

**Self-Related Constructs in Cognitive Behavioural Treatment for Social Anxiety  
Disorder**

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## **Thesis Summary**

Despite the efficacy of cognitive-behavioural therapy (CBT) for social anxiety disorder (SAD), many patients remain symptomatic following treatment. More research is therefore needed to uncover active change mechanisms that govern anxiety reduction to help optimise CBT outcomes. The program of research undertaken in this thesis addresses whether self-related constructs change during and/or following CBT for SAD and how change in these variables relate to treatment outcome. The first two papers employ a review methodology and investigate the current state of the theoretical (Paper One) and empirical (Paper Two) literature in this area. Overall, these papers underscore the importance of self-related constructs (e.g., maladaptive self-beliefs, self-focused attention) in cognitive models and CBT for SAD, and indicate that these constructs change during and following treatment intervention. Change in these variables also predict and/or mediate treatment response; however, relatively few studies have examined this in the literature.

The empirical papers build on the findings and future research suggestions generated from the review papers. Paper Three finds that while self-esteem is the strongest unique statistical predictor of depression scores in a non-clinical sample, maladaptive self-beliefs are the strongest unique statistical predictor of social anxiety scores. Paper Four permits inferences about the temporal sequence of change processes in therapy, and suggests that change in maladaptive self-beliefs predicts later change in social anxiety (but not vice versa). Paper Five indicates that while both the implicit and explicit anxiety self-concept change from pre- to post-CBT, they may function independently in treatment. Finally, Paper Six shows that pre- to post-treatment change in self-structure, as measured by self-concept clarity, is associated with both treatment outcome and change in self-related content. Taken together, these findings underscore the importance of modifying a negative self in CBT for SAD and extend the broader fields of the self, psychopathology, and CBT literature.

## **Statement of Candidate**

I certify that the work in this thesis entitled “**Self-Related Constructs in Cognitive Behavioural Treatment for Social Anxiety Disorder**” has not previously been submitted for a degree nor has it been submitted as part of requirements for a degree to any other university or institution other than Macquarie University.

I also certify that the thesis is an original piece of research and it has been written by myself under the supervision of Dr. Lorna Peters. Any help and assistance that I have received in my research work and the preparation of the thesis itself have been appropriately acknowledged.

In addition, I certify that all information sources and literature used are indicated in the thesis.

The research presented in this thesis was approved by Macquarie University Ethics Review Committee, reference numbers: **5201600146, 5201100907, 5201400583** (see Appendix A for documentation).

**Bree Gregory (41201655)**

**6<sup>th</sup> February, 2017**

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“There can be little doubt that a greater appreciation of the self in CBT research and treatment might be one of the most important imperatives for the next generation of cognitive behavioral therapists” (Clark, 2016, p. 40).



**Chapter 1**  
**General Introduction**

## Introduction

Social anxiety disorder (SAD) is characterised by an intense and persistent fear of social or performance situations where the individual is exposed to possible scrutiny from others (American Psychiatric Association [APA], 2013). SAD is recognised as a prevalent, complex, and disabling disorder that, if left untreated, is unremitting (Stein & Stein, 2008). Individuals with SAD show impairments in financial and employment stability, academic performance, and general mental health (Ruscio et al., 2008). These difficulties are often compounded by a high degree of comorbidity with other mental health diagnoses (for a review, see Szafranski, Talkovsky, Farris, & Norton, 2014). Recent meta-analytic evidence suggests that cognitive-behaviour therapy (CBT) is an effective treatment for SAD that compares favourably with other psychological and pharmacological interventions (Mayo-Wilson et al., 2014; Wersebe, Sijbrandij, & Cuijpers, 2013). However, despite the efficacy of CBT for SAD, a large proportion of patients remain symptomatic following treatment intervention (e.g., 59%; Rapee, Gaston, & Abbott, 2009). Uncovering active change mechanisms that govern anxiety reduction is therefore crucial in developing effective augmentation strategies to optimise CBT outcomes (Kazdin, 2007).

A consistent feature across cognitive models of SAD is the central role of the self in the emergence and maintenance of the disorder (Clark & Wells, 1995; Heimberg, Brozovich, & Rapee, 2010; Hofmann, 2007; Moscovitch, 2009; Stopa, 2009). For example, all cognitive conceptualisations of SAD are based on the premise that individuals with social anxiety have maladaptive cognitive schemata that activate negative self-beliefs under perceived social scrutiny. Individuals with social anxiety are also said to experience excessive self-focused attention in social situations, and hold mental representations of self that are comprised of distorted and negative self-imagery (for reviews, see Alden & Regambal, 2010; Gregory, Peters, & Rapee, 2016). In turn, dysfunctional self-related constructs exacerbate the anxiety



experienced before, during, and following social situations (for reviews, see Gregory & Peters, 2017; Ng, Abbott, & Hunt, 2014; Norton & Abbott, 2016).

The centrality of the self in cognitive models of social anxiety and related empirical research has led researchers to examine whether self-related constructs act as change mechanisms in treatment. The program of research undertaken in this thesis aims to address this question, and queries whether self-related constructs change during and/or following CBT for SAD, and how this change relates to treatment outcome. The thesis focuses on first reviewing and synthesising the current state of the literature (Chapters Two and Three) before extending previous research findings (Chapters Four to Seven). The purpose of this introductory chapter is therefore to provide some context for the information presented in subsequent chapters. A condensed overview of how the self has been conceptualised over time in the modern psychology era will be presented first. This review will be far from exhaustive; rather, it aims to provide the reader with information pertaining to recent developments in the literature that have influenced research on the self today. For more extensive elaborations on the history of the self, see Baumeister (1987), Hattie (2014), and Barresi and Martin (2011). Discussion will then address how the self-concept has been positioned in psychopathology research more generally, with particular focus directed toward discussions of content and structural components of the self. A review of how the self has been conceptualised in early and current CBT protocols will then be presented. Finally, a brief examination of how self-related constructs are positioned in current cognitive models of social anxiety and CBT for SAD will be explored. These latter topics will be further elaborated upon in Chapters Two and Three of the thesis.

## **The Self**

Thousands of research publications are produced every year on the concept of the self. Indeed, 31,550 abstracts dealing with the self were found between 1974 and 1993 (Ashmore & Jussim, 1997), and more recent estimates suggest that 1 in 7 publications in psychology

address the construct of the self (Tesser, Stapel, & Wood, 2002; Bhar & Kyrios, 2016).

However, the self has had a tempestuous history in psychology. While William James (1890) brought the self into central focus in his classic text, *The Principles of Psychology*, John Watson (1924) considered it a topic unworthy of scientific investigation. Indeed, for much of the early 20<sup>th</sup> century, the topic of the self was largely ignored by mainstream psychology. A resurgence of interest in the self in the 1970s reclaimed much of what was imbued in James' (1890) work and contemporary social-personality psychologists now position the self as a multidimensional and multifaceted construct that holds both enduring and fleeting components (Markus & Wurf, 1985).

**The Self: A History.** The beginnings of intellectual discussions about the self are often traced to Plato (circa 428-347 B.C.E.). However, evidence of earlier Eastern writers wrestling with notions of the self has been found (e.g., in India and China; Leary & Tangney, 2003). Still, the first psychological discussion of the self did not appear until William James (1890) devoted an entire chapter to the topic in *The Principles of Psychology*. Here, James (1890) conceptualised the self as having both empirical and agent qualities, referred to as the 'me' and 'I' of the self-system, respectively. The empirical self was said to refer to the self as an object of perception and knowledge, that could be divided into the material self (including body, clothes, and home), the social self (i.e., the impression that one gives to significant others), and the spiritual self (including values, ideals, beliefs, dispositions, and thinking). The empirical self was also discussed in terms of feelings of self-worth and self-seeking actions, which inspired the notion of the multiplicity of social selves (e.g., "a man has as many social selves as there are individuals who recognise him and carry an image of him in their mind" [p. 294]), the concept of self-esteem as the ratio of successes to pretensions, and the proposition of ideal versus real selves (e.g., "in each kind of self, material, social, and spiritual men distinguish between the immediate and actual, and the remote and potential..." [p. 315]). In

contrast, the agentic or subjective self was said to refer to the self as a knower and construer of reality (i.e., an information-processing structure).

This distinction between the self as an object to be known and perceived, and the self as the subject doing the knowing and perceiving, has informed many of the empirical approaches within the modern literature of the self. Most empirical studies, however, have concentrated on the conceptualisation of the self as an object of perception (i.e., the self-concept), particularly as it relates to a person's set of self-beliefs (Bhar & Kyrios, 2016). As a result, the subjective self remains less clearly articulated (however, see Baumeister, 1998). The notion of self-esteem and the conceptual difference between ideal and real selves positioned by James (1890) has also been assimilated into psychological selfhood theories (e.g., Higgins, 1987; Rosenberg, 1965), particularly in the psychopathology literature (discussed below). Despite the clear influence of James' work on modern formulations of the self, interest in the self by mainstream psychology dwindled considerably following publication of his work. Instead, the rise of behaviourism and its emphasis on positivism led researchers to be sceptical of constructs perceived to lack clear empirical focus (Allport, 1943). Researchers enamoured by psychoanalysis at the time also dealt with issues of the self too removed from prevailing constructs in psychology (e.g., highly abstract metapsychological constructions), to promote widespread adoption among behaviourist researchers (Leary & Tangney, 2003).

During this period, however, scholars from other fields continued to explore and further conceptualise the construct. In particular, two prominent sociologists, Charles Cooley (1902) and George Mead (1934), took an interactionist approach to evaluating the self. Exploring the nature and origins of self-knowledge, these scholars argued that one's self-conceptualisation does not come from who we are, but rather how we perceive others to view us (termed the 'looking glass self', Cooley, 1902). Thus, from the interactionist perspective, essential to the genesis of the self is the ability to take the perspective of another individual

and perceive the attitude of the other person toward the self (however, see Shrauger & Schoenerman, 1979). About the same time, scholars from the psychoanalytic perspective also tied the self to interpersonal processes, however they tended to emphasise the interaction of a child with significant others in the development of self, rather than with society at large (Sullivan, 1953). While the interactionist approach aligns with James' (1890) notion of the social self, the more enduring qualities of the self-concept were largely ignored. More recent, nuanced definitions of the self that include this looking glass conceptualisation therefore argue that people's self-evaluation are determined by their own attitudes and perception, which is *also* influenced by the perceived attitudes and perception of others (Tice & Wallace, 2003).

When social psychologists became reinterested in the study of self in the 1960s, they mostly turned to the sociologist perspective for a promising paradigm (Swann & Bosson, 2010). At that time, the dramaturgical movement, spearheaded by Goffman (1959), was paramount. This movement used a theatre metaphor to suggest that individuals present a character to the audience that allows them to control the impression of others. Thus, like in the interactionist approach, for Goffman (1959) there was no enduring quality to the self; instead, the self-concept emerged and vanished depending upon the situational cues that regulated its form and structure. The influence of this movement is most notable in theories of self-presentation and impression management (e.g., Baumeister, 1982; Leary, 1995), and led to the recognition that variation exists in the extent to which individuals strategically cultivate public appearances (i.e., self-monitoring; Gangestad & Snyder, 2000; Snyder, 1974; Snyder & Campbell, 1982).

The resurgence of interest from mainstream psychology in the 1960s and 1970s was also the result of several other developments at the time. The concept of trait self-esteem (i.e., subjective perception of one's self-worth) was influential in stimulating empirical and systematic examinations of the self-concept, particularly following the development of the

self-report Self-Esteem Scale (Rosenberg, 1965). Researchers worked quickly to establish predictors and concomitants of trait self-esteem, which spurred questions regarding how individuals maintain high levels of self-esteem following adverse events and threats to identity (e.g., Baumeister, 1993; Coopersmith, 1967; Rosenberg, 1965). The cognitive revolution also legitimised the study of thoughts and internal processes, which in turn led to the development of a number of new theories conceptualising the self in terms of attentional and cognitive processing. For example, the landmark theory of self-awareness (Duval & Wicklund, 1972) suggested that when an individual focuses their attention on themselves, they evaluate and compare current behaviour to internal standards and values, and Markus' (1977) conceptualisation of self-schemas posited that the self-concept comprises cognitive generalisations about oneself that guide and organise the processing of self-referent information. The development of several self-report measures of dispositional attributes related to the self (e.g., the Self-Monitoring Scale, Snyder, 1974; the Self-Consciousness Scales, Fenigstein, Scheier, & Buss, 1972) also influenced and directed attention toward the examination of the self.

From the 1980s onwards, the conceptualisation and empirical study of the self dominated most areas of psychology. Researchers now consider that at any given moment only a small part of what people believe and know about themselves (i.e., the self-concept) is salient (Showers & Zeigler-Hill, 2003). This subset of retrieved associations, called the working self-concept, contains the knowledge that will be used in any specific context (Markus & Kunda, 1986) and shapes how individuals interpret their environment, memory, and emotional and behavioural responses (Markus & Wurf, 1987; Showers & Zeigler-Hill, 2003). Researchers also no longer treat the self-concept as a unitary, generalised, monolithic entity, or focus all their empirical efforts on a single aspect of the self-concept, trait self-esteem (Campbell et al., 1996). Instead, they recognise the dual nature of the self-concept - its

stability and malleability - and also empirically focus on its multifaceted and dynamic structure (Markus & Kunda, 1986; Markus & Wurf, 1987).

With the advent of a multifaceted self, and our improved understanding of how self-knowledge is stored and represented in memory, current formulations of the self now allow for the distinction between the content and structural components of the self-concept (McConnell & Strain, 2011). Content refers to information about the self and the way this information is represented, which is often divided into self-knowledge and self-evaluation. Examples of content-related components of the self include the types of beliefs and appraisals that one holds about their individual traits, attributes, and physical characteristics, as well as mental imagery of the self, and self-schemas. Conversely, structure refers to how one's self-concept is represented or organised in memory (Campbell et al., 1996). Examples of structural components of the self include its complexity, organisation (i.e., compartmentalised versus integrated self-structure), consistency, and clarity. This distinction has informed the theoretical and empirical psychopathology literature, both in terms of understanding the aetiology and maintaining factors of mental health disorders as well as in a treatment context.

### **The Self in Psychopathology Theory and Research**

**The Content of the Self-Concept and Psychopathology.** The dominant approach in research on the self in psychopathology has been to investigate the relationship between beliefs about the self, particularly relating to self-worth, and mental health (Bhar & Kyrios, 2016; Stopa, 2009; Zeigler-Hill, 2011). Given the historical preference and emphasis on investigating predictors and concomitants of trait self-esteem, the dominance of this approach is not so surprising. A body of research now indicates that self-esteem is linked to indicators of psychological adjustment such as happiness (Cheng & Furnham, 2004), low negative affect and high positive affect (Orth, Robins, & Widaman, 2012), and less psychological symptoms and severity of psychopathology, including depression (Sowislo & Orth, 2013), anxiety (Iancu, Bodner, & Ben-Zion, 2015), and bulimia nervosa (Vohs et al., 2001). Moreover,

several theories postulate that self-esteem serves as a buffer against anxiety (see Crocker & Park, 2004), and two theories dominate the literature addressing the relationship between self-esteem and depression: the vulnerability model arguing that negative self-evaluation constitutes a causal risk factor for depression (e.g., Beck, 1967), and the scar model positing that low self-esteem is a consequence of depression (Coyne, Gallo, Klinkman, & Calarco, 1998). Findings from a recent meta-analysis support the vulnerability model for depression, with the effect of self-esteem on depression stronger than the effect of depression on self-esteem, and both the vulnerability and scar models for anxiety conditions (i.e., a reciprocal effect; see Sowislo & Orth, 2013).

Similarly, a considerable amount of research has investigated the role of self-schemas and core-beliefs in psychopathology (e.g., Calvete, Orue, & Hankin, 2015; Pinto-Gouveia, Castilho, Gallardo, & Cunha, 2006). Indeed, the central importance of negative and dysfunctional self-schemas in cognitive theories of emotional disorders (e.g., Beck, 1967; Beck & Emery, 1985) has led to the development of a therapeutic protocol specifically designed to target and modify the construct (i.e., schema therapy; Young, 1990). Markus (1977) argues that self-schemas form a set of beliefs about the self that emerge from past experiences and organise and guide the processing of self-related information. Several studies have now provided evidential support for these assumptions, with both anxious and depressed individuals often engaging in negative thinking about themselves and events, and selectively attending to and recalling negative self-referent information (e.g., Derry & Kuiper, 1981; Steinman, Gorlin, & Teachman, 2014; see Strauman & Kolden, 1997; Wong et al., 2017; Wong & Moulds, 2009). However, the content of these self-schemas often varies according to the disorder. For example, patients with panic disorder or agoraphobia are said to be concerned about mental or physical collapse and therefore construe themselves as being “vulnerable to unpredictable and dangerous bodily sensations” (McNally, 1993, p. 84). In

contrast, individuals with social anxiety are said to see themselves as lacking the resources needed to meet social demands (Clark & Wells, 1995).

The content of negative and recurrent self-imagery can also vary according to the disorder (Cili & Stopa, 2015). Negative self-imagery is often conceptualised as mental pictures of the self that represent an individual's feared outcome; for example, looking foolish in the case of SAD (Hackman, Clark, & McManus, 2000; Ng, Abbott, & Hunt, 2014), being contaminated in the case of obsessive-compulsive disorder (OCD; Coughtrey, Shafran, & Rachman, 2013; Lipton, Brewin, Linke, & Halperin, 2010; Speckens, Hackmann, Ehlers, & Cuthbert, 2010), or having a serious illness in the case of health anxiety (Muse, McManus, Hackmann, Williams, & Williams, 2010). The perspective from which patients experience intrusive self-images also differs across disorders (Cili & Stopa, 2015). Patients with SAD (Wells, Clark, & Ahmad, 1998), body dysmorphic disorder (Osman, Cooper, Hackmann, Veale, 2004), and bulimia nervosa (Somerville, Cooper, & Hackmann, 2007) are typically characterised as experiencing negative self-images from an observer perspective (i.e., from another person's vantage point), while individuals with OCD (Coughtrey et al., 2013) tend to see themselves from a field perspective (i.e., one's original vantage point). Importantly, an observer perspective seems to have a greater influence over future behaviour (Libby, Shaeffer, Eibach, & Slemmer, 2007) whereas a field perspective may be more related to the intensity of emotions (Holmes & Mathews, 2010).

Researchers have also looked at the difference between the implicit and explicit self-concept and beliefs related to the self. Explicit self-beliefs are deliberate and conscious representations about oneself, while implicit beliefs are those that occur automatically and are non-conscious (Bhar & Kyrios, 2016). The need to examine the implicit self-concept partly arose due to self-report measures failing to adequately capture self-views of which people were unaware (e.g., Greenwald & Farnham, 2000) and tending to be more susceptible to self-presentation or socially desirable responding (see Joinson, 1999). Attempts to circumvent



these issues led to the development of several indirect measures of the self-concept, including word association tasks such as the implicit association test<sup>1</sup> (IAT; Greenwald, McGhee, & Schwartz, 1998). Studies using these implicit measures suggest that the implicit self-concept may represent a premorbid vulnerability for psychopathology (Bhar & Kyrios, 2016). For example, individuals with social anxiety were found to be faster than non-anxious controls in attributing self-related concepts to anxiety-related words, suggesting enhanced automatic self-anxiety associations (Gamer, Schmukle, Luka-Krausgrill, & Egloff, 2008). Similar findings have been reported for depressive patients (Glashouwer & de Jong, 2010; Jabben et al., 2014). Studies also suggest that a discordance between implicit and explicit self-esteem may predict different psychopathology profiles. For example, the fragile self-esteem pattern refers to high explicit but low implicit self-esteem, and has been related to narcissistic behaviour (Jordan, Spencer, Zanna, Hoshino-Browne, & Correll, 2003), while the damaged self-esteem pattern refers to high implicit but low explicit self-esteem, and has been linked to more depressive and anxious symptomology (e.g., Creemers, Scholte, Engels, Prinstein, & Wiers, 2012).

**The Structure of the Self-Concept and Psychopathology.** The relationship between the structure of self-knowledge and psychopathology has also been explored in empirical and theoretical research. One of the approaches in this area has been to investigate the relationship between the cohesion of self-structure, including one's self-complexity and self-discrepancy, and mental health. Self-complexity has been defined as the number of different and independent self-aspects (e.g., social roles, physical features, traits, goals) that an individual uses to cognitively organise knowledge about the self, and the degree of relatedness between these aspects (Linville, 1987). An individual who is high in self-complexity is said to have more self-aspects that are totally independent, and will therefore be less vulnerable to swings in affect and self-appraisal in response to stressful life events (Linville, 1987). Several studies

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<sup>1</sup> Some researchers have questioned the validity of the IAT, however, particularly the assumption that implicit measures reflect unconscious, or introspectively inaccessible mental representations (For an overview, see Fazio & Olson, 2003).

have now demonstrated that individuals high in self-complexity are less prone to depression (Dozios & Dobson, 2001a, 2001b; Linville, 1987; Niedenthal, Setterlund, & Wherry, 1992; Woolfolk, Gara, Allen, & Beaver, 2004). However, empirical support for the stress-buffering effect of self-complexity remains mixed (see Rafaeli-Mor & Steinberg, 2002; Ryan, LaGuardia, & Rawsthorne, 2005; Solomon, Haaga, & David, 2003), leading some researchers to question whether it is actually the authenticity of one's self-aspects that moderates well-being (Ryan et al., 2005).

Self-discrepancy theory (Higgins, Klein, & Strauman, 1985) also offers some commentary on the cohesion of the self and psychopathology. According to this theory, individuals have an 'actual' self (i.e., perceived attributes that either themselves or others believe they possess), an 'ideal' self (i.e., perceived attributes that either themselves or others hope or wish they possessed), and an 'ought' self (i.e., perceived attributes that themselves or others believe it is their duty or responsibility to possess). Discrepancies among these self-domains are said to characterise different emotional disorders. For example, depressed and dysphoric individuals have been shown to experience actual-ideal discrepancies, whereas socially anxious individuals tend to report discrepancies in the actual-ought/other self-domains (Strauman, 1989, 1992; Weilage & Hope, 1999; Johns & Peters, 2012). Moreover, studies have demonstrated that priming these discrepancies increases feelings of dejection among depressed individuals, and agitation among individuals with social anxiety (Strauman, 1992).

Researchers have also been interested in the role of self-concept clarity and psychopathology. Self-concept clarity describes the structural integration (also known as structural unity) of the self-concept and refers to whether one's self-concept is clearly defined, internally consistent, and temporally stable (Campbell et al., 1996). Low self-concept clarity has been associated with low self-esteem, high neuroticism, high depression, negative affectivity, chronic self-analysis, and high levels of social anxiety (Butzer & Kuiper, 2006;

Campbell et al., 1996; Moscovitch, Orr, Rowa, Reimer, & Antony, 2009; Stopa, Brown, Luke, & Hirsch, 2010). The relationship between uncertain or inconsistent self-concepts and psychopathology has also been implied by several theorists. Arkin (1987) suggested that individuals with social anxiety are typified by chronic self-doubt, while Clark and Wells (1995) argue that these individuals possess 'unstable self-schemata' characterised by the emergence of negative self-views in socially threatening situations (see also Alden, Mellings, & Ryder, 2001; however see Moscovitch, 2009). Other authors suggest that patients with post-traumatic stress disorder experience considerable distress because of irreconcilable images of the self before and after trauma (McNally, 1993), and implicate disturbances in the temporal consistency of the self-concept in borderline personality disorder (Westen & Cohen, 1993).

Research has also investigated the role of an evaluative self-organisation in psychopathology. Evaluative self-organisation refers to the distribution of negative and positive self-beliefs in separate knowledge structures (Showers, 1992). Two types of evaluative self-organisation have been distinguished in the literature: compartmentalised self-organisation and integrative self-organisation. For individuals with a compartmentalised self-organisation, positive and negative self-aspects, roles, or schematic beliefs about the self are organised in separate knowledge structures, such that each structure contains largely positive or negative information about the self. By comparison, individuals with an integrative self-organisation display some duplication or overlap of attributes across different self-aspects (Showers, 1992). To date, research suggests that increased negative compartmentalisation may be a general feature of mood disorders (Showers, Limke, & Zeigler-Hill, 2004; Taylor, Morley, & Barton, 2007) and a possible maintaining factor of social anxiety (Stopa et al., 2010). Given this, some authors have argued that the underlying success of cognitive therapy may depend on shifting individuals from negative compartmentalisation to a more integrated self-organisation (Shower et al., 2004). This proposition is consistent with Brewin's (2006)

retrieval competition account, suggesting that the outcome of cognitive therapy may depend on helping individuals construct and strengthen competing positive self-representations, making them more accessible and retrievable in preference to dominant negative self-representations.

Overall, it is evident that the selfhood literature has been used to inform research on psychopathology, particularly relating to its content and structure. It is also clear that conceptualisations of the self have been adopted and used in a treatment context. This inclusion and adoption of the self-literature and theory into therapy and treatment protocols for mental health disturbances is not new. Indeed, one of the most extensively studied and widely adopted therapies for mental health disorders, CBT, has included notions and strategies to combat disturbances in the self since its initial conceptualisation.

### **The Self in CBT**

As an alternative to the prevailing psychodynamic models of the 1960s and following the recognition of behaviour therapy's limitation in certain client groups, clinical researchers began to examine the role of cognitive processes in treating psychological disorders. This led to the birth of cognitive therapy (Beck, 1967), which later incorporated behavioural processes and techniques and became known as CBT. CBT as a theoretical and therapeutic endeavour has embraced the proposition that concepts relating to the self are central to the understanding of a range of psychopathological conditions. Since its development, a new 'third-wave' of cognitive-behavioural therapies has emerged, such as acceptance and commitment therapy (Hayes, Strosahl, & Wilson, 2012), dialectical behavioural therapy (Linehan, 1993), and mindfulness-based cognitive therapy (Segal, Williams, & Teasdale, 2002). These newer approaches are said to focus on changing the function of psychological events that people experience, rather than changing or modifying the events themselves (Hofmann, 2010). We limit our discussion to the more traditional CBT approach, suggesting that cognitions play an important role in the maintenance of emotional disorders primarily through its causal

influence on one's emotions and behaviours, as this treatment modality comprises the focus of the current thesis.

**Early CBT.** Even in the earliest versions of CBT (i.e., cognitive therapy), the content of an individual's cognitions regarding the self was recognised as an integral concept. For example, the general premise of rational-emotive therapy (RET; Ellis, 1962), that psychological disturbance is the result of irrational thinking (including self-referent belief content), is predicated on the notion of the self as an object of perception or knowledge (James, 1890). Similarly, Mahoney (1974, 1995), in his influential publication *Cognitive and Behaviour Modification* and subsequent work, recognised the importance of cognitive mediation in understanding the aetiology and treatment of psychological disorders, and suggested that treatment should focus on correcting the self-evaluative aspect of the negative self. Later, Mahoney (1995) emphasised the need for a greater appreciation in the centrality of the self in treatment, particularly from a constructivist perspective (i.e., the development of the self occurs through intimate relationships).

Following Ellis (1962), Beck (1967) underscored the importance of the self-concept in his pioneering clinical formulations of depression and cognitive therapy for emotional disorders. One of the most significant contributions of this early work was the notion that a constellation of negative generalisations about the self (i.e., dysfunctional and negative self-views) constituted a particular vulnerability to depression, as well as negative thoughts about the world and the future. The negative impact of these dysfunctional cognitions was conceived to be a cyclic pattern of self-criticism that was considered by the individual to be an accurate representation of self (Clark, 2016). Coined the 'cognitive triad', this conceptual framework was the focus of treatment in Beck's seminal treatment manual for depression (Beck, 1967). Here, practitioners were encouraged to challenge client's negative automatic thoughts, as this would develop a more realistic self-view that, in turn, would facilitate a shift in dysfunctional information processing biases.

This early formulation of cognitive therapy and emphasis on the self-concept was not limited to depression. Beck also considered a negative self as being central to the aetiology and treatment of anxiety disorders (Beck & Emery, 1985). Moreover, following its conceptualisation, the treatment was quickly adopted and applied to a wide range of disorders, including eating disorders, personality disorders, schizophrenia, and family and marital problems (see Rachman, 2015). For anxiety specifically, Beck and Emery (1985) suggested that individuals hold negative cognitions around inadequacy, helplessness, and weakness, making them more susceptible to fears of negative evaluation and rejection by others. Unlike in depression, where negative self-views were considered to be absolute and global, for anxious individuals these self-views were deemed to be selective, fluctuating with the perceived risk or danger in a given situation. Like for depression however, practitioners were encouraged to draw patients' attention to, and to challenge, their automatic thoughts and unhelpful attitudes, providing a new perspective on the self.

Overall, it is evident that earlier variants of CBT recognised the importance of the self-concept as a cognitive construct. It is also clear that CBT in those earlier years held a number of fundamental propositions, many of which have been carried forward today. These include: (1) cognitive activity affects behaviour, which is a restatement of the mediation model presented by Mahoney (1974), (2) cognitive activity may be monitored and altered, and (3) desired behaviour change may be encouraged through cognitive change (Dobson & Dozois, 2010). However, earlier theory and treatment of psychopathological conditions in CBT often took a more simplistic view of the self and tended to overestimate self-evaluation or self-esteem as the chief progenitor of psychological disturbance (Clark, 2016). Given that the majority of the selfhood literature was enamoured by the concept of trait self-esteem at the time, this is not surprising. Consequently, other aspects of the self, such as self-structure, were rarely mentioned.

**Current CBT.** CBT over the years has continued to evolve; yet, while the self has continued to play an important role in the cognitive-behavioural perspective, its conceptualisation and formulation in CBT has continued to lag behind the advances made in the social psychology domain (Clark, 2016). Some progression has been made, however, particularly on the elaboration of the concept of the self-schema in Beck's (1996) cognitive therapy. Some of the work from social psychologists has also begun to infiltrate the CBT literature, notably Markus' self-schema research (Markus, 1977), Higgins' self-discrepancy theory (Higgins, 1987), and Linville's concept of self-complexity (Linville, 1987). These concepts have already been elaborated on in this chapter, but we will briefly summarise the concept of the self-schema and its relation to current CBT formulations as this is particularly relevant to the information presented in the following chapters.

As outlined previously, self-schemas are conceptualised as cognitive generalisations about the self derived from past experiences that guide and organise the way self-related information is perceived and interpreted (Markus, 1977). Clark and Beck (1999) elaborated on the schema concept in their revised clinical formulation of depression. Here, they argued that a number of propositions should be considered when regarding self-schemas, including: (a) the importance of self-representations, (b) whether beliefs represent actual or idealised aspects of self, (c) the temporal orientation and valence of the beliefs, (d) the degree of certainty, clarity, and accessibility associated with self-beliefs, (e) the level of complexity and incongruence of the self-schema, and (f) the extent of the interpersonal orientation of self-beliefs. As in the earlier versions of CBT, clinical research and treatment applications have tended to focus on schematic content (i.e., core-beliefs about the self), without much consideration for other characteristics (Clark, 2016). This conclusion remains despite the welcomed development of more recent theories linking self-schematic structure change in psychological treatment, including the retrieval competition account of CBT (Brewin, 2006)

and Showers et al.'s (2004) model of self-change in treatment. These theoretical models are discussed in more detail in Chapter Seven of this thesis.

