



Review

Changes in the self during cognitive behavioural therapy for social anxiety disorder: A systematic review



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HIGHLIGHTS

- Cognitive models of social anxiety disorder (SAD) emphasise the central role of the self in maintaining the disorder.
- Examined whether self-constructs change during or following cognitive-behavioural therapy for SAD.
- Pre- to post-treatment reductions were observed. Few studies examined whether change mediated treatment outcome.
- Change in self-content and self-related processing were the most widely examined. No paper examined change in self-structure.

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ABSTRACT

A consistent feature across cognitive-behavioural models of social anxiety disorder (SAD) is the central role of the self in the emergence and maintenance of the disorder. The strong emphasis placed on the self in these models and related empirical research has also been reflected in evidence-based treatments for the disorder. This systematic review provides an overview of the empirical literature investigating the role of self-related constructs (e.g., self-beliefs, self-images, self-focused attention) proposed in cognitive models of SAD, before examining how these constructs are modified during and following CBT for SAD. Forty-one studies met the inclusion criteria. Guided by Stopa's (2009a, b) model of self, most studies examined change in self-related content, followed by change in self-related processing. No study examined change in self-structure. Pre- to post-treatment reductions were observed in self-related thoughts and beliefs, self-esteem, self-schema, self-focused attention, and self-evaluation. Change in self-related constructs predicted and/or mediated social anxiety reduction, however relatively few studies examined this. Papers were limited by small sample sizes, failure to control for depression symptoms, lack of waitlist, and some measurement concerns. Future research directions are discussed.

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Contents

1.	Introduction	2
1.1.	Self-content and social anxiety	3
1.2.	Self-related processing and social anxiety.	3
1.3.	Self-structure and social anxiety.	3
1.4.	CBT and self-related constructs	4
1.5.	Study rationale and objectives.	4
2.	Method	4
2.1.	Summary of search strategy.	4
2.2.	Selection, exclusion, and design of included studies	4
2.3.	Data analysis	4

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3.	Results and discussion	5
3.1.	Study characteristics	5
3.2.	Stopa's (2009a) categories of self: content, process, and structure	5
3.3.	Study outcomes: Self-content changes	5
3.3.1.	Change in thoughts and beliefs about the self	5
3.3.2.	Changes in self-esteem	7
3.3.3.	Changes in self-schema	7
3.4.	Study outcomes: changes in self-related processing	7
3.4.1.	Changes in self-awareness: self-focused attention.	7
3.4.2.	Changes in self-evaluation.	8
3.5.	A brief summary	9
3.6.	Limitations.	9
3.7.	Future research directions	9
4.	Conclusion	10
	Acknowledgements	10
	Appendix A	10
	References.	16

1. 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 (e.g., Ruscio et al., 2008). These difficulties are often compounded by a high degree of comorbidity with other diagnoses (for a review see Szafranski, Talkovsky, Farris, & Norton, 2014). Given the high prevalence and impairment associated with the disorder, a number of cognitive-behavioural models have been developed to improve the understanding and treatment of SAD (e.g., Clark & Wells, 1995; Heimberg, Brozovich, & Rapee, 2010; Hofmann, 2007; Moscovitch, 2009; Stopa, 2009a).

A consistent feature across cognitive-behavioural models of SAD is the central role of the self in the emergence and maintenance of the disorder (see Gregory, Peters, & Rapee, 2016). For example, models by Clark and Wells (1995) and Rapee and Heimberg (1997); see Heimberg et al. (2010) for the updated model) suggest that when social situations are encountered, individuals with SAD focus on an internal mental representation of the self as seen by the audience. This mental representation may be a distorted self-image based on prior experiences and is generally consistent with an individual's negative beliefs about the self and others (e.g., "I am a boring person", "Other people will be negative and critical"). This distorted self-view prevents socially anxious individuals from incorporating accurate feedback from others and can instigate a series of processes and behaviours such as self-focused attention and safety seeking behaviours that further exacerbate anxiety. Other cognitive models of social anxiety also place importance on perceived discrepancies between actual, other, and ought selves in maintaining the disorder (Hofmann, 2007), or propose a specific typology of core fears about the self that includes perceived flaws in social skills and behaviour, failure to conceal visible signs of anxiety, and physical and personality flaws (Moscovitch, 2009).

Given the importance placed on the self in cognitive models of SAD, the current paper presents an overview of the literature investigating the role of the self in social anxiety, before systematically examining how the self is modified during and following cognitive-behavioural treatments (CBT) for SAD. The paper is empirically driven, with less focus attributed to the theoretical positioning of SAD (including cognitive-behavioural models of the disorder) and the conceptualisation of the self (see Gregory et al., 2016; Markus & Wurf, 1987). To date, there has been no systematic review of the literature addressing whether constructs related to the self proposed in

cognitive models of SAD change during treatment and how this change may impact social anxiety symptom amelioration. Yet a comprehensive paper integrating the current state of the literature in this area would be of significant benefit to address current gaps in the field and to drive further research where promising areas have already been identified. Such an investigation is also timely, as despite being an efficacious treatment for the disorder (Mayo-Wilson et al., 2014), many patients with SAD who receive CBT either fail to respond to the therapy or continue to experience residual symptoms following treatment discontinuation (e.g., Rapee, Gaston, & Abbott, 2009). Uncovering active change mechanisms that govern anxiety reduction are therefore crucial in developing effective augmentation strategies to optimise CBT outcomes (Kazdin, 2007).

One of the difficulties in systematically collating a review of the literature that focuses on the construct of the self, however, is that the term itself remains elusive. The self has been studied from multiple approaches, with different approaches ascribing different definitions to the concept (see Bhar & Kyrios, 2016). Terms relating to the self have also sometimes been used interchangeably to refer to the same construct, as well as different constructs being associated with the same term (Hattie, 2014). For example, the terms self-presentations (e.g., in Anderson, Goldin, Kurita, & Gross, 2008) and self-views (e.g., in Goldin et al., 2013) have often been used interchangeably with self-beliefs. Moreover, a considerable number of variables have been proposed in the literature that reflect the various characteristics of the self (here referred to as self-related constructs), and many of these self-related constructs have been examined in relation to social anxiety. To assist with the integration of this review, the current paper therefore adopts the theoretical framework presented by Stopa (2009a). Stopa's framework is useful here as it contextualises the construct of self within cognitive models of SAD, provides organisation to the literature, and emphasises the importance of examining the structure of the self, something which has often been ignored in the SAD literature.

According to Stopa (2009a), the self consists of three broad categories: content, process, and structure. 'Content' refers to information about the self and the way this information is represented. 'Process' refers to how attention is allocated to self-relevant information and the strategies that are used to evaluate and monitor information about the self. Finally, 'structure' describes the way information about the self is organised, which can determine what aspects of self-knowledge are accessed at any given time. Subsumed within each category of self are self-related constructs, some of which have been of primary empirical focus in research on social anxiety (e.g., the negative content of self-beliefs). The following paragraphs will briefly position these self-related constructs within the broader categories of self as outlined in Stopa's (2009a) theoretical framework, and discuss some of the empirical studies examining the relationship between these constructs and social anxiety.

1.1. Self-content and social anxiety

The dominant approach in research on the self and social anxiety, including in cognitive models of SAD, has been to investigate the relationship between the content of the self and social anxiety. 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 (i.e., organised knowledge structures about oneself). 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 (Hope, Burns, Hayes, Herbert, & Warner, 2010; Rapee & Abbott, 2006; Rapee & Lim, 1992; Stopa & Clark, 1993). They tend to hold negative unconditional beliefs about the self (e.g., “I am boring”; Clark & Wells, 1995; see also Allen & Page, 2005; Wong & Moulds, 2009, 2011), and report a wide range of maladaptive schemas, most of which relate to the perception of the self as a failure, socially defective, socially undesirable, and socially isolated (Calvete, Orue, & Hankin, 2015; Gonzalez-Diez, Calvete, Riskind, & Orue, 2015; Pinto-Gouveia, Castilho, Galhardo, & Cunha, 2006). Socially anxious individuals also consistently report experiencing negative self-images in social situations (for a review see Ng, Abbott, & Hunt, 2014). These negative self-images are often recurrent and from the observer perspective, and tend to increase the visibility of anxiety symptoms, increase the evaluation of social performance being poor (Hirsch, Mathews, Clark, Williams, & Morrison, 2003; Stopa & Jenkins, 2007), decrease explicit self-esteem (Hulme, Hirsch, & Stopa, 2012), and decrease negative self-appraisal reinforcement (Stopa & Jenkins, 2007).

1.2. Self-related processing and social anxiety

A considerable amount of research has also investigated the role of self-related processing in social anxiety. However, the majority of this research has tended to focus on the way in which individuals with social anxiety direct their attention toward the self in social situations. Indeed, a consistent finding in the literature is that individuals with social anxiety experience excessive self-focused attention (for a review see Norton & Abbott, 2016b), which has been linked to impairments in social performance, higher frequency of self-critical thoughts (Bögels & Lamers, 2002; Zhou, Hudson, & Rapee, 2007; however see Jakymyn & Harris, 2012), and enhanced negative affect in the form of self-criticism and self-dissatisfaction (Kashdan & Roberts, 2004). Less attention has been directed toward the examination of social anxiety and other self-processing variables, such as social comparison and self-evaluation (Stopa, 2009a). However, socially anxious individuals have been found to report lower levels of self-efficacy (Iancu, Bodner, & Ben-Zion, 2015; Rodebaugh, 2006), higher levels of self-criticism compared to those without social anxiety (Cox, Fleet, & Stein, 2004; Iancu et al., 2015; Kopala-Sibley, Zuroff, Russell, & Moskowitz, 2014), and 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).

