2018), however, Blackie and Kocovski did not use an active comparator group involving any component of CBT. Given the lack of differential mediation in the current study, it may be that self-compassion and cognitive restructuring offer different ways to address social anxiety, but none-the-less operate through similar mechanisms. Another possibility, however, is that unique mechanisms of self-compassion become apparent during longer interventions or when alternative therapeutic strategies are implemented. Several other compassion-based approaches exist, such as visualising an ideal compassionate other and engaging in loving kindness meditation directed at the self (Gilbert, 2014). It may be useful to explore whether these alternative self-compassion strategies, not tested in my study, involve mechanisms that are distinct to those seen in cognitive restructuring. A further possibility is that there are mechanisms that were not measured, or measured poorly in the current study. For example, activation of the soothing system was assessed using two proxy measures that may not truly represent the target construct (although they were developed by one of prominent theorists in the compassion field). Future

researchers could measure this construct using different methods, and also include other constructs that shed light on the unique mechanisms of self-compassion.

Although the main study findings suggest that a self-compassion intervention reduced social anxiety, the mechanistic analyses present a more complex picture of what drove change in the current study. When the Study 1 models were replicated and expanded in this study, there were no significant overall direct or indirect effects of self-criticism or self-compassion on social anxiety. Although there was far greater within-person variance in all constructs compared to Study 1, what appeared to predict this within-person variance was earlier changes in the *same* constructs, rather than earlier changes in *other* constructs. These findings are consistent with Study 1 and weaken the case for a causal role self-attitudes in social anxiety. Moreover, there was no support for some of the foundational assertions of compassion theorists as self-compassion did not indirectly affect social anxiety through activation of the soothing system. Rather, the processes that appeared to precede reductions in social anxiety were earlier reductions in anticipatory anxiety and cost biases. These findings are less in line with a compassion-based model of social anxiety, and more in line with a CBT model, which has a more explicit focus on these processes as maintenance factors (e.g., Hofman, 2007). Thus, there is some conflict in the fact that a self-compassion intervention appeared to reduce social anxiety, but the processes underlying this change did not seem to relate to changes in self-compassion itself. One potential explanation for these conflicting findings is that self-compassion interventions operate through non-specific treatment effects (e.g., increased expectations of improvement, increased awareness of cognitions), as opposed to unique elements of the practice of self-compassion (e.g., explicit focus on enhancing feelings of warmth and security). Alternatively, the measures used in the current study may not have fully captured the construct of self-compassion. Indeed, recent research has criticized current measures of compassion and called for the development of

new measures that better assess an integrated definition of the construct (Strauss et al., 2016). A further possibility is that the duration of the study was insufficient to capture the role of self-compassion as a process underlying the change in social anxiety. In the context of compassion-based interventions, it may be that reductions in anticipatory anxiety and cost biases are initially responsible for changes in social anxiety, but other constructs are responsible for change thereafter.

Contrary to hypotheses, the variables proposed, *a priori*, to moderate outcomes, namely fear of self-compassion and self-criticism, did not significantly influence outcomes. The current findings are inconsistent with the only previous study that has examined fear of self-compassion as a moderator of self-compassion (Kelly & Carter, 2015). These authors found that fear of self-compassion differentially predicted outcomes across study conditions, such that only in the self-compassion condition did fear of self-compassion predict worse outcomes on binging and depression. Several possible explanations exist for these inconsistencies. Firstly, it is possible that fear of self-compassion only moderates outcomes at more extreme levels of this construct. In Kelly and Carter's study, the mean score for fear of self-compassion was significantly higher than the current study[11]. Secondly, the moderating role of fear of self-compassion may only occur when self-compassion is compared with a non-compassionate intervention. Kelly and Carter used an active comparator group of a behavioural intervention aimed at implementing healthier alternatives to binging. One important difference between this active comparator group and that used in the current study is that cognitive restructuring could actually be thought of as a self-compassionate intervention, given that it likely involves the explicit challenging of negative self-beliefs and adoption of more positive self-beliefs (i.e., alternative thoughts). In comparison, the behavioural intervention aimed at reducing binging cannot be viewed as having the same

[11] d = 0.74, CI_{95} [0.38, 1.10].

level of explicit self-compassion. For example, it is plausible that someone could engage in these behavioural strategies while continuing to be highly self-critical. Thirdly, it may simply be the case that fear of self-compassion is not a reliable moderator of treatment outcomes. Kelly and Carter's study was a pilot RCT with a small sample size of 41 participants which included a sub-sample of 11 completers in the self-compassion condition. In view of the small sample size, the demonstrated moderation effect may not be generalizable, and may instead be an effect that occurred by chance or was unique to that sample.

My study was the first to investigate whether baseline self-criticism differentially predicts outcomes between self-compassion and cognitive restructuring, a component of CBT. The lack of moderation of self-criticism is consistent with two previous studies (Shapira & Mongrain, 2010; Sommers-Spijkerman et al., 2018), and inconsistent with one study that did find a moderating effect (Kelly, Zuroff, Foa, & Gilbert, 2010). However, it should be highlighted that Kelly et al. only found self-criticism moderated outcomes when comparing the self-compassion group with a self-controlling group, which was clearly non-compassionate. Self-criticism did not differentially predict outcomes when comparing the self-compassion group with a self-energizing group, which did contain some self-compassionate elements (e.g., encouragement). As such, similar to the proposition made in regards to fear of self-compassion, it may be that self-criticism only moderates outcomes when self-compassion is compared with a clearly uncompassionate intervention. If this proposition is true, it would contradict the central arguments of compassion theorists that compassion-based approaches are particularly beneficial for highly self-critical individuals, even when compared with other (relatively compassionate) approaches such as CBT. It may be the case that CBT is equally as effective as self-compassion for reducing social anxiety among those high in self-criticism, perhaps because tools such as cognitive restructuring equip individuals with the skills to challenge and reduce their self-critical thinking. Broadly

speaking, it is possible that CBT is just as effective at activating the psychobiological soothing system even for individuals who struggle to access this system. Indeed, the current study provides some support for this proposal given there were no group differences on the secondary outcome measures of safe positive affect and social safeness, both included as proxies for activation of the soothing system. Larger scale study designs comparing self-compassion and CBT are required to further evaluate the foundational arguments of compassion theorists.

Of the nineteen exploratory moderators examined, only baseline Social Phobia Inventory (SPIN) proved to be a significant moderator, although most variables examined were non-specific predictors of outcome. The absence of moderating effects of the demographic variables (e.g., gender and age) is consistent with previous research that has generally failed to discover any such effects (MacBeth & Gumley, 2012; Sommers-Spijkerman et al., 2018). In the context of social anxiety, the current study builds on past studies showing that baseline rumination and self-compassion do not moderate the effect of self-compassion (Arch et al., 2016; Sommers-Spijkerman et al., 2018). With regards to the moderating effect of baseline social anxiety as measured by the SPIN, this variable appeared to predict differential trajectories between the groups for the SIAS. However, given that baseline SPIN did not predict differential group outcomes at the final assessment point, it may be that this moderating effect does not carry much clinical importance. Accordingly, this finding also highlights the need to interpret the results of other studies using fewer assessment points with caution. Previous research has provided evidence that higher levels of baseline social anxiety and non-attachment predict better within-group outcomes for participants engaging in self-compassion, when compared with control groups (Arch et al., 2016; Blackie & Kocovski, 2018). Given the short time-frames of these studies, however, it is possible that these are not enduring effects. Alternatively, it is also possible that the variables

that failed to show moderating effects in the short-term (e.g., self-compassion and rumination; Arch et al., 2016), may have shown effects in the long-term. The moderating effect of the SPIN also needs to be interpreted with caution as it was not a theory driven moderator, and also because it was one of nineteen exploratory moderators examined. As such, the fact that the interaction was significant may be a product of Type 1 error, something that can be verified in future research.

With the primary findings of the current study in mind, self-compassion may well be a viable alternative to current interventions for social anxiety. However, some considerations are important when making this suggestion. Notably, there was a trend towards self-compassion having more dropouts and being perceived as less credible compared to cognitive restructuring. Indeed, it is possible that these findings are causally related, given that dropouts generally demonstrated lower credibility than completers. Furthermore, it is important to confirm if self-compassion is less credible, or there are individual differences that influence this perceived credibility, given that greater baseline credibility predicted better outcomes on the SIAS, irrespective of condition. Future studies should measure credibility more comprehensively (only two items were included in the current study), in addition to related constructs such as treatment expectancies, in order to clarify whether group differences exist between self-compassion and CBT-type approaches. Future research might also consider the inclusion of qualitative interviews of participants who dropout or score low on credibility in order to evaluate their reasons for doing so.

The lack of outcome differences between self-compassion and cognitive restructuring, in addition to the paucity of treatment moderators and absence of differential mediators, lends some support to perspectives that treatment models are relatively unimportant. Some have argued that among different therapeutic interventions, little to no differences exist in terms of outcomes (e.g., Wampold et al., 2017).This line of thinking proposes that it is “common

factors" such as therapeutic alliance that most strongly predict outcomes, as opposed to specific factors like therapeutic techniques. If this line of thinking is accurate, then future research may be more valuable if it moves away from comparisons between different treatment models. However, there is also research demonstrating that CBT is generally superior to alternative treatments, particularly in the area of anxiety disorders (Hofmann et al., 2012). If this is the case, then it does in fact remain important to continue making comparisons between CBT and emerging interventions, such as self-compassion. A further possibility for the lack of group-differences on primary outcomes is that both common *and* specific factors are important and additive, but self-compassion and cognitive restructuring share the same specific mechanisms. Future research should continue to compare the specific mechanisms (e.g., cognitive reappraisal, activation of the soothing system) of these interventions to gauge whether any differences exist.