Of course, the emphasis on the schematic content in CBT should not be considered a limitation of the treatment itself. Indeed, inaccurate and negative core-beliefs (e.g., '*I am worthless*') can often have a profound effect on an individual's self-concept, sense of self-efficacy, regulation of self-worth, information processing, and continued vulnerability to psychological disturbances (Clark, 2016). As a result, a number of therapeutic techniques have been proposed to modify patients' core-beliefs. Practitioners commonly use the *Downward Arrow Technique* (Beck, Rush, Shaw, & Emery, 1979) to assist patients in identifying core-beliefs. Practitioners also encourage their patients to critically examine evidence that supports the old, dysfunctional core-belief and evidence that supports a new, alternative core-belief (e.g., '*I am worthwhile*'). Cognitive restructuring is used to reframe the evidence for the old core-belief where necessary. Recently, Judith Beck (2011) developed a *Core-Belief Worksheet* to assist with this process. Other methods of evidence tracking such as the *Positive Data Log* (Dobson & Dobson, 2009) have also been advanced. More recently, CBT manuals have expanded on the benefits of analysing the advantages and disadvantages of the new and old core-belief from short- and long-term perspectives (Dobson, 2012), and encouraged the use of behavioural experiments to test predictions on the basis of core-beliefs (Rapee et al., 2009).

Other advances in CBT relating to the self-concept have been developed based on cognitive models and cognitive process research for specific psychological disorders. Cognitive models of social anxiety, for example, argue that individuals with SAD construct mental images or impressions of how they appear to others that tend to be negative, distorted, and inaccurate, and is based on underlying beliefs and assumptions about the self and others (Clark & Wells, 1995; Rapee & Heimberg, 1997). This distorted self-view can instigate a series of processes and behaviours, such as self-focused attention, that further exacerbate



anxiety (Clark & Wells, 1995). Empirical support for these propositions about the self in SAD has been provided (for a review, see Gregory & Peters, 2017). The emphasis on these self-related constructs in cognitive models of social anxiety has also been reflected in CBT for the disorder (Gregory & Peters, 2017). For example, techniques such as video feedback, behavioural experiments, and surveying other people's observations have been implicated as being useful strategies to modify negative self-images (Harvey, Clark, Ehlers, & Rapee, 2000; Warnock-Parkes et al., 2016) and distorted self-perceptions of performance. In video feedback, clients learn that their perceived impressions of themselves may not be an accurate reflection of how they objectively appear to others (Rapee & Hayman, 1996; Rodebaugh, Heimberg, Schultz, & Blackmore, 2010). Techniques designed to modify disruptive attentional processes (i.e., self-focused attention) have also been proposed (e.g., task concentration training; Mulkens, Bögels, de Jong, & Louwers, 2001) and incorporated into CBT protocols. Importantly, studies supporting the amenability of maladaptive self-related constructs following use of these techniques in treatment are beginning to accrue (for a review, see Gregory & Peters, 2017).

## **Conclusion**

From the literature cited above, it is clear that the concept of the self has had an impactful history in social and clinical psychology, and has been used to inform and extend the psychopathology literature. While most theories have focused on the content of the self-concept and psychological disorders, relatively recent advances on the structure of the self have also been incorporated into the mental health literature. It is also clear that for social anxiety specifically, eminent cognitive-behavioural models have emphasised the importance of different self-related constructs in the aetiology and maintenance of SAD, which has also been reflected in CBT protocols for the disorder. Despite being recognised as an efficacious treatment for SAD, however, a large percentage of patients retain a diagnosis of SAD following CBT (e.g., 54.7%; Loerinc et al., 2015). Uncovering active change mechanisms that

govern anxiety reduction therefore remain crucial in developing effective augmentation strategies to optimise CBT outcomes for individuals with SAD (Kazdin, 2007). The following thesis therefore examines whether self-related constructs proposed in cognitive models of social anxiety change during and/or following CBT for SAD, and how this change may impact social anxiety symptom amelioration.

## Overview of the Current Research

The overall structure of this thesis takes the form of eight chapters, including this introductory chapter. Taken together, the chapters aim to elucidate how constructs related to the self change during and/or following CBT for SAD, and how this change may relate to treatment outcome. The review and empirical studies reported in Chapters Two to Seven represent two phases of research. The first phase of research (Chapter Two and Three) employs a review methodology and synthesises the current state of the literature in this area. Building on the first phase, the second phase of research (Chapters Four to Seven) aims to empirically address current research gaps in the field. Each empirical chapter represents a research article that has been published or submitted for publication, which is the standard practice when doing a thesis by publication<sup>2</sup>. Thus, it is necessary that there will be some repetition from one chapter to the next.

To assess the current state of the literature in this area, Chapter Two comprises a review of the theoretical literature exploring how self-related constructs are positioned in cognitive models of social anxiety (Beck & Emery, 1985; Clark & Wells, 1995; Rapee & Heimberg, 1997; Hofmann, 2006; Moscovitch, 2009; Stopa, 2009). This review has since been published as a book chapter, and also includes a brief discussion about how maladaptive self-beliefs, self-imagery, and self-focused attention have been conceptualised in current CBT for SAD. Chapter Three presents a systematic review of the empirical literature examining whether self-related constructs change during and/or following CBT for SAD, and how this change relates to treatment outcome. This systematic review is the first attempt to synthesise the current empirical literature in this area, and has since been published in *Clinical*

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<sup>2</sup> This thesis by publication format has several advantages, including: increased research output in the form of published work; potential for peer-review feedback prior to thesis submission; and, the ability to publish research findings and contribute to the research community at the earliest time possible (rather than only having thesis work available upon award of the degree). However, this structure can limit the amount of information provided in each individual chapter. For this reason, additional information that could be considered supplementary (e.g., information around reasons for analytic approaches), but may not be entirely necessary for journal publication (e.g., perhaps due to word count and/or page restrictions), can be found in Appendix D of the thesis (p. 259).

*Psychology Review*. As self-related constructs represent vulnerability factors for various psychopathological conditions (as shown in this introductory chapter), Chapter Four examines the unique relationships between self-related constructs, social anxiety, and depression, using a non-clinical sample.

Building on the findings from the systematic review and the results of Chapter Four, the final three chapters of this program of research are dedicated to an empirical examination of different self-related constructs in CBT for SAD<sup>3</sup>. Chapter Five investigates the trajectory and temporal relationship between maladaptive beliefs about the self and social anxiety symptom severity over the course of treatment. This is the first study to include within session measures of enduring self-beliefs and examine the temporal relationship between change in dysfunctional beliefs and social anxiety change in treatment for SAD. Chapter Six examines the explicit and implicit anxiety self-concept prior to, following, and at six-month completion of the CBT program for SAD. This study represents the first attempt to examine the implicit anxiety self-concept, using the implicit association test (Greenwald et al., 1998), with a clinical sample in a social anxiety treatment context. Chapter Seven examines whether the structure of the self-concept, as measured by self-concept clarity, changes from pre- to post-CBT for SAD, and whether this change is related to social anxiety reduction. This study also examines whether change in self-structure is related to change in the content of the self, as measured by positive and negative self-attribute ratings. As identified in the systematic review, this is the first study to examine the role of self-concept clarity and the explicit relationship between self-structure change and self-content change in CBT for SAD. The final

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<sup>3</sup> The data collected to address these question relies on an ongoing treatment trial looking at whether pre-treatment motivational interviewing sessions enhance engagement and outcomes for individuals undergoing group cognitive behaviour therapy (CBT) for social anxiety disorder. Specific information about this treatment trial, such as the consort flowchart of participant recruitment, can be found in Appendix B of the thesis (p. 255). The choice of using group CBT as the treatment modality was therefore a pragmatic decision based on the format of the ongoing treatment trial.

chapter (Chapter Eight) presents the general discussion, and examines the theoretical and clinical implications and final conclusions of the current thesis.

The advantages of this program of research are twofold. First, examining self-related constructs as change mechanisms in SAD treatment may assist in the development and refinement of existing practices to improve current outcomes for patients with social anxiety. As discussed previously, while CBT is recognised as an efficacious treatment for SAD, a large proportion of patients still remain symptomatic following treatment intervention. More research is therefore needed to identify the processes and mechanisms that contribute to pathological symptom change, as this will assist in the optimisation of CBT. Second, as already outlined in this introductory chapter, it is clear that self-related constructs not only contribute to the development, maintenance, and treatment of social anxiety but are also vulnerability factors in other psychopathological conditions. This program of research therefore also extends the broader field of the self, psychopathology, and CBT literature.

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## **Chapter 2**

### **The Self in Social Anxiety**

It is evident from the preceding introductory chapter that the concept of the self has had an impactful history in social and clinical psychology, and has been used to inform and extend the psychopathology literature. It is also clear that for social anxiety specifically, eminent cognitive-behavioural models have emphasised the importance of different self-related constructs in the aetiology and maintenance of social anxiety, which has also been reflected in cognitive behavioural therapy for social anxiety disorder (SAD). The following chapter builds on this proposition, and more thoroughly examines how self-related constructs are integrated into cognitive models of social anxiety and how they inform treatment practices for SAD. The review paper has since been published as a book chapter, and is entitled ‘The Self in Social Anxiety’.

*This chapter has been published as a book chapter. The reference is:*

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*Author contribution:*

Ms. Bree Gregory was responsible for the write-up of the paper. Dr. Lorna Peters and Professor Ron Rapee supervised the project.



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### Chapter 3

## **Changes in the Self during Cognitive Behavioural Therapy for Social Anxiety Disorder: A Systematic Review**

From the preceding chapter, it is clear that eminent cognitive models of social anxiety emphasise the importance of self-related constructs in the aetiology and maintenance of social anxiety disorder (SAD). It is also evident that current cognitive-behavioural treatments (CBT) for SAD contain a variety of techniques designed to modify the maladaptive self-related constructs proposed in these models. No study to date, however, has *systematically* reviewed the literature to examine whether constructs related to the self change during CBT for SAD, and how this change impacts social anxiety symptom amelioration. Such an investigation would provide an integrated update of the research in this area, help identify current gaps in the literature, and drive further research where promising areas have already been identified. The following chapter therefore aims to address this research gap, and presents a review paper entitled ‘Change in the Self during Cognitive Behavioural Therapy for Social Anxiety Disorder: A Systematic Review’. This chapter has since been published in *Clinical Psychology Review*.

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### Endnotes

As discussed in the systematic review, methodological quality of the studies was assessed based on the number of participants included in the studies, whether the research aim was primary or secondary, and the psychometric properties of the measures employed. Using this criteria, the studies retained in the review demonstrated good methodological quality. It is important to note, however, that the strict inclusion criteria would have also helped ensure that the studies included in the review were methodologically sound. For example, participants had to have met diagnostic criteria for social anxiety disorder (SAD) assessed via a psychometrically sound procedure. Measures also had to be assessed on two or more occasions across a cognitive-behavioural therapy (CBT) protocol for SAD, and the studies had to be peer-reviewed. The high quality meant that there was no need to more formally assess the quality of the studies (e.g., through use of a self-report measure).

It is also important to note that one study has since been published that would have been included in the systematic review (Thurston, Goldin, Heimberg, & Gross, 2017); although, the conclusions drawn from the systematic review would not have changed with this study's inclusion. Regarding changes across treatment, the paper found that both CBT and mindfulness-based stress reduction (MBSR) produced significant and comparable decreases in negative trait adjectives and increases in positive trait adjectives, as measured by the Self-Referential Encoding Task (SFET; Derry & Kuiper, 1981), from pre- to post-treatment. Waitlisted controls demonstrated significant but smaller changes in these variables over time. This finding adds to the literature indicating that CBT protocols may share similar points of efficacy with other treatment modalities when seeking to modify self-related constructs (e.g., Desnoyers, Kocoviski, Fleming, & Antony; Rapee, Gaston, & Abbott, 2009; Ritter, Leichsenring, Strauss, & Stangier, 2003). The study also underscores the potential clinical importance of positive self-views in treatment protocols for SAD (see Brewin, 2006), as only increases in positive trait adjectives were associated with treatment outcome.

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## **Chapter 4**

### **Unique Relationships between Self-Related Constructs, Social Anxiety, and Depression in a Non-Clinical Sample**

From the preceding chapter it is evident that while a number of studies have examined whether self-related constructs change during and/or following CBT for SAD, and how this change may relate to social anxiety improvement, there remain a considerable number of research questions that have yet to be addressed. Given the importance placed on maladaptive self-beliefs in cognitive models of SAD (as described in Chapter Two) and their influence in treatment for SAD (as shown in Chapter Three), more research is needed that examines the temporal relationship between dysfunctional self-belief change and social anxiety improvement throughout the course of treatment. Doing so would help establish whether self-belief change is a direct contributor to treatment gains. Research is also needed addressing the potential role of self-structure change in the context of CBT for SAD (as shown in Chapter Three), and how this may relate to treatment outcome. Studies focusing on these questions are presented in Chapters Five and Seven of this thesis. Research is also needed, however, that considers the potential for self-related constructs as transdiagnostic vulnerability factors linking social anxiety and depression, as well as research that focuses on the examination of which self-related constructs are uniquely associated with social anxiety and depression when considered simultaneously. The following chapter aims to address these latter questions, and presents a paper entitled ‘Unique Relationships between Self-Related Constructs, Social Anxiety, and Depression in a Non-Clinical Sample’.



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*Author contribution:*

Ms. Bree Gregory was responsible for the design of the research, analysis, and write-up of the manuscript. Dr. Lorna Peters provided statistical and research supervision.

**Unique Relationships between Self-Related Constructs, Social Anxiety, and Depression  
in a Non-Clinical Sample**

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### Abstract

Self-related constructs feature prominently in cognitive models of both social anxiety and depression. Relatively few studies, however, have simultaneously investigated the unique relationship between self-related constructs and social anxiety and depression, while also controlling for the association between the variables. In the present study, 522 undergraduate students completed self-report measures of maladaptive self-beliefs, self-esteem, self-criticism, self-focused attention, self-concept clarity, social comparison, and social anxiety and depression. Bivariate correlations demonstrated that self-related constructs not only significantly correlated with social anxiety but also with depression and other self-variables. When entered simultaneously, multiple regression analyses indicated that maladaptive self-beliefs were uniquely and positively associated with social anxiety and depression, while self-esteem and self-concept clarity were uniquely and negatively associated with social anxiety and depression. A unique positive association between private self-consciousness and depression was found. Maladaptive self-beliefs and self-esteem were the constructs most strongly associated with social anxiety and depression, respectively. Future research should continue to uncover unique relationships between self-related variables and social anxiety and depression, while simultaneously controlling for shared variance with other self-related constructs in both clinical and non-clinical samples.

*Keywords:* self; unique relationship; social anxiety; depression

## Unique Relationships between Self-Related Constructs, Social Anxiety, and Depression in a Non-Clinical Sample

Considerable convergence exists among cognitive models regarding the importance of self-related constructs that contribute to the emergence and maintenance of social anxiety<sup>1</sup> (for reviews, see Alden & Regambal, 2010; Gregory, Peters, & Rapee, 2016). Indeed, there is increasing recognition that at a fundamental level, social anxiety encompasses a distorted and negative view of self (e.g., Moscovitch, 2009; Stopa, 2009). This emphasis is also reinforced in cognitive models of depression (e.g., the negative cognitive triad; Beck et al., 1967). Related empirical research underscores the role of maladaptive self-beliefs, low self-esteem, self-criticism, self-focused attention, social comparison, and an uncertain self-concept, in predicting both social anxiety (e.g., Wong et al., 2017; Norton & Abbott, 2016; Stopa, Brown, Luke, & Hirsch, 2010) and depression (e.g., see Mor & Winquist, 2002; Sowislo & Orth, 2013; Wheeler, 2013). Relatively few studies have simultaneously investigated the unique relationship between self-related constructs and social anxiety and depression, however, or controlled for the association between the variables. This is despite conceptual overlap between self-related variables (e.g., Butzer & Kuiper, 2006) and the common co-occurrence of social anxiety and depression (Ohayon & Schatzberg, 2010).

Many of the theoretical suppositions regarding self-related constructs in cognitive models of social anxiety (e.g., Clark & Wells, 1995) can be linked back to the seminal cognitive model of depression proposed by Beck (1967). The basic assumption underlying Beck's model suggests that depressive individuals hold implicit representations of their self,

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<sup>1</sup> Throughout this article, we use the terms social anxiety and depression to denote continuous variables (i.e., individual differences in anxiety pertaining to social situations or depressive affect) rather than a clinical category such as social anxiety disorder or major depressive disorder (American Psychiatric Association, 2013). Growing evidence now supports the existence of a continuum of social anxiety severity (e.g., Crome, Baillie, Slade, & Ruscio, 2010). Taxometric analyses also suggest that depression is best conceptualised as a continuous construct (e.g., Hankin, Fraley, Lahey, & Waldman, 2005).

which are called schemata, that are composed of rigid and inflexible beliefs about the self (often pertaining to maladaptive themes of contingent self-worth), the future, and the world. These negative beliefs comprise unrealistic, distorted, and illogical ways of thinking that, once activated by negative life-experiences, drive biases of memory, attention, and interpretation. Individuals with social anxiety are posited to hold maladaptive beliefs about the self (Clark & Wells, 1995; Rapee & Heimberg, 1997), though their cognitive profile is suggested to relate to a future orientation with more focus on threat cognitions of perceived social harm or danger (see the content-specificity hypothesis; Beck & Emery, 1985). Like depression, activation of these beliefs tend to shift attentional processing to detailed self-monitoring. Unlike in depression, however, socially anxious individuals are said to possess ‘unstable self-schemata’, which are characterised by the emergence of negative self-views in perceived socially threatening situations (Clark & Wells, 1995).

Empirical research has supported many of the propositions made in cognitive models of social anxiety. A consistent finding in the literature is that individuals with social anxiety report having a negative self-view that is comprised of maladaptive thoughts and beliefs about the self and others (e.g., Hope, Burns, Hayes, Herbert, & Warner, 2010; Moscovitch, Rowa, Paulitzki, Antony, & McCabe, 2015; Rapee & Abbott, 2006; Stopa & Clark, 1993; Wong & Moulds, 2009). These dysfunctional self-beliefs can be dependent on social-evaluative context (e.g., “*If I make a mistake, others will reject me*”; Rodebaugh, 2009; Turner, Johnson, Beidel, Heiser, & Lydiard, 2003; Wong & Moulds, 2009) or be independent of this social context (e.g., “*I am unlikeable*”; Wong et al., 2017). These latter beliefs tend to reflect global and absolute self-statements, however, and as a result are also likely to relate to depression (e.g., Wong et al., 2017; Wong, Moulds, & Rapee, 2014). Studies have also demonstrated that socially anxious individuals tend to be highly self-critical (Cox et al., 2000; Cox, Fleet, & Stein, 2004; Kopala-Sibley, Zuroff, Russel, & Moskowitz, 2014), hold an uncertain or unstable sense of self (i.e., self-concept clarity; Moscovitch, Orr, Rowa, Reimer, & Antony,

2009; Stopa et al., 2010; Wilson & Rapee, 2006), and engage in upward social comparisons (i.e., comparisons of oneself to an appraised higher standard) (Antony, Rowa, Liss, Swallow, & Swinson, 2006; Mitchell & Schmidt, 2014). Considerable evidence also exists linking social anxiety and excessive self-focused attention (i.e., an awareness of self-referent, internally generated information; for a review, see Norton & Abbott, 2016), although public self-consciousness (the dispositional tendency to examine the self as a public object) has tended to yield higher effect sizes than private self-consciousness (the dispositional tendency to focus on internal experiences and emotions) (see Mor & Winquist, 2002).

Empirical support for the role of self-related constructs in cognitive models of depression has also been provided. While research tends to indicate that low self-esteem (i.e., an individual's subjective evaluation of his or her worth as a person) and depression are related, the specific nature of this relationship has been questioned. Some researchers argue that self-esteem and depression are essentially the same construct as strong negative correlations between the two variables have been observed (e.g., Watson, Suls, & Haig, 2002). Other studies, however, demonstrate correlations ranging from  $-.20$  to  $-.70$  (Minor, Champion, & Gotlib, 2005), suggesting that a distinction between the two constructs remains necessary and useful (for a review, see Sowislo & Orth, 2013). Generally speaking, there is consensus regarding a strong relationship between self-focused attention and depression (e.g., Ingram, 1990). However, unlike for social anxiety, depression appears to be more strongly associated with private self-consciousness than public self-consciousness (see Mor & Winquist, 2002). Thus, trait levels of self-focused attention may be differentially related to anxiety and depression. Finally, studies have found that depressed individuals tend to have an unclear or inconsistent sense of self (i.e., low self-concept clarity; Bigler, Neimeyer, & Brown, 2001; Butzer & Kuiper, 2006; Campbell, 1990), and are particularly sensitive to social comparison (see Wheeler, 2013). Whether depressed individuals have a preference for

engaging in upward or downward social comparisons remains somewhat disputed in the literature (see Wheeler, 2013).

From the research cited above, it is evident that self-related constructs are consistently linked with both social anxiety and depression. Most of the literature to date, however, has examined self-related constructs independently from one another (however, see Butzer & Kuiper, 2006; Stopa et al., 2010). Exceptions to this include a study by Iancu, Bodner, and Ben-Zion (2014) that examined the joint role and relationship between low self-esteem, self-efficacy, high dependency, and high self-criticism in predicting social anxiety scores in a clinical sample with social anxiety disorder. While all variables were related to social anxiety when assessed independently, self-criticism was found to be the only unique predictor of social anxiety scores following concurrent examination. Such a finding underscores the importance of controlling for potential shared variance between self-related constructs when examining unique relationships with outcome variables. This proposition is further corroborated by empirical research documenting moderate to high inter-correlations between variables such as self-esteem, self-focused attention, self-criticism, social comparison, and negative self-judgments (e.g., Butzer & Kuiper, 2006; Campbell et al., 1996; Turner, Carver, Scheier, & Ickes, 1978; Woody, Chambless, & Glass, 1997).

More research is needed that simultaneously examines the relationship between a broader collection of self-related constructs and social anxiety and depression scores, while also controlling for the association between the variables. The present study aimed to address this gap using an undergraduate sample, and included the following self-related statistical predictors: maladaptive self-beliefs, self-esteem, self-criticism, self-focused attention, general, upward, and downward social comparison, and self-concept clarity. These variables were considered as relatively important statistical predictors of each condition given their central role in cognitive models and the extensive research linking these constructs. It was expected that all self-related constructs would be at least moderately and significantly associated with

both social anxiety and depression when examined independently. Self-related constructs were expected to be moderately and significantly associated with each other. When examined as simultaneous predictors, we expected that there would be a unique positive association between maladaptive beliefs about the self and public self-consciousness and social anxiety, while there would be a unique positive association between private self-consciousness and depression, and a unique negative association between self-esteem and depression.

## Method

### Participants

Participants were 522 psychology undergraduate students (441 females; mean age = 20.06,  $SD = 4.76$ ) at Macquarie University who participated for course credit.

### Measures

*Social Interaction Anxiety Scale* (SIAS; Mattick & Clarke, 1998). The SIAS is a 20-item questionnaire designed to measure feared social situations involving general social interactions with others. Items are rated on a 5-point Likert-type scale (0 = *not at all characteristic or true of me* to 4 = *extremely characteristic or true of me*). Total scores range from 0 to 80, with higher scores indicating greater symptom severity. Scores on the SIAS have been shown to possess desirable psychometric properties with a high level of internal consistency ( $\alpha = .88$  to  $.94$ ; Mattick & Clarke, 1998; Osman, Gutierrez, Barrios, Kopper, & Chiros, 1998), and adequate discriminant and construct validity (Mattick & Clarke, 1998; Peters, 2000). For the present study, internal consistency was  $.89$ .

*Depression Anxiety Stress Scales* (DASS; Lovibond & Lovibond, 1995). The DASS is a 21-item questionnaire designed to measure symptoms of dysphoric mood, symptoms of physiological arousal and fear, and symptoms of tension and negative appraisals of stressful events. Items are rated on a 4-point Likert-type scale (0 = *did not apply to me at all* to 3 = *applied to me very much, or most of the time*). Each of the scales have demonstrated good psychometric properties (Antony, Bieling, Cox, Enns, & Swinson, 1998). For the present



study only the 7-item depression subscale (DASS-D; items 3, 5, 10, 13, 16, 17, and 21) was used. Consistent with the scoring instructions for the DASS, scores were multiplied by two and ranged from 0 to 42, with higher scores indicating greater depression symptom severity. The DASS-D has been found to correlate with the Beck Depression Inventory ( $r = .70$ ; Lovibond & Lovibond, 1995). In the present study, internal consistency for the DASS-D was .92.

*Self-Beliefs Related to Social Anxiety (SBSA; Wong & Moulds, 2009).* The SBSA is a 15-item questionnaire designed to measure the strength of beliefs about the self in a social context. It includes three subscales that map directly onto the model proposed by Clark and Wells (1995): excessively high standard beliefs ( $n = 4$ ), conditional beliefs concerning social evaluation ( $n = 7$ ), and unconditional beliefs about the self ( $n = 4$ ). Participants rate the extent to which they agree with each belief on an 11-point Likert-type scale (0 = *do not agree at all* to 10 = *strongly agree*), with higher scores indicating a greater endorsement of maladaptive self-beliefs. The SBSA has demonstrated excellent internal consistency and good validity in both clinical and nonclinical samples (Wong et al., 2014). In the present study, internal consistency for the SBSA total scale was .96.

*Self-Concept Clarity (SCC; Campbell et al., 1996).* The SCC is a 12-item questionnaire designed to measure the extent to which an individual's self-concept is clearly defined and stable; capturing how certain the individual is of their self-concept (e.g., "*My beliefs about myself seem to change very frequently*"). Individuals rate each item on a 5-point Likert-type scale (1 = *strongly disagree* to 5 = *strongly agree*) with two reverse-scored items. Total scores range from 12 to 60, with higher scores indicating a greater degree of self-concept clarity. Campbell et al. (1996) report excellent internal consistency and construct validity coefficients. In the present study, internal consistency was .86.

*Rosenberg's Self-Esteem Scale (RSES; Rosenberg, 1965).* The RSES is a 10-item questionnaire designed to measure positive and negative evaluations of self. Items are rated

on a 4-point Likert-type scale (1 = *strongly disagree* to 4 = *strongly agree*). Total scores range from 10 to 40, with higher scores reflecting more positive self-evaluations or higher self-esteem. The scale demonstrates excellent internal consistency, stability, and construct validity (Rosenberg, 1965). In the present study, internal consistency was .91.

*Self-Consciousness Scale* (SCS; Scheier & Carver, 1985). The SCS is a 16-item questionnaire designed to measure private self-consciousness, related to the inward direction of one's thoughts (SCS-PRI; e.g., "*I'm always trying to figure myself out*"), and public self-consciousness, related to the outward direction of one's thoughts (SCS-PUB; e.g., "*I'm concerned about the way I present myself*"). The social anxiety subscale was not included in this study as the purpose of the measure was to assess individual differences in private and public self-consciousness. Items are rated on a 4-point Likert-type scale (0 = *strongly disagree* to 3 = *strongly agree*), with higher scores indicating higher public or higher private self-consciousness depending on the scale. Scores on the SCS exhibit good psychometric properties (Scheier & Carver, 1985). In the present study, internal consistency for the private and public self-consciousness subscales were .75 and .84 respectively.

*The Depressive Experiences Questionnaire* (DEQ; Blatt, D'Afflitti, & Quinlan, 1976). The DEQ is a 66-item questionnaire designed to assess a broad range of phenomenological experiences associated with negative self-evaluations (e.g., statements reflecting a depreciated evaluation of self and others, dependency, helplessness, distortions in family relations, self-blame, loss of autonomy etc.). These experiences tend to be associated with a depressive state of mind. Individuals rate each item on a 7-point Likert-type scale (1 = *strongly disagree* to 7 = *strongly agree*). The questionnaire is indexed according to three factors: dependency, self-criticism, and self-efficacy (goal-oriented strivings), however only 6-items reflecting self-criticism (DEQ-SC6) were used in the current study, with higher scores indicating greater self-criticism. Adequate internal consistency for the DEQ-SC6 has been demonstrated (Iancu et al., 2014). In the present study, internal consistency was .83.

*Iowa-Netherlands Comparison Orientation Measure* (INCOM; Gibbons & Buunk, 1999). The INCOM is an 11-item questionnaire designed to measure individual differences in social comparison orientation. Items are rated on a 5-point Likert-type scale (1 = *strongly disagree* to 5 = *strongly agree*) with two reverse-scored items. Total scores range from 0 to 55, with higher scores indicating a greater tendency to engage in general social comparison. Scores on the INCOM possess good psychometric properties (Gibbons & Buunk, 1999). Upward and downward social comparisons were assessed using revised INCOM items obtained from the original authors. Both measures of upward (INCOM-UC) and downward (INCOM-DC) social comparison contained 6-items rated on the same Likert-type scales as the original INCOM. Representative items include “*When I wonder how good I am at something, I prefer to compare myself with others who are doing better than I*” for upward social comparison, and “*I often compare myself with others who have accomplished less in life than I have*” for downward social comparison. For the present study internal consistency for the general, upward, and downward social comparison scales were .67, .78, and .90, respectively. Given the brevity of the general and upward social comparison scales, these internal consistency figures are acceptable.

#### Procedure

All procedures were approved by the Macquarie University Human Research Ethics Committee. After participants had provided informed consent, they completed the full assessment battery online via the Qualtrics website. The order of questionnaires was randomised to control for ordering bias.

### Results

#### Preliminary Analyses

The total data set included 58,206 data points with 242 (0.42%) containing missing data. Results from Little’s MCAR Test (Little & Rubin, 1989) confirmed that missing data points were missing completely at random ( $\chi^2 = 7466.38$ ,  $df = 7524$ ,  $p = 0.679$ , *n.s.*).

Expectation-maximisation was used to replace these missing values (Schafer & Graham, 2002). Eight multivariate outliers were identified as exceeding the Mahalanobis distance critical  $\chi^2$  statistic ( $df = 10$ ; all  $ps < .001$ ). Five univariate outliers were detected (z-scores  $> 3.29$ ; 1 DASS-D score, 1 RSES score, and 3 INCOM\_UC scores). These extreme values were winsorised, with outliers being replaced with values equivalent to 3.29 standard deviations from the mean of their respective variable. Following winsorisation, all multivariate outliers remained significant and were therefore removed. No evidence of careless responding, where participants complete the assessment battery in a very brief period, was found. Examination of P-P plots of the standardised residuals showed that normality for all variables were within normal limits, except DASS-D and SBSA. Square root transformations improved normality for these variables. These transformed variables were retained in analyses as their inclusion resulted in change in patterns of significance. Assumptions of multicollinearity, linearity, and homoscedasticity were met.

Means, standard deviations, and bivariate correlations for the measures of interest are shown in Table 1. All correlations were significant and in the expected direction. Self-related constructs not only significantly correlated with social anxiety but also with depression and other self-variables. These were mostly moderate correlations; however, the strongest relationship was found between maladaptive self-beliefs and social anxiety, and the weakest between self-esteem and downward social comparisons.