1.3. Self-structure and social anxiety

The structural component of the self has received relatively less attention in both cognitive models of SAD and empirical research; yet knowing how information about oneself is stored, organised,

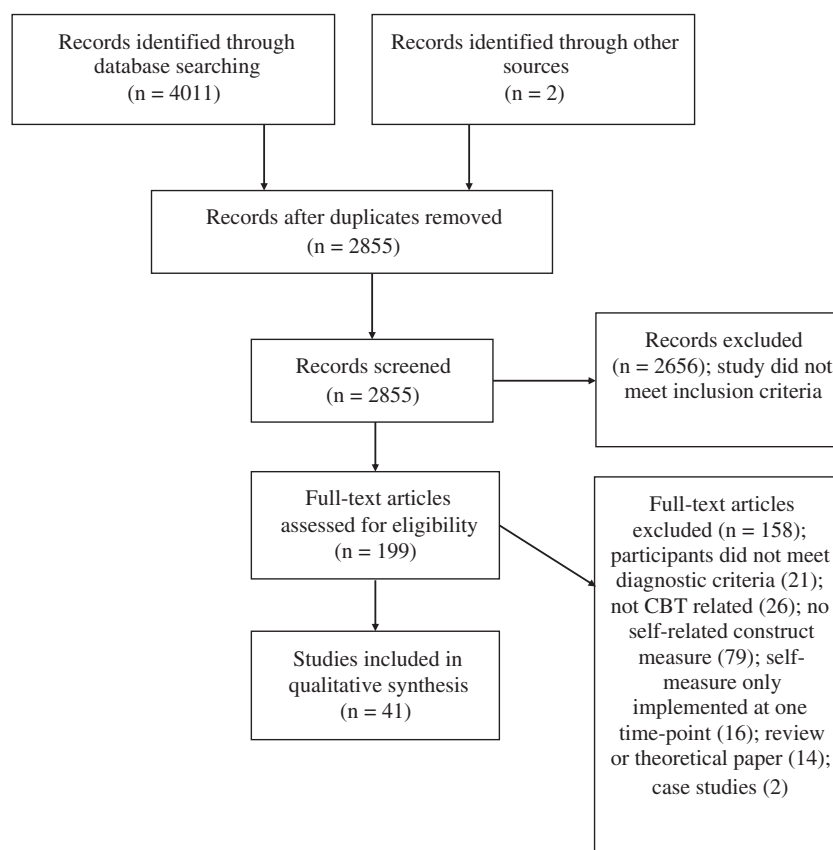


Fig. 1. Flow diagram of study selection.
Adapted from The PRISMA Group (Moher, Liberati, Tetzlaff, & Altman, 2009).

and retrieved could aid in establishing more efficacious treatments for the disorder (Stopa, 2009a). The self comprises many different self-aspects (see McConnell, Buchanan, & Skulborstad, 2012), so examples of structural components of the self include how consistent and complex ones' sense of self is. To date, studies have demonstrated that scores on measures of self-concept clarity (i.e., whether an individual has a clearly defined sense of self that is both consistent and stable across time; Campbell, 1990) and self-organisation predict social anxiety scores in undergraduate samples, with socially anxious individuals demonstrating less clarity about their self-concepts than those low in social anxiety (Stopa, Brown, Luke, & Hirsch, 2010). Findings also suggest that individuals with social anxiety are less likely to attribute more certainty and importance to positive self-judgements when compared with controls (Moscovitch, Orr, Rowa, Reimer, & Antony, 2009), and display reduced subjective confidence and longer reaction times when rating self-descriptiveness of personality characteristics (Wilson & Rapee, 2006).

1.4. CBT and self-related constructs

The strong emphasis placed on self-related constructs in cognitive models of SAD and related empirical research has also been reflected in evidence-based treatments for the disorder. A number of CBT programs have been developed that include therapeutic techniques to modify maladaptive self-related constructs (e.g., Clark et al., 2003; Rapee et al., 2009). 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, Wild, Stott, Grey, Ehlers and Clark, in press) 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). Other techniques such as cognitive restructuring, a core component of CBT protocols, have been utilised to challenge the dysfunctional thoughts and belief patterns that individuals with social anxiety typically experience (e.g., Rapee et al., 2009). 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.

1.5. Study rationale and objectives

To date, there has been no systematic review of the literature addressing whether self-related constructs proposed in cognitive models of SAD change during treatment and how this change may impact social anxiety symptom amelioration. Guided by Stopa's (2009a) theoretical framework of self and social anxiety, the following research questions were pursued: What category of self (i.e., content, process, or structure) has been the most thoroughly investigated regarding changes across and following treatment? Do CBT protocols facilitate changes in self-related constructs?; and, do changes in self-related constructs facilitate reductions in social anxiety?

2. Method

2.1. Summary of search strategy

A comprehensive literature search was conducted using the following electronic databases: PsycInfo, PubMed, Scopus, Embase, Medline, Web of Science, and Google Scholar. Three categories of keywords were used. The first category of search terms included

social anxiety disorder, social anxiety, and social phobia. Search items in the second category included cognitive behaviour therapy, CBT, cognitive therapy, exposure therapy, and cognitive behaviour therapy. The third category of keywords related to self-related constructs: self, self-beliefs, self-esteem, self-image, self-schema, working self-concept, self-awareness, self-efficacy, social-comparison, self-focused attention, self-evaluation, temporal comparison, self-attributes, self-concept clarity, self-complexity, self-organisation, self-regulation, and self-confidence. Terms were searched for as keywords, in abstracts, and in full-texts where possible. No provisions were made regarding publication date. Only English-language articles were included. The reference lists and citations of all included studies were manually examined for any relevant studies not previously obtained in the initial search. The last search was carried out on September 21st, 2016.

2.2. Selection, exclusion, and design of included studies

Studies were included if participants were 18 years of age or older¹ and met diagnostic criteria for SAD, assessed via a psychometrically sound procedure (the Anxiety Disorders Interview Schedule [ADIS; Di Nardo, Brown, & Barlow, 1994], the Structured Clinical Interview for DSM-IV Axis I Disorders [SCID-IV; First, Spitzer, Gibbon, & Williams, 1996], the World Health Organisation Composite International Diagnostic Interview [CIDI; Robins et al., 1988], or the Mini International Neuropsychiatric Interview [MINI; Sheehan et al., 1998]). Papers were also retained provided the methodology included at least two assessment points of a given self-related construct across the treatment period including follow-up, and if treatment was CBT, exposure therapy, or cognitive therapy. Studies were excluded if no measure of self was used or if the article was not peer-reviewed. Dissertations, conference abstracts, case-studies, book chapters, and review articles were excluded. The original search retrieved a total of 4011 articles of which 41 were eligible for inclusion in this review. The earliest article retained was published in 1991 with the latest published in 2017. A flow diagram of study selection is shown in Fig. 1.

2.3. Data analysis

As there was considerable heterogeneity among the studies regarding sample size, variables of interest, analytic approach, and in comparisons between different CBT-related and non-CBT related treatment protocols, a systematic, narrative review of the literature was considered to be the most suitable approach to address the current set of research questions. Studies were systematically organised in accordance with the criteria below, and summarised qualitatively. For every retained paper, the following study characteristics were extracted and recorded (Table 1): self-related construct and self-construct category according to Stopa's (2009a) model; sample size for clinical, waitlist, and control participants, as well as sample size for participants in other treatment conditions (e.g., psychodynamic psychotherapy) if applicable; the treatment protocol used; whether assessments were conducted at pre, post, follow-up, or during treatment; whether changes in self-constructs were a primary or secondary research aim; and the assessment measures employed. Findings were also summarised and recorded (Tables 2 and 3): whether self-related constructs changed from pre- to post-treatment (including effect sizes for this change where possible); whether self-related construct change predicted or was associated with treatment outcome (findings were reported so long as the analyses controlled for pre-treatment severity); and

¹ Only studies including participants over 18 were examined here, as the cognitive-behavioural models of SAD, from which these self-related constructs have been derived, are adult models.

whether self-related construct change mediated treatment outcome. An independent rater confirmed that the selected papers met the inclusion criteria and coded the following sample characteristics: self-construct, self-concept category, and the assessment measures employed. There was 93.9% agreement between the two raters. Any discrepancies in coding were discussed and resolved. The methodological quality of each paper was determined 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 (non-validated measures were deemed to possess poor psychometric properties). Details of the study characteristics of retained papers are reported in Table 1 in Appendix A.

3. Results and discussion

3.1. Study characteristics

Table 1 presents a summary of the extant research on how self-related constructs change during and/or following CBT for SAD. Altogether, 41 studies were included in this review. Participants were mainly female (52%) with an average age of 34.05 ($SD = 11.71$). Notably, results may not be generalizable to younger (under 18 years) adults given that child and adolescent studies were excluded from this review. Sample sizes of the studies ranged from 11 (Stott et al., 2013) to 269 (Wong et al., 2017) ($M = 51.71$, $SD = 45.49$), however the majority of studies reported sample sizes of <50 (66%). Twenty-two of the studies had the primary aim of investigating self-related construct change during and/or following CBT for SAD. The majority of studies employed a pre- to post-treatment methodology with or without follow-up assessment (76%). Limited information regarding the trajectory of self-related construct and social anxiety symptom change during treatment was therefore obtained. Most studies utilised group CBT (48%) as the treatment protocol. Thirteen papers included a waitlist control comparison, and two papers had a non-waitlisted control group comprised of first year undergraduate students (Abbott & Rapee, 2004; Hedman, Ström, et al., 2013). Almost all assessment measures employed were established and validated instruments. When measures were designed for the purposes of the study (Boden et al., 2012; Cox, Walker, Enns, & Karpinski, 2002; Gaudiano & Herbert, 2003; Hofmann & DiBartolo, 2000; Mulkens et al., 2001; Taylor & Alden, 2008; Woody, Chambless, & Glass, 1997) sound psychometric properties were reported. Overall, the studies retained in the present review demonstrate good methodological quality.

3.2. Stopa's (2009a) categories of self: content, process, and structure

The dominant approach in research on the self and social anxiety, including in cognitive models of SAD, has been to investigate the relationship between the content of the self and social anxiety. This trend has been reflected in treatment studies for SAD. Of the 41 studies retained in the systematic search, change in the content of the self were the most widely examined (see Table 1). Specifically, 28 papers assessed change in self-content. Twenty-four of these papers examined change in thoughts and beliefs about the self; three papers examined change in implicit and/or explicit self-esteem; and, two papers examined change in self-schema. A number of studies were also found that examined self-related processing change in CBT for SAD. Specifically, 21 papers assessed change in self-related processing. Fifteen of these papers examined change in self-awareness, including self-focused attention; and eight papers examined change in self-evaluation, which included studies examining self-criticism, self-efficacy, self-blame, and internal shame related to how an individual views themselves. Two papers examined change in both self-awareness and self-evaluation. The number of papers examining change in content and processing of the self exceeds the total

number of retained papers as eight studies examined change in both categories of self.

No paper was found to explore change in the structure of the self during and/or following CBT for SAD. This finding may not be so surprising given the limited empirical research examining the relationship between self-structure and social anxiety in the literature more generally. However, self-representations depend on both the content of self-knowledge and on the accessibility (i.e., structure) of this knowledge (Showers, Limke, & Zeigler-Hill, 2004). The outcome of cognitive therapy may also depend on helping individuals construct and strengthen alternative and competing positive self-representations, making them more accessible and retrieved in preference to dominant negative self-representations (Brewin, 2006). Furthermore, individuals with social anxiety are typified by chronic self-doubt (Arkin, 1987) or characterised as possessing 'unstable self-schemata' (Clark & Wells, 1995). Such reduced clarity about the self is likely to enable the confirmation of negative views about the self as well as the concomitant difficulty in holding confidence in positive aspects of the self (Stopa et al., 2010). Examining how self-structure changes during and/or following treatment, and how this change may relate to symptom amelioration, therefore remains a necessary and warranted endeavour. The following pages will now summarise the findings of the 41 studies retained in this review.