There were a number of limitations to the current study. First, there was no waitlist control group to compare with the active interventions. As such, it is possible that participants' social anxiety reduced merely by being involved in a study for social anxiety, rather than as a consequence of completing the respective exercises. That said, numerous studies have demonstrated that brief CBT interventions outperform waitlist control groups (e.g., Diedrich et al., 2014; Goldin et al., 2013; Wolgast, Lundh, & Viborg, 2011), and as illustrated by my first study and elsewhere (e.g., Hayward et al., 2008), social anxiety symptoms tend to be relatively stable. A further consequence of the absence of a waitlist control group is that it precludes strong inferences regarding adverse outcomes. Although comprising less than 10% of the sample, nine participants across both groups reported a significant elevation in their social anxiety during the course of the two-week intervention. It would be valuable to know whether these increases were a result of the treatments, or just normal fluctuations that would have occurred irrespective of the treatments (it should be

noted that six of the participants' levels had reduced by the next assessment point). Second, the study had a relatively short follow-up period, therefore whether observed gains were maintained in the longer term is unknown. Furthermore, the current study utilized a 'pure' self-help design rather than guided (i.e., therapist assisted) self-help, where the latter has generally shown larger effect sizes (e.g., Gellatly et al., 2007). However, the length of follow-up and the lack of therapist guidance were used for both methodological and practical reasons. In regards to the former, given the relatively brief intervention (2-weeks), it was considered unrealistic that it would have an impact such as seen in full intervention studies, thus too long a follow-up may not have captured short-term maintenance. In regards to the latter reason, the study was done within the confines of a PhD.

Third, there were some baseline differences between the groups on several indices including the SIAS and the number of participants with a full SAD diagnosis. However, it is unlikely that the SIAS discrepancy was a major confound given that analyses involving this measure were conducted with and without controlling for baseline levels, and no significant differences were found. Moreover, the difference between receiving full- versus subthreshold-SAD diagnosis was only an increase of one symptom for the full diagnosis, and when combining these categories there was no difference in group size. Nevertheless, in order to prevent such discrepancies, future research could consider more comprehensive methods of randomization (e.g., covariate adaptive randomization). Finally, the majority of the sample utilized were females (76.5%) which means that the findings may not be fully generalizable with respect to gender. However, research has shown that SAD prevalence is significantly higher among women (Asher, Asnaani, & Aderka, 2017).

There were also several strengths to this research. First, the study recruited participants with clinical levels of social anxiety and conducted clinical assessment of SAD diagnosis, as well as other comorbidities. This allowed thorough documentation of the

comorbidities that frequently accompany SAD, which also assists with conclusions in regard to the generalisability of findings. Second, the inclusion of an active comprator group was beneficial in order to make inferences about the efficacy of self-compassion in relation to a component of a gold-standard therapy for social anxiety. Additionally, use of such a control allowed more thorough and informative tests of both moderators and mediators. Knowledge of the factors that influence whether one benefits more from a self-compassion approach versus cognitive restructuring approach (or vice versa) is arguably more useful than when such comparisons are made against a waitlist control group. Informative evaluation of the moderators and mediators underlying therapeutic interventions is in line with the current movement towards process-based therapy (see Hayes & Hofman, 2017). Third, a further strength was the direct manipulation of self-compassion which addressed some of the limitations identified in Study 1. Finally, the current study also benefited from the use of a range of statistical methodologies, including advanced contemporary techniques for analysing longitudinal mediation.

In terms of further research avenues not already mentioned, a clear next step would be to implement larger scale study designs with longer interventions that include waitlist control groups. Different potential moderators and mediators could also be included. For example, non-attachment shows some evidence of moderating the self-compassion-social anxiety relationship (Arch et al., 2016), a finding that could be consolidated through replication in larger trials. Although further research and replication is required, should self-compassion techniques be found to be effective, dismantling and comparison studies could be undertaken (e.g., dismantling the active ingredients of CFT, comparing CBT with CBT *plus* self-compassion). Given the suggestion that self-compassion may operate through non-specific treatment effects, it would be useful to determine whether adjunct self-compassion techniques (e.g., emphasizing warm voice tone, visualizing compassionate other) can complement and

enhance standard CBT techniques such as cognitive restructuring. Finally, although admittedly ambitious, staged randomized designs could be considered that would allow testing of the foundational arguments of compassion theorists (i.e., that self-compassion is superior to CBT for self-critical clients) while addressing important clinical issues (e.g., when to change approach in therapy). For example, well-resourced trials could have multiple arms, in which those originally randomized to CBT (versus CFT) undergo secondary randomization if they are not responding to treatment (i.e., randomized to either remain in CBT or be crossed over to CFT (and vice-versa).

4.5 Conclusion

The current study extended prior research by illustrating that self-compassion methods might be able to alleviate social anxiety symptoms. In the context of a brief two-week intervention, self-compassion appeared to have the same efficacy as cognitive restructuring in reducing social anxiety. However, some questions remain around the relative acceptability of self-compassion, given the trend towards greater dropouts and lower credibility. Furthermore, questions remain around for whom self-compassion might be optimal, given the absence of meaningful moderators in the current study. This area of investigation awaits larger scale studies that will further inform us as to the utility of self-compassion approaches for SAD. The broader implications of my PhD are summarized in the following chapter.

Chapter Five – General Discussion

5.1 Introduction

Given we are yet to have a complete understanding of the critical factors that maintain social anxiety disorder (SAD), my thesis investigated a promising line of inquiry - the role of attitudes to oneself. Specifically, I was interested in whether attitudes of self-criticism and self-compassion contribute to the maintenance of social anxiety, and if so, through what mechanisms. I was also interested in whether self-compassion could be used as an intervention to reduce social anxiety symptoms, and if so, whether there were certain individuals who were particularly suitable for such interventions. In this chapter, I briefly summarize the content of each chapter before integrating the findings with other contemporary research, and finally, suggest how this field of investigation could progress.

Summarizing the Findings

In Chapter 1, I introduced the major models of SAD and observed that critical self-attitudes are implicit in these models but have not yet received much explicit focus, and therefore have not been emphasized in SAD interventions to date. Subsequently, I reviewed the literature on the relationship between self-criticism and mental health, and found evidence that self-criticism represents a risk factor for numerous psychological problems. Additionally, I reviewed literature on possible mechanisms that may explain how self-criticism impacts on mental health, which included various constructs such as negative self-beliefs, stress sensitivity, and shame.

In Chapter 2, I introduced self-compassion as a possible solution to the problem of self-criticism. I demonstrated that self-compassion has a robust relationship with mental health, and described how self-compassion may be a teachable skill that can alleviate

psychiatric symptoms including those of social anxiety. This chapter also included a systematic review of the moderators and mediators of self-compassion. In terms of the mediation literature, I found evidence for possible mechanisms of change relating to repetitive negative thinking, emotion regulation, negative affect, interpersonal factors, and risk/protective factors. Generally, I found that although studies examined these constructs with the goal of testing them as mediators, the studies lacked the methodological rigour to make strong inferences about their validity as genuine mechanisms of changes. Amongst the mediators reviewed, it was repetitive negative thinking that showed the most promise as a construct that could explain how self-compassion influences mental health. I also identified that no studies had empirically examined the theoretical mechanism of "activation of the soothing system" which is central to one of the most influential models of compassion (Gilbert, 2010). In terms of the moderation literature, I found no evidence for consistent moderators between studies. However, there was some evidence that fear of self-compassion differentially predicted worse outcomes for participants high in this trait who received self-compassion interventions. It was noteworthy that to date there has been relatively minimal study of the theoretically informed moderators of self-criticism and shame, and interventions purported to influence these variables had not been evaluated against established treatment methods (e.g., CBT) in clinical samples.

In Chapter 3, I specifically reviewed the relationship between social anxiety and self-criticism, and proposed several mechanisms through which self-attitudes of self-criticism and self-kindness (as a component of self-compassion) might affect social anxiety. I found robust cross-sectional, but minimal longitudinal and experimental evidence for a relationship. To expand our knowledge on these topics and others, I conducted a three-wave longitudinal study testing whether self-criticism and self-kindness prospectively predicted social anxiety through indirect effects mediated by negative self-beliefs (as well as self-criticism for self-

kindness). I did not find support for any of these models, but concluded that there may have been insufficient variance to detect such mediational effects.

In Chapter 4, to account for specific limitations of Study 1, I administered a brief two-week online experimental study comparing self-compassion with cognitive restructuring in a sample with clinical levels of social anxiety. I found that both interventions led to significant decreases in trait social anxiety which persisted at the final five-week follow-up assessment. No differences between the treatment conditions were found for social anxiety outcomes. Similarly, there were no measures that differentially mediated the effect of treatment condition on social anxiety. Furthermore, there was no support for longitudinal mediation models that replicated the Study 1 models, nor was there support for a theory-driven mediational model of self-compassion affecting social anxiety through the activation of the soothing system. Notably, neither self-criticism nor fear of self-compassion moderated the effect of the interventions. One exploratory moderator which did show a significant effect was baseline social anxiety as measured by the Social Phobia Inventory (SPIN). However, this effect appeared to moderate just the trajectory of social anxiety between groups, rather than final outcomes, and was the only significant moderator finding in the context of a large number of analyses.