[INSERT TABLE 1 HERE]

#### Unique Relationships between Self-Related Constructs, Social Anxiety, and Depression

Two multiple regression models using SPSS version 21 were used to examine whether self-related constructs were uniquely associated with social anxiety and depression scores in the undergraduate sample. Predictors<sup>2</sup> in these models included all self-related constructs, and

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<sup>2</sup> Given the cross-sectional design of the study, we use the term ‘predictor’ here to denote statistical prediction rather than the type of predictor analysis that establishes temporal precedence.

either social anxiety or depression scores depending on the model being tested. The regression model predicting social anxiety was significant,  $F(10, 511) = 55.41, p < .001$ , with around 52% of the variance in social anxiety scores accounted for by the predictors in the model. Specifically, scores on maladaptive self-beliefs and depression were uniquely and positively associated with social anxiety scores, while scores on self-concept clarity and self-esteem were uniquely and negatively associated with social anxiety scores. Maladaptive self-beliefs were identified as the strongest unique statistical predictor of social anxiety (see Table 2). The relationship between public self-consciousness and social anxiety was found to approach significance with a  $p$ -value of .051.

[INSERT TABLE 2 HERE]

The regression model predicting depression was also significant,  $F(10, 511) = 52.63, p < .001$ , with around 51% of the variance in depression accounted for by the predictors in the model. Similar to social anxiety, scores on maladaptive self-beliefs were uniquely and positively associated with depression scores, and scores on self-concept clarity and self-esteem were uniquely and negatively associated with depression scores (see Table 3). However, scores on private self-consciousness and social anxiety were also found to be uniquely and positively associated with depression scores, and both general and downward social comparisons approached significance. While maladaptive self-beliefs was identified as the strongest unique statistical predictor of social anxiety, self-esteem was found to be the strongest unique predictor of depression scores. Self-criticism and upward social comparisons were not found to be uniquely associated with either social anxiety or depression, while controlling for all other variables in the models.

[INSERT TABLE 3 HERE]

## Discussion

Self-related constructs feature prominently in both cognitive models of social anxiety (e.g., Clark & Wells, 1995) and depression (e.g., Beck, 1979). As a result, they have been the

focus of a considerable amount of empirical research. To our knowledge, however, this is the first study to include a broad collection of key self-related constructs proposed in these models and simultaneously examine the unique relationship between self-related constructs and social anxiety and depression, while also controlling for the association between the variables. Most hypotheses were supported. When examined independently, self-related constructs not only significantly correlated with social anxiety but also with depression and other self-variables. When examined simultaneously, maladaptive self-beliefs and depression scores were uniquely and positively associated with social anxiety scores, and self-concept clarity and self-esteem was uniquely and negatively associated with social anxiety. In contrast, maladaptive self-beliefs, private self-consciousness, and social anxiety were uniquely and positively associated with depression scores, and self-concept clarity and self-esteem were uniquely and negatively associated with depression. Inconsistent with our hypotheses, however, was the finding that the unique relationship between public self-consciousness and social anxiety only approached significance. Self-criticism and upward social comparisons were not found to be uniquely associated with higher scores of either social anxiety or depression.

The finding that self-esteem was uniquely and negatively associated with both social anxiety and depression<sup>3</sup> is consistent with prior empirical research (see Sowislo & Orth, 2013) and theoretical accounts. Several theories suggest that higher self-esteem serves as a buffer against anxiety (see Crocker & Park 2004), and the cognitive theory of depression (Beck, 1967) suggests that negative beliefs about the self (particularly relating to self-worth) are not just a symptom of depression but a diathesis exerting causal influence in the onset and maintenance of depression (the vulnerability model, *cf* Beck, Steer, Epstein, & Brown, 1990;

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<sup>3</sup> It is possible that the significant relationship found between depression and self-esteem in this paper and other research may have arisen due to common measurement items when assessing the constructs. For example, the RSES (Rosenberg, 1965) contains items such as “*I feel that I am a person of worth*”. Similarly, the DASS (Lovibond & Lovibond, 1995) contains items such as “*I felt like I wasn’t much worth as a person*”.

alternatively see the scar model; *cf* Coyne, Gallo, Klinkman, & Calarco, 1998). While the present research does not speak to the temporality or causality between the constructs, past studies demonstrate that the effect of depression on self-esteem is significantly stronger than the inverse relationship (see Sowislo & Orth, 2013). The present findings do underscore the possibility that low self-esteem may be a common underlying factor associated with both higher levels of social anxiety and depression. Findings are also consistent, however, with models and research describing how depression and anxiety may be differentially related to self-esteem. Both the tripartite model (*cf* Clark, Watson, & Mineka, 1994) and cognitive content hypothesis (Beck, Steer, & Epstein, 1992) state that low self-esteem should be more strongly related to depression than anxiety. Consistent with this supposition, self-esteem was the strongest unique statistical predictor of depression levels in this study, accounting for around 37% of the variance in depression scores, while only 10% of the variance in social anxiety was accounted for by low self-esteem.

The finding that maladaptive self-beliefs, as measured by the SBSA (Wong & Moulds, 2009), was uniquely and positively associated with both social anxiety and depression was also not surprising. High levels of social anxiety (Hope et al., 2010; Moscovitch et al., 2015; Rapee & Abbott, 2006; Stopa & Clark, 1993; Wong & Moulds, 2009; Wong et al., 2017) and depression (see Orth & Robins, 2013) have often been characterised as constituting negative beliefs about the self. While the SBSA contains maladaptive self-beliefs that are positioned in a social-evaluative context, the unconditional belief subscale of the questionnaire contains items that may be considered more absolute, global, and conclusive (Wong & Moulds, 2009), which are the types of self-statements typically characteristic of depressive thinking. It is therefore possible that the relationship between self-beliefs and depression was mostly driven by greater endorsement on these particular items. High inter-correlations and multicollinearity between the SBSA subscales prevented simultaneous analyses with each subscale entered as potential unique predictors. However, when looking at part-correlations for each subscale

separately, it was found that while all three subscales of the SBSA were uniquely associated with social anxiety, only unconditional beliefs about the self was uniquely associated with depression scores (see the Appendix for these analyses; see also Wong & Moulds, 2011; however see Wong et al., 2014). These findings may suggest differential patterns in the types of self-beliefs that exist among individuals with social anxiety and depression (see also the cognitive content hypothesis; Beck et al., 1992), although unconditional beliefs about the self may be a transdiagnostic vulnerability factor linking the two conditions (see also Wong et al., 2017). Finally, the finding that maladaptive self-beliefs were the strongest unique statistical predictor of social anxiety scores, accounting for around 40% of the variance in social anxiety, may corroborate the proposition that maladaptive self-related beliefs form a central part of what maintains excessive levels of social anxiety (Clark & Wells, 1995; Rapee & Heimberg, 1997).

While a considerable amount of research has considered the relationship between maladaptive beliefs about the self and social anxiety, relatively few studies have examined the role of structural features of the self and social anxiety (see Stopa, 2009; Gregory et al., 2016; Gregory & Peters, 2017). Of the few studies that have examined the role of self-structure in social anxiety, however, most have provided converging evidence for the role of reduced clarity or certainty about the self in maintaining social anxiety (Moscovitch et al., 2009; Stopa et al., 2010; Wilson & Rapee, 2006). Present results are consistent with this small body of research, suggesting that around 11% of the variance in social anxiety scores may be accounted for by self-concept clarity. Notably, the significance of this negative relationship remains even after controlling for shared variance with other important self-related constructs, such as self-focused attention, self-criticism, social comparison processes, and maladaptive self-beliefs. Research identifying positive associations with more general constructs like self-esteem and positive affectivity, and negative associations with neuroticism and chronic self-analysis (Campbell, 1990; Campbell et al., 1996), suggests that uncertainty of the self-concept



may be associated with psychopathology more generally. This uncertainty may also be particularly characteristic of disorders that involve negative self-evaluations. That self-concept clarity also uniquely accounted for significant variance in depression scores supports this proposition (see also Bigler et al., 2001; Butzer & Kuiper, 2006; Campbell, 1990; Campbell et al., 1996).

Interestingly, public self-consciousness was not found to be uniquely associated with social anxiety scores. This is a surprising finding given the substantial amount of empirical research linking self-focused attention and social anxiety (for a review, see Norton & Abbott, 2016; however, see Bögels, Rijsemus, & de Jong, 2002; Jakymin & Harris, 2012). It could be argued that this result may be an artefact of using undergraduate, non-clinical participants; however, the sample reflected relatively high levels of social anxiety severity, with around 54% of participants scoring above the cut-off score<sup>4</sup> for generalised social anxiety as measured by the SIAS (Heimberg, Mueller, Holt, Hope, & Liebowitz, 1992). Cognitive models of social anxiety suggest that socially anxious individuals develop a series of dysfunctional beliefs about themselves and the social world that, when activated in social situations, shift attentional focus to detailed monitoring of themselves. This increased self-focus, along with negative self-perception more generally, enhances awareness of feared anxiety responses and interferes with the processing of information inconsistent with dysfunctional beliefs (Clark & Wells, 1995). It is therefore possible that once the variance shared with maladaptive self-beliefs was accounted for, the relationship between self-focused attention and social anxiety was dampened. Future research could examine more causal relationships between self-related constructs, particularly self-focused attention and negative self-beliefs, and how they relate to social anxiety over time. Importantly, present findings are

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<sup>4</sup> Cut-off scores of 34 for the SIAS has been shown to differentiate individuals with social anxiety disorder from those without social anxiety disorder (Heimberg et al., 1992). Recruitment advertisement for the study included the title 'Are You Shy in Social Situations?' which may account for higher scores on the measure compared to the more normative sample used by Mattick and Clarke (1998) in their validation of the scale.

supportive of the proposition that private and public self-consciousness are differentially related to anxiety and depression. Specifically, private self-consciousness (but not public self-consciousness) was uniquely and positively related to depression, whereas public self-consciousness (but not private self-consciousness) approached significance with social anxiety (Mor & Winquist, 2002).

Finally, present results seem to indicate that upward social comparison and self-criticism may account for little unique variance in social anxiety and depression scores. These findings appear to be inconsistent with previous studies supporting a relationship between self-criticism and social anxiety (Antony et al., 2006; Mitchell & Schmidt, 2014) and depression (Beck et al., 1967; Cantazaro & Wei, 2010; Blatt et al., 1976), and between upward social comparisons and social anxiety (Cox et al., 2000; Cox, Fleet, & Stein, 2004; Kopala-Sibley et al., 2014) and depression (see Wheeler, 2013). The majority of these studies do not take into account the variance shared between different constructs related to the self-concept, however, and therefore do not provide a direct test of the unique predictive utility of self-constructs. Notably, the association between downward social comparison and depression approached significance. Inconsistent findings in the literature exist on whether depression is more greatly associated with upward or downward social comparisons (see Wheeler, 2013). Downward comparison theory (Wills, 1981) predicts that low self-esteem individuals will choose to make downward comparisons as a self-enhancement strategy, while Beck (1967) suggests that individuals with higher levels of depression have a systematic bias against the self that is reflected in and maintained by their upward social comparisons. Present results appear to be supportive of the former proposition; however, we note that only around 11% of the sample had depression scores in the moderate range as measured by the DASS (Lovibond & Lovibond, 1995). Replication of current findings using individuals with higher depression scores is recommended.

While these findings are important in improving current understanding of the unique relationship between self-related constructs and social anxiety and depression, the research presents several caveats and future research suggestions. First, the primary limitation of the present study was the cross-sectional design of the research methodology, which prevents conclusions being made regarding the temporal association between predictors and outcomes, and the significance testing of potential indirect effects (see Maxwell & Cole, 2007). Second, participants were undergraduate university students, calling into question the generalisability of these findings to clinical samples. Growing evidence now supports the existence of a continuum of social anxiety (Crome et al., 2010) and depression (Hankin et al., 2005) severity, suggesting that social anxiety disorder and major depressive disorder may reflect only a difference in the degree of social anxiety and depression a person experiences in clinical and non-clinical presentations. Nevertheless, it would be important to establish whether the relationships between self-related constructs and social anxiety and depression found in the current research hold in a clinical sample. Third, while the self-related constructs examined here are key constructs implicated in maintaining social anxiety and depression in cognitive models (see Alden & Regambal, 2010; Gregory et al., 2016; Beck, 1967), other variables that address various aspects of the self-concept (e.g., self-efficacy and self-imagery) were not addressed. Future research should therefore aim to explore the unique predictive utility of these variables while simultaneously controlling for the self-related constructs presented here and either depression or anxiety.

Overall, the current research appears to be mostly consistent with cognitive conceptualisations of social anxiety and depression and related empirical research. Results emphasise the importance of the relationships between maladaptive self-beliefs and social anxiety, and between self-esteem and depression. Findings also support the supposition that several key self-related constructs may represent transdiagnostic vulnerabilities between social anxiety and depression. It is important that future research continues to uncover unique

predictors of social anxiety and depression while simultaneously controlling for shared variance with other self-related constructs in both clinical and non-clinical samples.

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Table 1.

*Means, standard deviations, and correlations for social anxiety, depression and self-related variables*

	1	2	3	4	5	6	7	8	9	10	11
1. DASS-D_sr											
2. SIAS	.52**										
3. SBSA_sr	.56**	.68**									
4. RSES	-.63**	-.54**	-.59**								
5. DEQ-SC6	.52**	.50**	.60**	-.62**							
6. SCS-PUB	.42**	.48**	.61**	-.42**	.55**						
7. SCS-PRI	.37**	.33**	.41**	-.23**	.49**	.59**					
8. SCC	-.55**	-.50**	-.55**	.57**	-.59**	-.41**	-.36**				
9. INCOM-UC	.31**	.35**	.52**	-.37**	.50**	.46**	.36**	-.37**			
10. INCOM-DC	.25**	.24**	.40**	-.15**	.21**	.29**	.16**	-.34**	.28**		
11. INCOM	.26**	.31**	.47**	-.28**	.44**	.50**	.44**	-.35**	.55**	.34**	
Mean (SD)	2.98 (1.69)	35.17 (16.34)	7.19 (2.65)	16.64 (5.06)	27.31 (7.09)	19.01 (7.12)	14.24 (4.46)	16.18 (4.21)	21.18 (4.21)	14.85 (4.97)	33.75 (5.71)

*Note.* DASS-D = Depression Anxiety Stress Scales – Depression subscale square root transformed; DEQ-SC6 = The Depressive Experiences Questionnaire – 6 item Self-Criticism subscale; NCOM = Iowa-Netherlands Comparison Orientation Measure; INCOM-DC = Iowa-Netherlands Comparison Orientation Measure – Downward Comparison; INCOM-UC = Iowa-Netherlands Comparison Orientation Measure - Upward Comparison; RSES = Rosenberg's Self-Esteem Scale; SBSA = Self-Beliefs Related to Social Anxiety – square root transformed; SCC = Self-Concept Clarity Scale; SIAS = Social Anxiety Interaction Scale; SCS-PRI = Self-Consciousness Scale – Private Subscale; SCS-PUB = Self-Consciousness Scales – Public Subscale.

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

Table 2.

*Multiple regression model of self-related constructs predicting social anxiety*

	B	SE B	$\beta$	<i>p-value</i>	95% CI for B	Partial r
Constant	23.16	6.05		.000	11.28, 35.05	
DASS-D_sr	0.94	0.42	0.10	.026	0.11, 1.76	0.10
SBSA_sr	3.0	0.30	0.49	.000	2.42, 3.61	0.40
SCS-PUB	0.32	0.17	0.09	.051	-0.00, 0.65	0.09
SCS-PRI	-0.00	0.14	-0.00	.977	-0.28, 2.71	-0.00
RSES	-0.33	0.15	-0.10	.032	-0.64, -0.03	-0.10
SCC	-0.25	0.10	-0.11	.013	-0.44, -0.05	-0.11
DEQ-SC6	0.06	0.11	0.03	.582	-0.16, 0.28	0.02
INCOM-UC	-0.12	0.16	-0.03	.457	-0.42, 0.19	-0.03
INCOM-DC	-0.12	0.12	-0.04	.305	-0.35, 0.11	-0.04
INCOM	-0.12	0.12	-0.04	.321	-0.34, 0.11	-0.04

*Note.*  $R^2 = 0.52$ . DASS-D = Depression Anxiety Stress Scales – Depression subscale square root transformed; DEQ-SC6 = The Depressive Experiences Questionnaire – 6 item Self-Criticism subscale; NCOM = Iowa-Netherlands Comparison Orientation Measure; INCOM-DC = Iowa-Netherlands Comparison Orientation Measure – Downward Comparison; INCOM-UC = Iowa-Netherlands Comparison Orientation Measure - Upward Comparison; RSES = Rosenberg's Self-Esteem Scale; SBSA = Self-Beliefs Related to Social Anxiety – square root transformed; SCC = Self-Concept Clarity Scale; SCS-PRI = Self-Consciousness Scale – Private Subscale; SCS-PUB = Self-Consciousness Scales – Public Subscale.

Table 3.

*Multiple regression model of self-related constructs predicting depression*

	B	SE B	$\beta$	<i>p-value</i>	95% CI for B	Partial r
Constant	4.53	0.61		.000	3.33, 5.73	
SIAS	0.01	0.01	0.10	.026	0.01, 0.02	0.10
SBSA_sr	0.09	0.03	0.14	.013	0.02, 0.15	0.11
SCS-PUB	-0.01	0.02	-0.02	.668	-0.04, 0.03	-0.02
SCS-PRI	0.06	0.01	0.17	.000	0.03, 0.09	0.18
RSES	-0.13	0.01	-0.38	.000	-0.16, -0.10	-0.37
SCC	-0.04	0.01	-0.15	.001	-0.07, -0.02	-0.15
DEQ-SC6	0.01	0.01	0.04	.424	-0.01, 0.03	0.04
INCOM-UC	-0.02	0.02	-0.04	.339	-0.05, 0.02	-0.04
INCOM-DC	0.02	0.01	0.07	.059	-0.00, 0.05	0.08
INCOM	-0.02	0.01	-0.07	.079	-0.04, 0.00	-0.08

*Note.*  $R^2 = 0.51$ . DEQ-SC6 = The Depressive Experiences Questionnaire – 6 item Self-Criticism subscale; NCOM = Iowa-Netherlands Comparison Orientation Measure; INCOM-DC = Iowa-Netherlands Comparison Orientation Measure – Downward Comparison; INCOM-UC = Iowa-Netherlands Comparison Orientation Measure - Upward Comparison; RSES = Rosenberg's Self-Esteem Scale; SBSA = Self-Beliefs Related to Social Anxiety – square root transformed; SCC = Self-Concept Clarity Scale; SIAS = Social Anxiety Interaction Scale; SCS-PRI = Self-Consciousness Scale – Private Subscale; SCS-PUB = Self-Consciousness Scales – Public Subscale.

## Appendix

Table 1.

*Part correlations for SBSA subscales and either social anxiety or depression*

	SIAS <sub>SAD</sub>	SIAS <sub>DEP</sub>
SBSA-HSB_sr	.33**	.00
SBSA-CB_sr	.47**	.04
SBSA-UB_sr	.31**	.12*

*Note.* Part correlations controlled for self-esteem, self-consciousness, social comparison, self-concept clarity, self-criticism, and either depression or anxiety in respective analyses. SBSA-HBS = Self-Beliefs Related to Social Anxiety – High Standard Beliefs subscale square root transformed; SBSA-CB = Self-Beliefs Related to Social Anxiety – Conditional Beliefs subscale square root transformed; SBSA-UB = Self-Beliefs Related to Social Anxiety – Unconditional Beliefs subscale square root transformed.

\* $p < .05$     \*\* $p < .01$





## **Chapter 5**

### **Maladaptive Self-Beliefs during Cognitive Behavioural Therapy for Social Anxiety Disorder: A Test of Temporal Precedence**

It is evident from the preceding chapter that maladaptive beliefs about the self play an important role in social anxiety. It is also clear from the systematic review presented in Chapter Three that maladaptive self-beliefs typically reduce from pre- to post-treatment for social anxiety disorder (SAD). To date, however, no study has included within session measures of enduring maladaptive self-beliefs during cognitive-behavioural therapy (CBT) for SAD, and assessed the temporal relationship between change in maladaptive self-beliefs and social anxiety change across treatment. Such an investigation is needed, however, to rule out the possibility that reductions in self-related beliefs are simply a consequence of treatment gains (i.e., symptom reduction), rather than a contributor to such gains. The following chapter therefore aims to address this gap, and presents an empirical study entitled ‘Maladaptive Self-Beliefs during Cognitive Behavioural Therapy for Social Anxiety Disorder: A Test of Temporal Precedence’.

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*Author contribution:*

Ms. Bree Gregory was responsible for the design of the research, analysis, and write-up of the manuscript. Dr. Quincy Wong and Dr. Craig Marker provided statistical assistance. Dr. Lorna Peters provided research supervision.

**Maladaptive Self-Beliefs during Cognitive Behavioural Therapy for Social  
Anxiety Disorder: A Test of Temporal Precedence**

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## Abstract

Given the putative importance of maladaptive self-beliefs in cognitive models of social anxiety, there is growing interest in the construct's influence on social anxiety reduction in treatment. The present study sought to examine whether maladaptive self-beliefs reduce over a 12 week course of cognitive behavioural therapy (CBT) for social anxiety disorder (SAD), and whether change in self-beliefs is a leading indicator of later change in social anxiety symptom severity within treatment. Participants were 77 individuals with SAD who completed measures of maladaptive self-beliefs every two weeks of the treatment protocol, and measures of social anxiety each week. Using a dynamic bivariate latent difference score framework, results indicated that maladaptive self-beliefs reduced during CBT for SAD, and that change in maladaptive self-beliefs was a significant predictor of later change in social anxiety symptom severity. Reductions in social anxiety was not a significant predictor of later change in self-beliefs. Findings underscore the importance of maladaptive self-beliefs in the maintenance of social anxiety and in treatment for SAD. Moreover, they permit inferences about the temporal sequence of change processes in therapy, and are consistent with CBT therapeutic models suggesting that cognitive change precedes symptom change.

*Keywords:* self-beliefs; social anxiety disorder; CBT; mechanisms of change; latent difference score

Maladaptive Self-Beliefs during Cognitive Behavioural Therapy for Social Anxiety Disorder: A Test of Temporal Precedence

Social anxiety disorder (SAD) is a prevalent, complex, and disabling disorder that, if left untreated, runs a chronic course (Crome & Baillie, 2015; Stein & Stein, 2008; Wong, Gordon, & Heimberg, 2014). Individuals with SAD show impairments in financial and employment stability, academic performance, and general mental health (Ruscio et al., 2008). These difficulties are often compounded by a high degree of comorbidity with other mental health diagnoses, such as alcohol abuse and depression (for a review, see Szafranski, Talkovsky, Farris, & Norton, 2014). Recent meta-analytic evidence suggests that cognitive-behaviour therapy (CBT) is an effective treatment for SAD that compares favourably with other psychological and pharmacological interventions (Mayo-Wilson et al., 2014; Wersebe, Sijbrandij, & Cuijpers, 2013). Despite the efficacy of CBT for SAD, however, many patients with the disorder remain symptomatic following treatment intervention (e.g., 59%; Rapee, Gaston, & Abbott, 2009). More research is therefore needed to identify the processes and mechanisms that contribute to pathological symptom change in treatment (Kazdin, 2007).

Prominent cognitive-behavioural models of SAD emphasise the importance of maladaptive beliefs relating to the self and others' evaluations in the aetiology and maintenance of the disorder (for reviews of these models, see Alden & Regambal, 2010; Gregory, Peters, & Rapee, 2016). Related empirical research has supported this proposition (Allen & Page, 2005; Moscovitch et al., 2013; Rapee & Abbott, 2006; Wong et al., 2017; Wong & Moulds, 2009). For example, individuals with social anxiety have been shown to experience excessively high standard beliefs for social performance (e.g., '*I must be liked by everybody*'), conditional beliefs concerning social evaluation (e.g., '*If I make a mistake, others will reject me*'), and unconditional beliefs about the self (e.g., '*I am boring*') (Clark & Wells, 1995; Wong & Moulds, 2009, 2011). These negatively valenced beliefs maintain social anxiety by inducing perceptions of social danger (Clark & Wells, 1995). When

activated in social situations, maladaptive beliefs heighten self-focused attention, transform innocuous social cues (e.g., a person yawning) into significant social threats, increase safety behaviour use, dysregulate emotions, and exaggerate emotional reactivity (e.g., fear and anxiety) (Clark, 2001; Spurr & Stopa, 2002). As a result of these processes, maladaptive self-related beliefs become continually reinforced and perpetuated in a cyclic pattern.

Given the putative importance of maladaptive beliefs in SAD, there is growing interest in the construct's influence on social anxiety reduction in treatment. Cognitive models of anxiety imply that symptom reduction should be associated with, and preceded by, the weakening or modification of negative self-schemas (Beck, 1967; Clark & Beck, 1999). Indeed, "the concept of therapeutic change occurring through mediation or modification of negative cognitive schemas has traditionally underpinned the clinical cognitive model" (Casey, Newcombe, & Oei, 2005, p. 196). More recent therapeutic accounts indicate a more circular model of causality, however, where cognitive change both precedes and is influenced by symptom change (e.g., Clark, 1986; Clark & Wells, 1995). Stopa (2009) argues that this conceptualisation provides clinicians with a useful way of discussing the self with patients, and directs treatment towards correcting dysfunctional belief and thought patterns (i.e., self-schematic content). The most thoroughly studied and established therapeutic approach to SAD is CBT (Mayo-Wilson et al., 2014), and a core component of the treatment protocol is training patients to restructure their negative self-related cognitions (e.g., Rapee et al., 2009). This is often achieved via the systematic collection and rational disputation of evidence for and against maladaptive thoughts and beliefs (e.g., identified through downward arrow techniques, thought challenging records), and through the development of action plans to counter them (Rapee et al., 2009).

Despite the prominence of self-related beliefs in cognitive models of social anxiety and treatment for SAD, the field is lacking studies demonstrating whether change in these beliefs act as mediators or predictors of treatment response. Indeed, most studies have simply

examined and shown that CBT (Boden et al., 2012; Bögels, Wijts, Oort, & Sallaerts, 2014; Koerner, Antony, Young, & McCabe, 2013; Rapee et al., 2009; Wilson & Rapee, 2005; Wong et al., 2017) and exposure therapy (Gros & Sarver, 2014) significantly reduce dysfunctional self-related beliefs from pre- to post-treatment (for a review, see Gregory & Peters, 2017). Exceptions to this are the few studies demonstrating that reductions in maladaptive self-beliefs are associated with social anxiety improvement at post-treatment (Koerner et al., 2013; Wong et al., 2017) and at three-month follow-up (Wilson & Rapee, 2005), and mediate the effect of CBT on social anxiety symptom severity (Boden et al., 2012). All studies to date, however, have employed a two wave (e.g., pre- vs. post-treatment; post- vs. follow-up) methodological design, which does not allow for an adequate evaluation of mechanisms of action or therapeutic change in treatment (Kazdin & Nock, 2003). As a result, most studies leave open the possibility that reductions in self-beliefs are a consequence of treatment gains (i.e., symptom reduction), rather than a contributor to such gains (Teachman, Marker, & Smith-Kanik, 2008).

The possibility that change in maladaptive self-beliefs is simply an epiphenomenon of social anxiety, and not meaningfully related to symptom reduction, needs to be further addressed. From a clinical perspective, doing so would help improve current understanding of CBT for SAD, and may suggest why therapy occasionally fails and how treatment gains may be improved among partial responders. To establish that a theoretically derived variable serves as a mechanism of change in psychotherapy requires demonstration of a strong association between change in the cognitive and symptom variable, and the demonstration of a temporal relationship between change in cognitions and symptoms that is assessed repeatedly throughout treatment (Kazdin & Nock, 2003). To date, most studies have focused on the former of these methodological approaches, with the evaluation of temporality using repeated measures often considered to be the “Achilles heel of treatment studies” (Kazdin & Nock, 2003, p. 1121). Indeed, research has yet to include within-session measures of enduring



maladaptive beliefs about the self in CBT for SAD and examine temporal precedence with symptoms measures (see Gregory & Peters, 2017).

The present study therefore used a repeated measures design to examine whether maladaptive self-beliefs reduce over the course of CBT for SAD, and to understand the temporal sequence of change in self-related beliefs and change in social anxiety over the therapeutic protocol. Our repeated measures approach follows the model used by Teachman et al. (2008), which involves evaluating changes within a treatment group rather than comparing across treatment conditions (see also Barber, Connolley, Crits-Christoph, Gladis, & Siqueland, 2000). Many traditional approaches to mediation models and longitudinal data analysis (e.g., panel models; Cole & Maxwell, 2003) focus on interindividual standings across time (i.e., between individuals) rather than on intraindividual variation (i.e., within individuals) and individual differences in this intraindividual variation across time (Selig & Preacher, 2009). However, theoretical models of CBT almost universally focus on the importance of idiographic variation when considering hypothesised mechanisms of change (Clark, 2001). The present study therefore employed a bivariate latent difference score framework (see McArdle & Hamagami, 2001) to investigate within-individual differences in the possible ‘coupling’ of maladaptive self-beliefs and social anxiety; specifically, whether change in one univariate process variable predicts later change in the other.

Social anxiety symptoms were measured every week of the 12 week course of CBT for SAD while self-related beliefs were measured at seven time points over the course of the treatment (see Table 1). Self-beliefs were assessed using the Self-Beliefs Related to Social Anxiety Scale (SBSA; Wong & Moulds, 2009), which has the advantage of directly mapping onto the three self-belief categories proposed by Clark and Wells (1995): high standard beliefs for social performance, conditional beliefs concerning social evaluation, and unconditional beliefs about the self. While this is a well validated and reliable measure (Wong & Moulds, 2009; Wong, Moulds, & Rapee, 2014) supported by one of the most prominent

cognitive models of SAD (Clark & Wells, 1995), this is the first study to use this measure in the context of a full course of treatment for social anxiety (Gregory & Peters, 2017). Given the aforementioned literature, we expected that both maladaptive self-beliefs and social anxiety would reduce over the course of treatment. We also expected a bidirectional relationship between the two univariate processes, whereby a decrease in maladaptive self-beliefs would both predict, and be predicted by, a decrease in social anxiety symptom severity.

## Method

### Participants

Clinical participants were 77 (40 female) adults<sup>1</sup> who took part in a manualised treatment trial for SAD at the Centre for Emotional Health (CEH) Clinic, Macquarie University, Sydney, Australia. Inclusion into the trial required a primary diagnosis of SAD assigned following the Anxiety Disorders Interview Schedule–IV (ADIS–IV; Di Nardo, Brown, & Barlow, 1994) and a Clinician Severity Rating of 4 or above (i.e., there was at least moderate impairment caused by social phobia). Previous research has indicated strong reliability for diagnosis of SAD and clinical severity ratings using these methods in the CEH clinic ( $k = 0.86$ ;  $ICC = 0.85$ ) (Rapee et al., 2009). Participants were excluded if they had active suicidal ideation, unmanaged substance abuse or dependence, co-morbid psychosis, or a recent change (within a three month period) in medication type or dosage. Participants had an average age of 33.51 ( $SD = 10.48$ , range = 18–77 years), and most met criteria for the generalised subtype of SAD (97.4%; reported fear ratings of 4 or above for the majority of social situations listed in the Social Phobia module of the ADIS-IV). Around 40.3% met criteria for an additional anxiety disorder and 29.9% met criteria for a mood disorder. Around 48.1% met criteria for avoidant personality disorder, assessed using the avoidant personality

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<sup>1</sup> These participants were part of an ongoing randomised control trial (RCT) for the treatment of SAD at the CEH, all of whom received 12 weeks CBT. Participants in the present study represent 41.2% of the participants included in the RCT.

disorder section of the International Personality Disorder Examination (Loranger, Janca, & Sartorius, 1997). Further information revealed that 55.8% held a bachelor degree or higher, and 40.3% were employed full-time (13.0% were unemployed and 27.3% were students).