3.3. Study outcomes: Self-content changes

3.3.1. Change in thoughts and beliefs about the self

The difficulty with summarising the literature examining self-referent thought and belief change during CBT for SAD is that there is wide heterogeneity in the types of self-related thoughts and beliefs exhibited by individuals with the disorder. As a result, measures assessing these self-related cognitions often differ in the type(s) of self-referent thoughts and beliefs being assessed. For example, the social thoughts and beliefs scale (STABS; Turner, Johnson, Beidel, Heiser, & Lydiard, 2003) contains items tapping into beliefs related to social comparison (e.g., "I feel as if other people sound more intelligent than I do") and social ineptness (e.g., "I am not good at making small talk"), while items in the Core Beliefs Questionnaire – Trait (CBT-T; Wong et al., 2017; used in Rapee et al., 2009) reflect unconditional and global beliefs about the self (e.g., "I am unlikeable"). Direct comparisons between studies are therefore oftentimes difficult, as the measures being used may be assessing related but slightly different constructs.² For this reason, when discussing the results of individual studies we have clustered together the studies using the same measure and provided example items where possible.

As shown in Table 2, of the 24 studies examining change in self-related thoughts and beliefs during and/or following CBT protocols, six studies used the Social Interaction Self Statement Test (SISST; Glass, Merluzzi, Biever, & Larsen, 1982). The original SISST assesses both positive (e.g., "I can handle anything") and negative (e.g., "You're such an inhibited idiot") cognitions concerning a heterosexual interaction. A slightly modified version of the SISST concerning a speech or conversation task has also been utilised. Notably, two studies (Chambless, Tran, & Glass, 1997; Woody et al., 1997³) only used items reflecting negative cognition as this subscale demonstrates a greater ability to distinguish individuals with SAD from those without the disorder and is more highly correlated with SAD symptoms (Stopa & Clark, 1993). All studies demonstrated significant reductions in negative, and significant increases in positive self-related thoughts and beliefs from pre- to post-treatment, with reported

² We thank an anonymous reviewer for identifying this issue and providing this suggestion.

³ These studies report findings from the same sample population.

effect sizes indicating that change in these variables were considerably large effects (ranging from 0.65 to 2.18 for the negative subscale, and 0.81 to 2.11 for the positive subscale). These changes were found following treatments without an explicit cognitive component (Borgeat et al., 2009), with a cognitive-only component (Taylor et al., 1997), CBT (Borgeat et al., 2009; Chambless et al., 1997; Gelernter et al., 1991; Gruber, Moran, Roth, & Taylor, 2001; Woody et al., 1997), and computer-assisted CBT (Gruber et al., 2001). Interestingly, continued improvement in negative self-referent cognitions (but not positive self-referent cognitions, Borgeat et al., 2009; however see Gruber et al., 2001) was observed following group CBT during a six-month (Chambless et al., 1997) and one-year (Borgeat et al., 2009) follow-up period. These continued improvements were not observed with participants undergoing self-focused exposure therapy (Borgeat et al., 2009). These findings appear to suggest that CBT, with its inclusion of more formal cognitive work, may confer some additional benefit in its ability to modify SISST-related negative cognitions long-term. Improvements in negative self-related thoughts and beliefs was also found to predict reductions in social anxiety symptoms over treatment and follow-up (Chambless et al., 1997), suggesting that change in these variables may be an important mechanism of symptom change in treatment.

Three studies used the Social Cognitions Questionnaire (SCQ; Wells, Stopa, & Clark, 1993) to measure change in negative self-related thoughts and beliefs following treatment (see Table 2). The SCQ asks participants to rate the frequency and strength of beliefs related to the self (e.g., “I am foolish”) and about showing anxiety and performance failure (e.g., “I will not be able to speak”) that they experienced in the past week. All studies demonstrated significant pre- to post-treatment reductions in these types of negative self-related cognitions following individual face-to-face (Mörtberg, Clark, Sundin, & Aberg Wistedt, 2007; Mörtberg, Hoffart, Boecking, & Clark, 2015) and online (Stott et al., 2013) cognitive therapy (CT), with reported effect sizes ranging between 1.35 and 1.71 for the frequency subscale, and between 1.32 and 1.90 for beliefs subscale. The same participants were used in both Mörtberg et al. (2007, 2015) studies, however Mörtberg et al. (2007) compared and found that individual CT was associated with greater change in SCQ scores than either intensive group CT or treatment as usual (medication). This may have been due to the brevity of the intensive group CT condition and/or to the relative inability to tailor treatment toward individual idiosyncrasies in thought and belief predictions in group treatment. This latter consideration is consistent with recent findings that individual CBT is associated with greater effect sizes than group CBT (Mayo-Wilson et al., 2014). Interestingly, change in SCQ scores for participants in the individual CT condition was found to predict symptom change only when testing for mediation in a non-lagged model (Mörtberg et al., 2015). No evidence of reverse mediation was observed. Thus, a tight temporal relationship between changes in SCQ scores and social anxiety symptoms may exist, such that change in these self-related cognitions has a fairly immediate effect on improving social anxiety symptom severity.

Two studies used the Self-Statements during Public Speaking questionnaire (SSPS; Hofmann & DiBartolo, 2000) to measure change in negative self-related thoughts and beliefs following treatment (see Table 2). Construction of the scale was largely based on the SISST, and includes both positive (e.g., “I can handle everything”) and negative (e.g., “A failure in this situation would be more proof of my incapacity” and “I’m a loser”) self-statements. Both studies found significant reductions in negative thoughts from pre- to post-exposure-based treatment ($d = 0.85$; Hofmann & DiBartolo, 2000) and during CBT (Niles et al., 2014). No significant change was observed for positive self-statements ($d = 0.45$; Hofmann & DiBartolo, 2000). Notably, changes in negative cognitions early in treatment was found to be a significant predictor (but not mediator)

of changes in diagnostic severity. This was regardless of treatment group (CBT or acceptance and commitment therapy; Niles et al., 2014). Thus, how rapidly negative self-related thoughts change during treatments for SAD may be an important factor in social anxiety symptom improvement.

Two studies used the Social Phobia Beliefs Scale (SPB; Voncken, Bögels, & De Vries, 2003) and two studies used the Social Thoughts and Beliefs Scale (STABS; Turner et al., 2003) to measure change in self-related thoughts and beliefs following treatment (see Table 2). The SPB contains items such as “If I show my weakness in social situations, I will be rejected”, while the STABS assesses beliefs that other people are more socially competent (e.g., “Other people are more socially capable than I am”) and beliefs related to behaving awkwardly or appearing anxious in social situations (e.g., “Other people are bored when they are around me”). For the SPB, significant reductions with large effect sizes were observed from pre- to post-treatment ($d = 1.37$) and at two-month follow-up (Voncken & Bögels, 2006), as well as within-treatment, at post-treatment, and at three-months and one-year follow-up (Bögels, Wijts, Oort, & Sallaerts, 2014). Interestingly, no significant condition effects were found between CBT and psychodynamic therapy (Bögels et al., 2014), suggesting that CBT may share similar points of efficacy with psychotherapy when seeking to improve negative self-related beliefs for individuals with SAD. For the STABS, self-referent cognitions reduced from pre- to post-treatment, with reported effect sizes of 1.13 and 1.49 (Gros & Sarver, 2014; Koerner, Antony, Young, & McCabe, 2013). No change was observed for participants in a waitlisted condition (Gros & Sarver, 2014), suggesting that reductions in negative self-related thoughts and beliefs may be treatment-related effects rather than simply due to the passage of time. Improvements on the STABS were also found to predict treatment outcome over and above pre-treatment social anxiety symptoms, and changes in depression, nonspecific anxiety, and tension (Koerner et al., 2013). However, change in the belief that others are more socially proficient made a significant contribution to treatment outcome, over and above the significant contribution of changes in beliefs about the self as socially-inept. Thus, beliefs relating to upward social comparisons may have a particularly important role to play in the treatment of SAD.

Finally, nine studies used a questionnaire that was either established in the study or had not been previously used in treatment to examine change in self-related thoughts and beliefs. All studies demonstrated significant pre- to post-treatment changes, with moderate to large effect sizes (see Table 2), using CBT (Boden et al., 2012; Moscovitch, Rowa, Paulitzki, Antony, & McCabe, 2015; Rapee et al., 2009; Wilson & Rapee, 2005; Wong et al., 2017⁴), internet guided CBT (Tulbure et al., 2015), cognitive therapy (Norton & Abbott, 2016a), and exposure-based treatment (Mulken et al., 2001; Newman, Hofmann, Trabert, Rother, & Taylor, 1994). Indeed, one study (Boden et al., 2012) found that 83% of participants experienced reductions in maladaptive interpersonal beliefs (MIBS; e.g., “I don’t fit in”) over treatment, and that these participants experienced greater reductions in belief scores than waitlisted participants. Reductions in interpersonal maladaptive beliefs were also found to substantially mediate the effect of CBT on social anxiety symptoms severity (and vice versa, although to a lesser extent). Two other studies found that change in self-related beliefs predicted treatment outcome at post-treatment (core beliefs relating to the self and how others view the self; Wong et al., 2017) and at three-month follow-up (the belief that negative social events were indicative of negative characteristics relating to the self; Wilson & Rapee, 2005). Notably, Wong et al. (2017) controlled for depression symptom severity in their analyses, suggesting that this relationship occurred

⁴ A considerable portion of the study participants are also used in Rapee et al. (2009).

independent of change in depression symptom severity. This is important, as social anxiety and depression commonly co-occur, and global and absolute statements and beliefs about the self are also characteristic of depression thinking.

