WILEY

RESEARCH ARTICLE

Social cognition and metacognition in social anxiety: A systematic review

Styliani Gkika[1,2] (iD) | Anja Wittkowski[1,2] (iD) | Adrian Wells[1,2] (iD)

[1] The University of Manchester, Manchester, UK

[2] Greater Manchester Mental Health NHS Foundation Trust, Manchester, UK

Correspondence
Adrian Wells, Professor of Clinical and Experimental Psychopathology Rawnsley Building Manchester Royal Infirmary Oxford Rd Manchester M13 9WL, United Kingdom.
Email: styliani.gkika@postgrad.manchester.ac.uk

Abstract

Cognitive–behavioural and metacognitive approaches to emotional disorder implicate beliefs in social anxiety, but the types of beliefs differ across these perspectives. Cognitive models suggest that social beliefs about the self (i.e., high standards and conditional and unconditional beliefs) are central. In contrast, the metacognitive model gives centre stage to metacognitive beliefs (i.e., positive and negative beliefs about thinking) as main contributors to the maintenance of the disorder. Despite an expanding research interest in this area, the evidence for such contributions has not yet been reviewed. This study set out to systematically review relevant cross-sectional, longitudinal, and experimental investigations of the direct and indirect (through cognitive processes, such as anticipatory processing, self-focused attention, the post-mortem, and avoidance) relationships of social and metacognitive beliefs with social anxiety. Clinical and nonclinical samples were included, and correlation and regression coefficients as well as results from group comparisons (e.g., t tests and analyses of variance) were extracted. Overall, 23 papers were located, through PsycINFO, PubMed, and Web of Science, and reviewed using narrative synthesis. The results showed a robust positive relationship between social beliefs and social anxiety that appeared to be mediated by cognitive processes. Specific metacognitive beliefs were found to positively contribute to social anxiety both directly and indirectly, through cognitive processes. The study's findings are limited to 2 models of social anxiety and other minor limitations (e.g., grey literature was excluded). With these accounted for, the results are discussed in terms of the conceptualization and treatment of social anxiety and suggestions for future research are made.

KEYWORDS

cognitive processes, metacognitive beliefs, social anxiety, social beliefs

1 | INTRODUCTION

Social anxiety disorder (SAD) is characterized by an excessive fear of social situations, including engaging in social interactions, being observed, and performing in the presence of others. People with SAD are often fearful of being negatively evaluated by others and respond by either avoiding social situations or by enduring them while experiencing extreme anxiety (American Psychiatric Association, 2013). SAD is a relatively common disorder in Western cultures, with reported lifetime prevalence ranging between 4.4% in Europe (Ohayon & Schatzberg, 2010) and 12.1% in the United States (Kessler, Berglund,

et al., 2005; Ruscio et al., 2008). The age of onset has been found to be approximately 13 years (Kessler, Berglund, et al., 2005; McEvoy, Grove, & Slade, 2011), and its impact can be severe; it has been associated with increased risk for subsequent depression (Beesdo et al., 2007); co-morbid anxiety, mood, and impulse control disorders (Kessler, Chiu, Demler, & Walters, 2005); alcohol dependence (Kessler, Chiu, et al., 2005; Schneier et al., 2010); and significant problems in social and occupational functioning (McKnight, Monfort, Kashdan, Blalock, & Calton, 2016).

The understanding of SAD has been advanced by cognitive models leading to effective conceptualization and treatment (Clark & Wells, 1995; Rapee & Heimberg, 1997). One similarity among these models is a primary focus on cognitive aspects of self-knowledge, such as beliefs about the social self (here referred to as social beliefs)

This article is based on the doctoral (ClinPsyD) qualifying examination paper by the first author, supervised by the second and third authors.

and cognitive processes (e.g., worry- and rumination-like processes and self-focused attention). However, another dimension of self-knowledge, metacognitive beliefs (i.e., one's beliefs about thinking), appears to have been neglected (Wells & Matthews, 1994).

This is important because both social and metacognitive beliefs are considered core and relatively stable vulnerability factors in cognitive (Clark & Wells, 1995; Rapee & Heimberg, 1997) and metacognitive (Wells & Matthews, 1994) models of disorder and even though there is an overlap with respect to maintenance processes, such as worry, rumination, self-focused attention, and coping behaviours (e.g., avoidance), a discriminating feature of the cognitive and metacognitive models is the type of knowledge or belief thought to underlie these processes. The cognitive models (Clark & Wells, 1995; Rapee & Heimberg, 1997) emphasize beliefs about the self as a social object, whereas the metacognitive model (Wells & Matthews, 1994) specifies that metacognitive beliefs are the most important.