#### Measures

*Social Phobia-12* (SP-12; Peters, Sunderland, Andrews, Rapee, & Mattick, 2012). The SP-12, otherwise known as the SIAS-6/SPS-6 scale in the literature, is a short-form measure of social anxiety based on nonparametric item response theory analyses conducted on the items of the Social Interaction Anxiety Scale (SIAS; Mattick & Clark, 1998) and the Social Phobia Scale (SPS; Mattick & Clark, 1998). The SIAS and SPS are companion questionnaires designed to measure feared social situations involving general social interactions with others (the SIAS) and public scrutiny (the SPS). The scale contains 12-items overall, with six items derived from the SIAS and six items derived from the SPS. Thus, the SP-12 captures both social interaction and performance-based fears. Items are rated on a 5-point Likert-type scale (0 = *not at all characteristic or true of me* to 4 = *extremely characteristic or true of me*), with total scores ranging from 0 to 48. Higher scores indicate greater symptom severity. Scores on the measure correlate strongly and significantly with the SIAS/SPS in clinical samples at pre-treatment, post-treatment, and 3-month follow-up ( $r = .79-.90$ ), and also correlate strongly and significantly with change scores in the SIAS/SPS following treatment ( $r = .81-.91$ ) (Peters et al., 2012). In the present study, internal consistency for the SP-12 was .89.

*Self-Beliefs Related to Social Anxiety* (SBSA; Wong & Moulds, 2009). The SBSA is a 15-item questionnaire designed to measure the strength of beliefs about the self in a social context. It includes three subscales that map directly onto the model proposed by Clark and Wells (1995): excessively high standard beliefs ( $n = 4$ ), conditional beliefs concerning social evaluation ( $n = 7$ ), and unconditional beliefs about the self ( $n = 4$ ). Participants rate the extent they agree with each belief on an 11-point Likert-type scale (0 = *do not agree at all* to 10 = *strongly agree*), with total scores ranging from 0 to 150. Higher scores indicate greater

endorsement of maladaptive self-beliefs. Scores on the SBSA have demonstrated excellent internal consistency and have good validity in both clinical and nonclinical samples (Wong & Moulds, 2009; Wong et al., 2014). In the present study, internal consistency for the SBSA total scale was .92.

### Treatment

Participants received CBT delivered in small groups (6–8 participants) over 12 weekly two and a half hour sessions. Primary therapists were clinical psychologists or graduate clinical psychology students with specific expertise in the treatment of SAD. In most cases a graduate psychology student acted as a co-therapist. Treatment was guided by a manual for the therapists and was supported by printed materials and handouts for participants. All therapists received weekly clinical supervision across the whole treatment protocol.

Details about the group treatment manual have been reported previously (see Rapee et al., 2009). Session 1 covered basic psycho-education and was followed by Session 2, which introduced attentional retraining toward the task at hand. Sessions 3 and 4 included identifying and modifying maladaptive cognitive patterns through hypothesis testing and evidence gathering. Sessions 5 and 6 introduced and encouraged ongoing behavioural experiments and in vivo exposure through exposure hierarchies. Sessions 7 and 8 focused on reduction of safety behaviours and subtle avoidance, as well as realistic appraisal and feedback of social performance. Session 9 provided an opportunity to practise integrating previously introduced skills through in vivo exposure. Sessions 10 and 11 included the examination and refutation of underlying core beliefs. Session 12 involved relapse prevention and revision.

### Procedure

The procedures received approval from the Macquarie University Human Research Ethics Committee and all participants gave informed consent. Following assessment of suitability, treatment typically began within the following few weeks upon completion of the

diagnostic interview. Participants completed the SP-12 every week of the CBT protocol (i.e., from weeks 1 to 12), while the SBSA was completed by participants at pre-treatment, and at weeks 2, 4, 6, 8, 10, and 12 of the weekly CBT treatment.

#### Data Analysis

Latent growth curve modelling (LGCM; McArdle, 2009) was first used to estimate patterns of univariate change in the SBSA and the SP-12<sup>2</sup>. LGCM allows for the testing of multiple hypotheses in one model (i.e., change over treatment and predictors of change), while also minimising measurement error in observed variables. LGCM also takes into consideration interindividual differences in these intraindividual change trajectories across time. Determining the best pattern of univariate change (e.g., linear or some type of non-linear growth) yielded six models in total: linear, quadratic, and freely-estimated models for each of the univariate process variables. Models were compared using the following fit indices: Loglikelihood function, the Akaike Information Criteria (AIC), the Bayesian Information Criteria (BIC), and the Sample Size Adjusted Bayesian Information Criteria (SSBIC), with lower values indicating better model fit. All variables exhibited significant individual variation and change needed to move forward with bivariate models.

Next, dynamic bivariate latent different score analyses (LDS) were conducted to evaluate how maladaptive self-beliefs and social anxiety symptom severity interact across the course of treatment. Specifically, we wanted to highlight whether change in one variable was a leading indicator of change in the other variable. Due to space limitations, a complete description of LDS models is not possible here; however, interested readers are referred to

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<sup>2</sup> For the current study, time was nested within individuals who were also nested within groups throughout treatment. However, intra-class correlation coefficients (ICCs) calculated using the program HLM 7.01 (Raudenbush, Bryk, & Congdon, 2013) demonstrated that there was little effect of group variance on variable scores (i.e., all ICCs < 0.05). Thus, accounting for the three-level hierarchical data structure was not considered a necessary endeavour. The RCT also randomly allocated participants to receive two different types of three weekly and individual preparatory sessions prior to group CBT. Results also indicated that there was no significant random component attributable to this allocation in the models (i.e., all ICCs < 0.05), and therefore only the nested effect of individuals remained controlled for. For these analyses, please contact the corresponding author.

McArdle and Nesselroade (2002) as the current procedures are based on their methods (for further technical details, see McArdle, 1988; McArdle & Hamagami, 2001; for a review of LDS, see Ferrer & McArdle, 2010; for other practical examples, see Teachman, Marker, & Clerkin, 2010). The LDS model is an alternative method for the structural modelling of longitudinal data that integrates features of latent growth curve models and cross-lagged regression models. LDS is especially useful for examining the present questions because one can simultaneously model overall change across time and lagged relationships, allowing for the estimation of whether change in one process (e.g., maladaptive self-beliefs) predicts later change in outcome (e.g., social anxiety), while controlling for overall change in both. As the change process could be bidirectional – change in maladaptive self-beliefs could predict subsequent change in social anxiety outcome, or vice versa – we simultaneously estimated a parameter for each direction.

Markov Chain Monte Carlo (MCMC) estimation was used for all analyses with Mplus software (Muthén & Muthén, 2010; Asparouhov & Muthén, 2010). This type of Bayesian estimation, which uses prior distributions on all parameters and simulation-based estimation, is especially suited for small sample sizes and incomplete data. Furthermore, all models were estimated with full information maximum likelihood estimation (Muthén & Muthén, 2008) and results were similar. This procedure estimates the model parameters using all available information rather than deleting cases with incomplete data (Enders, 2001). Thus, people who did not have all sessions completed were still utilised in these analyses. Over 80 percent of people completed 9 sessions or more. This decision was made to maximise power and to be conservative in our approach (by not only examining treatment completers). Analogously, our focus was on creating a *reliable* parameter estimate for change in each variable as a predictor of the dynamic change in the other variables, rather than on estimating all possible curvilinear growth parameters. Thus, we only estimate growth parameters for a linear pattern of change in the bivariate latent difference score models in order to keep the tests highly focused and not

raise the risk of Type I error by estimating many parameters with a relatively small sample size. Notably, other curvilinear modelling approaches were also examined, but these models did not provide substantively better estimates of fit than the linear models so are not reported here.

Finally, the number of participants attending each of the main assessment sessions were: Session 1 = 77, 4 = 71, 6 = 71, 8 = 61, 10 = 59, 12 = 60. To help address the impact of attrition on the results, we conducted an analysis of incomplete data (Little & Rubin, 2002). The total data set included 16,819 data points with 2,354 (12.28%) containing missing data. Results from Little's MCAR Test confirmed that missing data points were missing completely at random ( $\chi^2 = 2837.36$ ,  $df = 7825$ ,  $p = 1.000$ , *n.s.*). As part of this analysis, we also examined variables that might predict patterns of missingness with procedures in Mplus (based on Collins, Schafer, & Kam, 2001; Enders, 2010; Graham, 2003). Initial levels of social anxiety severity (using the SP-12) and baseline self-belief scores (using the SBSA) were not found to be significant predictors of incomplete data.

## Results

### Univariate latent growth curve modelling

Means and standard deviations for the measures of interest are shown in Table 1. Univariate latent growth curve modelling was first used to determine whether significant change occurred across treatment for both variables (see McArdle and Nesselroade, 2002, for a more detailed discussion of this type of modelling). Fit indices did not indicate substantial improvement when modelling non-linear change (see Table 2), suggesting that modelling linear change was sufficient. Figure 1 displays the path diagrams of the models, which estimate the latent intercept growth factor (initial status), the latent slope growth factor (change over time), and the covariation between intercept and slope factors, with a linear change trajectory. Both the SBSA and SP-12 reduced over the course of treatment. Specifically, estimates of maladaptive self-beliefs, as measured by the SBSA, began on

average at 101.81 and reduced by 6.03 units ( $SE = 0.64, p < .001, 95\% \text{ CI } [-7.40, -4.64], d = 0.94$ ) over the course of the treatment. Estimates of social anxiety, as measured by the SP-12, began on average at 26.30 and reduced by 0.98 units ( $SE = 0.10, p < .001, 95\% \text{ CI } [-1.20, -0.78], d = 1.15$ ) over the course of the treatment. For both variables, significant variance in the intercept and slope growth factors was indicated (SBSA: initial = 681.65,  $p < .001$ , slope = 9.67,  $p = .004$ ; SP-12 initial = 89.10,  $p < .001$ , slope = 0.29,  $p = .001$ ), suggesting that individuals differed in their starting value and rate of change over treatment. Negative coefficients for the covariation between intercept and slope factors (SP-12: -1.81; SBSA = -15.94) also indicate that individuals with greater scores on these variables at either the first session of the CBT treatment (for the Sp-12) or at pre-treatment (for the SBSA) tended to have less reductions in social anxiety symptom severity and maladaptive self-beliefs over time.

[INSERT TABLE 1 HERE]

[INSERT TABLE 2 HERE]

[INSERT FIGURE 1 HERE]

#### Bivariate latent difference score modelling

Bivariate latent difference score modelling was used to determine whether change in maladaptive self-beliefs (SBSA) was a leading indicator of later change in social anxiety symptom severity (SP-12), and vice-versa. Figure 2 presents a simplified diagram of the bivariate latent difference score model. Notably, all 12 of the SP-12 time points were used in this model for better reliability of change parameters. Most arrows have parameters set to one (approach modelled from McArdle & Nesselroade, 2002), while the arrows labelled with the  $\alpha$  (alpha) parameters are used to estimate change in each variable over time. The arrows labelled with  $\gamma$  (gamma) predict the temporal relationship between variables (i.e., whether one process predicts later change in the other, reported with standardised beta coefficients). The  $\alpha$  and  $\gamma$  parameters were constrained to be equal across time. Results indicated that, as



hypothesised, previous change in maladaptive self-beliefs significantly predicted later change in social anxiety symptoms ( $\gamma_{\text{SBSA}} = .50, p < .05, 95\% \text{ CI } [-1.28, -.39]$ ). However, previous change in social anxiety symptoms did not predict later change in maladaptive self-beliefs ( $\gamma_{\text{SP-12}} = .10, p > .05, 95\% \text{ CI } [-0.20, 0.26]$ ).

[INSERT FIGURE 2 HERE]

### Discussion

To date, research examining whether maladaptive self-beliefs change over treatment and how this change relates to treatment outcome has employed a two wave (e.g., pre- vs. post-treatment; post- vs. follow-up) methodological design (Boden et al., 2012; Bögels et al., 2014; Koerner et al., 2013; Rapee et al., 2009; Wilson & Rapee, 2005; Wong et al., 2017). Such an approach does not allow for an adequate evaluation of mechanisms of action or therapeutic change in treatment, however, or demonstrate the temporal precedence of change in proposed mechanisms (Kazdin & Nock, 2003). As a result, most studies leave open the possibility that reductions in self-related beliefs are simply an epiphenomenon of social anxiety, rather than a contributor to social anxiety amelioration in treatment (Teachman et al., 2008). To our knowledge, this is the first study to include within-session measures of enduring maladaptive self-beliefs and social anxiety in CBT for SAD, and to examine the temporal sequence of change in the univariate process variables over the course of the therapeutic protocol.

As expected, scores on maladaptive self-beliefs and social anxiety symptom severity reduced over treatment. These findings are in accordance with previous research demonstrating pre- to post-treatment changes in self-related beliefs (Boden et al., 2012; Bögels et al., 2014; Koerner et al., 2013; Rapee et al., 2009; Wilson & Rapee, 2005; Wong et al., 2017) and studies demonstrating within-session changes in social anxiety symptoms (e.g., Hedman et al., 2013; Hoffart, Borge, Sexton, & Clark, 2009; Mörtberg, Hoffart, Boecking, & Clark, 2015; Niles et al., 2014). A core component of CBT is restructuring patients'

dysfunctional self-related cognitions (Beck, 1967; Clark & Beck, 1999). Indeed, patients are taught to systematically collect and rationally dispute negative, automatic thoughts that contribute to anxiety early in treatment and to challenge maladaptive core-beliefs related to the self (e.g., '*I am worthless*') in later sessions of the therapeutic protocol (Rapee et al., 2009). Moreover, self-related beliefs are often indirectly altered in treatment through attentional training procedures (e.g., task-concentration training; Mulkens, Bögels, de Jong, & Louwers, 2001), and by teaching patients to reduce their ruminative processing (Wong & Moulds, 2009) and to minimise safety behaviour use (Clark & Wells, 1995). Each of these therapeutic techniques were included within the current treatment protocol (see Rapee et al., 2009) and likely contributed to the decline in maladaptive self-belief endorsement over the course of therapy (Beck & Haigh, 2014). However, we note that the absence of a waitlist control sample and a dismantling methodology (i.e., to test the contribution of various components of treatment on self-belief reduction) prevents definitive conclusions regarding treatment-related effects.

Importantly, the present study also addressed one of the central tenets in cognitive models of anxiety and CBT: that change in cognitions should precede changes in anxious symptomology (Beck, 1967; Clark & Beck, 1999). Early variants of CBT held a number of fundamental propositions, many of which have been carried forward today. These include: (1) cognitive activity affects behaviour, which is a restatement of the mediation model presented by Mahoney (1974); (2) cognitive activity may be monitored and altered; and (3) desired behaviour change may be effected through cognitive change (Dobson & Dozois, 2010). Consistent with these assumptions, present findings indicate that change in maladaptive self-beliefs are a leading indicator of later change in social anxiety symptom severity during CBT for SAD. This finding adds to the body of research providing not only direct support for cognitive mediation in SAD (e.g., Goldin, et al., 2013; Hofmann, 2004; Smits, Rosenfeld, McDonald, & Telch, 2006) but across disorders; including, major depressive disorder (Quilty,

McBride, & Bagby, 2008), generalised anxiety disorder (Donegan, & Dugas, 2012), eating disorders (Wilson, Fairburn, Agras, Walsh, & Kraemer, 2002), sleep disorders (Schwartz & Carney, 2012), and bipolar disorder (Totterdell, Kellett, & Mansell, 2012).

Theoretical adaptations derived from earlier cognitive models (Beck, 1967), however, have tended to shift emphasis from a linear causal model to a more circular model of causality; although the notion of reciprocal relationships was also mentioned by Beck (1967) and Ellis (1962). This shift has also been reflected in cognitive models of psychopathology (Clark, 1986). For example, negatively valenced self-beliefs have been argued to heighten self-focused attention, increase safety behaviour use, dysregulate emotional regulation, and exaggerate emotional reactivity (e.g., fear and anxiety) (Clark, 2001; Spurr & Stopa, 2002), which in turn trigger and increase the frequency of dysfunctional self-related cognitions and symptomology (Clark & Wells, 1995). Several studies now support the circular model of causality in treatment for SAD (e.g., Gregory, Peters, Abbott, Gaston, & Rapee, 2015; Sowislo & Orth, 2013); however, present findings were not consistent with this temporal pattern. Specifically, while change in maladaptive self-beliefs significantly predicted later change in social anxiety symptoms, the reciprocal effect (i.e., social anxiety predicting later self-belief change) was not found to be significant. It is possible that this null effect may have been due to a power issue. Present findings should therefore be replicated using a larger sample size before more definitive conclusions can be made.

While these findings are important in their novelty and in improving understanding of potential mechanisms underpinning psychological treatment for SAD, several caveats and future research suggestions should be mentioned. First, the primary limitation of the present study was the absence of a randomised, waitlist control condition, which prevents definitive conclusions regarding whether changes in the investigated constructs are truly mechanisms of CBT, are a general treatment effect, or even due to passage of time. However, previous research suggests that individuals with SAD in waitlist control conditions typically do not

change on symptom variables (e.g., Clark et al., 2006; Steinert, Stadter, Stark, & Leichsenring, 2016) or on cognitive variables such as self-beliefs (e.g., Boden et al., 2012) over treatment. Furthermore, our repeated measures approach involved evaluating changes *within* a treatment group rather than comparing across treatment conditions; although, we note that these approaches are not mutually exclusive. Second, the sample size was relatively small for the type of modelling approach employed. As a result, multiple versions of the bivariate latent difference score model were run using different time lags and all models produced similar results (consistent with Teachman et al., 2008), potentially indicating reliability of findings. To assist with model convergence, a number of parameters were also constrained to be equal across time, including the  $\gamma$  (gamma) parameters. This meant that while results tested the reciprocal causal model, they do not specify at what stage of the treatment protocol change was predictive. Replication of findings using a larger sample size, a waitlist control condition, and non-constrained  $\gamma$  (gamma) parameters, therefore remains necessary and warranted endeavours. Finally, future research should include within session measures of depression symptom severity and control for the potential impact of change in depression scores over CBT for SAD. Without doing so, it is difficult to rule out the possibility that reported changes over treatment are contingent upon improvements in depression (see Gregory & Peters, 2017). This may be particularly important in the context of maladaptive self-belief change, as global, absolute, and negative self-statements are also typically characteristic of individuals with depression (Wong et al., 2014; Wong et al., 2017).

Notwithstanding these limitations and future research suggestions, this is the first study to include within-session measurements of maladaptive self-beliefs in CBT for SAD and examine the temporal sequence of change in self-related beliefs and change in social anxiety over the therapeutic protocol. A linear, unidirectional model was supported, with only change in maladaptive self-beliefs being significantly predictive of later social anxiety change. Importantly, self-report measures assessed both social interaction and performance-

based social anxiety-related fears (using the SP-12), and mapped directly onto the three self-belief categories proposed by Clark and Wells (1995): high standard beliefs, conditional beliefs, and unconditional beliefs about the self (using the SBSA). From a clinical perspective, present findings underscore the importance of reducing maladaptive self-beliefs in treatment for SAD, and suggest that increased focus on modifying enduring maladaptive self-beliefs should encourage greater reductions in patients' social anxiety symptom severity.

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Table 1.

*Means and standard deviations for maladaptive self-belief and social anxiety scores*

Treatment	SBSA	SBSA	SP-12	SP-12
Session	M	SD	M	SD
0	84.54	33.23	-	-
1	-	-	25.04	10.22
2	93.02	30.32	24.33	9.60
3	-	-	22.01	9.20
4	90.52	31.63	22.41	9.88
5	-	-	20.73	9.69
6	84.11	27.61	19.41	9.10
7	-	-	19.07	9.23
8	73.33	27.92	18.44	9.43
9	-	-	17.30	8.68
10	72.01	27.83	16.38	8.09
11	-	-	14.83	8.83
12	65.08	28.83	13.98	9.01

Note. Treatment sessions: 0 = pre-CBT, 1 = week 1 of CBT, 2 = week 2 of CBT, 3 = week 3 of CBT, and so on; SBSA = Self-Beliefs Related to Social Anxiety; SP-12 = Social Phobia-12; M = Mean; SD = Standard deviation.



Table 2.

*Univariate latent growth curve criterion information fit indices*

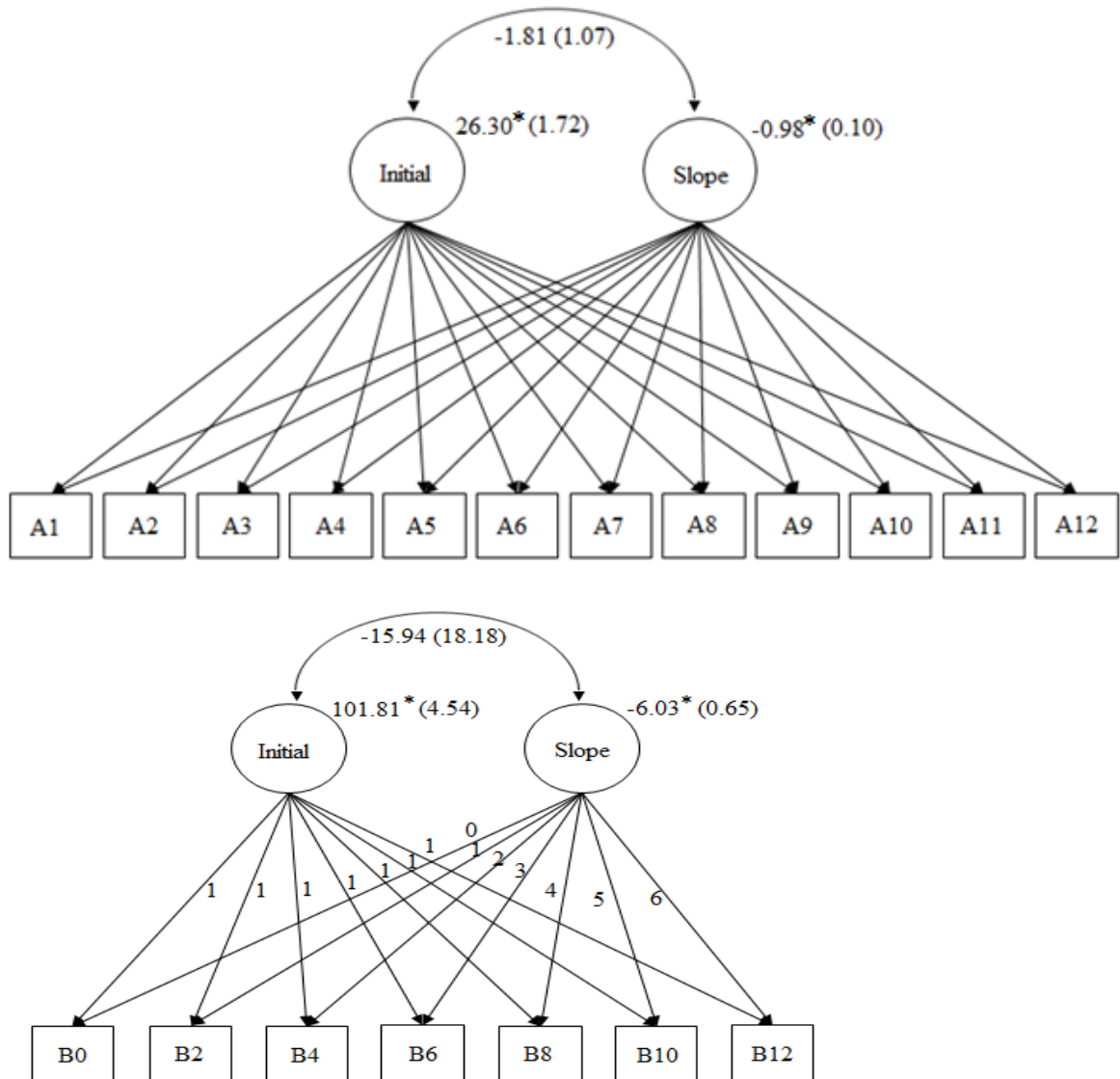
Variable	Model	Loglikelihood	df	AIC	BIC	SSBIC
SP-12	1	-1004.78	73	2043.56	2067.94	2014.97
	2	-994.68	69	2031.35	2061.46	1996.04
	3	-998.86	70	2051.73	2090.45	2006.33
SBSA	1	-1186.66	23	2397.32	2380.04	2380.04
	2	-1175.95	19	2383.90	2410.92	2360.85
	3	-1176.95	20	2383.90	2409.23	2362.30

*Note.* Models, 1 = linear model, 2 = quadratic model, 3 = freely-estimated model. AIC =

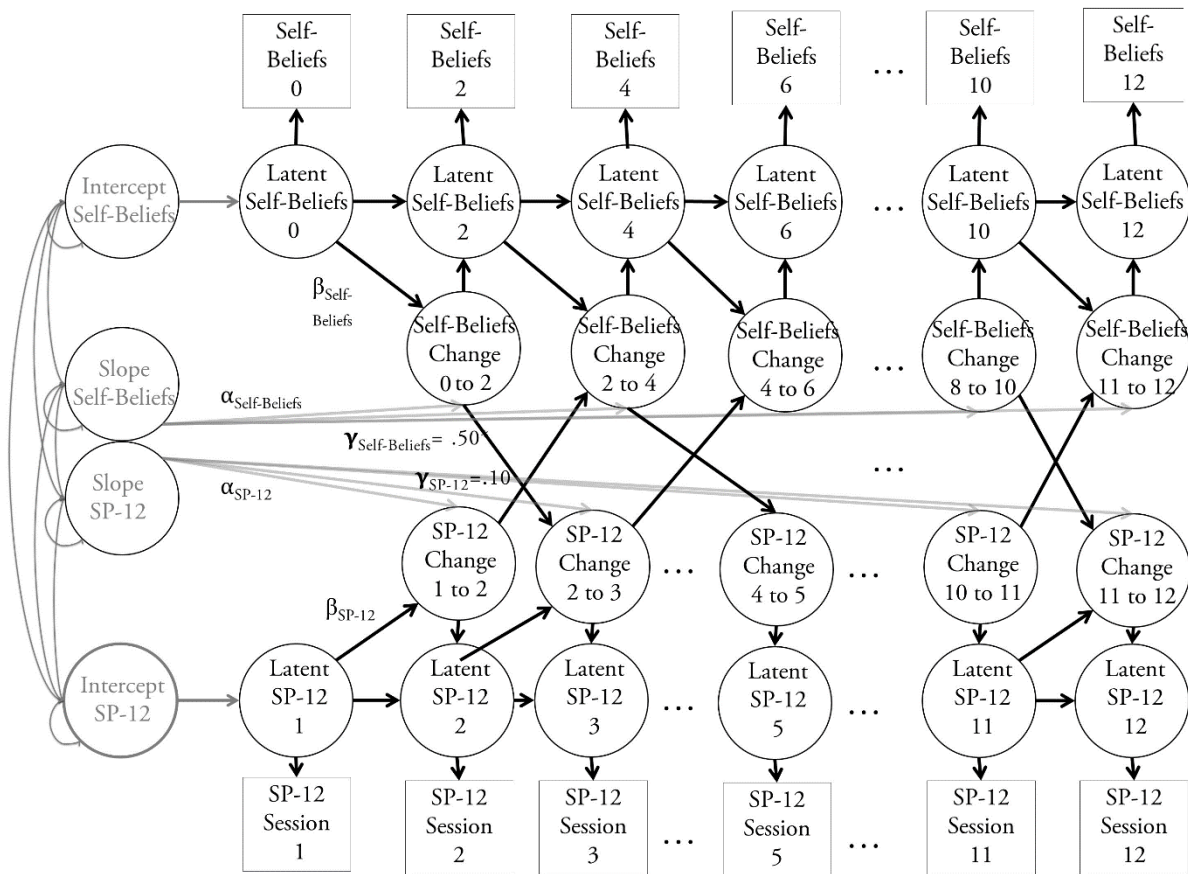
Akaike Information Criteria; BIC = Bayesian Information Criteria; SSBIC = Sample Size

Adjusted Bayesian Information Criteria; df = degrees of freedom; SP-12 = Social Phobia-12;

SBSA = Self-Beliefs Related to Social Anxiety.



*Figure 1.* Univariate latent growth curve modelling for the Social Phobia-12 (SP-12; top) and the Self-Beliefs Related to Social Anxiety (SBSA; bottom). Error terms for the manifest and latent variables are not consistently noted in the Figures to improve readability, but were included in all analyses. Initial refers to the initial pre-treatment (for SBSA) or immediately prior to first session of CBT (for SP-12) level on the variable. Slope refers to the latent growth variable indicating change over time. Factor loadings in each model were set so that linear trajectories were predicted. A = SP-12; B = SBSA. 0 = pre-treatment, 1 = week 1 of CBT treatment, 2 = week 2 of CBT treatment, 3 = week 3 of CBT treatment, and so on.



*Figure 2.* Bivariate latent difference score model of the Social Phobia-12 (SP-12) and Self-Beliefs Related to Social Anxiety (SBSA). Previous change on the SBSA is a significant predictor of later change on the SP-12. However, previous change on the SP-12 is not a significant predictor of later change on the SBSA. *Note.* The role of the latent intercepts and slopes is to describe change in a manner similar to a latent growth curve model (i.e., to take into account the starting point and overall linear change process for each measure separately, as we look at our primary question of how the change processes across variables are predictive of one another). The  $\alpha$  refers to alpha (estimate to model straight-line growth), and the  $\gamma$  refers to gamma (estimate to model change process across time). All 12 SP-12 time points were used in the analyses, but only a subset of the time points are shown here for readability. The estimates are reported as standardised betas. 0 = pre-treatment, 1 = week 1 of CBT treatment, 2 = week 2 of CBT treatment, 3 = week 3 of CBT treatment, and so on.

## **Chapter 6**

### **Explicit and Implicit Anxiety Self-Concept in Cognitive Behavioural Therapy for Social Anxiety Disorder**

From the preceding chapters in the thesis, it is evident that maladaptive self-related beliefs play an important role in the maintenance of social anxiety and in cognitive behavioural therapy (CBT) for social anxiety disorder (SAD). As outlined in the general introduction, however, research is also beginning to accrue suggesting that the implicit self-concept may represent a premorbid vulnerability for psychopathology, including for SAD. To date, no study has examined the role of the implicit anxiety self-concept, as measured using the implicit association test (IAT), and the explicit anxiety self-concept in CBT for SAD using a clinical sample. However, such an examination would help improve understanding of the role of automatic, implicit associations, reflecting the activation of links in memory between ‘self’ and anxious concepts, in SAD and in CBT for the disorder. The following chapter therefore aims to address this gap, and presents a paper entitled ‘Explicit and Implicit Anxiety Self-Concept in Cognitive Behavioural Therapy for Social Anxiety Disorder’.

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*Author contribution:*

Ms. Bree Gregory was responsible for the design of the research, analysis, and write-up of the manuscript. Dr. Lorna Peters provided statistical assistance and research supervision.