Overall, it is not surprising that the majority of the literature examining self-related construct change over and/or during treatment has focused on self-related thoughts and beliefs about the self. Indeed, all current cognitive conceptualisations of the disorder are based on the premise that individuals with social anxiety have maladaptive cognitive schema that activate these types of negative self-related thoughts and beliefs (Turner et al., 2003). Stopa (2009b) argues that this conceptualisation provides clinicians with a useful way of discussing the self with patients, and directs treatment toward correcting dysfunctional beliefs and thought patterns (e.g., Rapee et al., 2009). This is often achieved via techniques such as cognitive restructuring, imagery rescripting, video feedback, and behavioural experiments. Encouragingly, studies included in the present review indicate that CBT appears to improve negative self-related thoughts and beliefs over treatment, and that in the majority of cases changes in different types of thoughts and beliefs about the self either predict or mediate treatment outcome. Few studies have included measures of positive self-referent thoughts and beliefs about the self, however. This is most likely due to the emphasis on negative and dysfunctional self-views in earlier cognitive models of social anxiety (Clark & Wells, 1995; Rapee & Heimberg, 1997) and in most treatment protocols for the disorder (e.g., Clark et al., 2003; Rapee et al., 2009). Yet the enhancement of positive self-representations has been proposed to play an important role in determining treatment outcome and in preventing relapse (e.g., Brewin, 2006). It could be argued that studies that do include measures examining positive thoughts and belief change should be considered with caution. Generalisability across these beliefs is questionable, as the SPSS only contains two items tapping into this self-related construct. Concerns about whether most items on the positive subscale of the SISST assess the self (e.g., the original coping scale contains items such as “*Even if things go wrong, it’s not a catastrophe*”) is also warranted. Overall, investigations into how positive thoughts and beliefs change during treatment and how this change predicts symptom improvement remains limited.

3.3.2. Changes in self-esteem

Of the three studies examining change in self-esteem, all used Rosenberg’s self-esteem scale (e.g., “*I wish I could have more respect for myself*”; Rosenberg, 1965) to measure change in explicit self-esteem (i.e., conscious and reflective self-evaluation), while only one study used the Implicit Association Test (IAT; Greenwald, McGhee, & Schwartz, 1998) to measure change in implicit self-esteem (i.e., unconscious and automatic self-evaluation). The IAT asks participants to categorize four classes of items, two representing a concept discrimination (e.g., *self/other*) and two representing an attribute discrimination (e.g., *anxious/calm*). One concept and attribute are categorized together (e.g., *self* and *anxious*), followed by the opposite pairing (e.g., *self* and *calm* together). Response latencies to categorize items are interpreted in terms of relative association strength, with responses thought to be more rapid when the concept and attribute mapped onto the same response are more strongly associated in memory.

These studies demonstrated that cognitive-only (Ritter, Leichenring, Strauss, & Stangier, 2013), exposure-only (Salaberría & Echeburúa, 1998), and combined cognitive and exposure therapy (Taylor et al., 1997; however see Salaberría & Echeburúa, 1998) were effective in enhancing implicit and explicit self-esteem for individuals with SAD, with effect sizes ranging from 0.66 to 0.99 for explicit self-esteem, and 0.74 for implicit self-esteem (see Table 2). The relative nature of the IAT constrains the interpretation that can be made, however, as it is equally as possible that the evaluation of

others (in addition to the association between self and anxiety) might have changed over the course of treatment. Waitlisted control participants did not demonstrate significant change on these measures from pre- to post-treatment (Ritter et al., 2013). Interestingly, changing explicit self-esteem may have a more important role to play in reducing social anxiety symptom severity over treatment, as only change in explicit self-esteem was found to significantly correlate with social anxiety change in both CT and psychodynamic therapy conditions. Overall, these findings suggest that CBT for SAD is able to improve explicit self-esteem and, by including an implicit measure, that change in maladaptive self-evaluative beliefs and self-concept can also occur at an implicit level.

3.3.3. Changes in self-schema

Of the two studies examining change in self-schema (see Table 2), both used CBT as the treatment modality but used different measures to assess the construct. Lundh and Öst (2001) used the Stroop task (see also Hope, Rapee, Heimberg, & Dombeck, 1990; Mattia, Heimberg, & Hope, 1993), while Goldin et al. (2013) used the self-referential encoding task (SRET; Derry & Kuiper, 1981). For the Stroop task, only when participants were classified as treatment responders on the basis of reduced scores for social anxiety (75% of the sample) was there a significant reduction in Stroop interference of social threat words (e.g., “*Stupid*”; $d = 0.68$). For the SRET, CBT was found to reduce the endorsement of negative social trait adjectives ($d = 1.39$) and increase the endorsement of positive social trait adjectives ($d = 2.61$) over treatment compared to waitlist. Increased endorsement of positive (but not negative) social trait adjectives was also found to mediate the effects of CBT on social anxiety reduction, as well as be significantly associated with social anxiety reduction at one year follow-up (Goldin et al., 2013). These findings indicate that CBT seems to affect both negative and positive self-concepts, however the enhancement of positive schemas during CBT may be more clinically meaningful than previously considered.

3.4. Study outcomes: changes in self-related processing

3.4.1. Changes in self-awareness: self-focused attention.

Self-focused attention (SFA) has been defined in the literature as “attention towards aspects of the self which are not necessary to perform the task, such as one’s arousal (e.g., “*am I blushing?*”), emotions (e.g., “*do I feel anxious?*”), private self (e.g., “*how am I doing?*”) or public self (e.g., “*how do others see me?*”)” (Bögels, Mulken, & De Jong, 1997, p. 252). Measures that have aimed to assess SFA have typically assessed different aspects of the construct. For example, the Self Focused Attention scale (SFAS; Bögels, Alberts, & De Jong, 1996) assesses both SFA-arousal and SFA-performance, while the Focus of Attention questionnaire (FAQ; Woody et al., 1997) assesses FAQ-internal, which is comprised of items mostly reflecting SFA-arousal and SFA-private self, as well as the more optimal FAQ-external, which assesses the tendency to direct attention toward things in the environment other than oneself (e.g., “*I was focusing on what the other person was saying or doing*”). Measures also differ in whether they reflect state (e.g., FAQ) or trait (e.g., Self-Consciousness Scales; Schneier & Carver, 1985) SFA. Given this, for the following section studies continue to be clustered together based on the assessment measures employed.

As shown in Table 3, of the 15 studies examining change in SFA during and/or following CBT protocols, two studies used the FAQ and two studies used a thought-listing procedure that included classifying thoughts related to both internal (i.e., SFA) and external focused attention (see Hofmann, 2000, for more detail). Interestingly, similar findings were observed across studies regardless of the measure being used. Change in self-focused, but not externally-focused attention, was found to occur with treatment, with effect sizes ranging from 0.35 to

0.72. The reduction in SFA was also found to be associated with social anxiety symptom improvement during (Laposa & Rector, 2014; Woody et al., 1997) and over CBT (Hofmann, Moscovitch, Kim, & Taylor, 2004), and exposure treatment (Hofmann, 2000; however see Hofmann et al., 2004). Importantly, waitlisted participants did not demonstrate similar change in negative SFA (Hofmann et al., 2004), suggesting that these findings may be treatment-related effects. These findings indicate that reductions in SFA may be a more important determinant of treatment outcome than improvements in externally focused attention. It is possible, however, that the results simply reflect a difference in recall such that individuals with SAD have greater recall for when their attention has been focused on distressing aspects of the self rather than on the task-at-hand, and are therefore more likely to self-report these experiences.

Three studies used the SFAS (Bögels et al., 1996) and one study used a composite assessment of both the SFAS and the FAQ (Woody et al., 1997) to measure treatment change in SFA. For the SFAS, significant pre- to post-treatment reductions in SFA, with moderate to large effect sizes (ranging from 0.47 to 1.33), were observed following CT (Donald, Abbott, & Smith, 2014; Voncken & Bögels, 2006), and combined task-concentration training (TCT) and CT (Bögels, 2006). Treatment gains were also demonstrated at two-month (Voncken & Bögels, 2006), three-month (Bögels, 2006; Donald et al., 2014), and one-year (Bögels, 2006) follow-up. Regarding comparisons to other treatment modalities, Donald et al. (2014) demonstrated that pre- to post-differences in SFA were greater in an attention training protocol similar to TCT than CT, although at three-month follow-up there were no condition effects, while Bögels (2006) found that the combination of TCT and CT was more effective at reducing SFA-arousal than the combination of applied relaxation and CT. These findings indicate that the addition of attention-training to CBT will likely facilitate further reductions in SFA over treatment. Relatively recent CBT protocols have integrated attention training procedures into their treatment packages (e.g., Rapee et al., 2009). For the composite measure, compared to waitlist, SFA was found to significantly reduce from pre- to post-treatment for both CBT ($d = 0.96$) and mindfulness and acceptance-based treatments ($d = 1.08$) for SAD (Desnoyers, Kocovski, Fleming, & Antony, 2016). SFA was also found to mediate the effect of safety behaviour use and social anxiety, with safety behaviour use also mediating the relationship between SFA and social anxiety. These results suggest that clients who are having difficulty in reducing their self-focused attention could receive more direct instruction to drop safety behaviour use as an indirect way to target SFA and subsequent social anxiety, and vice versa.

Five studies used the Self-Consciousness Scales (Schneier & Carver, 1985) to examine change in self-focused attention during and/or following CBT protocols. The SCS measures individual differences in private (i.e., the tendency to introspect and examine one's inner self and feelings; e.g., "I am generally attentive to my inner feelings") and public (i.e., the tendency to think about self-aspects that are more overt; e.g., "I care a lot about how I present myself to others") self-consciousness (SC). All studies used the public subscale of the SCS, however Bögels (2006) and Lundh and Öst (2001) also included the private SC subscale but found little change in this subscale over or following treatment. Rapee et al. (2009) combined the public SC subscale with six additional items reflecting the tendency to introspect about self-aspects (e.g., "I wonder how I look to other people"). Studies demonstrated significant reductions in public SC from pre- to post-treatment, with moderate to large effect sizes (ranging from 0.38 to 1.77; see Table 3). These changes were found following TCT + CT (Bögels, 2006), CBT (Bögels et al., 2014; Lundh & Öst, 2001; Rapee et al., 2009), and CT followed by exposure therapy (Taylor et al., 1997). Interestingly, no differences in SFA, as measured by the public SC subscale, emerged between CBT and psychodynamic psychotherapy (Bögels et al., 2014), or between an enhanced CBT, standard CBT, and a stress-management treatment package

(Rapee et al., 2009). Change in SFA may therefore be attributed to common treatment factors and/or to treatment specific interventions within these treatment conditions.

Finally, three studies used the Social Phobia Weekly Summary Scale (SPWSS; Clark et al., 2003) to assess whether change in SFA mediates treatment outcome. The SPWSS contains two items that assess the degree to which an individual engages in either self- or external-focused attention in the last week (e.g., "For social situations in general...rate the extent to which your attention was focused on yourself or on the external situation..."). All studies included weekly measures of SFA in individual CT (Hedman, Mörtberg, et al., 2013; Mörtberg et al., 2015), residential CT (Hoffart, Borge, Sexton, & Clark, 2009), or CBT (Hedman, Mörtberg, et al., 2013). CT appeared to be more effective than CBT in reducing SFA (Hedman, Mörtberg, et al., 2013), however all studies found that reductions in SFA mediated subsequent changes in social anxiety in treatment. Thus, modifying SFA is important in both CT and CBT, however participants undergoing CBT appeared to be less likely to do so. Again, this finding may be consistent with recent findings that individual CBT is associated with greater effect sizes than group CBT (Mayo-Wilson et al., 2014). Evidence of reverse mediation was also found (Hoffart et al., 2009; however see Mörtberg et al., 2015), suggesting that change in social anxiety also predicted change in SFA. Thus, there appears to be a cyclical relationship between SFA and social anxiety.