Integrating the Findings

Taken together, my findings provide mixed support for the role of self-attitudes in social anxiety. In relation to self-criticism, my research contradicts the majority of research in this area which has generally shown evidence of a robust relationship (Cox et al., 2009; Cox et al., 2004; Cox et al., 2000). However, it should be noted that nearly all research examining this relationship thus far has been cross-sectional. Taking into account findings by Gautreau et al. (2015) and my thesis, there are now three studies examining the temporal relationship between self-criticism and social anxiety, none of which have found a predictive effect of

self-criticism. As such, it may be that socially anxious individuals tend to be self-critical, but their self-criticism is not a driving force in maintaining their social anxiety. Rather, there may be other maintaining factors that are more important which may or may not have already been identified in models of this disorder (e.g., judgemental biases, post-event processing, safety behaviours etc.). If self-criticism is not central to the maintenance of social anxiety, then it may not represent an important target in social anxiety interventions. However, research in this area is still scarce and thus many questions remain. Future research should continue to examine the relationship between self-criticism and social anxiety, particularly using longitudinal study designs with different assessment intervals (e.g., diary studies) or experimental designs that manipulate self-criticism. This type of research will help to elucidate the specific causal relationship between self-criticism and social anxiety.

My findings for self-compassionate attitudes were mixed. On the one hand, a self-compassion intervention resulted in a reduction in social anxiety symptoms equal to that of a cognitive restructuring intervention, and these benefits were still present five weeks post-intervention. These findings support a growing body of literature which suggests that self-compassion can be used to alleviate social anxiety (Arch et al., 2014; Boersma et al., 2015) or related factors such as post-event processing (Blackie & Kocovski, 2018). As such, self-compassion may be a viable alternative to current approaches to social anxiety.

On the other hand, although self-compassion appeared to reduce social anxiety, longitudinal data analysis in two samples did not find that measures of self-compassion and self-kindness predicted changes in social anxiety when controlling for earlier measures of the same constructs and between-person differences (i.e., Random-Intercept Cross-Lagged Panel Modelling). These findings were consistent when examining various measures of compassionate self-attitudes (e.g., standard self-compassion, social self-compassion, self-kindness). As such, integrating the research to date on self-compassion and social anxiety

demonstrates the following: 1) there is a robust cross-sectional relationship across most studies (Blackie & Kocovski, 2017; Hayes, Lockard, Janis, & Locke, 2016), 2) there is a consistent relationship when self-compassion is manipulated (Arch et al., 2014; Blackie & Kocovski, 2018; Boersma et al., 2015), and 3) there is no relationship when using longitudinal observational designs, as per my own findings. As outlined in Chapters 3 and 4, there are several possible explanations for the apparent inconsistency in the literature. First, the time intervals used in my study designs may have been inappropriate to detect an effect of self-compassion on social anxiety. As such, future studies could consider experimenting with shorter timelines (e.g., diary studies). Second, the finding that self-compassion interventions reduce social anxiety may be accounted for by nonspecific treatment factors such as improved optimism or increased awareness of thoughts, rather than any unique components of the self-compassion intervention itself. Third, if it is true that self-compassion exerts an effect on social anxiety through nonspecific factors, then the relationship between these constructs may be merely concurrent, without any causal reciprocity (i.e., akin to self-criticism). That is, socially anxious individuals may just happen to be low on self-compassion, and a change in self-compassion alone may have no impact on social anxiety. However, it is possible that a change in self-compassion accompanies other positive changes that actually do affect social anxiety, such as a reduction in anticipatory processing. In light of these findings, it remains unclear whether self-compassion is a worthy target in social anxiety interventions.

Consistent with the lack of direct effect of continuous measures of self-attitudes on social anxiety, my thesis also failed to find indirect effects (which can still occur in the absence of a direct effect; Hayes & Rockwood, 2017) across both studies. That is, no mediation was found when perceived inferiority, activation of the soothing system, and self-criticism were scrutinized (with self-kindness as the independent variable). No other studies

have examined the indirect effects of self-attitudes on social anxiety using continuous measures. These null findings may simply be reflective of a lack of any causal effect of self-attitudes on social anxiety, or alternatively, they may suggest that there are other constructs not measured in my thesis that may play a mediating role. Another possibility, as discussed in Chapter 3, is that the constructs examined in my thesis (e.g., negative self-beliefs) may play mediating roles in other disorders (e.g., MDD), but not in social anxiety.

Notably, one of the foundational arguments of compassion theorists was unsupported in my research as self-compassion did not exert an impact on social anxiety through the activation of the soothing system. This finding challenges the argument that self-compassion cultivates a particular type of positive affect uniquely associated with the soothing system (e.g., warmth, security) which in turn alleviates psychological distress (e.g., social anxiety). Given that this mechanism is central to compassion-based theories (e.g., Gilbert, 2010), future research urgently needs to continue evaluating its merit. Future research could also consider using alternative measures, as it is also possible that the measures used in my thesis did not accurately quantify the admittedly broad concept of 'activation of the soothing system'.

In relation to differential mediation, only one other study to my knowledge has examined mediators in the relationship between a self-compassion intervention and a construct related to social anxiety: willingness to engage in social situations (Blackie & Kocovski, 2017). The study found that the effect of the intervention on the outcome variable was mediated by post-event processing and social performance perceptions. This finding is inconsistent with my own, although comparisons are difficult because of different study designs. Blackie and Kocovski used an independent variable of self-compassion versus rumination, whereas I compared self-compassion with the active comparator of cognitive restructuring. It is no surprise that a rumination control would increase the analogous process

of post-event processing, and it is also no surprise that cognitive restructuring would reduce post-event processing. As such differential mediation was to be expected in Blackie and Kocovski's study, whereas there was no reason to expect this outcome in my study. The lack of differential mediation provides some support for the notion that self-compassion operates through nonspecific treatment effects, as suggested earlier. However, future studies need to conduct longer interventions and utilize different CBT/self-compassion techniques in order to make further comparisons.

The notion that self-compassion may operate through nonspecific treatment effects is somewhat consistent with the lack of treatment moderators in Chapter 4. My research found no meaningful treatment moderators between self-compassion and cognitive restructuring. Although baseline social anxiety (as measured by the Social Phobia Inventory) did have a moderating effect, it only predicted differing trajectories between the two interventions, rather than different overall outcomes. In a similar pattern to the mechanistic analyses, my research did not find significant effects for the theory-driven moderators of self-criticism or fear of self-compassion. These findings are notable, particularly in relation to self-criticism, because compassion-based approaches were designed specifically for self-critical individuals (Gilbert, 2014). One explanation for these findings is that self-compassion is no more suitable than other approaches (e.g., CBT) for highly self-critical individuals, as other approaches are equally equipped to address self-criticism. In relation to fear of self-compassion, it may be worth reconsidering the potential moderating effect of this construct. In the area of anxiety disorders, a core principle thought to underlie symptom improvement is the confrontation of fears which in turn changes beliefs and reduces symptoms (Foa & McLean, 2016). A fear of self-compassion might well be another fear that can be confronted which can in turn leads to symptom reduction. As such, at a theoretical level, an argument for both sides can be made

for why a fear of self-compassion might predict different outcomes for self-compassion versus other types of interventions.

In summary, both self-criticism and self-compassion have been identified as risk/protective factors in SAD, respectively, and also as transdiagnostic processes that affect various psychological disorders (Cuppage, Baird, Gibson, Booth, & Hevey, 2018; Schanche, 2013). A primary contribution of my research is to somewhat temper the confidence in such conclusions. The majority of previous research has been cross-sectional and has not accounted sufficiently for between-person differences. As such, previous research has not rigorously determined whether self-criticism and self-compassion are actually responsible for changes in psychiatric symptoms, even if strong associations exist. Moreover, despite strong theoretical foundations for self-compassionate interventions, it still remains unclear when and for whom these types of interventions are favourable to other gold-standard interventions with regards to social anxiety (and other disorders). Future research should continue making comparisons between self-compassion and standard approaches (e.g., CBT) in order to gauge whether any treatment moderators emerge, and as such, whether the theoretical arguments of self-compassion are supported. In line with Wampold et al. (2017), and consistent with my findings, it may be the case that self-compassion is no more or less suitable when compared with other approaches, because therapeutic improvement is being driven by common factors rather than treatment-specific factors.

Future Research

Although a recommendation that applies to most areas of psychology, in the area of self-attitudes and social anxiety, future research does need to focus on longitudinal designs given that the majority of evidence currently is cross-sectional. As the literature reviews in this thesis demonstrate, it is already established that self-criticism and self-compassion are risk/protective factors, respectively, for social anxiety. However, far less is known about the

causal relationship between these self-attitudes and the disorder. As already outlined, future research could consider investigating these relationships using different: 1) time intervals, 2) measures, and 3) populations (e.g., adolescents). Of particular interest is determining whether the presence of self-criticism and/or absence of self-compassion contribute to the initial onset of SAD, which tends to occur during adolescence (Lijster et al., 2017). If self-attitudes do predict SAD onset, it will also be of interest to investigate how self-criticism and self-compassion develop through childhood (e.g., through parental influences; Bleys et al., 2016) and whether early intervention is possible.