Following the above, we set out to review the empirical literature to assess the contribution of each of these belief domains with the aim of steering future research efforts in this area. The current review focused on the social beliefs emphasized in the Clark and Wells (1995) model, because it is one of the leading cognitive approaches and the treatment that derived from it is recommended by the U.K. National Institute of Clinical Excellence (2013) guidelines. This model integrated traditional cognitive–behavioural theory (Beck, Emery, & Greenberg, 2005) and metacognitive approaches (Hartman, 1983; Wells & Matthews, 1994, 1996) to highlight the maintaining role of social beliefs, such as high standards (HSs), conditional beliefs (CBs), and unconditional beliefs (UBs), and particular cognitive processes (as described in more detail later) and avoidance. In terms of metacognitive beliefs, the review focused on the Wells and Matthews (1994) self-regulatory executive function model because this is the leading model in defining metacognitive beliefs in emotional disorder.

1.1 | Social beliefs

HSs (e.g., "I must get everyone's approval" and "I must not let anyone see I am anxious") were hypothesized to "generate anxiety because they are difficult, if not impossible to achieve" (Clark & Wells, 1995, p. 75). CBs were defined as assumptions in relation to social evaluation (e.g., "If I make mistakes, others will reject me"), and UBs ("I am ..." statements) were defined as stable self-beliefs triggered in social evaluative situations. These beliefs can be egosyntonic, in which case they are likely to develop early in life, or they may be egodystonic, in which case they are more likely to develop following adverse social events. The authors linked the former type with more generalized types of SAD and the latter with fear of specific social situations (Clark & Wells, 1995).

Several studies have found positive relationships between social beliefs and social anxiety in nonclinical (Heeren, Wong, Ceschi, Moulds, & Philippot, 2014; Wong et al., 2017; Wong & Moulds, 2011b, 2011c; Wong, Moulds, & Rapee, 2014) and clinical samples (Wong et al., 2014, 2017). Nevertheless, these relationships appear to be inconsistent in their predictive value for social anxiety (Holzman, Valentiner, & McCraw, 2014). This could be because cognitive processes that are also key in the Clark and Wells (1995) model, such

KEY PRACTITIONERS MESSAGES

- High standards and conditional and unconditional beliefs positively and significantly correlated with social anxiety.
- These relationships appeared to be affected by cognitive processes, such as anticipatory processing, self-focused attention, and post-mortem processing.
- Positive and negative metacognitive beliefs and beliefs about the need to control thoughts positively and significantly correlated with social anxiety.
- Metacognitive beliefs showed both direct and indirect (via cognitive processes) effects on social anxiety.
- The general methodological quality of the papers was moderate to very good.

as anticipatory processing (i.e., a type of worry about forthcoming social situations) and the post-mortem (i.e., a type of rumination about past social situations), mediate or moderate the relationships between social beliefs and social anxiety.

1.2 | Cognitive processes

More specifically, anticipatory processing was defined (Clark & Wells, 1995) as a detailed review of what might happen in a forthcoming social situation. It often takes the form of worrying, and it is suggested to lead to self-focused processing and avoidance. Consistently, anticipatory processing has been associated with increased anxiety (Hinrichsen & Clark, 2003; Vassilopoulos, 2005) compared with distraction, and Mills, Grant, Lechner, and Judah (2013) found that thoughts about avoidance within the context of anticipatory processing predicted social anxiety in a sample of undergraduate students. The post-mortem (also referred to as postevent processing and postevent rumination) is defined as a review of past social situations that is influenced by the person's self-focused state whilst in the situation, and therefore, it is negatively biased (Clark & Wells, 1995). It is distinguished from general rumination in that the latter refers to repetitively dwelling over general symptoms of distress, their cause, and their influence on one's life (Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008), whereas the post-mortem is specific to social situations and social performance. There is considerable evidence suggesting that high levels of social anxiety and SAD are positively associated with the post-mortem and that the post-mortem might be maintaining negative self-interpretations, self-focused attention, and retrieval of negative memories in social anxiety (see Brozovich & Heimberg, 2008, for a review).

The Clark and Wells (1995) model suggests that anticipatory processing and the post-mortem contribute to negative social beliefs by increasing or prolonging the focus on anxious feelings and negative perceptions. To date, these proposed relationships between social beliefs and cognitive processes in social anxiety have not yet been reviewed. A deeper exploration of the direct and indirect effects of social beliefs on social anxiety could expand our understanding of

how the disorder is maintained and how to approach such beliefs in treatment (e.g., through cognitive restructuring or through the control of processes, such as anticipatory processing and the post-mortem).