Overall, these findings suggest that changes in SFA during the course of CBT are related to important therapeutic gains. These results are not so surprising given that cognitive-behavioural models of SAD emphasise the importance of SFA in the aetiology and maintenance of the disorder (Clark & Wells, 1995; Heimberg et al., 2010; Hofmann, 2007). Moreover, a considerable amount of empirical research has documented associations between negative SFA and social anxiety in both student and clinical samples (see Norton & Abbott, 2016b). It is interesting that treatments designed without an explicit attention training component (e.g., CT in Donald et al., 2014) also show reductions in SFA over the course of treatment and at follow-up. Of course, present findings suggest that teaching patients to limit their safety behaviour use is likely to impact levels of SFA and subsequent social anxiety (Desnoyers et al., 2016), however it is also likely that other techniques used in common CBT protocols such as changing patients' negative perception of themselves through cognitive restructuring would also help reduce SFA in social situations.

3.4.2. Changes in self-evaluation

Self-evaluation is a broad term used to describe types of processing related to the evaluation of oneself. Of the eight studies examining change in self-evaluation, all demonstrated significant reductions over treatment, with effect sizes indicating that these were mostly moderate effects (see Table 3). Specifically, studies have demonstrated pre- to post-treatment reductions in self-criticism (e.g., "I often find that I don't live up to my own standards or ideals"; Cox et al., 2002), self-blame (i.e., the tendency to make internal attributions; Taylor et al., 1997), internal shame related to how an individual views themselves (e.g., "You would feel like you wanted to hide" in response to a scenario; Hedman, Ström, Stünkel & Mörtberg, 2013), and self-efficacy for social situations (e.g., "How confident are you that you have the basic skills to perform well in social situations?"; Gaudiano & Herbert, 2003). Pre- to post-treatment reductions in evaluations of self-worth (e.g., "Other people's approval [or disapproval] strongly affects how worthy I feel"; Taylor & Alden, 2008) and performance appraisals (e.g., evaluating various aspects of a speech task; "I had a clear voice"; Abbott & Rapee, 2004; Norton & Abbott, 2016a; and evaluating perceptions of performance following idiosyncratic exposure tasks from participants' hierarchies; Laposa & Rector, 2014) have also been observed.

Improvements in self-criticism (Cox et al., 2002), the weight individuals with SAD assigned to interpersonal feedback when evaluating their self-worth (Taylor & Alden, 2008), and self-efficacy for

social situations (Gaudiano & Herbert, 2003) was found to be associated with positive responses to CBT. After controlling for pre-treatment self-criticism, depression, and social anxiety scores, the amount of additional variance explained by self-criticism was not large however, calling into question the clinical utility of this change (Cox et al., 2002). Overall, findings suggest that CBT may be able to improve how individuals with SAD evaluate themselves. It is possible that through treatment, socially anxious individuals' sense of self may become more stable and/or secure, making them less vulnerable to other people's evaluations.

3.5. A brief summary

The present review addressed whether constructs related to the self proposed in cognitive models of SAD change during treatment and how this change may impact social anxiety symptom amelioration. Guided by Stopa's (2009a) model of self, the majority of the papers were found to examine change in self-related content, followed by self-related processing. No study was found to examine change in self-structure. Overall, pre- to post-treatment improvements in self-related negative thoughts and beliefs, implicit and explicit self-esteem, self-schema, self-focused attention, and self-evaluation was found. 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, TCT that shifts attention away from the self, imagery rescripting, and video feedback) have the ability to modify constructs related to the self. Changes in self-related constructs were also observed following non-CBT treatments, suggesting that CBT protocols may share similar points of efficacy with other treatments when seeking to improve negative self-related constructs for individuals with SAD. Importantly, there was some evidence that change in these constructs predicted and/or mediated social anxiety reduction, however relatively few studies examined this. Overall, findings are consistent with cognitive behavioural models of SAD in emphasising the importance of self-related constructs in social anxiety, and suggest that CBT is able to modify dysfunctional constructs related to the self for individuals with SAD.

3.6. Limitations

SAD and depression typically co-occur (e.g., Ohayon & Schatzberg, 2010). It is therefore likely that individuals with these disorders share common cognitive features. Consistent with this proposition, several studies have now documented that individuals with social anxiety and depression share similar negative self-schematic structures for interpersonal context (Dozois & Frewen, 2006) and corresponding levels of self-criticism and attributional styles (Cox et al., 2000). Like those with social anxiety, individuals with depression are also often characterised as having low self-esteem, low self-confidence (APA, 2013), and cognitive biases like self-focused attention (Aldao, Nolen-Hoeksema, & Schweizer, 2010). A number of constructs relating to the self may therefore be transdiagnostic phenomena linking the two disorders. Only a small number of reviewed studies controlled for depression symptom severity in their analyses, however (Koerner et al., 2013; Cox et al., 2002; Wong et al., 2017). It is therefore difficult rule out the possibility that reported associations between change in self-related constructs and social anxiety over treatment is contingent upon improvements in depression.

Small sample sizes were also a common issue across papers. Despite Gaudiano and Herbert (2003) including a sample size of 131 clinical participants, the majority of studies reported sample sizes of <50. As a result, sample sizes may have been insufficient to detect desired effects in some instances. Small sample sizes are also likely to have impacted the statistics used to analyse the data, with more complicated and preferable statistical methods (e.g., structural equation modeling) unable to be performed. As a clinical population, socially anxious individuals are

quite heterogeneous with respect to overall symptomology, including variations in social fears and avoidance behaviours. Having larger sample sizes may therefore be particularly important, as increased samples are more likely to capture diversity within the population, making findings more generalisable.

A number of other study limitations can also be identified. Some questionnaires related to specific feared social situations. For example, the SPSS (Hofmann & DiBartolo, 2000) addresses cognitive aspects of social anxiety specific to a public speaking situation. While such measures typically tap into commonly feared social situations, generalisability to other social domains may be limited. Furthermore, only nine papers included a waitlist control condition, with two papers including a first year undergraduate control group. Given this, in most instances we are unable to rule out the possibility that change in reported self-constructs were a consequence of time-related factors. It was also the case that a large proportion of studies did not include an assessment at follow-up. Hence, the majority of results speak only to effects in the short term and do not allow conclusions to be drawn about the maintenance of self-related construct, and subsequent social anxiety, change long-term.

There were also some potential limitations of the present review. First, when examining some of the questionnaires on an item-level basis, concerns may be raised about whether all items tap into the self-related construct of interest. This is particularly relevant for the SISST-positive subscale (Glass et al., 1982). As discussed earlier, findings using this subscale should be considered with caution as some of the items seem to reflect cognitions not directly addressing the self. It should be noted here that if concerns were raised about individual items of a questionnaire, the paper of interest was only retained if the measure included a number of items addressing self-related concerns and reported good internal consistency. Second, there may be some issue with how different self-related constructs were divided into Stopa's (2009a) three categories of self. For the most part, self-constructs aligned nicely with the categories of self. Only two instances occurred where questions were raised. First, two studies (Rapee et al., 2009; Wong et al., 2017) included a measure of core-beliefs. While in the literature the terms core-beliefs and self-schemas have often been used interchangeably, at other times a distinction between the terms has been retained. We consider core-beliefs to be sub-components of self-schema, and thus included findings of these studies under the thoughts and beliefs subsection of the review. Second, although Stopa (2009a) included 'self-schemas' in the self-content category of self, schemas have also been proposed to comprise a structural and process component (Markus & Wurf, 1987). Thus, the studies examining self-schemas could have also been positioned in the other categories of self. We chose to include 'self-schemas' in the self-content category, however, to be consistent with Stopa's (2009a) model of self.

3.7. Future research directions

No paper has examined change in self-structure during or following CBT. Thus, perhaps the most obvious area in need of future research concerns whether current treatment practices facilitate change in the structure of self, and how this may be related to social anxiety symptom amelioration. Among other measures, studies could use the card-sorting task (Showers, 1992), which provides a measure of self-organisation, differential importance, proportion of negative attributes, and self-complexity (see Stopa et al., 2010) and the self-concept clarity scale (Campbell et al., 1996) to address these research questions. Researchers also note that structural change may facilitate change in self-related content (Showers et al., 2004). Indeed, 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). Structural change may also impact self-related processing, with individuals low in self-concept clarity also being suggested

to be more susceptible to, and influenced by, external self-relevant stimuli (Campbell, 1990). The current literature would therefore benefit from studies examining the relationship between different categories of self both over and during treatment.

More research is also needed examining the role of positive aspects of the self in CBT for SAD. Brewin (2006) suggests that CBT may enable the preferential access of more positive and functional self-knowledge by inhibiting access to negative information. Perhaps consistent with this proposition, pre- to post-treatment improvements in positive (but not negative) schema-related adjectives has been found to mediate the effects of CBT on social anxiety reduction, and been associated with social anxiety reduction at one year follow-up (Goldin et al., 2013). Measures examining positive self-related constructs related to social anxiety have often lagged behind measures tapping into negative aspects of the self, however. Further development and/or refinement of existing measures could therefore help progress research in this area. More research is also needed examining how change in both positive and negative self-related constructs mediate social anxiety reduction. Methodologically, optimal tests of mediation should include measures within treatment. Of the 41 studies included in this review, however, only ten contained within-session treatment data. Limited information regarding the trajectory and temporal relationship of self-related construct and social anxiety symptom change during treatment was therefore obtained.

Finally, in the majority of areas there remains a paucity of studies examining how CBT facilitates change in self-related constructs, and how these changes may lead to social anxiety reduction. As a result, despite findings being mostly consistent with current cognitive models of SAD and the general trends in the literature, reported outcomes are mostly preliminary and in need of replication. Furthermore, not all self-related construct variables suggested in Stopa's (2009a) model or empirical research have been studied. For example, it is likely that the process of upward social comparison has an important role to play in the treatment of SAD. We also encourage researchers to keep in mind the limitations of the studies reported here, with the need to improve current sample sizes, include control or comparison groups, control for depression

symptom severity, include more follow-up appointments, and choose self-related construct measures carefully. Studies utilising larger sample sizes could also aim to use more sophisticated methods of analysis. A considerable number of methods assumes that participants come from a single population and that a single growth trajectory can adequately approximate an entire population (e.g., *t*-tests, ANOVAs). Future research should instead aim to capture information about interindividual differences in intraindividual change over time (e.g., growth mixture modeling or group based trajectory modeling). Research should also continue to address present findings that changes in self-related constructs may not be specific to CBT and related protocols, or that change in self-related constructs may be a transdiagnostic feature across different psychopathological disorders.