In light of recent criticisms (Rose & Rimes, 2018; Strauss et al., 2016), future research should also endeavour to create new measures of self-criticism and self-compassion, or to make significant adjustments to existing scales in order to improve their validity and reliability. In particular, given a lack of support for a single-factor structure of self-compassion (e.g., López, Sanderman, Smink, Zhang, Eric, et al., 2015), future research should ensure that scales are measuring the *presence* of self-compassion rather than the *absence* of self-criticism and other negative markers. It may also be useful to continue examining the comparative role of self-attitudes versus other maintenance factors of social anxiety. Such comparisons may inform whether the focus of SAD interventions should shift to also include self-attitudes, in addition to other more common maintenance factors (e.g., probability and cost biases). Moreover, it may be useful to continue investigating the comparative role of self-attitudes in different disorders in order to gauge the relative importance of these constructs across disorders. Currently, there is some evidence that self-criticism is more predictive of depression than anxiety (Mcintyre, Smith, & Rimes, 2018), but other evidence of a similar predictive effect (Cox et al., 2000). Similarly, it is worth continuing to investigate whether self-compassion plays more of a role in depressive disorders versus anxiety disorders. It is possible that self-attitudes are a more important

therapeutic target in disorders that feature self-worth problems as more central to their maintenance, such as depression and eating disorders (Beck, 1979; Fairburn, Cooper, & Shafran, 2003). If this the case, then the theoretical models of these disorders may need to be refined and updated in order to reflect the role of self-criticism and self-compassion. As discussed in Chapter 4, perhaps the most informative idea for future research is to investigate whether adding a self-compassionate component to current CBT interventions for social anxiety produces any incremental benefits when compared with CBT alone. Such comparisons will advance knowledge about the relative value of compassion-based approaches. Although the addition of intervention adjuncts can be burdensome to both the therapist and client, it may be that this burden is outweighed by the benefit of improved therapeutic outcomes. For example, previous research demonstrates that motivational interviewing as an adjunct to CBT can significantly improve outcomes in anxiety disorders (Randall & McNeil, 2017).

Finally, my thesis provides some cautionary evidence that self-compassion may be less readily accepted than cognitive restructuring, although these effects were small and only bordered on significance. Future research could examine why certain people rate self-compassion as less acceptable, for example through conducting post-treatment interviews. In the context of self-compassion research, it may also be beneficial to examine whether treatment outcomes are affected by participant preference of treatment approach. For example, by having participants choose between treatments (i.e., self-compassion versus cognitive restructuring) and a second group in which there is no choice (i.e., automatic randomization). It could then be examined whether those who were allowed treatment preference had better outcomes than those who were automatically allocated. Findings in other areas such as Major Depressive Disorder and Post-Traumatic Stress Disorder has

indeed shown that receiving one's preferred treatment results in improved outcomes (Kwan, Dimidjian, & Rizvi, 2010; Zoellner, Roy-Byrne, Mavissakalian, & Feeny, 2018).

Limitations

My research was limited by the typical time and resource constraints of a PhD. The relationships between self-attitudes and social anxiety were only studied using a limited range of study designs, particularly in relation to time intervals between assessments and duration of interventions. Additionally, I only used a limited number of measures of self-attitudes, and these measures have been criticized in recent research (Rose & Rimes, 2018; Strauss et al., 2016), although superior alternatives do not yet exist. The relative lack of research in the area of self-criticism, self-compassion, and social anxiety meant that I was not always able to make clear or confident hypotheses regarding the relationships between these constructs. As such, many of my analyses were exploratory in nature which means that strong conclusions from these results need to be tempered. However, exploratory findings can be used as the foundations for future hypothesis generation. Finally, my thesis did not include a full-length treatment trial comparing self-compassion and CBT, which would have proven most useful for the types of research questions explored. However, it is arguably more resource efficient to gather pilot data before undertaking a full-length treatment trial which can be highly expensive and time consuming.

Strengths

Despite these limitations, my thesis has numerous strengths. First and foremost, analyses were justified and conducted in a planned and transparent manner. This type of approach is important given the prevalent replication-related issues that have plagued the field of psychology (e.g., Lindsay, 2015). Furthermore, my research attempted to keep up with contemporary developments in psychology research at both the statistical (Hamaker et al., 2015) and measurement level (e.g., taking into account recent research illustrating the

importance of separating positive and negative subscales of self-compassion instruments; Lopez et al., 2015). Another strength was an emphasiz on testing the foundational claims of compassion-based theories, which has not occurred sufficiently in past research, as well as my thesis being strongly driven by prevailing cognitive models of social anxiety. Additionally, I used a clinical sample accompanied by structured diagnostic assessment in Study 2, and a sample with elevated social anxiety in Study 1. This type of sample is important given that my central aim was to expand knowledge on Social Anxiety *Disorder*, rather than social anxiety alone. Finally, both studies were accompanied by reasonable sample sizes, thus the likelihood that some null findings were driven by inadequate power was kept to a minimum.

5.2 Conclusion

In summary, my thesis investigated the role of self-attitudes in social anxiety. I showed that a self-compassion intervention appeared to perform equally well to a cognitive restructuring intervention in reducing social anxiety, which suggests that self-compassion may be a feasible alternative in the treatment of this disorder. However, I also showed that self-criticism and self-compassion did not appear to predict changes in social anxiety, even in a context in which considerable change occurred. In line with these null findings, I also did not find that self-attitudes had an indirect effect on social anxiety, nor did I find any meaningful moderation when comparing self-compassion and cognitive restructuring. As such, my thesis provides mixed support for the role of self-attitudes in this disorder. Whereas self-compassion appears to be a feasible intervention for social anxiety, it does not appear that changes in self-attitudes are the true processes that underlie changes in social anxiety. Taken together, therefore, my thesis provides some evidence that certain self-attitudes are relatively unimportant in SAD and existing maintenance factors (e.g., probability and cost

biases) of this disorder represent more valuable therapeutic targets. However, there is a strong need for further longitudinal research to continue this line of enquiry.

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Appendices

Appendix A – Characteristics of Mediator Studies

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Study	Participants	Self-Compassion Measure or Intervention	Outcome Measures	Mediator Measures	Design	Findings	MCV
Andrew, Tiggemann, & Clark (2016)	266 undergraduate females	SCS-SF	Body appreciation (BAS)	Appearance processing made up of self-objectification (OBCS), social appearance comparison (PACS), thin ideal internalization (SATAQ)	Cross-sectional	Appearance processing mediated the effect of self-compassion on body appreciation.	2
Arimitsu & Hofman (2015)	231 undergraduates (study 1); 233 undergraduates (study 2)	SCS	Anxiety (STAI); depression (BDI-II); life satisfaction (SWLS)	Negative automatic thoughts (DACS); positive automatic thoughts (PATS)	Cross-sectional	Positive automatic thoughts mediated the relationship between self-compassion and all outcomes. Negative automatic thoughts mediated this relationship for depression and anxiety, but not life satisfaction.	1
Baker & McNulty (2011)	72 newlywed couples	Self-compassionate imagery	Marital satisfaction (SMD)	Marital problems (IMP)	Longitudinal	Among men high in conscientiousness, marital problems mediated the relationship between self-compassion and marital satisfaction.	2

Study	Participants	Self-Compassion Measure or Intervention	Outcome Measures	Mediator Measures	Design	Findings	MCV
Barlow, Turow, & Gerhart (2017)	466 university students	SCS	PTSD symptoms (TAQ)	Emotion regulation difficulties (DERS)	Cross-sectional	Emotion regulation difficulties mediated the relationship between self-compassion and PTSD symptoms.	1
Blackie & Kocovski (2018)	98 undergraduates with elevated social anxiety	Self-compassionate writing	Willingness to communicate (WC); post-event processing (PEPI)	Post-event processing (PEPI); performance perceptions (SSESPS)	Controlled experiment with 2 control groups; no pre-measures of outcome variable; manipulation of self-compassion	State performance perceptions mediated the relationship between condition (self-compassion versus control) and post-event processing, but not willingness to communicate. Post-event processing mediated the relationship between condition and willingness to communicate. There was multiple mediation of condition predicting performance perceptions, which in turn predicted post-event processing, which in turn predicted willingness to communicate.	3
Bistricky et al. (2017)	132 trauma-exposed adults	SCS-SF	PTSD symptoms (PCL-C)	Interpersonal competence (ICQ)	Cross-sectional	Interpersonal competence mediated the relationship between self-compassion and PTSD symptoms.	2

Study	Participants	Self-Compassion Measure or Intervention	Outcome Measures	Mediator Measures	Design	Findings	MCV
Bluth & Blanton (2014)	65 high school students	SCS	Positive and negative affect (PANAS); life satisfaction (SLSS); stress (PSS)	Mindfulness (CAMM)	Cross-sectional	Mindfulness mediated the relationship between self-compassion and several outcomes (negative affect, life satisfaction, and stress), but not positive affect.	2
Breines et al. (2014)	158 female undergraduates	SCS-SF (appearance related)	Anticipated disordered eating, weight gain concern motives, self-punishment motives (adapted scales)	Body shame (OBCS)	Uncontrolled experiment, no pre-measures of outcome variables, manipulation of mediator	State body shame mediated the relationship between self-compassion and two outcome variables (anticipated disordered eating and weight gain concern motives), but not self-punishment motives.	3

Study	Participants	Self-Compassion Measure or Intervention	Outcome Measures	Mediator Measures	Design	Findings	MCV
Brown et al. (2016)	517 middle-aged women	SCS	Depression (CES-D); positive mental health (WEMWBS)	Attitudes to ageing (AAQ)	Cross-sectional.	Two subscales of attitudes to ageing (psychosocial loss and physical change), but not the third subscale (psychological growth) mediated the relationship between self-compassion (both positive and negative) and depression. Physical change alone mediated the relationship between self-compassion and positive mental health.	1
Diedrich et al. (2017)	69 adults with unipolar depression diagnosis	SCS	Depression (BDI-II)	Emotion regulation skills (ERSQ)	Longitudinal with two time points; not controlling for baseline levels of outcome variable	T1 emotion regulation skills mediated the relationship between T1 self-compassion and T2 depression. Exploratory analyses showed that only the tolerance of negative emotion subscale was a significant mediator.	2
Dowd & Yung (2017)	220 adults with celiac disease	SCS	Celiac quality of life (CQoL)	Self-regulatory efficacy; concurrent self-regulatory efficacy (adapted scales)	Longitudinal with two time points; not controlling for baseline levels of outcome variable	T1 Concurrent self-regulatory efficacy, but not T1 self-regulatory efficacy, mediated the relationship between T1 self-compassion and T2 celiac quality of life.	2
Dudley et al. (2018)	128 adults who hear voices	SCS	Severity of voices (HPSVQ)	Mindfulness of voices (SMVQ)	Cross-sectional	Mindfulness of voices mediated the relationship between self-compassion and severity of voices.	1