1.3 | Metacognitive beliefs

The centrality of and necessity for social beliefs in SAD are brought into question by the metacognitive model (Wells, 2009). Specifically, Wells and Matthews (1994) proposed that metacognitive beliefs are the central factor contributing to the cognitive processes of worry and rumination (i.e., anticipatory processing and the post-mortem) and to prolonged psychological distress (Wells & Matthews, 1994, 1996). Research has highlighted several types of metacognitive beliefs, including positive beliefs about worry (e.g., "worrying helps me cope"), beliefs about the uncontrollability and dangerousness of thoughts (e.g., "my worrying could make me go mad"), cognitive confidence (i.e., beliefs about how well one's cognitive processes function, such as "I have little confidence in my memory for places"), cognitive self-consciousness (i.e., knowledge about how aware one is of cognitive processing, such as "I monitor my thoughts"), and beliefs about the need to control thoughts such as "If I could not control my thoughts, I would not be able to function" (Cartwright-Hatton & Wells, 1997; Wells & Cartwright-Hatton, 2004).

Metacognitive beliefs have been found to be positively associated with depression, (Papageorgiou & Wells, 2001), symptoms of psychosis such as hallucinations, (Morrison, Wells, & Nothard, 2002), obsessions and compulsions (Solem, Myers, Fisher, Vogel, & Wells, 2010), health anxiety (Bailey & Wells, 2015), and alcohol misuse (Spada & Wells, 2010). In relation to SAD, preliminary findings suggest a positive relationship between metacognitive beliefs and social anxiety (Fisak &

Hammond, 2013; Vassilopoulos, Brouzos, & Moberly, 2015; Wong & Moulds, 2010), although not all results have been consistent (Dannahy & Stopa, 2007; Vassilopoulos et al., 2015) and not all types of metacognitive beliefs have been explored.

1.4 | Aims

Motivated by the gap in the literature concerning the relative strength of relationships between social beliefs and metacognitive beliefs and social anxiety, we set out to conduct a systematic review of relevant research findings. The main aim was to examine the data in relation to the respective relationships between social and metacognitive beliefs and social anxiety. In particular, we explored direct and indirect relationships between social and metacognitive beliefs and social anxiety (correlations, regressions, and group comparisons) as well as any impact of the cognitive processes and avoidance on these relationships.

2 | METHOD

We identified relevant studies through PsycINFO, PubMed, and Web of Science. The keywords used in the search for social and metacognitive beliefs were *beliefs* AND (*social anxiety* OR *social phobia*) and *metacog** AND *social* in the full text, respectively. Follow-up searches included the acronyms of the selected questionnaires measuring targeted beliefs (i.e., *SBSA, SCQ, CBQ,* and *MCQ*) AND (*social anxiety* OR *social phobia*). Overall, the searches yielded 4,664 studies relevant to social beliefs and 2,738 studies relevant to metacognitive beliefs (Figure 1). The final search was conducted on October 28,
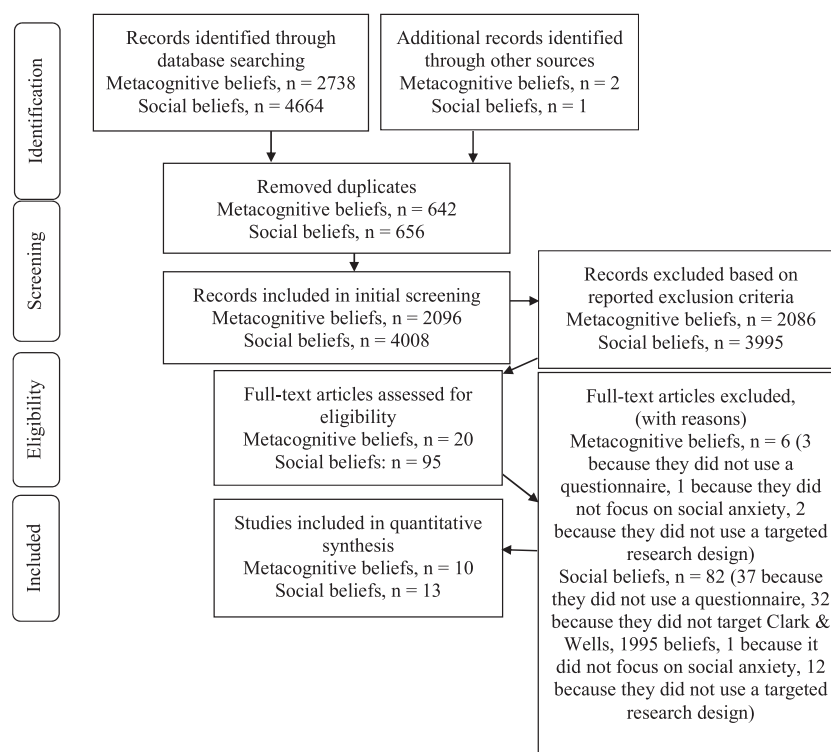

FIGURE 1 Selection flow chart

2016. The results are presented in line with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses statement (where applicable) to ensure key information is reported (Moher, Liberati, Tetzlaff, Altman, & The, 2009).