4. Conclusion

Self-related constructs feature prominently in contemporary cognitive-behavioural models and therapies for SAD. While a considerable number of studies have examined whether CBT improves self-related constructs over and/or during treatment, the predominant focus has been to examine constructs relating to self-related thoughts and beliefs and self-focused attention. However even within these areas, most studies have employed a pre- to post-treatment methodology. Knowledge of the temporal relationship between these variables and social anxiety improvement is therefore limited. Around 46% of the studies retained in this review has been published within the last five years, emphasising the growing recognition of the importance of this topic. It is hoped that this review can update researchers on the current state of the literature, and encourage further research where needed.

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Appendix A

Table 1
Study characteristics.

Study	Self-construct (category)	n	CBT Treatment Protocol	Number of Assessment Points	Aim	Measures used
Abbott and Rapee (2004)	Self-evaluation: speech performance (Process)	43 clinical 30 healthy control	12 weeks group CBT	4 – pre (after speech) & 1 week later; post (after speech) & 1 week later	1	PQ (Rapee & Lim, 1992); reliability (✓), validity (✓)
Boden et al. (2012) ^o	Thoughts and beliefs about the self (Content)	47 clinical (27 initially WL)	16 weeks individual CBT	2 – pre, post	1	MIBS (Boden et al., 2012); reliability (✓), validity (?)
Bögels (2006)	Self-awareness: self-focused attention (Process)	33 clinical (initially WL) 32 applied relaxation	16 weeks individual TCT + CT	6 – pre WL, after WL, after TCT, after CT, 3 mth f/up, 1 year f/up	2	Dutch translation SCS (Schneier & Carver, 1985); reliability (✓), validity (✓) SFAS (Bögels et al., 1996); reliability (✓), validity (✓)
Bögels et al. (2014)	Thoughts and beliefs about the self (Content) Self-awareness: self-focused attention (Process)	27 clinical (initially WL) 22 psychodynamic therapy	12 weeks minimum individual CBT	6 – WL, pre, 12 weeks, 24 weeks ⁱ , post, 3mth f/up, 1 year f/up	2	Public SCS subscale (Schneier & Carver, 1985); reliability (✓), validity (?) SPB (Voncken et al., 2003); reliability (✓), validity (✓)
Borgeat et al. (2009)	Thoughts and beliefs about the self (Content)	27 clinical	8 weeks group CBT (14) 8 weeks self-focused group exposure therapy (13)	7 – pre, week 4, week 8, 1 mth f/up, 3 mth f/up, 6 mth f/up, 1 year f/up	2	SISST (Glass et al., 1982); reliability (✓), validity (✓)
Chambless et al. (1997) ^r	Thoughts and beliefs about the self (Content)	60 clinical	12 weeks Group CBT	3 – pre, post, 6 mth f/up	1	SISST (Glass et al., 1982); reliability (✓), validity (✓)
Cox et al. (2002)	Self-evaluation: self-criticism (Process)	84 clinical	Group CBT (26), group CBT lay-therapist (29), bibliotherapy (29)	2 – pre, post	1	DEQ (Cox et al., 2002); reliability (?), validity (?)

Table 1 (continued)

Study	Self-construct (category)	n	CBT Treatment Protocol	Number of Assessment Points	Aim	Measures used
Desnoyers et al. (2016)	Self-awareness: self-focused attention (Process)	53 clinical 31 waitlist 53 mindfulness and acceptance-based treatment	12 weeks Group CBT	4- Pre, mid, post, 3 mth f/up	1	FAQ (Woody et al., 1997); reliability (✓), validity (✓) SFAS (Bögels et al., 1996); reliability (✓), validity (✓)
Donald et al. (2014)	Self-awareness: self-focused attention (Process)	16 clinical 14 attention training	6 weeks group CT	3 – pre, post, 3 mth f/up	2	SFAS (Bögels et al., 1996); reliability (✓), validity (✓)
Gaudiano and Herbert (2003)	Self-evaluation: self-efficacy for social situations (Process)	131 clinical	6–18 weeks group or individual CBT	2 – pre, post	1	GSE (Schwarzer & Jerusalem, 1989); reliability (✓), validity (✓) SESS (Gaudiano & Herbert, 2003); reliability (✓), validity (✓)
Gelernter et al. (1991)	Thoughts and beliefs about the self (Content)	17 clinical 13 pharmacotherapy + self-exposure 12 pharmacotherapy + self-exposure 15 pill-placebo + self-exposure	12 weeks group CBT	2 – pre, post	2	SISST (Glass et al., 1982); reliability (✓), validity (✓)
Goldin et al. (2013) ^o	Self-schema (Content)	75 clinical (37 initially WL)	16 weeks individual CBT	3 – pre, post, 1 year f/up	1	SRET (Derry & Kuiper, 1981); reliability (?), validity (?)
Gros and Sarver (2014)	Thoughts and beliefs about the self (Content)	48 clinical (18 initially WL)	12 weeks individual + group exposure-therapy ^l	2 – pre, post	1	STABS (Turner et al., 2003); reliability (✓), validity (✓)
Gruber et al., (2001)	Thoughts and beliefs about the self (Content)	36 clinical 18 WL	12 weeks group CBT (18) 8 weeks computer assisted group CBT (18)	3 – pre, post, 6 mth f/up	2	SISST (Glass et al., 1982); reliability (✓), validity (✓)
Hedman, Mörtberg, et al. (2013)	Self-awareness: self-focused attention (Process)	94 clinical	16 weeks individual CT (32) 15 weeks group CBT (62)	15/16 – weekly measures	1	SPWSS (Clark et al., 2003); reliability (X), validity (X)
Hedman, Ström, et al. (2013)	Self-evaluation: Shame (Process)	67 clinical	17 weeks group CBT (35) 16 weeks individual CBT (32)	2 – pre, 1 year f/up	1	TOSCA (Tangney, Wagner, & Gramzow, 1989); reliability (✓), validity (?)
Hoffart et al. (2009)	Self-awareness: self-focused attention (Process)	40 clinical 40 residential interpersonal psychotherapy	10 weeks residential CT. 4 group + 1 individual session per week	10 – weekly measures	2	SPWSS (Clark et al., 2003); reliability (X), validity (X)
Hofmann (2000)	Self-awareness: self-focused attention (Process)	23 clinical	8 weeks group exposure therapy	2 – pre, post	1	Thoughts coding; reliability (✓), validity (?)
Hofmann and DiBartolo (2000)	Thoughts and beliefs about the self (Content)	15 clinical	8–12 weeks group exposure	2 pre, post	2	SPSS (Hofmann & DiBartolo, 2000); reliability (✓), validity (✓)
Hofmann et al. (2004)	Self-awareness: self-focused attention (Process)	60 clinical 30 WL	12 weeks group exposure therapy (30) Group CBT (30)	2 – pre, post	1	Thoughts coding; reliability (✓), validity (?)
Koerner et al. (2013)	Thoughts and beliefs about the self (Content)	77 clinical	12 weeks group CBT	2 – pre, post	1	STABS (Turner et al., 2003); reliability (✓), validity (✓)
Laposa and Rector (2014)	Self-awareness: self-focused attention (Process) Self-evaluation: video feedback following idiosyncratic exposure tasks (Process)	93 clinical	12 weeks Group CBT	2 – weeks 4/5 & 8/9 of treatment	1	FAQ (Woody et al., 1997); reliability (✓), validity (✓) 2-item performance measure (cf., Harvey et al., 2000); reliability (X), validity (X)
Lundh and Öst (2001)	Self-awareness: self-focused attention (Process) Self-schema (Content)	24 clinical	12 weeks individual CBT (9), group CBT (10), and self-treatment (5)	2 – pre, post	1	Swedish version SCS (Schneier & Carver, 1985); reliability (✓), validity (✓) Stroop task (Hope et al., 1990); reliability (?), validity (?)
Mörtberg et al. (2007) ^p	Thoughts and beliefs about the self (Content)	67 clinical 33 Treatment as usual (medication)	16 weeks individual CT (32) 3 weeks intensive group CT (35)	4 – pre, post individual CT (4 mth), 8 mth f/up, 12 mth f/up	2	SCQ (Wells et al., 1993); reliability (✓), validity (✓) SPWSS (Clark et al., 2003); reliability (X), validity (X)
Mörtberg et al. (2015) ^p	Thoughts and beliefs about the self (Content) Self-awareness: self-focused attention (Process)	29 clinical	16 weeks individual CT	16 – weekly measures	1	SCQ (Wells et al., 1993); reliability (✓), validity (✓) SPWSS (Clark et al., 2003); reliability (X), validity (X)
Moscovitch et al. (2015)	Thoughts and beliefs about the self (Content)	36 clinical 51 non-anxious clinical controls	12 weeks group CBT	2 – pre, post	2	NSPS (Moscovitch & Huyder, 2011); reliability (✓), validity (✓)

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Table 1 (continued)