## **Explicit and Implicit Anxiety Self-Concept in Cognitive Behavioural Therapy for Social Anxiety Disorder**

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### Abstract

The present study examined the role of the explicit and implicit anxiety self-concept in cognitive-behavioural therapy (CBT) for social anxiety disorder (SAD). Clinical participants were 71 individuals with SAD who completed the implicit association test (IAT) and explicit measures of social anxiety and depression at pre- and post-treatment, and at six-month follow-up. Control participants were 24 and 33 undergraduate students with and without a SAD diagnosis who were not undergoing treatment and completed the IAT on two occasions, 12 weeks apart. For control participants, students with a SAD diagnosis showed more self-anxiety bias than students without a diagnosis. IAT scores did not change over time for either control group. For clinical participants, implicit self-anxiety associations and scores on explicit measures reduced from pre-to post-treatment. The relative strength of implicit self-anxiety associations continued to decrease from post-to six-month follow-up, while gains on explicit measures were maintained. No relationship was found between change in the implicit and explicit anxiety self-concept, while controlling for change in depression; however, depression scores at pre-treatment predicted subsequent change in social anxiety from pre- to post-treatment, and social anxiety scores at post-treatment predicted subsequent change in depression from post- to six-month follow-up. Theoretical and clinical implications are discussed.

*Keywords:* social anxiety disorder; cognitive behavioural therapy; implicit association test; anxiety self-concept; depression

## Explicit and Implicit Anxiety Self-Concept in Cognitive Behavioural Therapy for Social Anxiety Disorder

Cognitive models of social anxiety underscore the importance of dysfunctional, schema-driven, information processing in the development and maintenance of social anxiety disorder (SAD; for a review, see Alden & Regambal, 2010; Gregory, Peters, & Rapee, 2016). Several cognitive biases have been identified in social anxiety, including biases in interpretation, attention, and memory. These contribute to negative and dysfunctional thoughts and beliefs regarding the self and dysfunctional behaviour in social settings (for a review, see Steinman, Gorlin, & Teachman, 2014). To date, the majority of research investigating self-schemas relating to the anxious self-concept (i.e., associating the self with an anxious disposition) in social anxiety have predominantly relied on explicit, self-report measures. For example, the Social Interaction Anxiety Scale (SIAS; Mattick & Clarke, 1998) asks respondents to rate how characteristic a statement embodying social interaction anxiety is of them. However, there remains a need to differentiate between these types of explicit beliefs and more automatic, implicit associations that reflect the activation of links in memory between ‘self’ and anxious concepts (Beevers, 2005). The present study therefore examined the role of implicit self-anxiety associations, as an indicator of schematic processing, and the explicit anxiety self-concept in cognitive-behavioural therapy (CBT) for SAD.

Implicit self-anxiety associations have commonly been assessed in the literature using the implicit association test (IAT; Greenwald, McGhee, & Schwartz, 1998)<sup>1</sup>. The IAT measures the strength of associations between concepts by comparing response times in two combined discrimination tasks (Greenwald et al., 1998). In the IAT-Anxiety, the task of classifying items (e.g., me or they) into self and other categories is combined with categorising anxiety-related versus calm-related words (e.g., nervous or relaxed; Egloff &

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<sup>1</sup> Some researchers have questioned the validity of the IAT, however, particularly the assumption that implicit measures reflect unconscious, or introspectively inaccessible mental representations (For an overview, see Fazio & Olson, 2003).



Schmukle, 2002). The assumption underlying the IAT is that if two concepts are highly associated, categorisation should be easier when the two associated categories share the same response key (e.g., for an anxious individual the concepts ‘self’ with ‘anxiety’ and ‘others’ with ‘calm’) than when they require different responses (e.g., the concepts ‘self’ with ‘calm’ and ‘others’ with ‘anxiety’). In this way, IAT evaluations are said to reflect interconnected associations in memory and share similar qualities ascribed to self-schemas (Segal, 1988).

Several studies have now used the IAT to study implicit associations in clinical (Glashouwer, Vroling, de Jong, Lange, & de Keijser, 2013; Ritter, Ertel, Beil, Steffens, & Stangier, 2013) and highly socially anxious (de Jong, 2002; Tanner, Stopa, & De Houwer, 2006) samples; however, most of these studies have relied on the self-esteem variant of the IAT<sup>2</sup> (e.g., Ritter, Leichsenring, Strauss, & Stangier, 2013). Despite general support for the role of automatic self-anxiety associations in anxiety (Egloff & Schmukle, 2002; Glashouwer & de Jong, 2010; Glashouwer, de Jong, & Penninx, 2011), only one published study has examined whether stronger automatic self-anxiety associations are more evident in socially anxious than in non-anxious individuals, and assessed implicit self-anxiety associations in a treatment context for social anxiety (Gamer, Schmukle, Luka-Krausgrill, & Egloff, 2008). Using a socially anxious student sample, Gamer et al. (2008) found that individuals with social anxiety were faster than non-anxious controls in attributing self-related concepts to anxiety-related words, suggesting enhanced automatic self-anxiety associations. The authors also found that while IAT scores and an explicit measure of social anxiety remained relatively stable over time for control participants, individuals with social anxiety reported improvements in these measures following a four week CBT protocol. Similar findings have been reportedly obtained in an unpublished manuscript (Dickes, Schmukle, Luka-Krausgrill,

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<sup>2</sup> The IAT-anxiety was chosen for this study as it is an implicit measure of the self-concept of anxiety, rather than a personality trait measure of self-esteem and the self-concept; although, we note that the literature would benefit from studies assessing change in both the IAT-anxiety and the IAT-self-esteem over treatment for social anxiety disorder.

& Egloff, 2004). These findings indicate that the IAT may contribute an important source of information for the evaluation of the implicit anxiety self-concept in psychotherapy.

Importantly, there is some indication that the implicit and explicit anxiety self-concept may play important but independent roles in therapy. Information processing models emphasising the importance of distinguishing between deliberate (i.e., explicit) and more automatically activated (i.e., implicit) cognitions argue that these types of cognitive processing may have different functional qualities (Gawronski & Bodenhausen, 2006). Explicit cognitions are assumed to reflect the outcome of weighing propositions and their corresponding ‘truth’ values (i.e., validation processes), whereas automatic associations are assumed to follow from direct activation of simple associations in memory, independent of their truth value (Glashouwer & de Jong, 2010). Thus, while explicit cognitions have been found to predict more deliberate, controlled behaviours, automatic associations have been found to play an important role in guiding relatively spontaneous, uncontrolled behaviours (e.g., Egloff & Schmukle, 2002; Huijding & de Jong, 2006). These types of behaviour are also critically involved in psychotherapy where patients report symptoms being uncontrollable or unpredictable (Glashouwer & de Jong, 2010). Gamer et al. (2008) found partial support for independent roles of the implicit and explicit anxiety self-concept in a short course of CBT for socially anxious individuals; however, to date no study has examined the relationship between these types of cognitions in a full course of CBT for SAD.

The present study therefore sought to replicate and extend the findings by Gamer et al. (2008) by including an implicit measure of the anxious self-concept (i.e., the IAT) and explicit measures of the anxious self-concept (i.e., the SIAS and the Social Phobia Scale [SPS]; Mattick & Clarke, 1998) prior to and following a full 12-week course of CBT for clinical patients with SAD. As the IAT has also been related to explicit measures of depression symptom severity (e.g., Glashouwer & de Jong, 2010), we also included a measure of the explicit depression self-concept (i.e., the 7-item depression subscale of the Depression

Anxiety Stress Scales [DASS-D]; Lovibond & Lovibond, 1995) and sought to examine the relationship between the implicit and explicit anxiety self-concept and the explicit depression self-concept from pre- to post-treatment, and from post-treatment to six-month follow-up. Data was also collected from 24 university students who received a primary diagnosis of SAD following a diagnostic interview and from 33 university students who were classified as being diagnosis free. This additional data was collected to assess whether individuals with a diagnosis of SAD are relatively faster to respond to implicit self-anxiety associations (i.e., more anxiety bias) than those without the diagnosis, and to examine whether IAT scores for participants not undergoing treatment change with time (assessed on two assessment occasions, 12 weeks apart)<sup>3</sup>.

For the control samples, we predicted that students with a diagnosis of SAD would exhibit more self-anxiety bias than those without the diagnosis, and that IAT scores would not reduce over the assessment period for either group. For the clinical sample, we expected reductions in the strength of implicit self-anxiety associations from pre- to post-treatment, and an analogue change for the explicit anxiety self-concept, as measured by the SIAS and the SPS, and the explicit depression self-concept, as measured by DASS-D, over this period. We also expected all gains to be maintained from post- to six-month follow-up. Given information processing models suggesting that explicit and implicit cognitions may have different functional qualities (see Gawronski & Bodenhausen, 2006), we predicted that the implicit and explicit anxiety self-concept may play important but independent roles in treatment for SAD, while controlling for change in depression symptoms. As social anxiety and depression frequently co-occur (Ohayon & Schatzberg, 2010) and findings indicate that self-reported symptoms of anxiety and depression are highly predictive of one another in

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<sup>3</sup> Control and clinical conditions were not compared for the following reasons: one, control participants with SAD were not a treatment seeking sample randomly allocated to a waitlist control condition; two, control and clinical samples varied significantly across demographic variables; and three, there was a considerable difference in sample sizes.

treatment (Persons, Roberts, & Zalecki, 2003; however see Moscovitch, Hofmann, Suvak, & In-Albon, 2005), we also expected that the explicit anxiety and depression self-concept would interact from pre- to post-treatment and from post- to six-month follow-up, while controlling for change in all variables previously specified in the model (i.e., depression, anxiety, and IAT scores).

### Method

Clinical participants were 71 (39 female) adults<sup>4,5</sup> who took part in a manualised treatment trial for SAD. Inclusion into the trial required a primary diagnosis of SAD assigned following the Anxiety Disorders Interview Schedule–IV (ADIS–IV; Di Nardo, Brown, & Barlow, 1994). Exclusion criteria included having active suicidal ideation, unmanaged substance abuse or dependence, co-morbid psychosis, or a recent change (within a three-month period) in medication type or dosage. Control participants were 24 (23 female) undergraduate students who had a primary diagnosis of SAD assigned following the ADIS–IV (Di Nardo et al., 1994) and 33 (22 female) undergraduate students who were diagnosis free following the diagnostic interview. Control groups were not currently undergoing treatment at the time or during assessment occasions, and received course credit for their participation. Baseline demographic and symptom characteristics for the samples are presented in Table 1. Clinical participants had significantly higher IAT, social anxiety, and depression scores than non-anxious controls, but did not differ from control participants with a SAD diagnosis. An identical pattern emerged when testing for differences between additional comorbid conditions. Regarding demographics, clinical participants were more likely to be older, hold a bachelor degree, and be male than participants in control conditions, while anxious controls were less likely to be employed than clinical participants or non-anxious controls.

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<sup>4</sup> These participants were part of an ongoing randomised control trial (RCT) for the treatment of SAD at the EHC, all of whom received 12 weeks CBT. Participants in the present study represent 38% of the participants included in the RCT.

<sup>5</sup> 80% of these clinical participants were also included in the study reported in the previous chapter.

[INSERT TABLE 1 HERE]

*Social Interaction Anxiety Scale (SIAS) and the Social Phobia Scale (SPS; Mattick & Clarke, 1998).* The SIAS and SPS are companion questionnaires designed to measure two types of commonly feared social situations: those involving general social interactions with others (assessed using the SIAS), and those involving public scrutiny (assessed using the SPS). Both scales consist of 20 items rated on a 5-point Likert-type scale (0 = *not at all characteristic or true of me* to 4 = *extremely characteristic or true of me*). Total scores range from 0 to 80, with higher scores indicating greater symptom severity. Scores on the SIAS and SPS have been shown to possess desirable psychometric properties with a high level of internal consistency ( $\alpha = .88$  to  $.94$ ), high test–retest reliability ( $r > .91$ ; Mattick & Clarke, 1998; Osman, Gutierrez, Barrios, Kopper, & Chiros, 1998), and adequate discriminant and construct validity (Mattick & Clarke, 1998; Peters, 2000). For the present study, internal consistency was found to be .82 and .90 for the SIAS and SPS, respectively.

*Depression Anxiety Stress Scales (DASS; Lovibond & Lovibond, 1995).* The DASS is a 21-item questionnaire designed to measure symptoms of dysphoric mood, symptoms of physiological arousal and fear, and symptoms of tension and negative appraisals of stressful events. Items are rated on a 4-point Likert-type scale (0 = *did not apply to me at all* to 3 = *applied to me very much, or most of the time*). Each of the scales have been found to exhibit good psychometric properties (Antony, Bieling, Cox, Enns, & Swinson, 1998). For the purposes of the present study, only the 7-item depression subscale (DASS-D; items 3, 5, 10, 13, 16, 17, and 21) was used. Consistent with the scoring instructions for the DASS, scores were multiplied by two and ranged from 0 to 42, with higher scores indicating greater depression symptom severity. The DASS-D has been found to correlate with the Beck Depression Inventory ( $r = .70$ ; Lovibond & Lovibond, 1995). In the present study, internal consistency for the DASS-D was .90.

*Implicit Association Test (IAT; Greenwald, 1998)*. The IAT was administered on personal computers with the program Inquisit (Draine, 2001). The IAT has been shown to demonstrate adequate reliabilities, be independent of social desirability, and be predictive of behavioural indicators of anxiety even when self-report measures are controlled for (Egloff & Schmukle, 2002; Egloff, Schwerdtfeger, & Schmukle, 2005; Nosek, Greenwald, & Banaki, 2005; however, see Fiedler, Messner, & Bluemke, 2010). Target category labels consisted of ‘me’ (*me, my, own, I, self*) and ‘other’ (*they, your, them, you, others*), while attribute category labels consisted of ‘anxiety’ (*anxious, nervous, afraid, embarrassed, criticised*) and ‘calm’ (*relaxed, balanced, at ease, calm, restful*). Table 2 describes the task sequence of the IAT, consisting of seven blocks, some of which were practise blocks to acquaint participants with the stimulus material and categorisation task. Blocks were counterbalanced across participants to control for order effects. The split-half reliability of the IAT was high, with Spearman-Brown adjusted correlation between test halves of .80 (pre-test), .84 (post-test), and .85 (follow-up).

Participants were informed that they would be required to make a series of category judgments. Category labels were displayed on the left and right sides of the computer window. On each trial, a stimulus word was displayed in the centre of the computer screen (e.g., *nervous*) that had to be classified into the respective category (or categories). The stimulus word remained on the screen until a categorisation was made. Participants used the letters “E” and “I” response keys to indicate their answers. They were further instructed, “*Please try to be as accurate though also as quick as possible. If your selection is incorrect, you will see a red ‘X’.* To continue to the next judgment, you must make the correct selection.” Participants were told to keep their index fingers on the “E” and “I” keys throughout the experiment to facilitate fast responding. An inter-trial interval of 150 ms was used.

[INSERT TABLE 2 HERE]

## Treatment

Clinical participants received CBT delivered in small groups (6–8 participants) over 12 weekly two and a half hour sessions. Primary therapists were clinical psychologists or graduate clinical psychology students with specific expertise in the treatment of SAD. In most cases a graduate psychology student acted as a co-therapist. Treatment was guided by a manual for the therapists and was supported by printed materials and handouts for participants. All therapists received weekly clinical supervision across the whole treatment protocol.

Details about the group treatment manual have been reported previously (see Rapee, Gaston, & Abbott, 2009). Session 1 covered basic psycho-education followed by Session 2, which introduced attentional retraining toward the task at hand. Sessions 3 and 4 included identifying and modifying maladaptive cognitive patterns through hypothesis testing and evidence gathering. Sessions 5 and 6 introduced and encouraged ongoing behavioural experiments and in vivo exposure through exposure hierarchies. Sessions 7 and 8 focused on reduction of safety behaviours and subtle avoidance, as well as realistic appraisal and feedback of social performance. Session 9 provided an opportunity to practise integrating previously introduced skills through in vivo exposure. Sessions 10 and 11 included the examination and refutation of underlying core beliefs. Session 12 involved relapse prevention and revision.

## Procedure

Procedures received approval from the Macquarie University Human Research and Ethics Committee and all participants gave informed consent. For clinical participants, treatment began within the following few weeks upon completion of the diagnostic interview. Self-report questionnaires and the IAT were completed at pre-treatment, post-treatment, and at six-month follow-up. Control participants completed questionnaires and the IAT at their first research session following the diagnostic interview, and again 12 weeks later.

## Analyses

*Data reduction.* IAT scores were computed according to the algorithm (D-measure) proposed by Greenwald, Nosek, and Banaji (2003). This algorithm reduces sensitivity to prior IAT experience and is useful in pre-post designs. All trials from the combined tasks were included (see Table 1). No participant data had to be eliminated due to unusually fast or slow reaction times (> 10% of trials have latency either below 300 ms or above 10,000 ms). The IAT score was calculated by subtracting mean reaction times of block 6 from block 3 and block 7 from block 4. Difference scores were then divided by their pooled standard deviation based on all responses in blocks 3, 4, 6, and 7. Consistent with Gamer et al. (2008), positive IAT values reflect relatively faster response times for automatic self-anxiety associations (i.e., more self-anxiety bias).

*Statistical analyses.* To examine whether anxious and non-anxious control participants differed in their implicit anxiety self-concept at Session One, and whether there was a significant change in the strength of self-anxiety associations from Session One to Session Two, a 2x2 mixed ANOVA with one between subject variable (condition: non-anxious, socially anxious) and one within subjects variable (time: session one, session two) was conducted using SPSS version 21. To examine whether the implicit and explicit anxiety self-concept and the explicit depression self-concept changed from pre-to post-treatment and from post- to six-month follow-up for clinical participants, multilevel modelling (MLM) with maximum likelihood estimation was then used with the program HLM 7.01 (Raudenbush, Bryk, & Congdon, 2013). MLM is an extension of the general linear model and facilitates analysis of hierarchically structured data by directly modelling clustering as level-specific orthogonal components (e.g., between- and within-persons). MLM analyses can also accommodate missing data by using all available data points to fit growth trajectories for each participant under the assumption that data are missing at random (Schafer & Graham, 2002). Results from Little's MCAR Test (Little & Rubin, 1989) confirmed that missing data points



were missing completely at random ( $\chi^2 = 387.48$ ,  $df = 746$ ,  $p = 1.000$ , *n.s.*). For the current study, time was nested within individuals who were also nested within groups throughout treatment. Intra-class correlation coefficients (ICCs) demonstrated that there was little effect of group variance on variable scores (i.e., all ICCs < 0.05).<sup>6</sup> Thus, 2-level unconditional linear growth models (i.e., only Time entered as a level 1 predictor; e.g., pre-treatment 0, post-treatment 1) were used.

Finally, to examine the predictive relationship between IAT, social anxiety, and depression scores from pre- to post-treatment and from post-treatment to six-month follow-up for clinical participants, we used a three-wave cross-lagged path analysis using the program MPlus (version 7; Muthén & Muthén, 2012). Cross-lagged regression coefficients examine how much variance in a variable at time 1 (e.g., pre-treatment) predicts change in another variable between times 1 and 2 (e.g., pre- to post-treatment), after controlling for all variables previously specified in the model. Consistent with Aderka, McLean, Huppert, Davidson, and Foa (2013), the model also controlled for synchronous correlations (e.g., correlations between different variables at the same time) and stability correlations (e.g., correlations between the same variable measured at different times). Model fit was assessed using the chi-squared statistic ( $\chi^2$ ), the comparative fit index (CFI), and the root mean square error of approximation (RSMEA). Models are said to fit the data well when the  $\chi^2$  is non-significant, the CFI exceeds .90 (Bentler, 1990), and the RSMEA is below .06 (Kline, 1998).

## Results

### Control Participants

A full factorial Time (session one, session two) by Condition (non-anxious, anxious) between subjects analysis of variance was conducted on IAT scores. Consistent with our hypotheses, a significant main effect for Condition was found,  $F(1, 100) = 14.86$ ,  $p < .001$ ,

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<sup>6</sup> The RCT also randomly allocated participants to receive two different types of three weekly and individual preparatory sessions prior to group CBT, however no significant random component was attributable to this allocation in the models.

$partial \eta^2 = 0.13$ . Specifically, undergraduate students with a SAD diagnosis ( $M = -0.13$ ,  $SE = 0.06$ ) responded relatively faster to implicit self-anxiety associations than undergraduate students without a SAD diagnosis<sup>7</sup> ( $M = -0.42$ ,  $SE = 0.05$ ). The main effect for Time,  $F(1, 100) = 0.03$ ,  $p = .858$ ,  $partial \eta^2 = 0.00$ , and the interaction term,  $F(1, 100) = 2.65$ ,  $p = .107$ ,  $partial \eta^2 = 0.03$ , were not significant. Session one IAT scores were  $-0.47$  ( $SD = 0.42$ ) and  $-0.06$  ( $SD = 0.38$ ) for non-anxious and anxious participants, respectively, while session two scores were  $-0.36$  ( $SD = 0.38$ ) and  $-0.19$  ( $SD = 0.33$ ) for non-anxious and anxious participants.

### Clinical Participants

*Preliminary Analyses.* Pre-treatment means, standard deviations, and bivariate correlations for the measures of interest are shown in Table 3. All correlations were significant and in the expected direction, except for IAT values. Specifically, IAT scores were not found to be significantly related to social anxiety as measured by the SPS at pre-treatment, however they were positively related to social anxiety as measured by the SIAS.

[INSERT TABLE 3 HERE]

*Unconditional Linear Growth Models:* As shown in Table 4 and consistent with our hypotheses, implicit self-anxiety associations and explicit measures of social anxiety and depression significantly decreased from pre- to post-treatment. These were moderate to large effects. Also consistent with our predictions, explicit measures of social anxiety and depression did not change from post- to six-month follow-up (i.e., gains over treatment were maintained at follow-up), however implicit self-anxiety associations continued to reduce over the follow-up period.

[INSERT TABLE 4 HERE]

*Path Analysis.* We estimated a model with all synchronous effects, stability effects, and cross-lagged effects (see Figure 1). As the SPS was not related to IAT scores at pre-

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<sup>7</sup> Despite this between-group comparison, we note that neither group exhibited a self-anxiety bias in the way one might expect (although, see de Jong, 2002; Tanner, Stopa, & De Houwer, 2006).

treatment, we used the SIAS as an indicator of the explicit anxiety self-concept. The model exhibited good fit with the data ( $\chi^2 = 15.25$ ,  $df = 9$ ,  $p = 0.08$ ; CFI = 0.96; RSMEA = 0.04). Regarding cross-lagged coefficients, depression scores at pre-treatment significantly predicted change in social anxiety from pre- to post-treatment ( $\beta = 0.47$ ,  $SE = 0.17$ ,  $p = .005$ ), social anxiety at post-treatment significantly predicted change in depression scores from post-treatment to six-month follow-up ( $\beta = 0.44$ ,  $SE = 0.17$ ,  $p = .008$ ), and IAT scores at post-treatment significantly predicted change in depression scores between post-treatment and six-month follow-up ( $\beta = -0.33$ ,  $SE = 0.13$ ,  $p = .014$ ). Thus, as expected, no predictive relationship was found between implicit anxiety associations and the explicit anxiety self-concept across time, however there appeared to be an interactive relationship between change in depression and social anxiety scores over the assessment period. These analyses controlled for all synchronous and stability coefficients in the model (see Figure 1 for these coefficient estimates).

[INSERT FIGURE 1 HERE]

### Discussion

The overall aim of the present study was to examine the role of the implicit anxiety self-concept as an indicator of schematic processing, and the explicit anxiety self-concept in CBT for SAD. The empirical findings can be summarised as follows. For control participants: first, students with a diagnosis of SAD showed more self-anxiety bias when assessed at baseline than students without a diagnosis; and second, IAT scores did not significantly change over time for either the anxious or non-anxious control group. For clinical participants: first, more positive IAT values, reflecting relatively faster response times for implicit self-anxiety associations, were weakly associated with greater endorsement on explicit measures of social anxiety and depression at pre-treatment; second, reductions in the relative strength of implicit self-anxiety associations and explicit measures were observed from pre- to post-treatment; third, while gains were maintained for explicit measures, implicit

self-anxiety associations continued to decrease from post- to six-month follow-up; and finally, there was no evidence of a predictive relationship between change on the implicit and explicit anxiety self-concept; however, there was a predictive relationship between the explicit anxiety and depression self-concept. Altogether, these findings suggest that the IAT may contribute an important source of information for the evaluation of the implicit anxiety self-concept in psychotherapy, and indicate that implicit self-anxiety associations may be sensitive to treatment intervention.

The finding that the IAT differentiated between students with and without a SAD diagnosis supports the construct validity of the measure and is consistent with previous empirical research. For example, Gamer et al. (2008) similarly found that individuals with social anxiety were faster than non-anxious controls in attributing self-related concepts to anxiety-related words, suggesting enhanced automatic self-anxiety associations. Comparable findings have also been observed in the panic disorder (Teachman, Marker, & Smith-Janik, 2008), depression (Glashouwer & de Jong, 2010; Jabben et al., 2014), and chronic pain (Grumm, Erbe, von Collani, & Nestler, 2008) literature. That scores on the IAT did not appear to change over time for either control group also supports the stability of the measure, and may give more weight to findings obtained with clinical participants, particularly in relation to inferring treatment related effects. As a result, we may be more confident that the reduction in self-anxiety associations observed from pre- to post-treatment for clinical participants was due to the treatment itself rather than the passage of time or repeated assessment; however, we cannot definitively rule out other potential explanations like regression to the mean. Interestingly, while clinical and control samples were not statistically compared due to sample characteristics, post-treatment IAT scores for clinical participants ( $M = -0.41$ ,  $SD = 0.37$ ) are similar to baseline values for non-anxious controls ( $M = -0.47$ ,  $SD = 0.42$ ). This may suggest that automatic self-anxiety associations become more aligned with non-socially anxious individuals upon the conclusion of CBT.

Of course, it is important to note that replication of present findings with the inclusion of a randomised, waitlisted control sample is needed before definitive conclusions regarding treatment-related effects can be made, particularly as some authors suggest that there may be different practice effects for clinical vs. non-clinical control groups (see Grumm et al., 2008). This may be particularly important given mixed findings in the literature regarding reductions in implicit associations over treatment. Despite a small but growing body of evidence suggesting that certain implicit associations can be altered following treatment, which the current findings add to (e.g., self and pain associations in chronic pain; Grumm et al., 2008; self with panic associations in panic disorder; Teachman et al., 2008), this is not a consistent finding. Huijding and de Jong (2009), for example, did not find reductions in implicit anxiety associations following exposure therapy for spider phobia beyond changes seemingly caused by practice effects. Their study used a treatment protocol that lasted one session, however, which may have impacted results. In the present study, it is possible that the 12-week treatment duration allowed more opportunity for consolidation of the new associative learning from treatment, resulting in a more substantive effect on the implicit anxiety self-concept (Teachman, Cody, & Clerkin, 2010). This explanation, in addition to the inclusion of more formal cognitive work in the treatment protocol, may also help explain why further reductions in self-anxiety associations were observed when assessed at six-month follow-up.

The present study also found no evidence of a predictive relationship between change on the implicit and explicit anxiety self-concept from pre- to post-CBT for SAD and from post-treatment to six-month follow-up for clinical participants. This finding appears to both conflict (Teachman et al., 2008) and align (Boschen, Parker, & Neumann, 2007; Gamer et al., 2008; Teachman & Woody, 2003) with previous research, and may be indicative of two independent models of functioning (e.g., Wilson, Lindsey, & Schooler, 2000): an implicit self-concept of anxiety (assessed via the IAT) and an explicit self-concept of anxiety (assessed via self-report measures). This proposition is consistent with information processing

models that emphasise the importance of distinguishing between deliberate (i.e., explicit) and more automatically activated (i.e., implicit) cognitions (Gawronski & Bodenhausen, 2006). These models argue that these types of cognitive processing may have different functional qualities (Gawronski & Bodenhausen, 2006), with explicit cognitions predicting more deliberate, controlled behaviours, and automatic associations having a more important role in guiding relatively spontaneous, uncontrolled behaviours (e.g., Egloff & Schmukle, 2002; Huijding & de Jong, 2006). From this perspective, it may be possible that change in explicit cognitions related to an anxious self-concept has relatively little influence over the deactivation of associations between ‘self’ and ‘anxious’ attributes in memory, or vice versa.

Finally, while there was no evidence of a relationship between the implicit and explicit anxiety self-concept, there was evidence of an interdependent relationship between the explicit anxiety and depressive self-concepts. Specifically, depression scores at pre-treatment predicted subsequent change in social anxiety from pre- to post-treatment, and social anxiety scores at post-treatment predicted subsequent change in depression from post- to six-month follow-up, controlling for all variables previously specified in the model. This finding may not be surprising given that social anxiety and depression frequently co-occur (Ohayon & Schatzberg, 2010) and previous research has found that self-reported symptoms of anxiety and depression are highly predictive of one another in treatment (Persons et al., 2003; however see Moscovitch et al., 2005). However, relatively few studies have examined the relationship between symptom changes in social anxiety and depression over treatment and at follow-up. It may be that CBT taps shared elements of affective and cognitive distress in anxiety and depression, leading to reciprocal changes in the explicit social anxiety and depression self-concepts.

Despite potential implications of present findings, results should be interpreted with the following limitations in mind. First, as already discussed, the absence of a randomised, waitlist control condition prevents *definitive* conclusions regarding treatment-related effects;

however, the finding that IAT scores of undergraduate students with a SAD diagnosis did not change over a 12-week period in the absence of treatment may permit tentative inferences around treatment effects. Second, while the clinical sample size in the present study is relatively large compared to those used in previous research (e.g.,  $n = 24$ ; Gamer et al., 2008), the current sample limits the possibility of using more sophisticated and complex analyses (e.g., a latent variable structural equation modelling framework) that would enable the inference of causality. Third, the assessment periods (pre-, post-, and six-month follow-up) may not be the optimal time to detect predictive relationships between variables, which may account for different findings in the literature. For example, Teachman et al. (2008) assessed implicit self-panic associations every two weeks of a CBT protocol and found that change in implicit self-panic associations predicted subsequent change on explicit measures of panic (see also Moscovitch, et al. 2005). Fourth, the relative nature of the IAT may obscure the exact nature of the attitudes under study. The IAT can only be used to assess relative attitudes for bipolar target concepts (e.g., self vs. other), so results of the current IAT cannot speak to whether IAT effects are specifically due to self-associations or to other-associations. Finally, although the explicit measures of social anxiety and depression ask participants to rate how anxious or depressive statements are characteristic of themselves (e.g., "...I become tense" in the SIAS; Mattick & Clarke, 1988), these may not be the optimal measures to assess the explicit social anxiety or depression self-concept. Future research is therefore needed that includes a randomised, waitlisted control sample, has a larger sample size, includes within-session measures, and individually examines and explores how self vs. other associations drive change in IAT scores and its relationship with the explicit anxiety self-concept in a treatment context, perhaps using a single-category IAT (e.g., Glashouwer et al., 2013).

This is the first study to examine the implicit (using the IAT) and explicit anxiety self-concept in CBT using a clinical sample with SAD (Gregory & Peters, 2017). Present findings add to the body of literature assessing the utility of implicit self-anxiety associations in a

treatment context for SAD, and with research assessing IAT and psychopathology more broadly. While more research is needed before definitive conclusions can be derived, present findings indicate that implicit self-anxiety associations may be sensitive to treatment intervention. These findings also suggest that the implicit and explicit anxiety self-concepts may function independently in CBT for SAD, providing a potential pathway for future research examining the nature and impact of implicit and explicit treatment intervention.