Study	Participants	Self-Compassion Measure or Intervention	Outcome Measures	Mediator Measures	Design	Findings	MCV
Dundas et al. (2016)	277 undergraduates	SCS (positive subscales)	Depression (SCL-90-R)	Negative self-compassion	Cross-sectional	Among participants high in positive self-compassion, negative self-compassion mediated the relationship between positive self-compassion and depression.	1
Ewert, Gaube, & Geisler (2018)	105 university students	SCS	Shame (PANAS)	Denial (COPE-I)	Uncontrolled experiment manipulating shame	After participating in the Trier Social Stress Test (TSST), state denial as a coping strategy mediated the relationship between trait self-compassion and state shame.	2
Ferguson et al. (2014)	83 female athletes	SCS	Eudaimonic wellbeing (SPWB)	Passivity (CBAS); responsibility (PRQ); initiative (PGIS); self-determination (SDS)	Cross-sectional	Passivity and initiative mediated the relationship between self-compassion and eudaimonic wellbeing. Responsibility and self-determination did not.	1
Finlay-Jones, Reese, & Kane (2015)	198 Australian psychologists	SCS-SF	Stress (DASS-21)	Emotion regulation difficulties (DERS)	Cross-sectional	Emotion regulation difficulties mediated the relationship between self-compassion and stress symptoms.	1
Fresnic & Borders (2017)	201 undergraduates	SCS	Anger (STAXI-2); aggression (EAS)	Angry rumination (ARS)	Cross-sectional	Angry rumination mediated the relationship between self-compassion and anger and aggression. When examining the effects of the subscales of self-compassion, only over-identification was a unique predictor.	2

Study	Participants	Self-Compassion Measure or Intervention	Outcome Measures	Mediator Measures	Design	Findings	MCV
Gouveia et al. (2016)	480 parents	SCS	Parenting stress (PSI-SF)	Mindful parenting (IM-P)	Cross-sectional	Mindful parenting mediated the relationship between self-compassion and parenting stress.	2
Johnson & O'Brien (2013)	335 university students	SCS	Depression (BDI)	Shame (TOSCA-3); guilt (TOSCA-3); rumination (RRQ); self-esteem (RSE)	Cross-sectional	When entered simultaneously, self-esteem, rumination, and shame mediated the relationship between self-compassion and depression. Guilt did not.	1
Johnson et al. (2018)	59 African Americans with recent suicide attempts	Cognitively Based Compassion Training	Depression (BDI-II)	Self-criticism (LOSCS)	Controlled experiment; manipulation of self-compassion	Condition (compassion meditation versus control) predicted a change in self-criticism (T1 to T2) which in turn predicted a change in depression (T1 to T2).	3
Kelliher-Rabon et al. (2018)	365 undergraduates	SCS-SF	Suicidal behaviour (SBQ-R)	Depression (CESD-10); wellness behaviours (WBI)	Cross-sectional	Depression and wellness behaviours (also in reverse order) serially mediated the relationship between self-compassion and suicidal behaviour.	1

Study	Participants	Self-Compassion Measure or Intervention	Outcome Measures	Mediator Measures	Design	Findings	MCV
Krieger et al. (2013)	142 clinically depressed outpatients	SCS	Depression (BDI-II)	Rumination (RSQ); avoidance (CBAS)	Cross-sectional	Avoidant functioning (a latent factor combining symptom-focused rumination and avoidance) mediated the relationship between self-compassion and depression. In individual analyses, 1 of 2 subscales of rumination was a significant mediator (symptom focused, but not self-focused rumination), and 3 of 4 avoidance subscales were significant (behavioural social, behavioural nonsocial, cognitive nonsocial, but not cognitive social avoidance).	1
Lenferink et al. (2017)	137 adults with missing relatives	SCS	Prolonged grief (ICG); depression (IDS-SR); posttraumatic stress (PCL-5)	Grief rumination (UGRS)	Cross-sectional	There was an overall mediating effect of grief rumination on the relationship between self-compassion and all outcome variables. 3 of 5 subscales (relationship, injustice, meaning, but not counterfactuals and reactions) were significant mediators for the outcome variables of prolonged grief and posttraumatic stress. Only the relationship and meaning subscales were significant mediators for the outcome variable of depression.	2

Study	Participants	Self-Compassion Measure or Intervention	Outcome Measures	Mediator Measures	Design	Findings	MCV
Lincoln, Hohenhaus, & Hartmann (2013)	71 undergraduates	Self-compassionate imagery	Paranoia (PC)	Negative emotions (adapted); self-esteem (RSE)	Controlled experiment; manipulation of self-compassion	The effect of condition (self-compassion versus control) on paranoia was mediated by state negative emotions, but not self-esteem.	3
Lloyd et al. (2018)	73 caregivers	SCS-SF	Caregiver burden (ZBI)	Coping strategies (COPE)	Cross-sectional	1 of the 2 subscales of coping strategies (dysfunctional, but not emotion-focused coping) mediated the relationship between self-compassion and caregiver burden.	2
Montero-Marin et al. (2018)	42 adults with fibromyalgia	Attachment-based compassion therapy	Fibromyalgia impact (FIQ); mental illness severity (CGI-S); pain catastrophizing (PCS); depression and anxiety (HADS)	Psychological flexibility	Controlled experiment; manipulation of self-compassion	Psychological flexibility mediated the effect of condition (attachment-based compassion therapy versus control) on all outcomes except mental illness severity.	3
Mowlaie et al. (2016)	370 undergraduates	SCS	Worry (PSWS)	Personal intelligence (PIT)	Cross-sectional	Personal intelligence mediated the relationship between self-compassion and worry.	1

Study	Participants	Self-Compassion Measure or Intervention	Outcome Measures	Mediator Measures	Design	Findings	MCV
Neff, Hsieh, & Dejitterat (2005)	222 undergraduates	SCS	Intrinsic motivation (LSRQ); anxiety (STAI); achievement goals (PALS)	Fear of failure (FFS); perceived competence (PCLS)	Cross-sectional.	Fear of failure and perceived competence mediated the relationship between self-compassion and all outcome variables.	1
Petrocchi, Ottaviani, & Couyoumdjian (2017)	86 adults from general community	Self-compassionate mirror intervention	Positive affect (TPAS)	Common humanity (SCS)	Controlled experiment; 2 control groups; manipulation of self-compassion	The effect of condition (self-compassion mirror intervention versus controls) on state positive affect was mediated by state common humanity.	3
Raes (2010)	271 undergraduates	SCS	Depression (BDI-II); anxiety (STAI-T)	Rumination (RRS); worry (PSWQ)	Cross-sectional	The brooding subscale of rumination mediated the relationship between self-compassion and depression, while worry did not. Both brooding and worry mediated the relationship between self-compassion and anxiety, with the mediating effect of worry being significantly greater.	2

Study	Participants	Self-Compassion Measure or Intervention	Outcome Measures	Mediator Measures	Design	Findings	MCV
Stephenson et al. (2017)	184 under-graduates	SCS-SF	Depression and anxiety (DAS)	Irrational beliefs (SSPB)	Cross-sectional	The self-directed shoulds subscale was not examined in mediation because it did not significantly correlate with self-compassion. The low frustration tolerance subscale of irrational beliefs (but not the contingent self-worth subscale) mediated the relationship between self-compassion and anxiety. The contingent self-worth subscale (but not the low frustration tolerance subscale) mediated the relationship between self-compassion and depression, but in the opposite direction as expected.	2
Tandler & Peterson (2018)	185 adults	SCS	Romantic jealousy (RJS)	Willingness to forgive (TRIMI); anger rumination (ARS)	Cross-sectional.	The relationship between self-compassion and the reactive jealousy subscale of romantic jealousy was mediated by willingness to forgive, but not anger rumination.	2
Wadsworth et al. (2018)	582 adults receiving CBT or DBT	SCS-SF	Depression (CESD-10); anxiety (GAD-7)	Repetitive negative thinking (PTQ)	Longitudinal with two time points; controlling for baseline levels of outcome variables	The relationship between changes in negative aspects of self-compassion (but not positive aspects) and changes in depression and anxiety, was mediated by changes in repetitive negative thinking.	2

Study	Participants	Self-Compassion Measure or Intervention	Outcome Measures	Mediator Measures	Design	Findings	MCV
Webb & Foreman (2013)	215 undergraduates	SCS (positive subscales)	Binge eating severity (BES)	Emotional tolerance (ETS); unconditional self-acceptance (USAQ)	Cross-sectional	Emotional tolerance and unconditional self-acceptance both mediated the relationship between positive self-compassion and binge eating severity.	1
Wong & Yeung (2017)	601 university students	SCS	Posttraumatic growth (PGI)	Cognitive reappraisal (COPE); meaning making (MILQ)	Cross-sectional	Cognitive reappraisal (positive reframing but not the acceptance subscale) and meaning making (presence of meaning but not search for meaning subscale) both mediated the relationship between positive aspects of self-compassion and posttraumatic growth (the mediating effect of positive reframing was significantly stronger). Negative aspects of self-compassion were not included in the analysis was they did not correlate significantly with posttraumatic growth.	2
Yang, Zhang, & Kou (2016)	335 adults from general community	SCS	Life satisfaction (SWLS)	Hope (SHS)	Cross-sectional	Hope mediated the relationship between self-compassion and life satisfaction.	2
Ying (2009)	65 postgraduate students	SCS	Depression (CPIDS)	Sense of coherence (SCQ)	Cross-sectional	Sense of coherence mediated the relationship between self-compassion (specifically, the overidentification subscale) and depression.	2