Study	Self-construct (category)	n	CBT Treatment Protocol	Number of Assessment Points	Aim	Measures used
Mulkens et al. (2001)	Thoughts and beliefs about the self (Content)	31 clinical (15 initially waitlisted)	6 weeks exposure (14)	4 – pre, post, 6 weeks f/up, 12 mth f/up	2	CCM (Mulkens et al., 2001); reliability (?), validity (?)
Newman et al. (1994)	Thoughts and beliefs about the self (Content)	16 clinical 12 WL	8 weeks group exposure therapy	2 – pre, post	1	CT (Hofmann, 1992); reliability (✓), validity (✓)
Niles et al. (2014)	Thoughts and beliefs about the self (Content)	25 clinical 25 acceptance and commitment therapy	12 weeks individual CBT	7 – pre, sessions 2, 4, 6, 8, and 10, post	1	SSPS (Hofmann & DiBartolo, 2000); reliability (✓), validity (✓)
Norton and Abbott (2016a)	Thoughts and beliefs about the self (Content) Self-evaluation: speech performance (Process)	30 clinical 30 imagery rescripting 30 controls	1 session cognitive restructuring	2 – pre, post	2	SBSA (Wong & Moulds, 2009); reliability (✓), validity (✓) PQ (Rapee & Lim, 1992); reliability (✓), validity (?)
Rapee et al. (2009) ^a	Thoughts and beliefs about the self (Content) Self-awareness: self-focused attention (Process)	127 clinical 58 stress management	12 weeks group standard CBT (59), and enhanced CBT (68)	2 – pre, post	2	NMRAP (Rapee & Abbott, 2006); reliability (✓), validity (✓) Adapted SCS (Schneier & Carver, 1985); reliability (✓), validity (✓) Trait-CBQ only (Wong et al., 2017); reliability (✓), validity (✓)
Ritter et al. (2013)	Implicit & Explicit self-esteem (Content)	27 clinical 12 WL 27 Psychodynamic therapy	25 weeks individual CT + up to 5 preparatory sessions	2 – pre, post,	1	IAT (Greenwald et al., 1998); reliability (✓), validity (✓) German version RSES (Rosenberg, 1965); reliability (✓), validity (✓)
Salaberria and Echeburúa (1998)	Explicit self-esteem (Content)	48 clinical 23 WL	8 weeks group exposure therapy (24), exposure therapy + CT (24)	6 – pre, post, 1 mth, 3 mth, 6 mth, 1 year f/up	2	Spanish version RSES (Rosenberg, 1965); reliability (✓), validity (✓)
Stott et al. (2013)	Thoughts and beliefs about the self (Content)	11 clinical	14 weeks internet CT	2 – pre, post	2	SCQ (Wells et al., 1993); reliability (✓), validity (✓)
Taylor and Alden (2008)	Self-evaluation: self-worth, probability and cost related to the self and others (Process)	19 clinical 23 WL	12 weeks group interpersonal-CBT	3 – pre, mid, post	1	PCQ (Taylor & Alden, 2008); reliability (✓), validity (?) CSW-S (Taylor & Alden, 2008); reliability (✓), validity (?)
Taylor et al. (1997)	Self-awareness: self-focused attention (Process) Explicit self-esteem (Content) Self-evaluation: self-blame (Process) Thoughts and beliefs about the self (Content)	32 clinical 28 Associative therapy	8 weeks individual CT followed by 8 weeks group exposure therapy	4 – pre, post CT, post exposure therapy, 3 mth f/up	2	SCS (Schneier & Carver, 1985); reliability (✓), validity (✓) RSES (Rosenberg, 1965); reliability (✓), validity (✓) Adapted ASQ (Peterson et al., 1982); reliability (?), validity (?) SISST (Glass et al., 1982); reliability (✓), validity (✓)
Tulbure et al. (2015)	Thoughts and beliefs about the self (Content)	66 clinical	9 weeks guided internet CBT	3 – pre, post, 6 mth f/up	2	ATQ (Hollon & Kendell, 1980); reliability (✓), validity (✓)
Voncken and Bögels (2006)	Thoughts and beliefs about the self (Content) Self-awareness: self-focused attention (Process)	13 clinical	9 weeks CT	3 – pre, post, 2 mth f/up	2	SFAS (Bögels et al., 1997); reliability (✓), validity (✓) SPB (Voncken et al., 2003); reliability (✓), validity (?)
Wilson and Rapee (2005)	Thoughts and beliefs about the self (Content)	36 clinical	10 weeks group CBT (25), bibliotherapy + 5 group CBT (11)	3 – pre, post, 3 mth f/up	1	CONSE-Q (Wilson & Rapee, 2004); reliability (✓), validity (✓)
Wong et al. (2017) ^a	Thoughts and beliefs about the self (Content)	269 clinical	12 weeks group CBT	2 – pre, post	1	All 3 versions of the CBQ (Wong et al., 2017); reliability (✓), validity (✓)
Woody et al. (1997) ^f	Self-awareness: self-focused attention (Process) Thoughts and beliefs about the self (Content)	59 clinical	10 weeks group CBT	2 – pre, post for the SISST 3 – sessions 2–3, 5–6, & 8–9 averaged for the FAQ	1	FAQ (Woody et al., 1997); reliability (✓), validity (✓) Modified SISST (Glass et al., 1982); reliability (✓), validity (✓)

Note. Aim category: 1 = primary research aim, 2 = secondary research aim; ASQ = Attributional Style Questionnaire; ATQ = Automatic Thoughts Questionnaire; CBQ = Core-Belief Questionnaire; CONSE-Q = Consequences of Negative Social Events Questionnaire; CSW-S = Contingencies of Self-Worth Questionnaire; CT = Cognitions During the Talk Questionnaire; DEQ = Depressive Experiences Questionnaire; FAQ = Focus of Attention Questionnaire; GSE = General Self-Efficacy Scale; IAT = Implicit Association Test; MIBS = Maladaptive Interpersonal Belief Scale; NMRAP = Negative Mental Representations of Appearance and Performance; NSPS = Negative Self-Portrayal Scale; PCQ = Probability and Cost Questionnaire; PQ = Performance Questionnaire; RSES = Rosenberg Self-Esteem Scale; SCQ = Social Cognitions Questionnaire; SCS = Self-consciousness Scale; SESS = Social-Efficacy for Social Situations Scale; SFAS = Self-focused Attention Scale; SISST = Social Interaction Self Statement Test; SPB = Social Phobic Beliefs Inventory; SPSS = Self-Statements During Public Speaking; SPWSS = Social Phobia Weekly Summary Scale; SRET = Self-Referential Encoding Task; STABS = Social Thoughts and Beliefs Scale; TCT = task concentration training; TOSCA = Test of Self-Conscious Affects; WL = waitlist condition. ^aOnly four participants reached 24 individual CBT sessions and completed this within-session measure; ^bIncluded a social skills training component; ^cStudies used the same clinical sample population; ^dStudies used the same clinical sample population; ^eStudies used the same clinical sample population; ^fStudies used the same clinical sample population; (✓) = good psychometric properties, (X) = poor psychometric properties, (?) unknown psychometric properties.

Table 2

Study outcomes: Change in self-content and relationship to treatment outcome.

Self-construct (category)	Measure	Study	Pre-post change (effect size)	Notes	Predict outcome (approach)	Mediation outcome (approach)	Notes
Thoughts and beliefs about the self (Content)	SISST	Borgeat et al. (2009)	Y (negative subscale, $d = 0.65$; positive subscale, $d = 0.81$)	N/A	N/A	N/A	N/A
		Chambless et al. (1997) ^a	Y (for dyad role plays, $d = 1.23$; for speech task, $d = 1.08$, $d = 1.14$)	Only included negative subscale.	Y (residualised gain scores)	N/A	Predicted treatment outcome at both pre-treatment and follow-up for both dyad role play and speech tasks.
		Gelernter et al. (1991)	Y	No between group differences.	N/A	N/A	N/A
		Gruber et al., (2001)	Y (CBT negative subscale, $d = 1.48$; positive subscale, $d = 0.02$. CACBT ^c negative subscale, $d = 1.36$; positive subscale, $d = 0.97$)	CBT and CACBT better than waitlist in reducing negative cognitions. CACBT better than both waitlist and CBT at increasing positive cognitions.	N/A	N/A	N/A
		Taylor et al. (1997)	Y (negative subscale, $d = 2.18$; positive subscale, $d = 2.11$)	Larger effect sizes following cognitive restructuring (CR) than associative therapy.	N/A	N/A	N/A
	SCQ	Woody et al. (1997) ^a	Y	Only included negative subscale.	N/A	N/A	N/A
		Mörtberg et al. (2007) ^b	Y (frequency subscale, $d = 1.35$ belief subscale, $d = 1.32$)	Cognitive Therapy (CT) associated with greater change in beliefs than intensive group CT or TAU (medication).	N/A	N/A	N/A
		Mörtberg et al. (2015) ^b	Y (frequency subscale, $d = 1.70$; belief subscale, $d = 1.50$)	N/A	N/A	Y (multilevel mediation modeling)	Only in a non-lagged mediation model
		Stott et al. (2013)	Y (frequency subscale, $d = 1.71$; belief subscale, $d = 1.90$)	N/A	N/A	N/A	N/A
	SSPS	Hofmann and DiBartolo (2000)	Y (negative subscale, $d = 0.85$; positive subscale, $d = 0.45$)	Only the negative subscale significantly changed from pre- to post-treatment.	N/A	N/A	N/A
		Niles et al. (2014)	Y ($b = -0.156$)	Used multilevel modeling. Rate of decline in CBT remained constant throughout treatment.	Y (ordinary least squared regression)	N (seemingly unrelated regression)	Change early in treatment was a significant predictor (but not mediator) of change in social anxiety
	SPB	Voncken and Bögels (2006)	Y ($d = 1.37$)	N/A	N/A	N/A	N/A
		Bögels et al. (2014)	Y ($d = 1.06$)	Despite slightly larger effect sizes across CBT condition, no significant differences between CBT and psychodynamic therapy.	N/A	N/A	N/A
	STABS	Gros and Sarver (2014)	Y (total score, $d = 1.49$; social comparison subscale, $d = 1.48$; social ineptness subscale, $d = 1.39$)	No change observed for participants in a waitlisted condition.	N/A	N/A	N/A
		Koerner et al. (2013)	Y (total score, $d = 1.13$; social comparison subscale, $d = 1.00$; social ineptness subscale, $d = 1.11$)	N/A	Y (hierarchical multiple regression)	N/A	Belief that others are more socially-competent was a significant unique predictor of social anxiety at post-treatment
	MIBS	Boden et al. (2012) ^c	Y ($\eta p^2 = 0.54$)	Greater reductions than waitlisted participants.	N/A	Y (multiple regression)	Note: only two assessment points (pre/post).
	NSPS	Moscovitch et al. (2015)	Y ($\eta p^2 = 0.38$)	Greater reductions than control intervention condition.	N/A	N/A	N/A
	CCM	Mulkens et al. (2001)	Y ($d = 1.34$)	Greater reductions than waitlisted participants.	N/A	N/A	N/A
	CT	Newman et al. (1994)	Y	Greater reductions than waitlisted participants.	N/A	N/A	N/A
	SBSA	Norton and Abbott (2016a)	Y (cognitive restructuring, $d = 0.65$; imagery rescripting, $d = 0.36$)	Control participants also decreased, however reductions were not maintained at follow-up.	N/A	N/A	N/A

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Table 2 (continued)