2.1 | Inclusion criteria

We focused on studies that employed clinical and nonclinical samples of participants 17 years of age and older. Studies on nonclinical samples (based on cut-off points on social anxiety scales) were included based on findings that clinical populations have demonstrated similar patterns of results (Stopa & Clark, 2001). Cross-sectional, longitudinal, and comparison studies (comparing people with high and low levels of social anxiety or clinical with nonclinical groups) were included provided that social anxiety or the beliefs of interest were the outcome variables.

2.2 | Exclusion criteria

Following removal of the duplicates, we screened the remaining papers in relation to the exclusion criteria. For the social beliefs, these were if (a) the focus of the paper was not on social anxiety or SAD, (b) the focus was on related constructs that were not clearly defined as social anxiety (e.g., test anxiety, fear of stuttering, fear of blushing, and general anxiety), (c) the study report was not in English, (d) participants were below 17 years old, (e) the measured beliefs were not directly relevant to the Clark and Wells (1995) model (see below for more details), (f) the research design did not provide information about the relationship between beliefs and social anxiety (e.g., correlations and regressions) or about the differences between groups with and without social anxiety (e.g., within-subject comparisons or designs where participants were not selected based on their social anxiety), (g) the beliefs were not measured by a questionnaire, and (h) the publication was not peer reviewed.

In order to increase conceptual clarity and adherence to the Clark and Wells (1995) model, the following exclusion criteria were applied in relation to social belief measures: (a) if the items had not derived entirely or mainly from the Clark and Wells (1995) model; (b) if the items measured symptoms, perceptions, and negative automatic thoughts as opposed to beliefs; and (c) if the content of the beliefs was not specific to social situations (e.g., "if my house gets burgled, it'll be my fault"). The measures explored against these criteria were the Social Thoughts and Beliefs Scale (STABS; Turner, Johnson, Beidel, Heiser, & Lydiard, 2003), the Maladaptive Interpersonal Beliefs Scale (Boden et al., 2012), the Social Phobic Belief scale (Bgels, unpublished), the Social Cognitions Questionnaire (SCQ; Wells, Stopa, & Clark, 1993), the Self-Beliefs in Social Anxiety (SBSA) scale (Wong & Moulds, 2011b), the Schema Questionnaire (Young & Brown, 1989), the Core Beliefs Questionnaire (CBQ; Wong et al., 2017), and the Self-Ratings of Personality Attributes (Wilson & Rapee, 2006).

On examination of the items and the process of development of these scales, it was evident that some were not closely linked to the Clark and Wells (1995) model. For example, the STABS has two subscales, social ineptness and social comparison, which could be conceptually related to the model. However, items such as "If I am

with a group of people and I have an opinion, I am likely to chicken out and not say what I think" might relate more to symptoms of social anxiety (e.g., avoidance) rather than beliefs. Indeed, the authors generated the items from sources such as diagnostic manuals and symptom scales as well as from relevant cognitions based on clinical experience (Turner et al., 2003). Consistently, a study that used both the STABS and the SBSA (the latter being directly driven from the model) found that two of the SBSA subscales (HSs and CBs) explained additional variance in social anxiety over and above the STABS, which suggested that they measure different concepts, although there might be some overlap in relation to UBs (Wong et al., 2014). The application of the above exclusion criteria led to the exclusion of the STABS, the Maladaptive Interpersonal Beliefs Scale, and the Schema Questionnaire. The Social Phobic Belief scale was also excluded because the measure was not provided by the authors and the items could not be explored.

For the metacognitive beliefs, the exclusion criteria were identical apart from the fifth criterion above that was changed to beliefs that were inconsistent with the Wells and Matthews (1994) model (e.g., studies on metacognitive concepts relevant to educational theories were excluded).