Study	Participants	Self-Compassion Measure or Intervention	Outcome Measures	Mediator Measures	Design	Findings	MCV
Zhang & Chen (2016)	400 university students	Self-compassionate imagery	Personal improvement (adapted)	Acceptance (COPE); forgiveness (HFS)	Controlled experiment; manipulation of self-compassion	Trait acceptance, but not trait forgiveness, mediated the relationship between condition (self-compassion versus controls) and personal improvement.	3
Zhou et al. (2013)	418 university students	SCS (positive subscales)	Hopelessness depression (HDSQ)	Negative cognitive style (CSQ-SF)	Cross-sectional	Negative cognitive style mediated the relationship between self-compassion (positive subscales) and hopelessness depression.	1

Notes. MCV = Mechanism of Change Validity; SCS = Self-Compassion Scale; SCS-SF = Self-Compassion Scale-SF; BAS = Body Appreciation Scale; OBCS = Objectified Body Consciousness Scale; PACS = Physical Appearance Comparison Scale; SATAQ = Sociocultural Attitudes Towards Appearance Questionnaire; STAI = Spielberger Trait Anxiety Inventory; BDI-II = Beck Depression Inventory-II; SWLS = The Satisfaction with Life Scale; DACS = Depression Anxiety Cognition Scale; PACS = The Positive Automatic Thought Scale; SMD = Semantic Differential; IMP = Inventory of Marital Problems; TAQ = Trauma Appraisal Questionnaire; DERS = Difficulties in Emotion Regulation Scale; PEPI = Post-Event Processing Inventory; WC = Willingness to Communicate; SSESPS = State Self-Esteem Scale-Performance Subscale; SEM = Structural Equation Modeling; PANAS = Positive and Negative Affect Scale; PSS = Perceived Stress Scale; SLSS = Student's Life Satisfaction Scale; CAMM = Children and Adolescent Mindfulness Measure; CES-D = Centre for Epidemiological Studies Depression Scale; WEMWBS = Warwick-Edinburgh Mental Well-Being Scale; AAQ = Attitudes to Ageing Questionnaire; CQoL = Celiac Quality of Life; HPSVQ = The Hamilton Program for Schizophrenia Voices Questionnaire; SMVQ = Southampton Mindfulness of Voices Questionnaire; SCL-90-R = Symptom Checklist-90-Revised; COPE-I = Carver's Brief COPE-Inventory; SPWB = Scales of Psychological Wellbeing; CBAS = The Cognitive-Behavioral Avoidance Scale; PRQ = The Personal Responsibility Questionnaire; PGIS = The Personal Growth Initiative Scale; SDS = The Self-Determination Scale; DASS-21 = Depression Anxiety Stress Scales-21; STAXI-2 = State Trait Anger Expression Inventory; EAS = Explicit Aggression Scale; ARS = Anger Rumination Scale; PSI-SF = Parenting Stress Index–Short Form; IM-P = Interpersonal Mindfulness in Parenting Scale; BDI = Beck Depression Inventory; TOSCA-3 = The Test of Self-Conscious Affect; RRQ = Reflection and Rumination Questionnaire; RSE = Rosenberg Self-Esteem Scale; LOSCS = Levels of Self-Criticism Scale; CESD-10 = Center for Epidemiologic Studies Depression Scales-Revised; WBI = Wellness Behaviour Inventory; SBQR = Suicidal Behavior Questionnaire-Revised; RSQ = Response Styles Questionnaire; ICG = Inventory of Complicated Grief; IDS-SR = Inventory of Depressive Symptomatology-Self-Report; PLC-5 = PTSD Checklist for DSM-5; UGRS = Utrech Grief Rumination Scale; PC = Paranoia Checklist; ZBI = Zarit Burden Interview; COPE = Coping Orientations to Problems Experienced; FIQ = Fibromyalgia Impact Questionnaire; CGI-S = Clinical Global Impression-Severity Scale; PCS = Pain Catastrophizing Scale; HADS = Hospital

Anxiety and Depression Scale; PSWS = Penn State Worry Questionnaire; PIT = Personal Intelligence Test; LSRQ = Learning Self-Regulation Questionnaire; FFS = Fear of Failure Scale; PCLS = Perceived Competence for Learning Scale; PALS = Patterns of Adaptive Learning Survey; RRS = Ruminative Response Scale; DAS = Depression and Anxiety Scales; SSPB = Short Survey of Personal Beliefs; RJS = Romantic Jealousy Scale; TRIMI = Transgression-Related Interpersonal Motivations Inventory; CBT = Cognitive Behavioural Therapy; DBT = Dialectical Behaviour Therapy; GAD-7 = 7-item Generalized Anxiety Disorder Scale; PTQ = Perseverative Thinking Questionnaire; BES = Binge Eating Scale; ETS = Emotional Tolerance Scale; USAQ = Unconditional Self-Acceptance Questionnaire; PGI = Posttraumatic Growth Inventory; MILQ = Meaning in Life Questionnaire; SHS = State Hope Scale; CPIDS = California Psychological Inventory-Depression Scale; HFS = Heartland Forgiveness Scale; HDSQ = Hopelessness Depression Symptom Questionnaire; CSQ-SF = Short-form version of Cognitive Style Questionnaire.

Appendix B – Characteristics of Moderator Studies

Study	Participants	Self-Compassion Measure or Intervention/s	Outcome Measures	Moderator Measures	Design	Findings
Arch, Landy, & Brown (2016)	105 undergraduate females	Self-compassion meditation; attentional control; no intervention	State anxiety (SUDS); salivary alpha amylase	Trait self-compassion (SCS); non-attachment (NAS); social anxiety (SIAS); rumination (RRQ)	Controlled experiment with repeated measures	Trait self-compassion did not moderate outcomes but was a baseline predictor of state anxiety such that those with higher trait self-compassion had lower state anxiety. Non-attachment moderated the effect of condition such that those with higher non-attachment in the self-compassion group had better outcomes on both measures. Social anxiety was a baseline predictor, but not a moderator, of salivary alpha-amylase. Social anxiety moderated the effect of condition on state anxiety such that those lower in social anxiety in the self-compassion group had better outcomes. Rumination moderated the effect of condition on salivary alpha-amylase such that those lower in rumination in the self-compassion group had worse outcomes compared to the control groups. Rumination was a baseline predictor, but not a moderator, of state anxiety.
Baker & McNulty (2011, study 1)	243 undergraduates	SCS	Motivation to correct interpersonal mistakes (invented)	Conscientiousness (BFPI-S)	Cross-sectional	For men but not women, conscientiousness moderated the relationship between self-compassion and motivation to correct interpersonal mistakes, such that men higher in conscientiousness had better outcomes.
Baker & McNulty (2011, study 2)	84 married couples	SCS	Observed problem solving behaviour (invented)	Conscientiousness (BFPI-S)	Cross-sectional	For husbands but not wives, conscientiousness moderated the relationship between self-compassion and observed problem solving behaviour, such that men higher in conscientiousness had better outcomes.
Baker & McNulty (2011, study 3)	88 undergraduates	Self-compassionate writing; self-critical writing	Motivation to correct interpersonal mistakes; accommodation (AS)	Conscientiousness (BFPI-S)	Controlled experiment without repeated measures	For men but not women, conscientiousness moderated the relationship between condition and both outcome variables, such that men higher in conscientiousness in the self-compassion group had better outcomes.
Baker & McNulty (2011, study 4)	72 newlywed couples	SCS	Marital satisfaction (SMD); marital problems (IMP)	Conscientiousness (BFPI-S)	Longitudinal with 6 assessment points	For husbands but not wives, conscientiousness moderated the relationship between self-compassion and changes in

Study	Participants	Self-Compassion Measure or Intervention/s	Outcome Measures	Moderator Measures	Design	Findings
						the outcome variables over time, such that men higher in conscientiousness had better outcomes.
Bluth & Blanton (2015)	90 adolescents	SCS	Positive and negative affect (PANAS); life satisfaction (SLSS); stress (PSS)	Age; gender	Cross-sectional	Age moderated the relationship between self-compassion and negative affect, such that there was a stronger negative association for older adolescents. No other moderator analyses were significant.
Bluth et al. (2017)	765 adolescents	SCS-SF	Stress (PSS); life satisfaction (SLSS); distress intolerance (DIX); depression (SMFQ); and anxiety (SSTAISF)	Age; gender	Cross-sectional	Gender and age moderated the effect of self-compassion on anxiety such that, among older adolescent boys, the negative association was stronger. Age moderated the effect of self-compassion on depression, such that among older adolescents the negative association was stronger. No other moderator analyses were significant.
Diedrich et al. (2014)	48 adults with major depressive disorder	Self-compassion; cognitive reappraisal; acceptance; waiting condition	State depression (invented)	Baseline state depression	Controlled experiment with repeated measures	Baseline depression moderated the effect of condition (self-compassion versus cognitive reappraisal) such that there was a trend towards greater change in depression for those higher in baseline depression and in the self-compassion group. No moderating effect was found for self-compassion versus acceptance.
Finlay-Jones et al. (2018)	49 adults	Mindful self-compassion training	Compassion for others (COS); fears of self-compassion (FOCS); rumination (RRS); depression, anxiety, stress (DASS-21)	Maladaptive perfectionism	Uncontrolled treatment trial with repeated measures	Maladaptive perfectionism did not moderate the effect of the intervention on any outcomes.
Harwood & Kocovski (2017)	56 undergraduates with elevated social anxiety and 62 health undergraduates	Self-compassionate writing; writing about negative event	Anticipatory anxiety (SUDS; STAI-S; ASBQ)	Social anxiety (SPIN; SIAS)	Controlled experiment without repeated measures	Social anxiety moderated the effect of condition on outcome. Those with elevated social anxiety in the self-compassion group had lower anticipatory anxiety than those with elevated social anxiety in the control group. In contrast, those with low social anxiety in the self-compassion group did not differ in outcome from their low social anxiety counterparts in the control group.