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Table 1.

*Comparison of baseline demographic characteristics of clinical (n = 71) vs. anxious (n = 24) and non-anxious (n = 33) control participants*

	Clinical	Anxious	Non-anxious
Mean Age (SD)**	33.38 (10.46)	20.13 (6.67)	21.79 (6.04)
Mean SIAS (SD)*	54.78 (11.92)	53.63 (15.69)	20.90 (15.06)
Mean DASS-D (SD)*	18.57 (10.30)	12.45 (9.74)	6.69 (6.67)
IAT*	-0.08 (0.54)	-0.06 (0.38)	-0.47 (0.42)
Female**	29 (41%)	20 (83%)	25 (75%)
Country of origin – Australia	50 (70%)	21 (88%)	21 (64%)
Bachelor degree or higher**	39 (55%)	2 (8%)	5 (15%)
Employed (full or part-time)***	40 (57%)	9 (38%)	20 (61%)
Generalised SAD subtype <sup>a</sup> *	69 (97%)	24 (100%)	0 (0%)
Comorbid mood diagnosis*	20 (28%)	6 (25%)	0 (0%)
Comorbid anxiety diagnosis*	30 (42%)	10 (42%)	0 (0%)
APD*	36 (51%)	12 (50%)	0 (%)

*Note.* \* Significant difference at  $p < .05$  between participants with a SAD diagnosis and non-anxious controls; \*\* Significant difference at  $p < .05$  between clinical and non-clinical participants; \*\*\* Significant difference at  $p < .05$  between anxious controls and the other conditions; SIAS = Social Interaction and Anxiety Scale; DASS-D = Depression Anxiety Stress Scales – Depression subscale; IAT = Implicit Association Test; APD = Avoidant personality disorder, assessed using the avoidant personality disorder section of the Personality Disorder Examination (Loranger, Janca, & Sartorius, 1997); <sup>a</sup> This classification was given if the participant reported fear ratings of 4 or above for the majority of social situations listed in the Social Phobia module of the ADIS-IV (Di Nardo et al, 1994).



Table 2.

*Arrangement of the different IAT blocks*

Block	Task	Left Label(s)	Right Label(s)	No. of Trials
1 Practise	Target discrimination	anxiety	calm	20
2. Practise	Attribute discrimination	me	other	20
3. Practise	Initial combined task	me/anxiety	other/calm	20
<b>4. Test</b>	Initial combined task	<b>me/anxiety</b>	<b>other/calm</b>	<b>40</b>
5. Practise	Reverse target discrimination	other	me	40
6. Practise	Reversed combined task	other/anxiety	me/calm	20
<b>7. Test</b>	Reversed combined task	<b>other/anxiety</b>	<b>me/calm</b>	<b>40</b>

*Note.* Nosek, Greenwald, and Banaji (2005) recommend increasing the number of trials in the fifth block as an effective means to reduce compatibility-order. Therefore, the IAT in the present study presented 40 trials instead of 20 in this block, in which participants practise the reverse target discrimination task.

Table 3.

*Pre-treatment means, standard deviations, and correlations for clinical participants (n = 71)*

	SIAS	SPS	DASS-D	IAT
SIAS	-	-	-	-
SPS	.48**	-	-	-
DASS-D	.54**	.38**	-	-
IAT	.28*	.12	.30*	-
Pre- Mean (SD)	54.78 (11.92)	34.30 (15.22)	18.57 (10.30)	-.08 (.54)
Post- Mean (SD)	38.13 (14.78)	19.17 (14.02)	11.19 (9.98)	-.41 (.37)
Follow-up Mean (SD)	37.84 (14.94)	18.97 (14.16)	12.25 (10.54)	-.67 (.33)

*Note.* For non-anxious controls, session 1 correlations were: -.21 (IAT-SIAS), -.25 (IAT-DASSD), and .14 (SIAS-DASSD). For anxious controls: -.14 (IAT-SIAS), -.06 (IAT-DASSD), and .70\*\* (SIAS-DASSD). SIAS = Social Anxiety Interaction Scale; SPS = Social Phobia Scale; DASS-D = depression Anxiety Stress Scales – Depression subscale; IAT = Implicit Association Test; positive IAT values reflect relatively faster response times for anxiety-self automatic associations (i.e., more anxiety bias); Pre- Mean = pre-treatment mean for the respective variable; Post- Mean = post-treatment mean for the respective variable; Follow-up Mean = six-month follow-up mean for the respective variable.

\*p < .05    \*\*p < .01

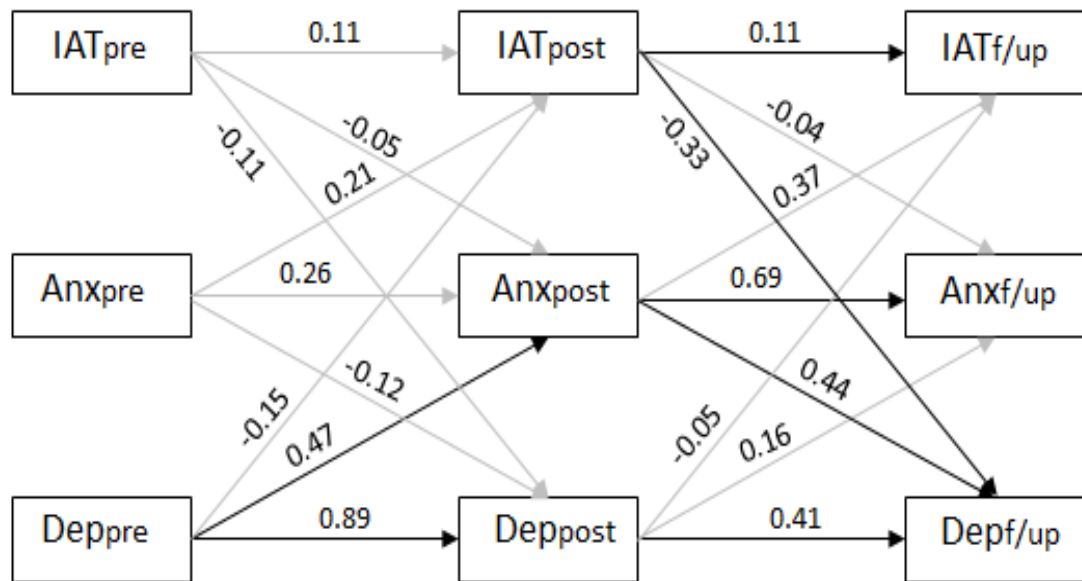
Table 4.

*Change from pre- (n = 71) to post-treatment (n = 69), and post- to follow-up (n = 37).*

	Pre/Post Treatment			Post/Follow-up		
	Mean initial	Mean linear	<i>d</i>	Mean initial	Mean linear	<i>d</i>
	status (SE)	change (SE)		status (SE)	change (SE)	
SIAS	54.85*** (1.43)	-15.95*** (1.70)	1.29	38.35*** (2.67)	-0.34 (1.70)	0.02
SPS	34.49*** (1.81)	-14.87*** (1.36)	1.03	20.22*** (2.46)	-1.41 (1.43)	0.03
DASS-D	18.64*** (1.23)	-7.300*** (1.12)	0.73	10.63*** (2.06)	0.47 (1.37)	-0.10
IAT	-0.07 (0.06)	-0.35*** (0.08)	-0.72	-0.41** (0.04)	-0.24*** (0.05)	-0.74

*Note.* Negative growth rates indicate decreases in the variable over time. *d* = Cohen's *d* effect size, based on pooled standard deviations; DASS-D = Depression Anxiety Stress Scales – Depression subscale; IAT = Implicit Association Test; Positive IAT values reflect relatively faster response times for anxiety-self automatic associations (i.e., more anxiety bias); SE = standard error; SIAS = Social Anxiety Interaction Scale; SPS = Social Phobia Scale;

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$



*Figure 1.* Full path analysis. Note: numbers represent regression weights ( $\beta$ ). Black lines pertain to statistically significant parameters. Synchronous effects (i.e., correlations between subscales at a given time point) are not included in the diagram to improve readability. Correlations at pre-treatment are 0.28, **0.55**, and 0.38 (or IAT-social anxiety, social anxiety-depression, and IAT-depression respectively). Correlations at post-treatment are **0.46**, 0.30, and 0.03 (for IAT-social anxiety, social anxiety-depression, and IAT-depression respectively). Correlations at six-month follow-up are 0.15, **0.53**, and 0.17 (or IAT-social anxiety, social anxiety-depression, and IAT-depression respectively). Bolded synchronous correlations indicate statistically significant regression weights.



## **Chapter 7**

### **Self-Concept Clarity and Self-Attribute Ratings in the Treatment of Social Anxiety Disorder**

So far in this thesis, the empirical papers have been consistent with previous literature in preferentially examining the role of self-related content variables in SAD treatment. While the preceding chapters are novel in their contribution to the topic, the systematic review presented in Chapter Three outlined the need for research examining whether structural components of the self change in CBT for SAD, and how this change may relate to treatment outcome. The following chapter presents the first known study to address these questions. Of the few studies that have examined the role of self-structure in social anxiety more generally, most have provided converging evidence for reduced clarity or certainty about the self in maintaining social anxiety. Thus, the following paper examines whether the self-concept clarity of individuals with SAD improves following CBT for SAD, and whether change in this construct is associated with social anxiety reduction. Previous research also suggests that structural change may facilitate change in self-concept content. Thus, the following paper also examines whether change in self-structure, as measured by self-concept clarity, is associated with change in the content of the self, as measured by positive and negative self-attribute ratings. The following paper is a revised and resubmitted version sent to Behavior Therapy, and is entitled ‘Self-Concept Clarity and Self-Attribute Ratings in the Treatment of Social Anxiety Disorder’.

*This chapter has been submitted for publication to Behavior Therapy.*

*This is the revised version of the manuscript that has been re-submitted at the editor's request.*

*Author contribution:*

Ms. Bree Gregory was responsible for the design of the research, analysis, and write-up of the manuscript. Dr. Lorna Peters provided statistical assistance and research supervision. Dr. Quincy Wong provided statistical assistance.

**Self-Concept Clarity and Self-Attribute Ratings in the Treatment of Social Anxiety  
Disorder**

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### Abstract

The present study examined whether the structure of the self-concept, as measured by self-concept clarity, changes from pre- to post- cognitive-behavioural therapy (CBT) for social anxiety disorder (SAD), and whether change in self-structure is associated with social anxiety reduction. We also examined whether change in self-structure is related to change in the content of the self, as measured by positive and negative self-attribute ratings, and vice versa. Participants included 143 adults with SAD undergoing group CBT. Results indicated that social anxiety and negative ratings of self-attributes significantly decreased from pre- to post-treatment, while self-concept clarity and positive ratings of self-attributes significantly increased. Change in these variables were significantly associated with social anxiety reduction, and the increase in self-concept clarity was significantly related to change in self-attribute ratings (and vice versa). However, change in self-concept clarity was found to be more strongly related to social anxiety symptom change as well as self-attribute change, compared to change in self-attribute ratings. Indeed, change in self-concept clarity was the only variable uniquely associated with social anxiety symptom reduction. These findings were evident even after controlling for depression symptomology. Results have implications for improving our understanding of potential mechanisms underlying change in CBT for SAD.

*Keywords:* social anxiety disorder; cognitive behavioural therapy; self-structure; self-content; self-concept clarity

## Self-Concept Clarity and Self-Attribute Ratings in the Treatment of Social Anxiety Disorder

Social anxiety disorder (SAD; previously known as social phobia) is one of the most common psychiatric conditions, affecting around 7.4% of the population in the United States (Kessler, Petukhova, Sampson, Zaslavsky, & Wittchen, 2012) and 8.4% in Australia (Crome & Baillie, 2015). SAD has a relatively early onset and a chronic course, and can result in substantial psychosocial and socioeconomic costs (Ruscio et al., 2008). Difficulties stemming from the disorder are often compounded by a high degree of comorbidity with other mental disorders, such as depression and alcohol abuse (for a review, see Szafranski, Talkovsky, Farris, & Norton, 2014). While strong support for the efficacy of cognitive-behavioural therapy (CBT) for the treatment of SAD has been provided (e.g., Mayo-Wilson et al., 2014), a large proportion of patients remain symptomatic following treatment intervention (e.g., 59%; Rapee, Gaston, & Abbott, 2009). More research is therefore needed to examine potential mechanisms underlying CBT for SAD and identify how treatment gains may be improved among partial responders.

Prominent cognitive models of SAD emphasise the importance of negative self-perception in the aetiology and maintenance of the disorder (Clark & Wells, 1995; Heimberg, Brozovich, & Rapee, 2010; Hofmann, 2007; Moscovitch, 2009; for reviews, see Gregory, Peters, & Rapee, 2016; Wong & Rapee, 2016). Related empirical research has supported this proposition. For example, studies have demonstrated that individuals with social anxiety believe that their self-attributes and social performance abilities do not meet audience expectations (e.g., Moscovitch & Hofmann, 2007), and tend to perceive themselves as being fundamentally flawed or deficient (e.g., Calvete, Orue, & Hankin, 2015; Gonzalez-Diez, Calvete, Riskind, & Orue, 2015; Hope, Burns, Hayes, Herbert, & Warner, 2010; Rapee & Abbott, 2006; Rapee & Lim, 1992; Stopa & Clark, 1993). When under social threat, these individuals also shift their attention inward and engage in detailed self-monitoring (see Bögels & Mansell, 2004, for a review), during which they can experience spontaneous and

excessively negative self-images from an observer-perspective (for a review, see Ng, Abbott, & Hunt, 2014).

Treatments that specifically address these factors, alongside other maintaining factors, have been shown to produce stronger effects than more traditional cognitive behavioural programs (Clark et al., 2006; Rapee et al., 2009). Moreover, reductions in dysfunctional self-beliefs (e.g., Boden et al., 2012; Koerner, Antony, Young, & McCabe, 2013; Rapee et al., 2009; Wong et al., 2017), and negative self-related thoughts (e.g., Borgeat et al., 2009; Hofmann & DiBartolo, 2000; Newman, Hofmann, Trabert, Roth, & Taylor, 1994) have been shown from pre- to post- CBT treatment. Reductions in self-focused attention (e.g., Hedman et al., 2013; Hofmann, Moscovitch, Kim, & Taylor, 2004; Laposa & Rector, 2014; Rapee et al., 2009) and maladaptive self-evaluation (e.g., Abbott & Rapee, 2004; Cox, Walker, Enns, & Karpinski, 2002; Gaudiano & Herbert, 2003; Laposa & Rector, 2014; Taylor & Alden, 2008) following CBT has also been well documented. Importantly, reductions in these variables have been shown to predict (e.g., Koerner et al., 2013; Niles et al., 2014) and mediate (Boden et al., 2012; Hedman et al. 2013; Mörtberg et al., 2015) social anxiety symptom relief (see Gregory & Peters, 2017).

Much of the aforementioned literature tends to view SAD from an information processing framework (e.g., Clark & Wells, 1995). In doing so, the self in social anxiety is often conceptualised in terms of faulty beliefs and self-schemas (Stopa, 2009a). Stopa (2009b) argues that this conceptualisation provides clinicians with a useful way of discussing the self with patients, and directs treatment towards correcting dysfunctional beliefs and thought patterns (e.g., Rapee et al., 2009). However, conceptualisation of the self in this way is limited in that it fails to adequately address the full complexities of the construct (Stopa, 2009a). As a consequence, most of the research to date has tended to focus on the content of self-views (information about the self and the way this information is represented; e.g., thoughts and beliefs related to the self and self-images) and some process variables (how attention is

allocated to self-relevant information and the strategies that are used to evaluate and monitor information about the self; e.g., self-focused attention), rather than on the way information about the self is structured (how information about the self is organised, which can determine what aspects of self-knowledge are accessed at any given time; e.g., complexity of self-aspects). This is despite the notion that self-representations depend on both the content and structure of self-knowledge (Showers, Limke, & Zeigler-Hill, 2004), and that the outcome of therapy may depend on making competing positive self-representations more accessible (Brewin, 2006).

Of the few studies that have examined the role of self-structure in social anxiety, most have provided converging evidence for the role of reduced clarity or certainty about the self in maintaining social anxiety. Self-concept clarity describes the structural integration (also known as structural unity) of the self-concept, and refers to whether one's self-concept is clearly defined, internally consistent, and temporally stable (Campbell et al., 1996). Conceived as a relatively stable person characteristic, self-concept clarity can be considered empirically assessable by self-report measures. Indeed, the most commonly used method to assess self-concept clarity is the Self Concept Clarity Scale (SCC; Campbell et al., 1996), which has been shown to be positively correlated with self-esteem, positive affect, and extraversion, and negatively correlated with depression, anxiety, and neuroticism (e.g., Campbell et al., 1996; Campbell, Assanand, & Di Paula, 2003). To date, studies have shown that individuals high in social anxiety exhibit lower self-concept clarity than individuals low in social anxiety (Stopa, Brown, Luke, & Hirsch, 2010). These low scores in self-concept clarity have been shown to uniquely predict social anxiety, even after controlling for depression and self-esteem (Stopa et al., 2010). Individuals with social anxiety have also been found to lack the tendency to attribute more certainty and importance to positive self-judgements when compared with controls (Moscovitch, Orr, Rowa, Reimer, & Antony, 2009), and to display reduced subjective confidence and longer reaction times when rating

self-descriptiveness of personality characteristics using a computerised measure of self-consistency and confidence in self-related judgments (Wilson & Rapee, 2006).

This relationship between uncertain or inconsistent self-concepts and social anxiety has also been implied by several theorists. For example, Arkin (1987) suggested that individuals with social anxiety are typified by chronic self-doubt, while Clark and Wells (1995) argue that these individuals possess ‘unstable self-schemata’ characterised by the emergence of negative self-views in socially threatening situations (see also Alden, Mellings, & Ryder, 2001; however see Moscovitch, 2009). Furthermore, Campbell (1990) proposed that individuals who are low in self-concept clarity “should be more dependent on, susceptible to, and influenced by external self-relevant stimuli” (p. 539). This may be one potential explanation for why the self-worth of individuals with social anxiety is more greatly impacted following negative perceptions about social performance than either non-socially-anxious or non-anxious control individuals (Gilboa-Schechtman, Franklin, & Foa, 2000). For socially anxious individuals, the reduced clarity about the self may enable the confirmation of negative self-views as well as the concomitant difficulty in having confidence in positive aspects of the self (Stopa et al., 2010). Taken together, both the empirical and theoretical literature suggest that the emphasis placed on the content of the self in social anxiety should also be supported by the examination of how reduced clarity in the self might maintain anxiety for individuals with SAD.

One area in need of examination is whether current treatment for SAD may improve self-concept clarity, and whether change in the construct is associated with reductions in social anxiety symptoms (see Gregory & Peters, 2017). In discussing the potential for self-structure change in psychological treatment, Showers et al. (2004) suggest that structural features of the self may be at least as amenable to change as specific content, and that structural change may facilitate change in the content of self-concepts. The authors also argue that treatment may already be implicitly addressing the structure of the self, as well as self-

content, by enabling the construction of healthier thoughts and beliefs about the self. This is most likely achieved using techniques such as video feedback (Harvey, Clark, Ehlers, & Rapee, 2000), thought challenging and exposure, and imagery rescripting (Holms, Arntz, & Smucker, 2008). To our knowledge, however, no study has examined the role of self-concept clarity in the context of SAD treatment (see Gregory & Peters, 2017).

The present study therefore sought to examine whether the structure of the self-concept, specifically self-concept clarity, changes from pre- to post-treatment for individuals with SAD, and whether change in self-structure is associated with social anxiety reduction. Given the notion that structural change may facilitate change in self-concept content (Showers et al., 2004), we also sought to examine whether change in self-structure could be associated with change in the content of the self as measured by positive and negative self-attribute ratings. We expected that from pre-to post-treatment self-concept clarity and positive ratings of self-attributes would increase, while social anxiety symptom severity and negative ratings of self-attributes would decrease. We also expected that pre- to post-treatment change in self-concept clarity and positive and negative ratings of self-attributes would be associated with social anxiety reduction. Finally, we expected that change in self-concept clarity would be associated with change in ratings of positive and negative self-attributes (i.e., self-content). As self-concept clarity has also been found to be negatively associated with depression symptomology (e.g., Stopa et al., 2010), depression was included as a covariate in these analyses.

## Method

Participants were 143<sup>1,2</sup> (71 female) adults who took part in a manualised treatment trial for SAD at the Centre for Emotional Health Clinic (CEH), Macquarie University,

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<sup>1</sup> These participants were part of an ongoing randomised control trial (RCT) for the treatment of SAD at the CEH, all of whom received 12 weeks CBT. Participants in the present study represent 76.5% of the participants included in the RCT.

<sup>2</sup> Around 50% of the sample was not previously used in either Chapter Five or Six of the thesis.

Sydney, Australia. Inclusion into the trial required a primary diagnosis of SAD assigned following the Anxiety Disorders Interview Schedule–IV (ADIS–IV; Di Nardo, Brown, & Barlow, 1994) and a Clinician Severity Rating of 4 or above (i.e., there was at least moderate impairment caused by social anxiety). Previous research has indicated strong reliability for diagnosis of SAD and clinical severity ratings using these methods in our clinic ( $k = 0.86$ ,  $ICC = 0.85$ ; Rapee et al., 2009). Participants were excluded if they had active suicidal ideation, unmanaged substance abuse or dependence, co-morbid psychosis, or a recent change (within a three-month period) in medication type or dosage. Participants had an average age of 32.29 years ( $SD = 9.97$ , range = 18–70 years), and most met criteria for the generalised subtype of SAD (97.9%). Around 39.0% met criteria for an additional anxiety disorder and 30.1% met criteria for a mood disorder. Around 51.0% met criteria for avoidant personality disorder, assessed using the avoidant personality disorder section of the Personality Disorder Examination (Loranger, Janca, & Sartorius, 1997). Further demographic information revealed that 51.7% held a bachelor degree or higher, 38.5% were employed full-time (14.7% were unemployed and 23.8% were students), 69.9% were never married, and 66.4% were born in Australia.

## Measures

*Social Interaction Anxiety Scale (SIAS) and the Social Phobia Scale (SPS*; Mattick & Clarke, 1998). The SIAS and SPS are companion questionnaires designed to measure two types of commonly feared social situations: those involving general social interactions with others (assessed using the SIAS), and those involving public scrutiny (assessed using the SPS). Both scales consist of 20 items rated on a 5-point Likert-type scale (0 = *not at all characteristic or true of me* to 4 = *extremely characteristic or true of me*). Total scores range from 0 to 80, with higher scores indicating greater symptom severity. Scores on the SIAS and SPS have been shown to possess desirable psychometric properties with a high level of internal consistency ( $\alpha = .88$  to  $.94$ ), high test–retest reliability ( $r > .91$ ; Mattick & Clarke,

1998; Osman, Gutierrez, Barrios, Kopper, & Chiros, 1998), and adequate discriminant and construct validity (Mattick & Clarke, 1998; Peters, 2000). For the present study, internal consistency was found to be .87 and .93 for the SIAS and SPS, respectively.

*Self-Concept Clarity* (SCC; Campbell et al., 1996). The SCC is a 12-item questionnaire designed to measure the extent to which an individual's self-concept is clearly defined and stable; capturing how certain the individual is of their self-concept (e.g., “*My beliefs about myself seem to change very frequently*”, “*If I were asked to describe my personality, my description might end up being different from one day to another day*”). Individuals rate each item on a 5-point Likert-type scale (1 = *strongly disagree* to 5 = *strongly agree*). After accounting for reverse scored items, total scores range from 0 to 30, with higher scores indicating greater self-concept clarity. Campbell et al. (1996) report excellent internal consistency, test–retest reliabilities, and construct validity coefficients. In the present study, internal consistency for the SCC was .79<sup>3</sup>.

*Self-Rating of Personality Attributes* (Wilson & Rapee, 2006, Study 2). Participants rated how they would personally describe themselves on each of 56 personality attributes on a 7-point Likert-type scale (0 = *much less than average* to 6 = *much more than average*). The attributes consisted of 28 negative characteristics (NATT; e.g., *boring, weak, ignorant, insignificant*) and 28 positive characteristics (PATT; e.g., *attractive, competent, humorous, intelligent*). These characteristics were selected by Wilson and Rapee (2006) to cover a range of potential facets of the self-concept (for instance, physical, intellectual and social aspects of the self; e.g., see Marsh, 1986), and to exclude characteristics describing individuals' trait levels of anxiety (e.g., *nervous, shy, calm*) in order to examine beliefs about the self rather than those regarding dispositional anxiousness. Items were summed, and total scores for each

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<sup>3</sup> Without reversed scored items internal consistency for the SCC was .84. No differences in patterns of significance was demonstrated across analyses when hypotheses were retested without inclusion of reverse scored items. To be consistent with previous research using the full scale, results including reversed scores items are therefore presented throughout the paper.



of the positive and negative self-attribute ratings range from 0 to 168, with higher scores indicating greater endorsement in corresponding self-attribute characteristics. In the present study, internal consistency for the positive and negative attributes items was .94 and .92, respectively.

*Depression Anxiety Stress Scales* (DASS; Lovibond & Lovibond, 1995). The DASS is a 21-item questionnaire designed to measure symptoms of dysphoric mood, symptoms of physiological arousal and fear, and symptoms of tension and negative appraisals of stressful events. Items are rated on a 4-point Likert-type scale (0 = *did not apply to me at all* to 3 = *applied to me very much, or most of the time*). Each of the scales has been found to have good psychometric properties (Antony, Bieling, Cox, Enns, & Swinson, 1998). For the purposes of the present study, only the 7-item depression subscale (DASS-D; items 3, 5, 10, 13, 16, 17, and 21) was used. Consistent with the scoring instructions for the DASS, scores were multiplied by two and ranged from 0 to 42, with higher scores indicating greater depression symptom severity. The DASS-D has been found to correlate with the Beck Depression Inventory ( $r = .70$ ; Lovibond & Lovibond, 1995). In the present study, internal consistency for the DASS-D was .92.

## Treatment

Participants received CBT delivered in small groups (6-8 participants) over 12 weekly two and a half hour sessions. Primary therapists were clinical psychologists or graduate clinical psychology students with specific expertise in the treatment of SAD. In most cases a graduate psychology student acted as a co-therapist. Treatment was guided by a manual for the therapists and was supported by printed materials and handouts for participants. All therapists received weekly clinical supervision across the whole treatment protocol.

Details about the group treatment manual have been reported previously (see Rapee et al., 2009). Session 1 covered basic psycho-education followed by Session 2, which introduced attentional retraining toward the task at hand. Sessions 3 and 4 included identifying and

modifying maladaptive cognitive patterns through hypothesis testing and evidence gathering. Sessions 5 and 6 introduced and encouraged ongoing behavioural experiments and in vivo exposure through exposure hierarchies. Sessions 7 and 8 focused on reduction of safety behaviours and subtle avoidance, as well as realistic appraisal and feedback of social performance. Session 9 provided an opportunity to practise integrating previously introduced skills through in vivo exposure. Sessions 10 and 11 included the examination and refutation of underlying core beliefs. Session 12 involved relapse prevention and revision.

### Procedure

The procedures received approval from the Macquarie University Human Research Ethics Committee and all participants gave informed consent. Participants who met the inclusion criteria following the diagnostic interview completed the self-report assessment battery at both pre- and post- CBT treatment.

### Analyses

Multilevel modelling (MLM) with maximum likelihood estimation was conducted using the program HLM 7.01 (Raudenbush, Bryk, & Congdon, 2013). MLM is an extension of the general linear model and facilitates analysis of hierarchically structured data by directly modelling clustering as level-specific orthogonal components (e.g., between- and within-persons). This approach allows for lower-level parameters (e.g., intercept and slope coefficients) to vary across higher-level units (e.g., individuals), and yields unbiased standard errors (avoiding Type I errors). MLM analyses can also accommodate missing data by using all available data points to fit growth trajectories for each participant under the assumption that data are missing at random (see Schafer & Graham, 2002). Analyses were conducted to examine this missing data assumption.

For the current study, time was nested within individuals who were also nested within groups throughout treatment. Analyses were first conducted to examine the cluster effects attributable to the group and individual levels in the multilevel models. To assess this,

intraclass correlation coefficients (ICCs) were calculated using random intercept models. It was demonstrated that there was little effect of group variance on variable scores (i.e., all ICCs < 0.07), indicating that variability in these scores due to the nesting of individuals within groups could be considered negligible (implying ICCs close to 0)<sup>4</sup>. However, ICCs assessing the effect of individual variance on variable scores were more considerable (i.e., ICCs ranged from 0.23 to 0.75). Thus, 2-level models (time nested within individuals) were retained for all analyses. To determine whether inclusion of random slopes were necessary, deviance statistics (-2 Restricted Log Likelihood [-2RLL]<sup>5</sup>) were used comparing unconditional linear growth models that included a random intercept and random slope at the subject level to the random intercept only model. Inclusion of random slopes did not result in better model fit for the models, except for SCC (-2RLL  $\chi^2$  (1) = 2.24,  $p$  < .001), SIAS (-2RLL  $\chi^2$  (1) = 1.52,  $p$  < .001), and PATT (-2RLL  $\chi^2$  (1) = 1.07,  $p$  < .001). Results for these variables are therefore presented using two level mixed models that included a random intercept and random slope.

Model testing proceeded first with the examination of separate unconditional linear growth models (i.e., only Time entered as a level 1 predictor<sup>6</sup>, with pre-treatment coded as 0 and post-treatment coded as 1) for the variables of interest. Given the pre- to post-treatment design of the study, non-linear trajectories were not able to be examined. These unconditional linear growth models estimated whether social anxiety, depression, self-concept clarity, and positive and negative self-attribute ratings significantly changed from pre- to post-treatment. Effect sizes for this change were calculated based on pooled standard deviations (Cohen's  $d$ )

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<sup>4</sup> The RCT also randomly allocated participants to receive two different types of three weekly and individual preparatory sessions prior to group CBT. Results indicated that there was no significant random component attributable to this allocation in the models, and thus only the nested effect of individuals remained controlled for. For these analyses, please contact the corresponding author.

<sup>5</sup> As only random components of the models were being compared, -2 Restricted Log Likelihood was utilised.

<sup>6</sup> Given the pre-to post-treatment design of the study, we use the term 'predictor' here and throughout the paper to denote statistical prediction rather than the type of predictor analysis that establishes temporal precedence.

and reported in Table 2. Examination of unconditional models was followed by examination of conditional linear growth models. Here, we used conditional growth models to: (a) examine whether change in self-related variables was independently associated with social anxiety symptom change from pre- to post-treatment, as measured by both the SIAS and the SPS, (b) examine the relative importance of self-related predictors by entering all variables into collective models to statistically predict treatment outcome, and (c) separately model statistical change predictors of self-structure and self-content change.

In these models, all variables were entered as level 1 predictors (i.e., as time-varying covariates), including the Time variable and depression covariate. In all unconditional and conditional models in the present study, continuous variables that were used as predictors were mean-centred. Only participants who attended at least three sessions of the treatment program were included in the current analyses (i.e., 82% of the total treatment trial sample).