At the initial stage of the study, during the screening process, 25% of all papers were also screened by a colleague, who was not related to the research team. Both raters (one of which was the first author) hold PhD degrees in Psychology and were clinical psychology trainees. The kappa coefficient was used to measure agreement between the two raters. There was substantial agreement for both social beliefs ($k = 0.78$, $n = 279$, $p < .0005$, 95% CI [0.68, 0.86]) and metacognitive beliefs ($k = 0.71$, $n = 174$, $p < .0005$, 95% CI [0.90, 1.00]). There were 19 occasions of disagreement, which were resolved by discussion. Following the screening process, 10 studies concerning metacognitive beliefs and 13 studies about social beliefs were included in the final sample (Figure 1).

2.3 | Quality assessment

The Quality Assessment Tool for Studies of Diverse Designs (Sirriyeh, Lawton, Gardner, & Armitage, 2012) was used as a framework to rate the quality of the 23 papers. This tool focuses on the congruency, consistency, and transparency of the study instead of on the actual results and was deemed appropriate because there was no intention to exclude studies based on their assessed quality. The Quality Assessment Tool for Studies of Diverse Designs includes 16 items that are scored on a 4-point Likert scale, of which 14 are relevant to quantitative designs and were used in the current review. Scores therefore ranged from 0 to 42, with scores of over 30 indicating very good methodological robustness. To examine potential assessment bias, 25% of the papers (seven papers) were independently assessed by a colleague.

2.4 | Quantitative synthesis

The synthesis involved the extraction of correlation and regression coefficients as measures of the magnitude of the relevant associations. Comparison statistics (e.g., t tests and analyses of variance) and their

effect sizes (Cohen's *d* and partial eta squared statistics) were also included when comparing high- and low-social-anxiety groups or clinical and nonclinical samples. Statistics for *t* test and Cohen's *d* were calculated from the reported means and standard deviations when not available.

3 | RESULTS

3.1 | Sample characteristics

Of the 10 metacognitive belief studies, four were conducted in the United Kingdom (Dannahy & Stopa, 2007; Field & Cartwright-Hatton, 2008; Gkika & Wells, 2016; Wells & Carter, 2001), two in the United States (Fergus, Valentiner, McGrath, Gier-Lonsway, & Jencius, 2013; Fisak & Hammond, 2013), two in Australia (McEvoy & Perini, 2009; Wong & Moulds, 2010), one in Norway (Nordahl, Nordahl, & Wells, 2016), and one in Greece (Vassilopoulos et al., 2015). Of the 13 social belief studies, 11 were conducted in Australia (Makkar & Grisham, 2011, 2013; Wong, McEvoy, & Rapee, 2016; Wong & Moulds, 2009, 2011a, 2011b, 2011c, 2012a, 2012b; Wong et al., 2014, 2017), one in Belgium and Switzerland (Heeren et al., 2014), and one in the United States (Holzman et al., 2014). Four studies on metacognitive beliefs (Fergus et al., 2013; McEvoy & Perini, 2009; Nordahl et al., 2016; Wells & Carter, 2001) and two on social beliefs (Wong et al., 2014, 2017) used clinical samples. The remaining samples consisted mainly of undergraduate students.

The total sample size was 3,251 in studies that targeted social beliefs and 2,126 in studies that targeted metacognitive beliefs. Information on study design, participant characteristics, and measures used for beliefs and social anxiety is reported in Table 1. In summary, among the studies on metacognitive beliefs, four used a cross-sectional design, three used experimental designs manipulating anxiety or cognitive processes, two used group comparisons between clinical and nonclinical samples, and one was a controlled trial. Among the studies on social beliefs, five used a cross-sectional design, five used experimental designs (as above), one used group comparisons, and one used both a cross-sectional design and group comparisons (Table 1).

Social anxiety was measured by self-report questionnaires, including the Fear of Negative Evaluation (FNE) scale (Watson & Friend, 1969), the Social Phobia Scale (SPS) and Social Interaction Anxiety Scale (SIAS; Mattick & Clarke, 1998), the Liebowitz Social Anxiety Scale (LSAS; Liebowitz, 1987), the Social Phobia and Anxiety Inventory (Turner, Beidel, Dancu, & Stanley, 1989), and the Social Phobia Inventory (SPIN; Connor et al., 2000).

3.2 | Quality scores

Overall, the quality scores (Table 2) ranged from 20 to 32 (out of a highest possible of 42), which suggests that the studies were of moderate to very good quality. The scores of the metacognitive belief studies ranged between 23 and 27 (*M* = 24.8, *SD* = 1.23), and the scores of the social belief studies ranged between 20 and 32 (*M* = 25.31, *SD* = 3.52). Seven papers were moderated by a colleague, and good agreement between the two raters was observed (Table 2). There were

no major discrepancies, and any minor issues were resolved by discussion.