Self-construct (category)	Measure	Study	Pre-post change (effect size)	Notes	Predict outcome (approach)	Mediation outcome (approach)	Notes
	NMRAP Trait-CBQ	Rapee et al. (2009) ^d	Y (enhanced: NMRAP, $d = 0.97$; CBQ, $d = 0.48$)	For the CBQ, no difference across treatment conditions. For the NMRAP, enhanced treatment showed greater reductions (than standard CBT treatment or stress management).	N/A	Y (multiple mediation -Preacher and Hayes macro)	Mediated differences between conditions. Note: mediators and outcomes assessed at the same time.
	ATQ	Tulbure et al. (2015)	Y ($d = 0.95$)	Lower scores compared to controls.	N/A	N/A	N/A
	CONSE-Q	Wilson and Rapee (2005) ^d	Y (perceived negatively, $d = 1.41$; indicative of negative self-characteristics, $d = 0.95$; adverse long-term consequences, $d = 1.01$)	N/A	Y (residualised gain scores; follow-up used hierarchical regression)	N/A	Only the degree to which individuals believed negative events were indicative of self-characteristics associated with 3 mth f/up.
	CBQ	Wong et al. (2017)	Y (for the trait-CBQ, $\beta = -8.66$; for the contingent CBT, $\beta = -11.34$; for the other CBT, $\beta = -11.37$)	N/A	Y (multilevel modeling)	N/A	All three versions associated with treatment outcome, controlling for depression.
Self-esteem (Content)	RSES IAT	Ritter et al. (2013)	Y (cognitive therapy: RSES, $d = 0.82$; IAT, $d = 0.74$. psychodynamic therapy: RSES, $d = 0.81$; IAT, $d = 0.44$)	No significant differences between conditions for both explicit and implicit self-esteem. Waitlist demonstrated no change.	Y (residualised gain scores)	N/A	Explicit self-esteem only.
	RSES	Salaberría and Echeburúa (1998)	Y (exposure-only, $d = 0.68$; exposure with cognitive restructuring, $d = 0.34$)	Only significant effect found for exposure-only condition.	N/A	N/A	N/A
	RSES	Taylor et al. (1997)	Y (cognitive restructuring, $d = 0.99$)	Larger effect sizes following cognitive restructuring than associative therapy.	N/A	N/A	N/A
Self-schema (Content)	SRET	Goldin et al. (2013) ^c	Y (positive self-view, $d = 2.61$; negative self-view, $d = 1.39$)	No change in waitlist. 48.3% achieved clinically significant change in positive self-views; 31.0% for change in negative self-views.	N/A	Y (MacArthur approach using linear model)	Only positive self-views mediated treatment outcome, and was associated with response at 1 year follow-up.
	Stroop task	Lundh and Öst (2001)	Y (treatment responders: social words, $d = 0.68$, physical words, $d = 0.76$)	Significant reductions only observed following classification of treatment responders. Physical threat interference also reduced.	N/A	N/A	N/A

Note. ATQ = Automatic Thoughts Questionnaire; CBQ = Core-Belief Questionnaire; CONSE-Q = Consequences of Negative Social Events Questionnaire; CT = Cognitions During the Talk Questionnaire; IAT = Implicit Association Test; MIBS = Maladaptive Interpersonal Belief Scale; NMRAP = Negative Mental Representations of Appearance and Performance; NSPS = Negative Self-Portrayal Scale; RSES = Rosenberg Self-Esteem Scale; SCQ = Social Cognitions Questionnaire; SISST = Social Interaction Self Statement Test; SPB = Social Phobic Beliefs Inventory; SPSS = Self-Statements During Public Speaking; SRET = Self-Referential Encoding Task; STABS = Social Thoughts and Beliefs Scale; ^aStudies used the same clinical sample population; ^bStudies used the same clinical sample population; ^cStudies used the same clinical sample population; ^dA significant portion of the sample in Wong et al. (2017) was used in Rapee et al. (2009); ^eComputer assisted cognitive behavioural therapy; N = study did not demonstrate significant pre- to post-treatment change, or predictive/mediation effect; Y = study demonstrated significant pre- to post-treatment change, or predictive/mediation effect; N/A = not applicable for the study.

Table 3

Study outcomes: Change in self-processing and relationship to treatment outcome.

Self-construct (category)	Measure	Study	Pre-post change (effect size)	Notes	Predict outcome (approach)	Mediation outcome (approach)	Notes
Self-focused attention	FAQ	Laposa and Rector (2014)	Y (self-focused, $d = 0.35$, other-focused, $d = 0.12$)	Within session change only: weeks 4 and 8 of treatment. External focused attention did not change.	N/A	N/A	N/A
		Woody et al. (1997)	Y	Within session change only: two sessions averaged at each stage of treatment. External focused attention did not change.	Y (residualised change scores)	N/A	Reductions in self-focus significantly correlated with treatment gains on dyad anxiety and self-judgement.
	Thought-listing procedure	Hofmann (2000)	Y (negative, $d = 0.72$; positive, $d = -1.03$)	Only the difference in negative self-focused thoughts remained significant after Bonferroni correction.	Y (residualised change scores)	N/A	Only change in negative self-focused thoughts predicted treatment outcome.

Table 3 (continued)

Self-construct (category)	Measure	Study	Pre-post change (effect size)	Notes	Predict outcome (approach)	Mediation outcome (approach)	Notes
	SFAS	Hofmann et al. (2004)	Y	CBT and exposure-only reported significantly fewer negative self-focused thoughts than waitlist ($d = 0.77$). No difference between treatment groups.	Y (residualised change scores)	N/A	Change in negative self-focused thoughts and social anxiety was correlated in CBT only. However, direct comparisons between correlations did not reach significance.
		Bögels (2006)	Y (SFA-arousal, $d = 1.33$; SFA-performance, $d = 0.70$)	Condition effects: TCT-CT greater reductions in SFA-arousal.	N/A	N/A	N/A
		Donald et al. (2014)	Y (cognitive therapy, $d = 0.47$; attention training, $d = 1.16$)	Greater reduction following attention training than cognitive therapy. No difference at 3 mth f/ up.	N/A	N/A	N/A
		Voncken and Bögels (2006)	Y ($d = 0.66$)	N/A	N/A	N/A	N/A
	SFAS + FAQ	Desnoyers et al. (2016)	Y (CBT, $d = 0.96$)	Greater reductions in mindfulness and acceptance based treatment and CBT than waitlist, but no between treatment effects.	N/A	Y (moderated mediation using HLM)	SFA mediated safety behaviour use and social anxiety; safety behaviour mediated SFA and social anxiety.
		Bögels (2006)	Y (public SC, $d = 0.67$; private SC, $d = 0.12$)	Only public SC significantly changed. Condition effects: TCT-CT greater reductions in public self-consciousness than applied relaxation-CT.	N/A	N/A	N/A
	SCS	Bögels et al. (2014)	Y (public SC, $d = 1.77$)	Only public SC measured. Despite larger effect size in CBT condition, no between treatment conditions effect.	N/A	N/A	N/A
		Lundh and Öst (2001)	Y (private SC, $d = 0.41$; public SC, $d = 0.38$)	Only public SC significantly changed.	N/A	N/A	N/A
		Rapee et al. (2009)	Y (enhanced: $d = 0.60$)	No difference across treatment conditions.	N/A	N/A	N/A
		Taylor et al. (1997)	Y (cognitive therapy, $d = 1.42$)	Only public SC measured. Greater change following cognitive restructuring than associative therapy.	N/A	N/A	N/A
	SPWSS	Hedman, Mörtberg, et al. (2013)	Y (group CBT, $d = 0.65$; individual cognitive therapy, $d = 1.88$)	Note: Data comes from two separate trials. Individual cognitive therapy stronger effect than group CBT.	N/A	Y (multilevel moderation analysis)	Change in self-focused attention was a significant mediator of both conditions.
		Hoffart et al. (2009)	Y	No significant treatment difference between XX and XX found.	N/A	Y (multilevel mediation model)	Weekly change in self-focus predicted weekly change in social anxiety (and vice versa).
		Mörtberg et al. (2015)	Y ($d = 1.81$)	N/A	N/A	Y (multilevel mediation model)	Weekly change in self-focus predicted weekly change in social anxiety (no reverse mediation).
Self-evaluation	PQ	Abbott and Rapee (2004)	Y	Treatment changed the overall level of self-appraisal (time 1 to time 2), but not the pattern of maintenance for self-appraisal.	N/A	N/A	N/A
	DEQ	Cox et al. (2002)	Y	N/A	Y (hierarchical regression)	N/A	N/A
	GSE SESS	Gaudiano and Herbert (2003)	Y (SESS, $d = 0.90$)	GSE did not change over treatment.	Y (hierarchical regression)	N/A	Remained even after controlling for changes in fear of negative evaluation.

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Table 3 (continued)

Self-construct (category)	Measure	Study	Pre-post change (effect size)	Notes	Predict outcome (approach)	Mediation outcome (approach)	Notes
	TOSCA	Hedman, Ström, et al. (2013)	Y ($d = 0.44$)	N/A	Trend (correlated change scores)	N/A	Change in shame was associated with CBT outcome ($p < 0.06$), but no effect was found for individual therapy.
	2-item performance measure	Laposa and Rector (2014)	Y	Within session change only: weeks 4/5 and 8/9 of treatment.	Y (residualised change scores)	N/A	Change in performance appraisal in the first videotaping session was associated with increases in actual performance (but not predicted performance) rating in subsequent exposure task.
	PQ	Norton and Abbott (2016a)	Y (cognitive restructuring, $d = 0.96$; imagery rescripting, $d = 1.30$)	No change demonstrated for control participants.	N/A	N/A	N/A
	PCQ CSW-S	Taylor and Alden (2008)	Y (self-probability, $d = 1.14$; self-cost, $d = 1.20$; CSW-S, $d = 0.72$)	Greater reductions on measures relative to waitlisted participants.	Y (residualised change scores)	N/A	Pre-mid change in perceived probability of negative self-outcomes only marginally associated with pre-post treatment outcome. Self-cost = no association. Pre-mid change in self-worth was associated with treatment outcome.
	ASQ	Taylor et al. (1997)	Y (cognitive restructuring, $d = 0.92$)	Larger effect size following cognitive restructuring than associative therapy.	N/A	N/A	N/A

Note. ASQ = Attributional Style Questionnaire; CSW-S = Contingencies of Self-Worth Questionnaire; DEQ = Depressive Experiences Questionnaire; FAQ = Focus of Attention Questionnaire; GSE = General Self-Efficacy Scale; PCQ = Probability and Cost Questionnaire; PQ = Performance Questionnaire; SCS = Self-consciousness Scale; SESS = Social-Efficacy for Social Situations Scale; SFAS = Self-focused Attention Scale; SPWSS = Social Phobia Weekly Summary Scale; TOSCA = Test of Self-Conscious Affects; N = study did not demonstrate significant pre- to post-treatment change, or predictive/mediation effect; Y = study demonstrated significant pre- to post-treatment change, or predictive/mediation effect; N/A = not applicable for the study.

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