## Results

### Preliminary Analyses

In terms of missing data, the total data set included 46,217 data points with 2,698 (5.50%) containing missing data. Results from Little's MCAR Test (Little & Rubin, 1989) revealed these missing data points were missing completely at random ( $\chi^2=159.831$ ,  $df=364$ ,  $p=1.000$ , *n.s.*). All variables had skew and kurtosis values within normal limits (i.e., all absolute skew values  $< 3$  and absolute kurtosis values  $< 8$ ; Kline, 2011). Three univariate outliers were detected (z-scores  $> 3.29$ ; 1 pre-treatment SIAS score, 1 post-treatment PATT score, 1 post-treatment NATT score). These extreme values were winsorised (replaced with values equivalent to 3.29 standard deviations from the mean of their respective variable). One multivariate outlier was identified as exceeding the Mahalanobis distance critical  $\chi^2$  statistic ( $df=12$ ;  $p<.001$ ; Tabachnick & Fidell, 2001) and was therefore excluded from analysis.

Pre-treatment means, standard deviations, and correlations for the measures of interest are shown in Table 1. All correlations were significant and in the expected direction, except

for positive ratings of self-attributes. Specifically, positive ratings in self-attributes were not found to be significantly related to social anxiety symptoms as measured by the SPS at pre-treatment, though they were related to social anxiety as measured by the SIAS.

[INSERT TABLE 1 HERE]

#### Unconditional Linear Growth Models

Our interest in using unconditional linear growth models centred on the examination of whether social anxiety and the self-structure and self-content variables change from pre- to post-treatment (see Table 2). Consistent with our predictions, social anxiety scores significantly decreased from pre- to post-treatment for both the SIAS and the SPS. Negative ratings of self-attributes also decreased from pre- to post-treatment, while scores on self-concept clarity and positive ratings of self-attributes significantly increased.

[INSERT TABLE 2 HERE]

#### Conditional linear growth models

*Statistical predictors of social anxiety change.* Table 3 shows the conditional models examining whether change in the self-structure and self-content variables was associated with change in social anxiety scores as measured by the SIAS and SPS. Consistent with our prediction, change in self-concept clarity was significantly associated with change in social anxiety for both the SIAS and the SPS, controlling for depression symptoms and the linear effect of time. That is, increases in self-concept clarity from pre- to post-treatment was significantly related to decreases in social anxiety. Change in positive ratings of self-attributes and negative ratings of self-attributes was also significantly associated with change in social anxiety, while controlling for depression and the linear effect of time; however, these effects were for the SIAS only. Specifically, an increase in positive ratings of self-attributes was significantly related to a decrease in social anxiety symptoms from pre- to post-treatment, while a decrease in negative ratings of self-attributes was significantly related to a decrease in social anxiety symptoms. However, only self-concept clarity remained uniquely associated

with change in social anxiety scores, as measured by both the SIAS and SPS, when all respective self-related variables were included in the models (see the last two columns of Table 3).

[INSERT TABLE 3 HERE]

*Statistical predictors of self-structure and self-content change.* Table 4 shows the conditional models examining whether change in the structure of the self-concept was related to change in content of the self-concept, and vice versa. Consistent with our predictions, change in self-structure significantly accounted for unique variance in change in the content of the self, controlling for depression symptoms and the linear effect of time. Specifically, an increase in self-concept clarity from pre- to post-treatment was significantly associated with an increase and decrease in positive and negative self-attribute ratings, respectively. Change in self-content also significantly accounted for unique variance in change in self-structure, while controlling for depression and the linear effect of time. That is, the decrease in negative ratings of self-attributes and increase in positive ratings of self-attributes from pre- to post-treatment were each associated with an increase in self-concept clarity.

[INSERT TABLE 4 HERE]

## Discussion

To date, the majority of the research examining the relationship between self-perception and social anxiety has focused on the content of the self-concept and often ignored structural components of the self (Stopa, 2009a). This is particularly the case in the context of SAD treatment (see Gregory & Peters, 2017). The present study therefore sought to examine whether the structure of the self-concept, as measured by self-concept clarity, changes from pre- to post-CBT for SAD, and whether this change may be related to social anxiety reduction. We also sought to examine whether change in self-structure is related to change in the content of the self, as measured by positive and negative self-attribute ratings, and vice versa. To our knowledge, this is the first study to examine the role of self-concept clarity and

the explicit relationship between self-structure change and self-content change in the context of SAD treatment.

As expected, scores on self-concept clarity increased from pre- to post-CBT for SAD. This is a novel finding. Given that no modifications were made to the CBT protocol to explicitly address change in the clarity of the self (see Rapee et al., 2009), this finding is consistent with the notion that current treatments for SAD may already be implicitly addressing structural features of the self-concept (Showers et al., 2004). Showers et al. (2004) suggest that one potential mechanism enabling self-structure change in psychological treatment is through the construction of healthier thoughts and beliefs about the self. Consistent with this notion, in the present study self-attribute ratings representing beliefs about self-characteristics were found to change from pre- to post-treatment. Specifically, positive self-attribute ratings increased from pre- to post-treatment, while negative self-attribute ratings decreased. These findings are consistent with prior research showing that negative (Boden et al., 2012; Bögels et al., 2014; Koerner et al., 2013; Rapee et al., 2009; Wilson & Rapee, 2005) and positive (Goldin et al., 2013) beliefs about the self are amenable to change from pre- to post-treatment for SAD, and may also be supportive of the retrieval competition account of CBT (Brewin, 2006). This account suggests that CBT changes the preferential access of more positive and functional knowledge about the self by inhibiting access to negative information. Interestingly, however, we found that while change in self-attribute ratings was associated with change in self-concept clarity, this was a small effect, suggesting that changing the beliefs that individuals' hold about themselves may be just one potential mechanism facilitating improvement in self-concept clarity.

Importantly, the increase in self-concept clarity from pre- to post-treatment was associated with a decrease in social anxiety symptomology. To our knowledge this is the first study to demonstrate this effect in the context of CBT for SAD. Notably, this result is independent of the effects of depression levels, as change in depression scores were included

as a covariate in the analysis. Change in positive and negative ratings of self-attributes was also found to be associated with treatment outcome. These findings are consistent with studies demonstrating that decreases in maladaptive self-related beliefs predict (Koerner et al., 2013; Wilson & Rapee, 2005) and mediate (Boden et al., 2012) social anxiety symptom relief in CBT for SAD, and that improvements in positive views of the self mediate (Goldin et al., 2013) social anxiety symptom change. When all self-related variables were entered into models statistically predicting social anxiety outcome, however, only self-concept clarity remained uniquely associated with social anxiety improvement from pre- to post-treatment. This may suggest that self-concept clarity may be a more important determinant of social anxiety symptom change in the context of group CBT for SAD. This proposal is consistent with the argument made by Huflejt-Lukasik, Bak, Styla, and Klajs (2015) that change in self-structure may be more strongly linked to adjustment and mental health than self-content change.

Finally, change in self-concept clarity was also associated with change in self-attribute ratings from pre- to post-treatment. Specifically, an increase in self-concept clarity from pre- to post-treatment was related to a decrease in negative and an increase in positive self-attribute ratings. This finding is consistent with the notion that change in the structure of the self may facilitate change in self-concept content (Showers et al., 2004). Increases in one's consistency or clarity about the self may help facilitate more positive and fewer negative beliefs around self-characteristics, as a high degree of certainty about oneself has been suggested to contribute to a greater sense of control about future outcomes, which in turn could support a more positive and confident view of the self (Baumgardner, 1990). Change in self-attribute ratings was also found to account for unique variance in change in self-concept clarity, however the effect sizes of these relationships were relatively small in comparison. This potentially suggests a greater role for self-structure change in facilitating change in self-



content over treatment. However, the methodological design of the study prevents conclusions regarding temporal precedence to be established.

While these findings are important in their novelty and in improving understanding of potential mechanisms underpinning psychological treatment for SAD, several caveats and future research suggestions should be mentioned. First, the primary limitation of the present study was the absence of a randomised, waitlist control condition, which prevents definitive conclusions regarding whether changes in the investigated constructs are truly mechanisms of group CBT, are a general treatment effect, or even due to the simple passage of time or repeated assessment. However, previous research has demonstrated that individuals with SAD in waitlist control conditions typically do not change on symptom variables (e.g., Clark et al., 2006; Steinert, Stadter, Stark, & Leichsenring, 2016). Moreover, we collected data from 24 undergraduate students<sup>7</sup> diagnosed with SAD following the ADIS-IV (Di Nardo et al., 1994) and found no changes on the measures completed by this sample over a 12-week period. Together, these findings suggest that we may be able to make tentative conclusions about treatment-related effects. Second, while previous research has provided converging evidence for the association between low self-concept clarity and social anxiety (e.g., Stopa et al., 2010; Wilson & Rapee, 2005), indicating that the examination of self-concept clarity in a treatment context was both a necessary and warranted endeavour, self-concept clarity is only one of the variables that tap into the structure of the self-concept. Similarly, self-related attributes, representing beliefs about self-characteristics, are only one component of self-concept content. Future research should therefore aim to examine other self-structure and self-content variables in a treatment context (e.g., differential importance, evaluative self-organisation, self-images, self-esteem), as well as including different measures of self-beliefs

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<sup>7</sup> Given these undergraduate students were not a treatment seeking sample randomly allocated to a waitlist control condition, the differences in demographics between the samples, and the large discrepancy in sample sizes, we did not directly compare clinical and this non-clinical sample across time in current analyses. Please contact the authors for results of these analyses.

(e.g., The Core-Belief Questionnaire; Wong et al., 2017) and self-concept clarity (e.g., computerised measures; Wilson & Rapee, 2006). Finally, while present findings are consistent with previous research suggesting that self-concept clarity is equally likely to be associated with depression and social anxiety<sup>8</sup> (Stopa et al., 2010; Wilson & Rapee, 2006), future research may wish to examine the uniqueness and robustness of these effects while also accounting for broader dimensions of SAD risk (e.g., negative and positive emotionality<sup>9</sup>).

Future research should also aim to include within session treatment measures of self-concept clarity and social anxiety. Doing so would help examine the temporal precedence between the variables, the overall trajectory of change (i.e., potential of non-linear functions), and allow for more direct assessment of mediation effects. Within session measures would also allow for the examination of which components of current CBT treatment protocols may enable change in self-concept clarity for individuals with SAD, and how this change can improve social anxiety over treatment. As suggested previously, Showers et al. (2004) argue that one potential mechanism enabling self-structure change in psychological treatment is through the construction of healthier thoughts and beliefs about the self. A key component of CBT is training clients to restructure their dysfunctional belief patterns. This is typically achieved via the systematic collection and rational disputation of evidence for and against core-beliefs about the self through exposure and cognitive restructuring techniques. However, self-concept clarity may also be improved by facilitating greater congruency between different self-knowledge structures (see Strauman & Higgins, 1987). Research has indicated that social anxiety arises when the individual becomes aware of a significant perceived discrepancy between actual and ought-other self-representations, indicating that they tend to perceive their self attributes to fall short of the characteristics they believe others expect them

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<sup>8</sup> Using a Fisher Z transformation, we found that there was no significant difference between the pre-treatment self-concept clarity and depression correlation and the self-concept clarity and social anxiety correlation ( $p = 0.58$ ).

<sup>9</sup> We thank an anonymous reviewer for this suggestion.

to possess (Strauman, 1989, 1992; Weilage & Hope, 1999; Johns & Peters, 2012). This discrepancy, as well as individuals with low self-concept clarity being more dependent upon and susceptible to external self-relevant stimuli (Campbell, 1990), enhances social anxiety. Thus, treatments that address these factors (e.g., possibly through video feedback, cognitive restructuring, attention re-training, and imagery rescripting) are more likely to produce improvements in the clarity of self and reductions in social anxiety symptoms. Future research could aim to experimentally examine the contribution of these different treatment techniques in addressing low self-concept clarity for individuals with SAD. Other techniques not currently included in CBT protocols such as improving self-acceptance and the ability to shift perspectives may also help facilitate greater consistency or clarity in oneself, and should therefore also be examined. Finally, while most studies have utilised the Self-Concept Clarity Scale (Campbell, 1996) to assess the construct, within social anxiety research others have used computer based tasks (see Wilson & Rapee, 2006). Thus, in the interest of improving our understanding of the psychometric properties of the Self-Concept Clarity Scale (Campbell, 1996), it would be important to evaluate the concurrent validity of these measures<sup>8</sup>.

Notwithstanding the limitations of the present study, this is the first study to examine the role of self-concept clarity and the explicit relationship between self-structure and self-content change in treatment for SAD. Findings converge with theoretical models of SAD suggesting that individuals with social anxiety possess ‘unstable self-schemata’ (Clark & Wells, 1995), and with theories linking self-structure change and psychopathological symptom improvement in treatment (Brewin, 2006; Showers et al., 2004). Overall, findings indicate that self-concept clarity may play an important role in social anxiety symptom change within the context of group CBT for SAD.

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Table 1.

*Pre-treatment means, standard deviations, and correlations for social anxiety and self-related variables*

	1	2	3	4	5	6
1. SIAS						
2. SPS	.62**					
3. DASS-D	.55**	.39**				
4. SCC	-.27**	-.33**	-.28**			
5. PATT	-.21*	-.10	-.28**	.25**		
6. NATT	.37**	.19*	.50**	-.25**	-.47**	
Mean (SD)	54.59 (13.00)	33.29 (16.67)	17.90 (10.86)	13.69 (6.51)	91.88 (21.15)	63.92 (27.68)

*Note.* SIAS = Social Anxiety Interaction Scale; SPS = Social Phobia Scale; DASS-D = Depression Anxiety Stress Scales – Depression subscale; SCC = Self Concept Clarity Scale; PATT = Positive Attributes Scale; NATT = Negative Attributes Scale.

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

Table 2.

*Unconditional models for social anxiety and self-related variables*

	Mean initial status	Mean linear change	<i>d</i>
SIAS	54.31***	-15.03***	-1.20
SPS	32.73***	-13.12***	-1.10
DASS-D	17.75***	-5.83***	-0.71
SCC	13.51***	2.58***	0.38
PATT	92.07***	3.28*	0.20
NATT	63.45***	-5.21**	-0.30

*Note.* Negative growth rates indicate decreases in the variable over time. *d* = Cohen's *d* effect size, based on pooled standard deviations; SIAS = Social Anxiety Interaction Scale; SPS = Social Phobia Scale; DASS-D = Depression Anxiety Stress Scales – Depression subscale; SCC = Self Concept Clarity Scale; PATT = Positive Attributes Scale; NATT = Negative Attributes Scale.

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

Table 3.

*Parameter estimates for the eight Models examining change in SIAS and SPS over treatment*

	SIAS	SPS	SIAS	SPS	SIAS	SPS	SIAS	SPS
Intercept	54.48***	33.31***	54.40***	33.19***	54.37***	33.18***	54.38***	33.20***
Time	-15.18***	-13.46***	-15.18***	-13.47***	-15.21***	-13.49**	-15.16***	-13.46***
DASS-D_C	0.69***	0.59***	0.73***	0.64***	0.67***	0.62***	0.60***	0.55***
SCC_C	-0.41**	-0.32**	-	-	-	-	-0.37**	-0.31*
PATT_C	-	-	-0.09*	-0.06	-	-	-0.04	-0.03
NATT_C	-	-	-	-	0.09**	0.04	0.06	0.02
Variance Explained	0.48	0.47	0.47	0.47	0.48	0.47	0.50	0.47

*Note.* SIAS = Social Anxiety Interaction Scale; SPS = Social Phobia Scale; DASS-D\_C = Depression Anxiety Stress Scales – Depression

subscale centered; SCC\_C = Self Concept Clarity Scale centered; PATT\_C = Positive Attributes Scale centered; NATT\_C = Negative Attributes Scale centered; Variance Explained = the proportion of variance explained in the outcome variable by the addition of level 1 predictors over and above the Intercept.

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$



Table 4.

*Parameter estimates for the four Models examining change in self-structure and self-content over treatment*

	Content		Structure	
	NATT	PATT	SCC	SCC
Intercept	63.64***	92.18***	13.41***	13.42***
Time	-5.32**	3.43**	2.70***	2.68***
DASS-D_C	0.89***	-0.36**	-0.20***	-0.22***
SCC_C	-0.47*	0.43*	-	-
PATT_C	-	-	-	0.05*
NATT_C	-	-	-0.05*	-
Variance Explained	0.14	0.13	0.15	0.16

*Note.* SIAS = DASS-D\_C = Depression Anxiety Stress Scales – Depression subscale centered; SCC\_C = Self Concept Clarity Scale centered; PATT\_C = Positive Attributes Scale centered; NATT\_C = Negative Attributes Scale centered; Variance Explained = the proportion of variance explained in the outcome variable by the addition of level 1 predictors over and above the Intercept.

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

## **Chapter 8**

### **General Discussion**

## **Overview**

Recent meta-analytic evidence suggests that cognitive-behavioural therapy (CBT) is an effective treatment for SAD that compares favourably with other psychological and pharmacological interventions (Mayo-Wilson et al., 2014; Wersebe, Sijbrandij, & Cuijpers, 2013); however, a large percentage of patients retain a diagnosis of SAD following CBT (e.g., 54.7%; Loerinc et al., 2015). More research is therefore needed to uncover change mechanisms that govern anxiety reduction to help optimise CBT outcomes. Given the central role of a negative self in cognitive models of social anxiety (for reviews, see Alden & Regambal, 2010; Gregory, Peters, & Rapee, 2016), this thesis sought to address whether self-related constructs change during and/or following CBT for SAD and how change in these variables relates to symptom amelioration. The overall structure of the thesis took the form of eight chapters, including this final discussion chapter. The first phase of research (Chapters Two and Three) employed a review methodology and synthesised the current state of the theoretical (Chapter Two) and empirical (Chapter Three) literature in this area. Building on the first phase, the second phase of research (Chapters Four to Seven) aimed to empirically address current research gaps in the field. The purpose of this final discussion chapter is to integrate and discuss the findings from each of the two review and four empirical papers presented in the preceding chapters, and provide an overall summary of the theoretical and clinical implications of results, limitations of the current research, and recommendations for future research.

### **The self in social anxiety and CBT for SAD**

The first aim of the current thesis was to review the theoretical literature exploring how self-related constructs are positioned in cognitive models of social anxiety (Beck & Emery, 1985; Clark & Wells, 1995; Hofmann, 2007; Moscovitch, 2009; Rapee & Heimberg, 1997; Stopa, 2009a). This review paper (Chapter Two) was not conceived to be vastly divergent from previous attempts to summarise the theoretical literature linking the self with

social anxiety (e.g., Alden & Regambal, 2010); instead, its purpose was to provide theoretical context for subsequent chapters and to extend prior work with an updated summary of more recently formulated cognitive models and cognitive-behavioural treatments for SAD. The paper first reviewed cognitive models that have been at the forefront of clinical research and clinical practice since their conception, including the influential models of Beck and Emery (1985), Clark and Wells (1995), and Rapee and Heimberg (1997). Focus then shifted to more recent cognitive conceptualisations of social anxiety (e.g., Hofmann, 2007), some of which have placed the self at the centre of the disorder (e.g., Moscovitch, 2009; Stopa, 2009a).

The paper underscored the importance of self-related constructs in cognitive models of social anxiety, particularly in the aetiology and maintenance of the disorder. Although not exhaustive, these self-related constructs included maladaptive thoughts and beliefs about the self, biased self-judgments, negative self-perceptions, self-focused attention, and negative imagery of the perceived self. Most models converged on ideas linking a negative self with social anxiety; however, conceptual differences between the models also emerged. For example, Moscovitch (2009) argues that previous conceptualisations of social anxiety confuse feared stimuli with feared consequences, and instead proposes a typology of core-fears related to the self that includes concerns about social competence, physical appearance, and showing signs of anxiety. Stopa (2009a) contends that previous conceptualisations of SAD often take a limited view of the self into consideration, and argues for a more comprehensive alignment with the social psychology literature that includes an emphasis on structural components of the self. The paper also highlighted the prominence of therapeutic protocols designed to modify maladaptive self-beliefs, self-imagery, and self-focused attention in cognitive-behavioural treatments for SAD, and argued that relatively new approaches (e.g., imagery rescripting) may confer additional benefits in reducing pathological anxiety symptoms.

Building on this first review paper, the second aim of the thesis was to systematically review the empirical literature addressing whether self-related constructs change during

and/or following CBT for SAD, and how this change relates to treatment outcome. Guided by Stopa's (2009a) framework, the systematic review had three main aims: first, to investigate what category of self (i.e., content, process, or structure) has been the most widely investigated regarding changes across treatment; two, to examine whether CBT protocols facilitate changes in self-related constructs; and three, to determine whether changes in self-related constructs in treatment are associated with and/or mediate treatment outcome. In total, 41 studies met the inclusion criteria. Consistent with the empirical and theoretical literature linking the self with social anxiety, change in the content of the self was the most widely examined. This was followed by change in self-related processing; although the majority of this literature focused on change in self-awareness (i.e., self-focused attention). No paper was found investigating how structural components of the self-concept change in response to CBT for SAD. This is despite the influential distinction between self-content and self-structure in the psychopathology literature more broadly (see Chapter One of the thesis; Bhar & Kyrios, 2016) and the theoretical models linking self-structure change with psychopathological improvement in cognitive-based therapies (Brewin, 2006; Showers, Limke, & Zeigler-Hill, 2004).

The review paper did find evidence for pre-to post-treatment improvements in negative self-related thoughts and beliefs, implicit and explicit self-esteem, self-schema, self-focused attention, and self-evaluation. These changes were observed across CBT protocols for many self-related constructs, suggesting that different techniques included within CBT (e.g., cognitive challenging and restructuring, behavioural experiments, task-concentration training, imagery rescripting, and video feedback) may have the propensity to modify constructs related to the self. However, it is worth noting that changes in self-related constructs were also observed following non-CBT treatment protocols (e.g., psychodynamic psychotherapy [e.g., Ritter, Leichenring, Strauss, & Stangier, 2013]; stress management [Rapee, Gaston, & Abbott, 2009], and mindfulness and acceptance based treatment [Desnoyers, Kocovski,

Fleming, & Antony, 2016]), indicating that CBT may share similar points of efficacy with other treatment modalities when seeking to improve maladaptive self-related constructs for individuals with SAD. Importantly, there was some evidence that change in self-related constructs was associated with and/or mediated treatment response; however, relatively few studies examined this.

Overall, the two review papers underscored the importance of maladaptive self-related constructs in the aetiology, maintenance, and treatment of SAD. The empirical papers that followed (Chapters Four to Seven) were based on the future research suggestions and limitations identified in these two preceding review chapters.

### **Self-related constructs in social anxiety and depression**

Empirical research underscores the role of maladaptive self-beliefs, low self-esteem, self-criticism, self-focused attention, social comparison, and an uncertain self-concept, in both social anxiety (e.g., Wong et al., 2017; Norton & Abbott, 2016; Stopa, Brown, Luke, & Hirsch, 2010) and depression (e.g., see Mor & Winkist, 2002; Sowislo & Orth, 2013; Wheeler, 2013). Relatively few studies, however, have simultaneously investigated the unique relationship between these self-related constructs and social anxiety and depression scores, while also controlling for the association between the two conditions. The paper presented in Chapter Four therefore aimed to address this gap and had 522 undergraduate students complete well-validated and reliable self-report measures of maladaptive self-beliefs, self-esteem, self-criticism, self-focused attention, self-concept clarity, social comparison, and social anxiety and depression.

The majority of the findings were consistent with the hypotheses. Analyses revealed that when these constructs were examined independently, self-related constructs not only significantly correlated with social anxiety but also with depression and other self-variables. When modelled simultaneously, however, maladaptive self-beliefs were identified as the strongest unique statistical predictor of social anxiety, while self-esteem was found to be the

strongest unique statistical predictor of depression scores. These findings align with both the tripartite model (Clark, Watson, & Mineka, 1994) and the cognitive content hypothesis (Beck, Steer, & Epstein, 1992) stating that low self-esteem should be more strongly related to depression than to anxiety. Moreover, the finding is consistent with cognitive models of social anxiety underscoring the propensity of maladaptive self-beliefs to be related to excessive levels of social anxiety (Clark & Wells, 1995; Rapee & Heimberg, 1997). Self-concept clarity was also found to be uniquely associated with both social anxiety and depression, while private self-consciousness was only uniquely associated with depression scores.

Interestingly, self-criticism and upward social comparisons were not found to be uniquely associated with higher scores on measures of either social anxiety or depression. These findings appear to be inconsistent with previous studies supporting a relationship between self-criticism and social anxiety (Antony, Rowa, Liss, Swallow, & Swinson, 2006; Mitchell & Schmidt, 2014) and depression (Cantazaro & Wei, 2010; Blatt, D’Afflitti, & Quinlan, 1976), and between upward social comparisons and social anxiety (Cox et al., 2000; Cox, Fleet, & Stein, 2004; Kopala-Sibley et al., 2014) and depression (see Wheeler, 2013). Also inconsistent with prior research, the relationship between public self-consciousness and social anxiety only approached significance. This was a surprising finding given the substantial amount of empirical research linking self-focused attention and social anxiety (for a review, see Norton & Abbott, 2016; however, see Bögels, Rijsemus, & de Jong, 2002; Jakymyn & Harris, 2012). However, the majority of these studies do not take into account the variance shared between different constructs related to the self-concept and therefore do not provide a direct test of unique predictive utility. It is possible, for example, that after controlling for shared variance with maladaptive self-beliefs, the relationship between self-focused attention and social anxiety was dampened, as these types of beliefs typically heighten self-focused attention and subsequent levels of social anxiety (Clark & Wells, 1995). These results may have also been an artefact of using undergraduate, non-clinical participants;

although, the sample reflected relatively high levels of social anxiety severity but only moderate levels of depression.

Taken together, the findings presented in Chapter Four indicated that maladaptive self-related beliefs and self-esteem were particularly related to higher levels of social anxiety and depression, respectively. The findings also implicated the potential role of self-concept clarity, self-esteem, and depression scores in social anxiety, and argued that several of these key self-related constructs may represent transdiagnostic vulnerability factors linking higher social anxiety and depression scores.

### **Maladaptive self-beliefs and social anxiety: Temporal precedence in treatment**

Prominent cognitive-behavioural models of SAD emphasise the importance of maladaptive beliefs relating to the self and others' evaluations in the aetiology and maintenance of the disorder (for reviews of these models, see Alden & Regambal, 2010; Gregory et al., 2016). Related empirical research has supported this proposition (Allen & Page, 2005; Moscovitch et al., 2013; Rapee & Abbott, 2006; Wong et al., 2017; Wong & Moulds, 2009). Given the putative importance of maladaptive beliefs in SAD, there is growing interest in the construct's influence on social anxiety reduction in treatment. Most studies to date, however, have simply examined and shown that CBT significantly reduces dysfunctional self-related beliefs from pre- to post-treatment (see Gregory & Peters, 2017), and have employed a two wave (e.g., pre- vs. post-treatment; post- vs. follow-up) methodological design. Such an approach does not allow for an adequate evaluation of mechanisms of action or therapeutic change in treatment (Kazdin & Nock, 2003). As a result, studies leave open the possibility that reductions in self-beliefs are a consequence of treatment gains (i.e., symptom reduction) rather than a contributor to such gains.

Chapter Four therefore included within session measures of self-beliefs and social anxiety and had the following research aims: first, to assess whether maladaptive self-beliefs and social anxiety reduce over CBT for SAD; and second, to examine the temporal sequence



of change in self-related beliefs and change in social anxiety over the course of the therapeutic protocol. As expected, scores on maladaptive self-beliefs and social anxiety symptom severity reduced over treatment. These findings are in accordance with previous research demonstrating pre- to post-treatment changes in self-related beliefs (Boden et al., 2012; Bögels, Wijts, Oort, & Sallaerts, 2014; Koerner, Antony, Young, & McCabe, 2013; Rapee et al., 2009; Wilson & Rapee, 2005; Wong et al., 2017) and studies demonstrating within-session changes in social anxiety symptoms (e.g., Hedman et al., 2013; Hoffart, Borge, Sexton, & Clark, 2009; Mörtberg, Hoffart, Boecking, & Clark, 2015; Niles et al., 2014). Change in maladaptive self-beliefs was also found to be a leading indicator of later change in social anxiety symptom severity. This finding supports a central tenet of cognitive models of anxiety and CBT: that change in cognitions should precede changes in anxious symptomology (Beck, 1967; Clark & Beck, 1999). Inconsistent with prior research indicating a more circular model of causality (e.g., Gregory, Peters, Abbott, Gaston, & Rapee, 2015; Sowislo & Orth, 2013), however, the reciprocal effect (i.e., social anxiety predicting later self-belief change) was not found to be significant. This null result may have been due to a power issue, so replication of the findings in Chapter Four with a larger sample size is required before more definitive conclusions can be made. Regardless, the findings presented in Chapter Four underscore the importance of maladaptive self-beliefs in the maintenance of social anxiety and in treatment for SAD, and indicated that change in maladaptive self-beliefs in CBT precedes symptom change.

### **Implicit and explicit anxiety self-concept in CBT for SAD**

Cognitive models of social anxiety also underscore the importance of dysfunctional, schema-driven, information processing in the development and maintenance of SAD (for a review, see Gregory et al., 2016). To date, however, research investigating self-schemas relating to the anxious self-concept (i.e., associating the self with an anxious disposition) in social anxiety has predominantly relied on explicit, self-report measures (e.g., the Social

Interaction Anxiety Scale; SIAS; Mattick and Clarke, 1998). However, there remains a need to differentiate between these types of explicit beliefs and more automatic, implicit associations that reflect the activation of links in memory between ‘self’ and anxious concepts (Beevers, 2005). Therefore, the paper presented in Chapter Five used the implicit association test (IAT; Greenwald, McGhee, & Schwartz, 1998) as an indicator of schematic processing, and examined the role of the implicit anxiety self-concept and the explicit anxiety self-concept following CBT for SAD. Data was also collected from undergraduate students with and without a primary diagnosis of SAD on two occasions, 12 weeks apart, to provide additional support for the validity and stability of the IAT measure.

As expected, the study found that students with a SAD diagnosis showed more self-anxiety bias when assessed at baseline than students without a diagnosis, and that IAT scores did not significantly change over time for either the anxious or non-anxious control group. Such findings provide support for the construct validity of the IAT measure, and suggest that we may be able to tentatively infer treatment-related effects. For clinical participants, the study found reductions in the relative strength of implicit self-anxiety associations and on explicit measures of social anxiety and depression from pre- to post-treatment. These findings are consistent with those found in a previous study using a socially anxious student sample (Gamer, Schmukle, Luka-Krausgrill, & Egloff, 2008), and in the panic disorder (Teachman, Marker, & Smith-Janik, 2008), depression (Glashouwer & de Jong, 2010; Jabben et al., 2014), and chronic pain (Grumm, Erbe, von Collani, & Nestler, 2008) literature. These gains were maintained for explicit measures when measured from post- to six-month follow-up, however implicit self-anxiety associations continued to decrease over this follow-up period. The paper also found no predictive relationship between change on the implicit and explicit anxiety self-concept at any assessment point. Again, this finding converges with previous literature (e.g., Boschen, Parker, & Neumann, 2007; Gamer et al., 2008), and may be indicative of two independent models of functioning (e.g., Wilson, Lindsey, & Schooler, 2000): an implicit

self-concept of anxiety (assessed via IATs) and an explicit self-concept of anxiety (assessed via self-report measures). The paper did find evidence, however, of a predictive relationship between change on explicit measures of social anxiety and depression, suggesting that CBT may tap shared elements of affective and cognitive distress in anxiety and depression, leading to reciprocal changes in the explicit social anxiety and depression self-concepts.