3.3 | Social beliefs in social anxiety

3.3.1 | High standards

All correlations were based on cross-sectional data from nonclinical samples, except one study that recruited people that scored high and low on the FNE scale (Wong & Moulds, 2009). The studies (Heeren et al., 2014; Holzman et al., 2014; Wong & Moulds, 2009, 2011b, 2011c, 2012a; Wong et al., 2014, 2016) showed that HSs positively and significantly correlated with measures of social anxiety (Table 3). Correlation coefficients were moderate to large and ranged between .37 and .65 with the exception of one study (Heeren et al., 2014), which found a relatively small, but significant, correlation (*r* = .17) with the LSAS. In this study, the relationship between social anxiety symptoms and HSs was higher when symptoms were measured with the FNE rather than with the LSAS. Therefore, a potential explanation could be that the French translation of the LSAS may have poorer reliability. In particular, the FNE and LSAS showed poor intercorrelations (*r* = .15), and the French version of the LSAS included four items with loadings below .40. This is consistent with previous findings that the French version of the LSAS has included six items with loadings bellow .40 (Heeren et al., 2012); however, the findings are preliminary, and further research is required.

HSs were also found to make a unique contribution to a composite social anxiety measure (FNE, SPS, and SIAS), β = .26, *t*(218) = 4.29, *p* < .01, when accounting for UBs and CBs together. All three belief types (HSs, UBs, and CBs) explained 49.1% of the variance in social anxiety (Wong & Moulds, 2011b). However, this analysis did not control for any other variables. Similarly, HSs entered in a regression analysis at Step 2, following the STABS subscales at Step 1, were individual predictors of the SPS, β = .17, *t*(234) = 3.56, *p* < .01, and explained additional variance in social anxiety (SPS, Δ*F* = 12.68, total R^2 = .55, *p* < .01; Wong et al., 2014). However, another cross-sectional study (Holzman et al., 2014) that controlled for the post-mortem and self-focused attention at Step 1, the interaction between these variables at Step 2, and SPS at Step 3 found no significant predictive value of HSs on SIAS (values were not reported). Similarly, when they repeated the analysis with SPS as the dependent variable and controlling for SIAS at Step 3, they found that HS beliefs did not uniquely predict SPS (values were not reported), although all three belief types (HSs, UBs, and CBs) explained additional variance in SPS (ΔR^2 = .02, *p* < .05, individual betas were not reported). Significant predictors were interoceptive self-focused attention, the post-mortem, and social interaction anxiety. The authors attributed this to the potential overlap among the SBSA subscales; however, it is also possible that any effects were mediated by or otherwise dependent on variance shared with the post-mortem and self-focused attention. Moreover, it should be noted that there might be overlap between the dependent variable (SPS) and the covariate (SIAS) as well as between the post-mortem and self-focused attention and their interaction variables. Such overlap might have confounded the results.

Two studies (Wong & Moulds, 2012b) compared groups of people high and low in FNE that engaged in experiential or analytical