Study	Participants	Self-Compassion Measure or Intervention/s	Outcome Measures	Moderator Measures	Design	Findings
Hwang et al. (2016)	1813 adults	SCS	Subjective wellbeing (COMOSWB); depression (CES-D)	Age	Cross-sectional	Age moderated the effect of self-compassion on subjective wellbeing (but not depression), such that for older adults, the relationship was stronger.
Kelly & Carter (2015)	41 adults with binge eating disorder	Food planning plus self-compassion; food planning plus behavioural strategies; waitlist control	Eating disorder pathology (EQE-Q); depression (CES-D)	Fear of self-compassion (FOCS)	Randomized controlled trial	Fear of self-compassion moderated the effect of condition on both outcome variables such that those lower in fear of self-compassion had better outcomes.
Lincoln, Hohenhaus, & Hartmann (2013)	71 undergraduates	Self-compassionate imagery; neutral control	Paranoia (PC)	Psychosis proneness (CAPE)	Controlled experiment with repeated measures	Psychosis proneness moderated the effect of condition on paranoia such that those with higher psychosis proneness had better outcomes in the self-compassion condition.
Przezdziecki & Sherman (2016)	105 female breast cancer survivors	Self-compassionate writing; neutral writing control	Negative affect (modified)	Self-compassion (SCS)	Controlled experiment with repeated measures	Self-compassion did not moderate the effect of condition on negative affect.
Sommers-Spijkerman et al. (2018)	242 adults	Self-guided CFT; waitlist control	Positive mental health (MHC-SF); depression and anxiety (HADS); stress (PSS); self-criticism and self-reassurance (FSCRS); positive and negative affect (PANAS); gratitude (GQ6)	Demographics (age, gender, marital status, living- and work situation, educational level); psychological resources (baseline levels of outcome variables); occurrence of significant life events in past 12 months	Randomized controlled trial	There were no significant moderating effects.
Yang, Zhang, & Kou (2016)	335 adults from general community	SCS	Life satisfaction (SWLS)	Age; gender	Cross-sectional	Age and gender did not significantly moderate the effect of self-compassion on life satisfaction.

Notes. SCS = Self-Compassion Scale; SCS-SF = Self-Compassion Scale Short Form; SUDS = Subjective Units of Distress Scale; NAS = Non-Attachment Scale; SIAS = Social Interaction Anxiety Scale; RRQ = Rumination Reflection Questionnaire; BFPI-S = Big Five Personality Inventory—Short; AS = Accommodation Scale; SMD = Semantic Differential; IMP = Inventory of Marital Problems; SLSS = Student's Life Satisfaction Scale; PSS = Perceived Stress Scale; PANAS = Positive and Negative Affect Scale; DIX = Distress Intolerance Index; SMFQ = Short Mood and Feelings Questionnaire; SSTAISF = Spielberger State-Trait Anxiety Inventory Short Form; COS = Compassion for Others Scale; FOCS = Fear of Compassion Scale; RRS = Ruminative Responses Scale; DASS-21 = 21-item Depression, Anxiety, Stress Scales; FSCRS = Forms of Self-Criticism/Self-Reassuring Scale; COMOSWB = Concise Measure of Subjective Well-Being; CES-D = Center for Epidemiologic Studies Depression Scale; EDE-Q = Eating Disorder Examination Questionnaire; SSC-SF = Smoking Stage of Change–Short Form; DEQ = Depressive Experiences Questionnaire; PC = Paranoia Checklist; CAPE = Community Assessment of Psychic Experiences; MLM = Multi-level modelling; SHI = Steen Happiness Index; CFT = Compassion Focused Therapy; MHC-SF = Mental Health Continuum–Short Form; HADS = Hospital Anxiety and Depression Scale; GQ6 = 6-Item Gratitude Questionnaire; SWLS = Satisfaction with Life Scale; STAI-S = Spielberger State-Trait Anxiety Inventory–State Version; ABSQ = Anticipatory Social Behaviors Questionnaire; SPIN = Social Phobia Inventory.

Appendix C – Correlation Matrix for Chapter 3 Main Variables

Measures	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. W1 Self-Crit	-																
2. W1 Self-Kind	-.672**	-															
3. W1 Inferior	.677**	-.558**	-														
4. W1 Poor SE	.841**	-.688**	.765**	-													
5. W1 SPS	.648**	-.454**	.741**	.710**	-												
6. W1 SIAS	.669**	-.476**	.795**	.746**	.871**	-											
7. W2 Self-Crit	.842**	-.648**	.628**	.788**	.590**	.617**	-										
8. W2 Self-Kind	-.648**	.802**	-.472**	-.634**	-.374**	-.416**	-.684**	-									
9. W2 Inferior	.660**	-.520**	.886**	.753**	.716**	.771**	.676**	-.529**	-								
10. W2 Poor SE	.800**	-.654**	.733**	.897**	.651**	.688**	.844**	-.667**	.789**	-							
11. W2 SPS	.563**	-.399**	.689**	.620**	.901**	.819**	.611**	-.407**	.704**	.632**	-						
12. W2 SIAS	.636**	-.481**	.789**	.710**	.839**	.931**	.685**	-.493**	.803**	.736**	.858**	-					
13. W3 Self-Crit	.836**	-.659**	.569**	.755**	.574**	.622**	.888**	-.685**	.656**	.792**	.567**	.663**	-				
14. W3 Self-Kind	-.621**	.776**	-.455**	-.635**	-.416**	-.482**	-.690**	.813**	-.543**	-.676**	-.433**	-.542**	-.706**	-			
15. W3 Inferior	.614**	-.514**	.874**	.720**	.731**	.792**	.636**	-.476**	.906**	.761**	.724**	.803**	.635**	-.532**	-		
16. W3 Poor SE	.760**	-.649**	.685**	.881**	.668**	.714**	.801**	-.619**	.769**	.897**	.635**	.748**	.811**	-.682**	.770**	-	
17. W3 SPS	.511**	-.389**	.683**	.584**	.878**	.820**	.542**	-.385**	.680**	.595**	.920**	.814**	.582**	-.411**	.718**	.630**	-
18. W3 SIAS	.606**	-.468**	.745**	.672**	.843**	.925**	.644**	-.452**	.772**	.681**	.849**	.946**	.653**	-.470**	.779**	.735**	.851**

Notes. **. Correlation is significant at the .01 level (2-tailed). *. Correlation is significant at the .05 level (2-tailed). W1 = Wave 1; W2 = Wave 2; W3 = Wave 3; Self-Crit = Self-Criticism; Self-Kind = Self-Kindness; Inferior = Perceived Inferiority; Poor SE = Poor Self-Esteem (i.e., self-esteem reversed); SPS = Social Phobia Scale; SIAS = Social Interaction Anxiety Scale.

Appendix D – Full Script for Self-Compassion

Rationale

In order to understand what causes social anxiety, we need to look at some well-established neuroscientific research. According to this research, humans have evolved to possess 3 primary emotional systems: The 'threat' system, the 'drive' system, and the 'soothing' system. The two systems we are mainly interested in are the threat and soothing systems.

The soothing system evolved to facilitate attachment between infants and caregivers, and it produces feelings such as contentment and social safety. The threat system evolved to protect the self, and it produces feelings such as anxiety and shame which motivate self-protective behaviour (e.g., fight or flight).

According to this framework, social anxiety can be understood as an imbalance between the threat and soothing systems, whereby the former is over-activated and the latter is under-activated. Importantly, these systems are seen as mutually exclusive, in that the activation of one will deactivate the other. More specifically, the activation of the soothing system down-regulates the threat system and thus reduces negative feelings such as anxiety.

So the question is: How can we activate the soothing system? One approach is through *self-compassion*, which can be defined as a sensitivity to suffering in oneself, coupled with a motivation to alleviate this suffering. Self-compassion involves treating oneself with kindness, care, warmth, and understanding.

Just as the threat system is sensitive to signals of threat and will activate defensive emotions such as anxiety, your soothing system is sensitive to signals of compassion which will reduce feelings of anxiety.

The next question is: How does one practice self-compassion? One technique is to write a short compassionate letter to oneself regarding a recent distressing event. For this project, you will be thinking about a recent situation in which you experienced social anxiety.

In the letter, you want to try to provide yourself with what you need in order to feel better. This will involve communicating to yourself with kindness and understanding, realising that your distress makes sense. You might imagine what you would say to a friend in a similar situation, and how you would feel toward such a friend. As you write the letter, you might actually visualise having a version of yourself in front of you, and verbalizing the letter you are writing to them. You want the tone of your communication to be warm and friendly, and you might actually hold a half-smile on your face as you're writing. Again, your goal is to activate the soothing system by generating feelings of warmth, contentedness, safety, and security. Write to yourself what you need in order to feel this way.

This is a craft for you to hone. Over the next 2 weeks, you will be practicing these skills on a daily basis. Once per day, you will log on to this webpage using this link, and complete one "compassionate letter" in which you write a letter to yourself regarding a recent situation that caused social anxiety.