Overall, the findings from the paper presented in Chapter Six suggest that implicit self-anxiety associations may be sensitive to treatment intervention, and that the implicit and explicit anxiety self-concept may function independently in treatment. From a clinical perspective, this may indicate that change in explicit cognitions related to an anxious self-concept has relatively little impact on the deactivation of associations between ‘self’ and ‘anxious’ attributes in memory within CBT for SAD. More research is needed, however, before more definitive conclusions can be derived.

### **Self-structure change in CBT for SAD**

Research examining the relationship between the self and social anxiety has tended to focus on the content of the self-concept and often ignored structural components of the self (Stopa, 2009a). This is particularly evident in the context of SAD treatment (Gregory & Peters, 2017). The study presented in Chapter Seven therefore sought to examine whether the structure of the self-concept, as measured by self-concept clarity, changes from pre- to post-CBT for SAD, and whether change is related to social anxiety reduction. The study also sought to examine whether pre- to post-treatment change in self-structure could be associated with pre- to post-treatment change in the content of the self, as measured by positive and negative self-attribute ratings. This latter aim was driven by the proposition that structural change may facilitate change in the content of self-concept (Showers et al., 2004).

All hypotheses were supported. Scores on self-concept clarity increased from pre- to post-CBT for SAD. This was a novel finding. Self-attribute ratings, representing beliefs about self-characteristics, were also found to change from pre- to post-treatment. These findings are

consistent with prior research showing that negative (Boden et al., 2012; Bögels et al., 2014; Koerner et al., 2013; Rapee et al., 2009; Wilson & Rapee, 2005) and positive (Goldin et al., 2013) beliefs about the self are amenable to change from pre- to post-treatment for SAD, and may also be supportive of the retrieval competition account of CBT (Brewin, 2006). This account argues that CBT changes the preferential access of more positive and functional knowledge about the self by inhibiting access to negative information. Importantly, the increase in self-concept clarity from pre- to post-treatment was also found to be associated with a decrease in social anxiety symptomology. Indeed, change in self-concept clarity was found to be the only unique predictor of treatment response when simultaneously modelled with change in positive and negative self-attribute ratings. Such a finding suggests that changing the structure of the self in individuals with SAD may have a potentially important role to play in improving treatment outcome. The study also demonstrated that change in self-structure significantly accounted for unique variance in self-content change, and vice versa (albeit to a lesser extent). Few studies have examined the relationship between self-related constructs across the different categories of self (i.e., content, process, and structure), and this result suggests that this may be an important avenue for future research.

Altogether, the findings from the program of research undertaken in this thesis argue that maladaptive self-related constructs are amenable to change during and following CBT for SAD, and that changing content-related, process, and structural components of the self can be associated with and predict treatment outcomes for individuals with SAD. These findings are consistent with theoretical conceptualisations of social anxiety (see Gregory et al., 2016) and theoretical models of CBT (Beck, 1967; Clark & Beck, 1999). The papers particularly emphasise the importance of maladaptive self-related beliefs in contributing to the maintenance and treatment of SAD, as is evidenced by the findings in both the empirical papers in Chapters Four and Five, and underscore the potential role of an inconsistent self-concept in SAD, as shown in Chapters Four and Seven. Throughout the preceding paragraphs,

a number of important clinical and theoretical implications of the current findings were briefly discussed; however, the following paragraphs will now elaborate on some of these implications in more detail.

### **Implications of the current findings**

**Implications for cognitive models of social anxiety.** A consistent feature across cognitive models of SAD, and models of anxiety more generally, is the central role of a negative self in the emergence and maintenance of the disorder (Clark & Wells, 1995; Heimberg, Brozovich, & Rapee, 2010; Hofmann, 2007; Moscovitch, 2009; Stopa, 2009). For example, all cognitive conceptualisations of SAD are based on the premise that individuals with social anxiety have maladaptive cognitive schemata that activate negative self-beliefs under perceived social scrutiny. These beliefs tend to reflect excessively high standards for social performance (e.g., *'I must be liked by everybody'*), conditional beliefs concerning social evaluation (e.g., *'If I make a mistake, others will reject me'*), and unconditional beliefs about the self (e.g., *'I am boring'*) (Clark & Wells, 1995; Wong & Moulds, 2009, 2011). Individuals with social anxiety are also said to experience excessive self-focused attention in social situations, and hold mental representations of self that are comprised of distorted and negative self-imagery (see Alden & Regambal, 2010; Gregory et al., 2016). In turn, these dysfunctional self-related constructs tend to exacerbate the anxiety experienced before, during, and following social situations (for reviews, see Gregory & Peters, 2017; Ng, Abbott, & Hunt, 2014; Norton & Abbott, 2016).

Empirical support for these propositions linking dysfunctional self-related constructs and social anxiety has been provided (for a review, see Gregory & Peters, 2017) and current findings add to this body of literature. Specifically, the finding that maladaptive self-beliefs were the strongest unique statistical predictor of higher social anxiety scores, accounting for around 40% of the variance in social anxiety, and that change in these beliefs was a leading indicator of social anxiety reduction in CBT for SAD, corroborates the proposition that

dysfunctional self-related cognitions form a central part of what maintains excessive levels of social anxiety (Clark & Wells, 1995; Rapee & Heimberg, 1997). These findings also support a central tenet of cognitive models of anxiety and CBT: that change in cognitions should precede changes in anxious symptomology (Beck, 1967; Clark & Beck, 1999). However, some theoretical models of social anxiety argue for a more circular model of causality. For example, negatively valenced self-beliefs are said to heighten self-focused attention, increase safety behaviour use, dysregulate emotional regulation, and exaggerate emotional reactivity (e.g., fear and anxiety) (Clark, 2001; Spurr & Stopa, 2002), which in turn trigger and increase the frequency of dysfunctional self-related cognitions leading to yet more symptoms (Clark & Wells, 1995). Change in social anxiety symptom severity was not found to be predictive of later self-belief change, however, perhaps calling into question the reciprocal nature of these relationships, at least in a treatment context for SAD.

Current thesis findings also support a number of other theoretical propositions in models of social anxiety. Arkin (1987) suggested that individuals with social anxiety are typified by chronic self-doubt, and Clark and Wells (1995) argue that these individuals possess ‘unstable self-schemata’ characterised by the emergence of negative self-views in socially threatening situations (see also Alden, Mellings, & Ryder, 2001; however see Moscovitch, 2009). While relatively little research exists testing this assumption (although see Stopa et al., 2010; Moscovitch et al., 2009; Wilson & Rapee, 2006), present findings suggest that individuals with social anxiety have self-concepts that are not clearly defined, internally consistent, or temporally stable (i.e., low self-concept clarity; Campbell et al., 1996). Indeed, while controlling for other self-related variables and depression, self-concept clarity remained uniquely and negatively associated with social anxiety scores. Moreover, improvements in self-concept clarity were related to social anxiety reduction in CBT for SAD. Together, these findings implicate the potential importance of self-concept clarity in social anxiety and suggest that future research in this area would be a worthwhile endeavour. Findings also

aligned with the assumption that individuals with SAD hold both implicit and explicit self-schemas relating to the anxious self-concept (i.e., associating the self with an anxious disposition), and indicate that the implicit association test, assessing the implicit anxiety self-concept, may contribute an important source of information for the evaluation of psychotherapy and for studying dysfunctional self-associations in social anxiety.

**Implications in treatment for SAD.** The current findings have a number of theoretical and clinical implications for CBT, and related protocols, in treating individuals with SAD. CBT as a theoretical and therapeutic endeavour has embraced the proposition that concepts relating to the self are central to the understanding of a range of psychopathological conditions, including in the treatment of SAD. Indeed, one of the earliest and most significant contributions in Beck's (1967) clinical formulations of depression and cognitive therapy for emotional disorders (a precursor to CBT) was the notion that a constellation of negative generalisations about the self constituted a vulnerability to depression, as well as negative thoughts about the world and the future. This proposition was carried forward in discussions related to the aetiology, maintenance, and treatment of anxiety disorders (Beck & Emery, 1985); although, these negative cognitions were said to focus on feelings of inadequacy, helplessness, and weakness, making anxious individuals more susceptible to fears of negative evaluation and rejection by others (Clark, 2016). Beck (1967) argued that the central aim of cognitive therapy was to challenge patients' automatic negative thoughts and develop a more realistic self-view that, in turn, would facilitate a shift in dysfunctional information processing biases and reduce psychopathological symptoms. The systematic review presented in Chapter Three found evidence consistent with this proposition. Several studies were identified that found reductions in negative self-related cognitions during and/or following cognitive-related therapies for SAD, and indicated that these reductions were associated with treatment response (see Gregory & Peters, 2017). Moreover, the results of Chapter Five suggested that maladaptive self-beliefs not only reduce over the course of CBT for SAD but are a leading

indicator of social anxiety improvement in treatment. Practitioners are therefore encouraged to continue to explicitly address clients' unhelpful thoughts and beliefs related to the self, with current findings indicating that more focus on correcting dysfunctional beliefs will likely lead to greater reductions in social anxiety.

Interestingly, the systematic review also found that CBT protocols without an explicit cognitive component (e.g., exposure only) facilitated a shift in dysfunctional thinking patterns related to the self (e.g., Borgeat et al., 2009; Hofmann & DiBartolo, 2000; Newman & Hofmann, 1994). For example, Borgeat et al. (2009) compared exposure therapy alone with CBT and found a more rapid and pronounced decrease in negative self-related thoughts, as measured by the Social Interaction Self Statement Test (SISST; Glass, Merluzzi, Biever, & Larsen, 1982), in the exposure-only condition. In the CBT condition, significant changes were only observed at the conclusion of treatment. One possible explanation for this finding is that patients in the exposure-only condition became more habituated to their own perceptions of themselves through repeated exposure, direct video feedback, and positive reinforcement, leading to greater reductions in negative self-thoughts early in treatment. Indeed, several studies have now demonstrated the value of video feedback in altering self-perceptions of performance and mental representations of self (e.g., Rapee & Hayman, 1996). Reductions in negative self-related thoughts and beliefs were also observed following non-CBT protocols (e.g., psychodynamic psychotherapy [e.g., Bögels et al., 2014]), however, indicating that CBT may share similar points of efficacy with other treatment modalities when seeking to improve maladaptive self-related cognitions for individuals with SAD. Such findings have been used to advocate for the more recent 'third-wave' cognitive-behavioural treatments, such as acceptance and commitment therapy (Hayes, Strosahl, & Wilson, 2012), dialectical behavioural therapy (Linehan, 1993), and mindfulness-based cognitive therapy (Segal, Williams, & Teasdale, 2002). The original research papers in this thesis only address self-construct change in the context of CBT for SAD, however, and therefore do not speak to



this proclamation. Nonetheless, readers are encouraged to keep in mind that the importance of self-related constructs in CBT may also be generalisable across a variety of treatments for SAD.

While the self has played an important role in the cognitive-behavioural perspective, its conceptualisation and formulation in CBT has continued to lag behind the advances made in the social psychology domain (Clark, 2016). This is particularly true in the context of SAD. For example, with the recognition of the dual nature of the self-concept - its stability and malleability, as well as its multifaceted and dynamic structure (Markus & Kunda, 1986; Markus & Wurf, 1987) - social psychologists quickly distinguished between content and structural components of the self-concept (Campbell et al., 1996; McConnell & Strain, 2011). Yet empirical literature and clinical formulations in treatment continue to focus on self-related content rather than on correcting faulty self-structures. Stopa (2009b) argues that this conceptualisation provides clinicians with a useful way of discussing the self with patients, and directs treatment towards correcting dysfunctional beliefs and thought patterns (e.g., Rapee et al., 2009). While doing so is indisputably important (as evidenced by the findings in Chapters Three and Five of this thesis), a considerable amount of research has linked structural components of the self with psychopathology more generally (see the introduction chapter, pp. 11-14).

As previously discussed, Chapter Seven therefore provided a novel contribution to the theoretical and clinical literature and examined the role of self-structure change, as measured by self-concept clarity, in CBT for SAD. Given that no modifications were made to the CBT protocol to explicitly address change in the clarity of the self (see Rapee et al., 2009), the finding that self-concept clarity improved from pre- to post-treatment may indicate that current treatment for SAD already implicitly addresses structural features of the self-concept. Showers et al. (2004) suggest that one potential mechanism enabling self-structure change in psychological treatment is through the construction of healthier thoughts and beliefs about the

self. Consistent with this notion, positive and negative self-attribute ratings, representing beliefs about self-characteristics, were also found to increase and decrease, respectively, from pre- to post-treatment. Such findings may indicate that CBT changes the preferential access of more positive and functional knowledge about the self and inhibits access to negative information (Brewin, 2006). In turn, this may assist in the formation of a more coherent and consistent self-concept. Self-concept clarity may also be improved by facilitating greater congruency between different self-knowledge structures (see Strauman & Higgins, 1987). Practitioners may therefore benefit from focusing on perceived discrepancies between actual: ought/other self-representations, perhaps by directly challenging patients' belief that their perceived self attributes fall short of the characteristics they believe others expect them to possess (Strauman, 1989, 1992; Weilage & Hope, 1999; Johns & Peters, 2012). In this way, new elements encountered during psychotherapy perceived through existing self-schemas should extend and clarify the self-concept, leading to greater internal consistency and temporal stability (i.e., an assimilative process of self-concept clarity; Styla, 2015).

**Implications for the self and psychopathology literature more broadly.** As shown in the general introduction of this thesis (Chapter One), the importance of a negative self is not limited to cognitive models of social anxiety or treatments for SAD. Indeed, dysfunctional self-related constructs have been shown to be relevant for a wide range of psychological disorders, including major depressive disorder (Sowislo & Orth, 2013), bulimia nervosa (Vohs et al., 2001), body dysmorphic disorder (Osman, Cooper, Hackmann, Veale, 2004), obsessive-compulsive disorder (Coughtrey, Shafran, & Rachman, 2013), post-traumatic stress disorder (McNally, 1993), health anxiety (Muse, McManus, Hackmann, Williams, & Williams, 2010), borderline personality disorder (Westen & Cohen, 1993), and bipolar disorder (Leitan, 2016). These constructs span the self-content and self-structure literature distinction and are discussed in relation to both the conceptualisation and treatment of mental health conditions. Notably, while self-related constructs related to the content of the self have

been predominant in most of the psychopathology and treatment literature, discussion around structural components of the self in a treatment context have increased in frequency over the past two decades. Most of this empirical research has been in relation to depression and mood disorders (Luyten & Fonagy, 2016) and bipolar disorder (Leitan, 2016), however research on self-structure and the treatment of other psychological conditions is beginning to accrue. On a broad level, the present thesis therefore adds to this body of research, and underscores the importance of dysfunctional self-related constructs in the maintenance and treatment of psychopathological conditions.

### **Limitations of the current thesis and future research directions**

The overall aim of the current thesis was to examine the role of self-related constructs in the context of CBT for SAD. Altogether, results demonstrate that a greater appreciation of the self in theoretical conceptualisations of social anxiety and CBT research and treatment should assist in improving therapeutic outcomes for individuals with SAD. However, while the empirical papers offer novel contributions to the literature, they should be considered in light of thesis limitations. The following discussion will focus on overall thesis limitations; for limitations pertaining to each individual empirical paper, we guide readers to view the appropriate chapters.

The primary limitation of the thesis as a whole was the absence of a waitlisted control sample when examining changes related to CBT, which prevents definitive conclusions regarding whether proposed changes are truly mechanisms of group CBT, were a general treatment effect, or even due to the passage of time. However, individuals with SAD in waitlist control conditions rarely change on symptom variables (e.g., Clark et al., 2006; Steinert, Stadter, Stark, & Leichsenring, 2016) or on the independent variables assessed in empirical papers (e.g., Boden et al., 2012; see Gregory & Peters, 2017). Data was also collected from undergraduate students with and without a diagnosis of SAD and demonstrated little change on IAT and self-concept clarity scores over a 12-week period. Moreover, the

repeated measures approach used in Chapter Five involved evaluating changes *within* a treatment group rather than comparing across treatment conditions; although, we note that these approaches are not mutually exclusive. Taken together, these findings indicate that we may be able to *tentatively* infer treatment-related effects; however, future research is still required to definitively confirm that reported changes are specifically related to the therapeutic protocol employed.

Another limitation of the thesis pertains to the sample sizes of clinical participants in the individual research papers. While the paper reported in Chapter Seven had a sample size of 143 clinical participants, the papers in Chapters Five and Six had sample sizes of 77 and 71, respectively. Compared to empirical literature examining how self-related constructs change in CBT for SAD, these samples are not small. Indeed, the systematic review presented in Chapter Three found that 66% of all studies reported sample sizes of less than 50, and 85% had sample sizes of 80 participants or less. Still, relatively recent advances in statistical approaches designed to assess change with longitudinal data (e.g., complex mediation modelling using a structural equation modelling framework) typically require sample sizes larger than those reported here, and future research would benefit from replicating present findings with a larger cohort of clinical participants. These more complicated, mediation models would also offer the advantage of being able to deduce causality, something which was not always achieved in the empirical papers.

Also, not all self-related constructs proposed in cognitive models of social anxiety were accounted for in the empirical papers. While this is not a specific limitation of the collective empirical research in the thesis, as it is beyond a thesis of this size to examine all variables related to the self in CBT for SAD, future research should continue to address the research gaps identified in the systematic review and empirical papers. For example, despite mixed results for the role of social comparison reported in Chapter Four of the thesis, it would be interesting to examine the role of social comparison processes in CBT for SAD. This may

be particularly warranted as individuals with social anxiety tend to report more engagement in upward social comparisons (i.e., comparisons of oneself to an appraised higher standard) (Antony, Rowa, Liss, Swallow, & Swinson, 2006; Mitchell & Schmidt, 2014) and research has linked negative self-appraisal with social comparison processes; although, most of this research has focused on individuals experiencing dysphoric or depressed mood (for reviews, see Suls & Wheeler, 2000; Wood & Lockwood, 1999). The current thesis also focused exclusively on self-related constructs proposed in cognitive models. However, theoretical models with different orientations may also offer distinct but important directions for future research (e.g., the conception of the relational self; see Alden & Taylor, 2004). Similarly, results may not be generalisable to younger (under 18) adults and children given that child and adolescent studies were excluded from the systematic review and only adult samples were recruited for the treatment trial. Future research may therefore wish to assess whether current findings are applicable to younger individuals with SAD, particularly as models and empirical research linking a negative self with social anxiety is not restricted to adult samples.

Finally, a number of other future research suggestions can be identified. First, recent meta-analyses indicate that individual CBT tend to be associated with larger effect sizes than group CBT, and has therefore been argued to be the best intervention for the initial treatment of SAD (Mayo-Wilson et al., 2014). However, findings of the empirical papers are based on a treatment protocol for group therapy. It would be interesting to examine whether greater effects are observed when individuals undergo individual sessions of CBT for SAD. We expect that change in self-related constructs may be even more strongly related to social anxiety change following individual therapy as this type of therapeutic format offers a more tailored approach in the identification and correction of individual self-perceptions and appraisals (see Mörtberg, Clark, Sundin, & Aberg Wistedt, 2007). There has also been a relative dearth of empirical research examining the role of positive aspects of the self in CBT for SAD (as shown in Chapter Three); yet how positive self-constructs influence and/or

improve social anxiety symptomology has recently been incorporated into theoretical models (Heimberg et al., 2010) and therapeutic research (Goldin et al., 2013) focusing on SAD. There are also alternatives to the assessment procedures and tools designed to assess the self-related constructs examined in the present thesis, so future research may wish to use different measures and replicate current findings. For example, in addition to using the Self-Concept Clarity scale (SCC Campbell et al., 1996) future research could include the computerised measure of self-consistency (as in Wilson & Rapee, 2006), or the card-sorting task (Showers, 1992), which would also provide a measure of self-organisation, differential importance, and self-complexity (see Stopa et al., 2010). Finally, the literature on the whole would benefit from more experimental research, with one avenue being to compare how different CBT protocols facilitate change across self-related constructs (e.g., Norton & Abbott, 2016).

## **Conclusion**

The concept of the self has had an impactful history in social and clinical psychology, and has been used to inform and extend the psychopathology literature. It is clear that for social anxiety specifically, eminent cognitive-behavioural models have emphasised the importance of different self-related constructs in the aetiology and maintenance of SAD, which has also been reflected in CBT for the disorder. However, despite CBT being an efficacious treatment for SAD, many patients remain symptomatic following the treatment intervention. Therefore, the program of research undertaken in this thesis aimed to address whether self-related constructs change during and/or following CBT for SAD and how change in these variables relate to treatment outcome. Overall, findings support the proposal that self-related constructs are important variables in both the maintenance and treatment of SAD, with change in self-related constructs often preceding change in social anxiety symptoms. As a result, we agree with Clark's (2016) recent proclamation that "a greater appreciation of the self in CBT research and treatment might be one of the most important imperatives for the

next generation of cognitive behavioral therapists” (p. 40) and encourage continued research in this area.

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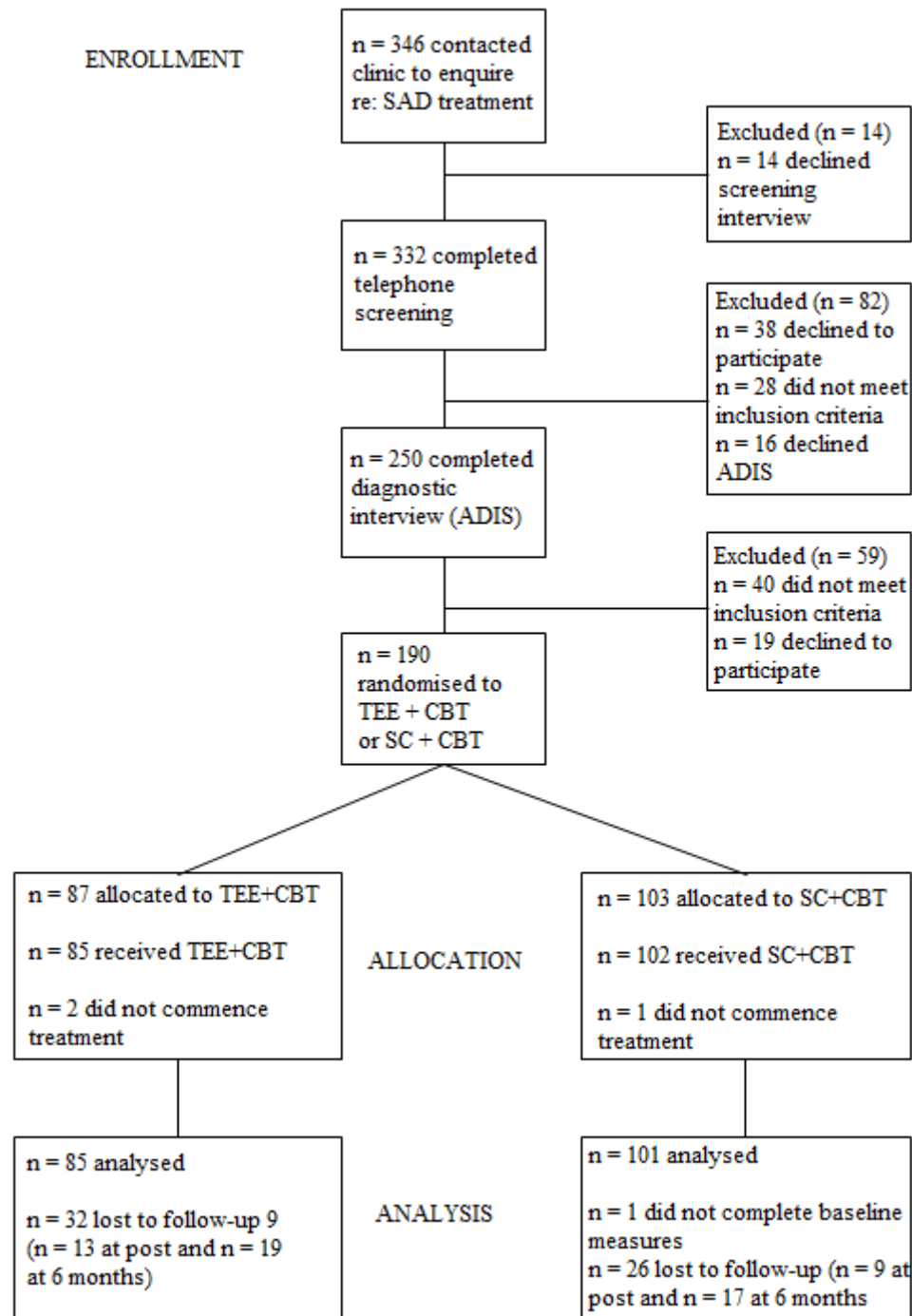
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Appendix A of this thesis has been removed as it may contain sensitive/confidential content

## Appendix B

### Copy of the consort flowchart for the main treatment trial



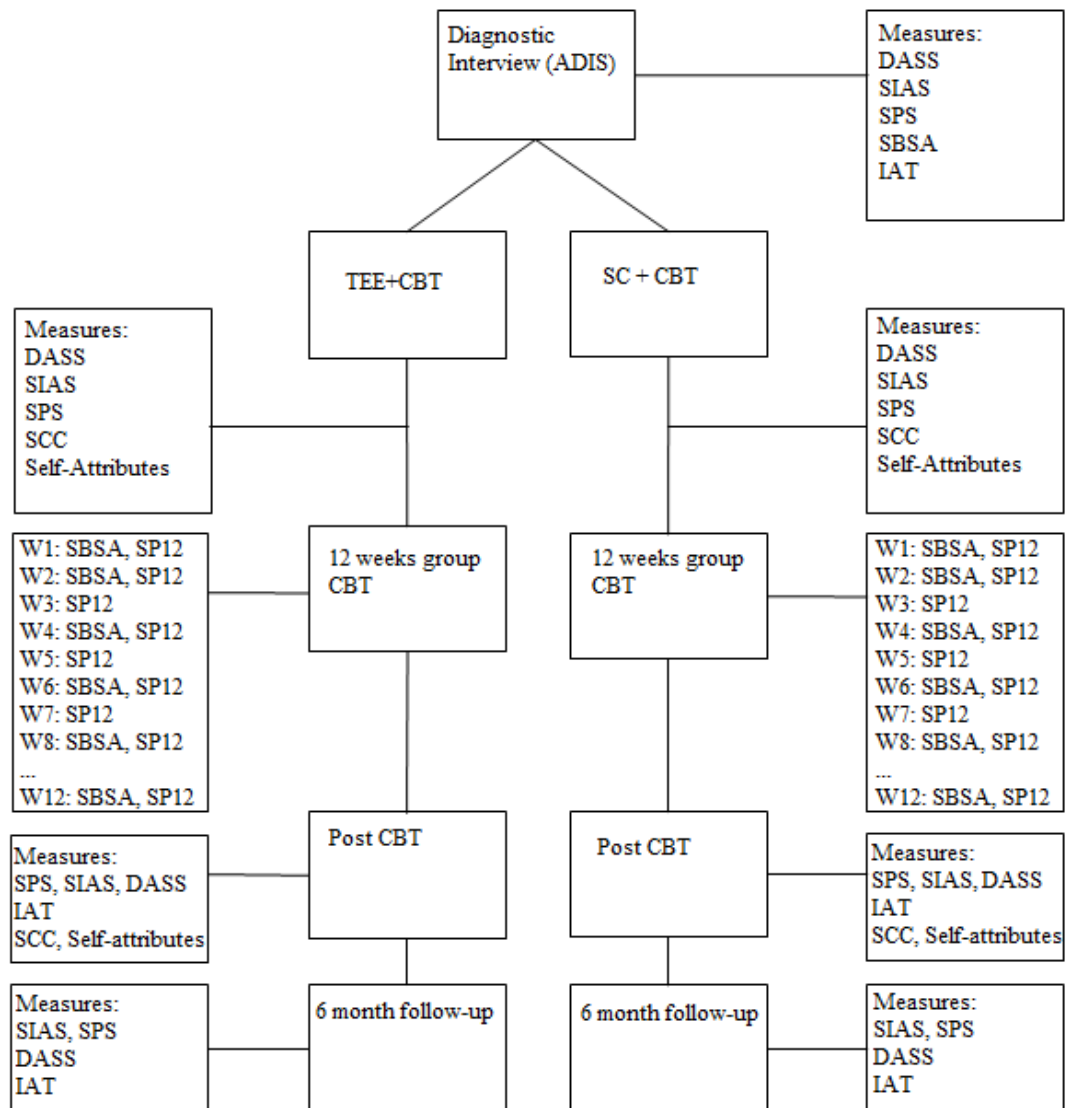
*Note:* SAD = social anxiety disorder; SC+CBT = participants received three individual sessions of supportive counselling prior to 12 weeks of group cognitive behavioural therapy (CBT); TEE+CBT = participants received three individual sessions of motivational interviewing prior to 12 weeks of group CBT.





## Appendix C

### Flowchart of when measures were completed in the PhD empirical studies



*Note.* Participant numbers differed between the empirical studies reported in Chapters 5-7 due to the measures being implemented into the treatment trial at different times over course of the PhD. Besides the symptom measures, the SCC and the Self-Attribute Scales were the first measures of the PhD employed into the trial. The SBSA and IAT measures were implemented into the trial a little later (year 2) once the research questions for these papers were developed. While some participants (around 42%) completed all PhD-relevant measures, this data was not compiled into one paper for the following reasons: to conserve power due this relatively small sample size; the different research questions prompted different analyses and approaches in each paper; and, measures were implemented into the trial at different stages of treatment to preserve research participation (i.e., not overload participants). Notably, where post-preparatory measures were given, differences in these preparatory sessions (TEE+CBT, SC+CBT) were controlled for where needed. DASS = Depression Anxiety and Stress Scale; IAT = Implicit Association Test; SBSA = Self-Beliefs Related to Social Anxiety; SCC = Self-Concept Clarity Scale; SIAS = Social Interaction Anxiety Scale; SP-12 = Social Phobia-12; SPS = Social Phobia Scale; SC+CBT = supportive counselling prior to 12 weeks of group cognitive behavioural therapy (CBT); TEE+CBT = motivational interviewing prior to 12 weeks of group CBT.



## **Appendix D**

### **Additional Notes**

#### Chapter Four:

Multiple regression is a highly general and flexible data analytic strategy that models the relationship between multiple independent variables and a dependent variable by fitting a linear equation for observed data. This analytic approach is especially useful for correlational research designs (i.e., non-experimental) that aim to examine statistical predictors of a given construct. For the purposes of the present study, this approach was particularly useful as it allowed for the examination of which independent variables (e.g., self-concept clarity, maladaptive self-beliefs, self-focused attention) were more ‘uniquely’ or ‘strongly’ related to the dependent variable (e.g., social anxiety), while controlling for all other variables in the model. Power analyses indicated that a total sample size of 118 participants would be needed to provide 80% power to detect an anticipated effect of 0.15 with 10 predictors in the model.

#### Chapter Seven

The Optimal Design computer program was utilised to calculate power for multilevel model analyses. With power set at .80 and the predicted intraclass correlation at the group level set at 0.10, a moderate effect size would be achieved with approximately 22 groups.