TABLE 1 Characteristics and quality assessment of included studies

Author (year), matching number for Tables 3 and 4	Design	Sample characteristic	Assessment tools (social anxiety, metacognitive and social beliefs)	Statistical analyses	Quality assessment: issues related to this review
Metacognitive beliefs					
1. Wells and Carter (2001)	Completion of questionnaires, group comparisons	Clinical sample, n = 24 in each group Five groups (GAD, PD, SAD, depression, and a control group) based on DSM-III-R diagnoses Mean age was 37.90 (GAD), 38 (PD), 33.50 (SAD), 34.63 (depression), and 30.13 (control group); 58.33% women in each group	Metacognitive beliefs: MCQ	ANOVAs and multigroup discriminant function analysis	Older version of the MCQ
2. Dannahy and Stopa (2007)	Experimental manipulation of anxiety (recorded conversation task)	Undergraduate students, n = 123 High in FNE, n = 25; mean age 20.28 (SD = 3.36); 92% women Low in FNE, n = 25; mean age 21.84 (SD = 5.72); 84% women	SAD: FNE Metacognitive beliefs: MCQ-30-adapted	ANOVAs and t tests	The MCQ-30 was changed with unknown impact on its psychometric properties and was administered only once, so it could not be explored as a predictor of the post-mortem.
3. Field and Cartwright-Hatton (2008)	Cross-sectional online questionnaire study	Undergraduate students, n = 559; mean age 22 (SD = 5.40); 81.4% women	SAD: SPAI Metacognitive beliefs: III	Correlations and structural equation modelling	The III is more specific to obsessive–compulsive disorder.
4. McEvoy and Perini (2009)	Controlled trial using the constructive strategy	Clinical sample of 81 people with SAD based on the DSM-IV; mean age 30.68 (SD = 9.37); 37% women	SAD: SPS and SIAS Metacognitive beliefs: MCQ-30	Correlations, t tests, and ANOVAs	
5. Wong and Moulds (2010)	Two cross-sectional questionnaire studies	Study 1: undergraduate students, n = 250; mean age 20.72 (SD = 4.67); 62% women Study 2: undergraduate students, n = 124; mean age 20.09 (SD = 2.84); 62.10%	Study 1 SAD: FNE Metacognitive beliefs: PBRS-SA Study 2 SAD: SPS, SIAS, and composite PBRS-SA	Correlations, regression analysis with PBRS-SA entered in the final step, and mediation analysis	The mediation analysis was not fully in line with the metacognitive model.
6. Fergus et al. (2013)	Pen and pencil questionnaires completed during initial assessment	Clinical sample of 141 people with diagnoses of various disorders, based on the DSM-IV Mean age 29.1 (SD = 12.9); 56.7% women 13 had a primary diagnosis of SAD	SAD: SIAS Metacognitive beliefs: CAS-I	Zero-order and partial correlations and hierarchical regressions with the CAS-I at Step 2	The CAS-I measures processes and avoidance as well as metacognitive beliefs.
7. Fisak and Hammond (2013)	Cross-sectional pen and pencil questionnaire study	Undergraduate students, n = 300; mean age 23.43; 74.3% women	SAD: SPIN Metacognitive beliefs: MCQ-30, PBRS-SA, PB-PEPQ	Correlations and regressions (including mediation analyses)	
8. Vassilopoulos et al. (2015)	Cross-sectional pen and pencil questionnaire study	Undergraduate students, n = 301; mean age 20 (SD = 1.8); 86.7% women	SAD: SIAS Metacognitive beliefs: MCQ-30, PB-APQ, PBRS-SA	Correlations and hierarchical regression (including mediation) analyses. PB-APQ entered at the final step controlling for depression and other beliefs	

TABLE 1 (Continued)

Author (year), matching number for Tables 3 and 4	Design	Sample characteristic	Assessment tools (social anxiety, metacognitive and social beliefs)	Statistical analyses	Quality assessment: issues related to this review
9. Gkika and Wells (2016)	Experimental manipulation of anticipatory processing	University students, $n = 80$; high in FNE divided into two experimental groups; mean age 20.90 ($SD = 2.72$) in the distraction group and 22.7 ($SD = 4.43$) in the anticipatory processing group; 85% women in each group	SAD: FNE Metacognitive beliefs: MCQ-30	ANOVAs and t tests	Relevant correlations were not reported
10. Nordahl et al. (2016)	Experimental manipulation of anxiety (conversation task).	Clinical sample, $n = 47$ people with SAD based on the DSM-IV; mean age 27.95 ($SD = 8.36$); 53% women	SAD: FNE, BCL (negative self-evaluation after the task) Metacognitive beliefs: MCQ-30		
Social beliefs					
11. Wong and Moulds (2009)	Experimental manipulation of the post-mortem following a speech task	University students, $n = 93$ High in FNE, $n = 56$; mean age 20.61 ($SD = 3.37$); 58.93% women Low in FNE, $n = 47$; mean age 20.49 ($SD = 3.36$); 48.94% women	SAD: FNE Social beliefs: SBSA	t tests and ANCOVAs	SBSA was not administered at baseline
12. Makkar and Grisham (2011)	Experimental manipulation of anxiety (conversation and speech: counterbalanced)	University students, $n = 40$; mean age 24.6 ($SD = 7.31$)	SAD: FNE, SIAS, SPS, composite Social beliefs: SCQ-modified, SBSA	ANOVAs and correlations	SBSA used as a total scale
13. Wong and Moulds (2011a)	Experimental manipulation of anticipatory processing (threat: speech task)	University students, $n = 80$; mean age 21.49 ($SD = 7.17$); 61.25% women; split into high- and low-FNE groups (details of each group: see Wong & Moulds, 2009)	SAD: FNE Social beliefs: SBSA	ANOVAs and mediation analyses	The design did not target any effect of beliefs on anticipatory processing.
14. Wong and Moulds (2011b)	Cross-sectional pen and pencil questionnaire study prior to entering an experimental design at two time points $M = 9.15$ days apart	University students, $n = 600$ ($n = 223$ included in reported correlation analyses); mean age 20.52 ($SD = 4.10$); 61.50% women	SAD: FNE, SPS, SIAS and composite Social beliefs: SBSA	Exploratory and confirmatory factor analyses, correlations and regressions	
15. Wong and Moulds (2011c	Cross-sectional questionnaire study	University students, $n = 361$; mean age 20.63 ($SD = 4.60$); 61.50% women	SAD: FNE Social beliefs: SBSA	Correlations and path analyses	FNE was conceptualized as a predictor of social beliefs and not vice versa
16. Wong and Moulds (2012a)	Cross-sectional questionnaire study (SBSA was completed a second time $M = 8.84$ days later)	University students, $n = 180$; mean age 20.60 ($SD = 3.50$); 62.22% women	SAD: FNE, SIAS, SPS, composite Social beliefs: SBSA	Correlations and regressions	No analysis with social anxiety as the dependent variable