To continue, please rate how much you understand this rationale and also how much you believe it can work. Then click proceed in order to move to the next page and practice this skill.

Instructions
In this letter, you are going to write about a recent social situation that made you anxious, but from the perspective of the compassionate part of yourself. The idea of compassionate letter writing is to help you refocus your thoughts and feelings on being supportive, helpful, and caring of yourself. In practicing doing this, it can help you access an aspect of yourself (the soothing system) that can help tone down more negative feelings and thoughts.

Before you begin, try to feel that part of you that can be kind and understanding of others; how you would be if you were caring for someone you like. Consider your general manner, facial expressions, voice tone, and feelings that come with your caring self. Think about that part of you as the type of self you would like to be. Think about the qualities you would like your compassionate self to have. It does not matter if you feel you are not actually like this – the goal is to focus on the ideal you would *like* to be. Spend at least a full minute really thinking about this and trying to feel in contact with that 'kind' part of you.

When you have a compassionate frame of mind (even just slightly), you are ready to start your letter. As you're writing, allow your face to reflect the kindness and understanding of your compassionate self (e.g., hold a warm half-smile on your face while writing). Imagine yourself using a warm and friendly tone of voice. You could even write the letter to yourself while internally verbalizing what you are writing, using this warm voice. If you find yourself getting distracted ("am I doing this right?" or "I don't feel very compassionate!"), just notice those thoughts and return to the compassionate self.

Here are some ideas of how you can write your letter:

- Think about what you would say to a friend in the same situation, or what a good friend would say to you.
- Try to express understanding towards your distress and recognise your feelings and needs (e.g., I am sad you feel distressed, I know that you want to feel calm and connected with others).
- Try to express validation towards yourself (e.g., It's ok to feel anxious/it makes sense that you feel distressed given what was going through your mind).
- If you are being self-critical, it is helpful to try to locate the feeling underlying this self-criticism (e.g., disappointment or embarrassment), and try to be compassionate and understanding towards these feelings (e.g., It's ok to feel embarrassed).
- You might remind yourself that, although you feel alone and different when you are distressed, there are many other people in the world who feel like this too.
- If there is something compassionate you would like to do in regards to your distress either now or in the future, you might like to write up about this. You might write in a supportive and encouraging way how you can progress towards your goals.

Write whatever comes to you, but make sure this letter provides you with what you think you need to feel nurtured and soothed about your stressful situation or event. This letter may take about 5–15 min to write, and there is no 'right' or 'wrong' way of doing it. Remember, the crucial point is to write this letter from the perspective of the compassionate self.

Appendix E – Full Script for Cognitive Restructuring

Rationale

How we think affects how we feel. If we think negative thoughts about ourselves, we are likely to experience negative feelings about ourselves. As such, a common cause of social anxiety is negative thoughts regarding our social performance. Other common negative thoughts relate to the perceived likelihood of negative social events, and how bad it would be if these events actually happened.

Given that negative thoughts cause negative feelings, if we change the way we think, then we can change the way we feel. Changing our thinking can be achieved by developing the skill of identifying negative automatic thoughts and challenging them. We challenge these thoughts by evaluating their validity. In other words, by evaluating how *true* they actually are.

One strategy for doing this is to write down the *evidence for* and *evidence against* the negative automatic thought. For example, we might have the automatic negative thought: "I humiliated myself at a party". The evidence against this this thought might be the fact that no one laughed at us, people were actually quite interested in talking to us, and one of our friends expressed interest in hanging out tomorrow. The evidence for this thought might be the fact that someone appeared to be judging us while we were talking. By evaluating the evidence for and against a thought, a common experience is for the thought to become less believable. When the thought becomes less believable, we actually feel better.

Another strategy for evaluating our thinking is to categorize the style of unhelpful thinking that we are engaging in. Some of the most common unhelpful thinking styles in social anxiety include:

- Mind-reading - jumping to conclusions about what people are thinking (e.g., "They think I'm boring")
- Black and white thinking - thinking in extreme all-or-nothing terms (e.g., "No one at the party wanted to speak to me")
- Fortune telling - predicting the future instead of seeing what happens.(e.g., "If I share my opinion, people will laugh at me")
- Personalisation - taking events or other people's' behavior personally or blaming yourself and overlooking other factors (e.g., "They're not talking to me because there's something wrong with me")
- Overgeneralization - thinking things like "always" and "never" and overgeneralizing from an isolated event (e.g., "I always humiliate myself at parties")
- Demanding - using words like "should," or "must" to make rigid rules about oneself, the world, or other people (e.g., "I shouldn't be as anxious as this")
- Disqualifying the positive - discounting positive information or twisting a positive into a negative (e.g., "I didn't have anything interesting to say tonight")
- Labelling - putting your whole person into a negative category (e.g., "I'm worthless/a failure")
- Catastrophising - jumping to the worst possible conclusion (e.g., "No one is ever going to like me")
- Emotional reasoning - listening too much to negative gut feelings instead of looking at objective facts (e.g., "Because I feel like an idiot, people must think I'm an idiot")
- Low frustration tolerance - thinking that something is too difficult or overwhelming (e.g., "I can't stand it)

Some thoughts may actually fit into several of these categories. For example, one thought might involve overgeneralization, personalisation, and mind-reading. The reason why it is helpful to categorize our thoughts is because it can show us how distorted and unhelpful they actually are. In turn, the degree to which we believe in the thought can decrease and we feel better.

Ultimately, the goal is to develop a balanced alternative to the negative automatic thought. A balanced thought is one which takes into account all the evidence, objective information, and alternative viewpoints generated from the thought evaluation process. Here is an example of a balanced thought:

"Although I felt like I humiliated myself at the party, it doesn't mean that I actually did. In fact, when I examined the evidence, there really wasn't much that indicated that this thought was true. The main evidence for the thought that I humiliated myself was actually my presumptions about what others were thinking of me, so I was actually engaging in mind-reading, which is impossible. I can also see that I was catastrophising and fortune telling about how bad parties would be in the future. In reality, I've been to plenty of parties before and while some are uncomfortable, generally they are never as bad as I predict."

This is a craft for you to hone. Over the next 2 weeks, you will be practicing these skills on a daily basis. Once per day, you will log on to this webpage using this link, and complete one "thought diary" in which you evaluate a negative automatic thought from a recent situation.

To continue, please rate how much you understand this rationale and also how much you believe it can work. Then click proceed in order to move to the next page and practice this skill.

Instructions
Please follow the instructions below and fill out the "My Recent Situation" column in order to evaluate your thinking and come up with a balanced alternative. You can use the "Examples" column for ideas if required. This process might take 5-15 minutes to complete.

Instructions	**Examples**	**My Recent Situation**
Describe a recent situation in which you experienced social anxiety. • What happened? • Who was involved? • What did I do?	At my brother's place and a friend of his drops by. He starts talking to me.	
Identify some negative automatic thoughts that occurred during the situation. • What was I thinking? • What was I afraid of? • What went through my mind?	I wish he wouldn't talk to me He will notice that I look like a nervous wreck I won't have anything to say He'll think I'm an idiot	

Identify the negative automatic thought that causes the most distress.	He'll think I'm an idiot	
Evidence for this thought.	Once at a party a few years ago, someone came and spoke to me, and a few minutes later asked me if I was OK because I looked a little nervous Sometimes, people have called me an idiot when I've made a mistake	
Evidence against this thought.	I have had many conversations where people have said that they have enjoyed talking to me, or that they have appreciated my opinion – even when I've been anxious when talking to them. I have spoken to him before and he didn't say anything negative People often call other people "idiots" when they are angry and upset, and most of the time they don't mean it	
Identify what category/ies of unhelpful thinking style this thought fits into. • Mind-reading - jumping to conclusions about what people are thinking (e.g., "They think I'm boring") • Black and white thinking - thinking in extreme all-or-nothing terms (e.g., "No one at	• Mind reading • Fortune telling • Catastrophising	

the party wanted to speak to me") • Fortune telling - predicting the future instead of seeing what happens.(e.g., "If I share my opinion, people will laugh at me") • Personalisation - taking events or other people's' behavior personally or blaming yourself and overlooking other factors (e.g., "They're not talking to me because there's something wrong with me") • Overgeneralization - thinking things like "always" and "never" and overgeneralizing from an isolated event (e.g., "I always humiliate myself at parties") • Demanding - using words like "should," or "must" to make rigid rules about oneself, the world, or other people (e.g., "I shouldn't be as anxious as this") • Disqualifying the positive - discounting positive information or twisting a positive into a negative (e.g., "I didn't have anything interesting to say tonight") • Labelling - putting your whole person into a negative category (e.g., "I'm worthless/a failure")		

• Catastrophising - jumping to the worst possible conclusion (e.g., “No one is ever going to like me”) • Emotional reasoning - listening too much to negative gut feelings instead of looking at objective facts (e.g., “Because I feel like an idiot, people must think I’m an idiot”) • Low frustration tolerance - thinking that something is too difficult or overwhelming (e.g., “I can’t stand it)		
Generate a healthy and balanced alternative thought. • Where is the weight of evidence? • What types of unhelpful thinking styles were used? • What other ways are there of viewing the situation? • If I were not anxious, how would I view the situation? • Realistically, what is the likelihood of that happening? • Is this a fact or opinion? • How might someone else view the situation? • Does it really help to think this way? • What is the worst that could happen? • How bad would it be if the worst happened?	Maybe I won’t have much to say, but that doesn’t mean I’m an idiot. I can’t read minds, and there is no evidence that he will think I’m an idiot. Everyone makes mistakes now and then, anyway. Many people have said they’ve enjoyed talking to me and said that they have appreciated my opinion.	

• How could I manage if the worst case scenario happened?		