(Continues)

TABLE 1 (Continued)

Author (year), matching number for Tables 3 and 4	Design	Sample characteristic	Assessment tools (social anxiety, metacognitive and social beliefs)	Statistical analyses	Quality assessment: issues related to this review
17. Wong and Moulds (2012b	Two studies: experimental manipulation of anticipatory processing and the post-mortem (analytical vs. experiential mode)	University students, n = 169 Study 1, n = 94; mean age 20.60 (SD = 3.07); 64.89% women Study 2, n = 74 UG; mean age 20.89 (SD = 3.10); 55.41% women	SAD: FNE Social beliefs: SBSA	ANOVAs, follow-up tests (false recovery rate), regressions	
18. Makkar and Grisham (2013)	Experimental manipulation of the post-mortem following a group discussion task	University students, n = 81 High in brief FNE, n = 49; mean age 19.83 (SD = 2.95); 71.43% women Low in brief FNE, n = 42; mean age 19.73 (SD = 2.60); 57.14% women	SAD: FNE, SIAS Social beliefs: SBSA	ANOVAs (FNE groups × manipulation × the three SBSA subscales)	Relevant correlations not reported
19. Heeren et al. (2014)	Cross-sectional questionnaire study in French-speaking populations (native speakers)	University students and friends or colleagues, n = 611; mean age 31.16 (SD = 12.18); 67.1% women	SAD: FNE, LSAS Social beliefs: SBSA	Confirmatory factor analysis, reliability tests, correlations	Prediction of social anxiety was not explored
20. Holzman et al. (2014)	Cross-sectional questionnaire study	University students, n = 101; mean age 19.9 (SD = 2.4); 71.3% female	SAD: SIAS, SPS Social beliefs: SBSA	Correlations and regressions with social beliefs entered at Step 4	Mediation analysis would have been useful
21. Wong et al. (2014)	Cross-sectional questionnaire study (SBSA was completed a second time M = 9.68 days later) and comparison with clinical sample	University students, n = 235; mean age 23.84 (SD = 3.58); 79.15% women Clinical sample, n = 33 based on DSM-IV; mean age 22.73 (SD = 3.58); 60.61% women	SAD: SPS Social beliefs: SBSA	Confirmatory factor analysis, reliability tests, correlations, regressions, and t tests	When SPS was the dependent variable, depression was not controlled for.
22. Wong et al. (2016)	Cross-sectional online questionnaire study at two time-points (second completion M = 8.44 days after first)	University students, n = 331 at Time 1 and n = 215 at Time 2; mean age 27.37 (SD = 5.92); 76.44% women	SAD: SPS Social beliefs: SBSA	Correlations and hierarchical linear modelling analyses with maximum likelihood estimation and simple slope analyses	No analysis used social anxiety as the dependent variable
23. Wong et al. (2017	Questionnaire study, cross-sectional and group comparisons	Clinical sample, n = 269 based on DSM-IV; mean age 33.71 (SD = 11.09); 47.21% women Community sample described as confident, n = 67; mean age 37.38 (SD = 16.20); 53.73% women	SAD:SIAS, SPS, composite Social beliefs: CBQ	Exploratory factor analysis, correlations, reliability tests, t tests, and receiver operating characteristic analysis	

Note. ANCOVA = analysis of covariance; ANOVA = analysis of variance; BCL = Behavioural Checklist; CAS-I = Cognitive Attentional Syndrome scale 1; CBQ = Core Beliefs Questionnaire; DSM = Diagnostic and Statistical Manual of Mental Disorders; FNE = Fear of Negative Evaluation scale; GAD = generalized anxiety disorder; III = Interpretation of Intrusions Inventory; MCQ = Metacognition Questionnaire; PB-APQ = Positive Beliefs about Anticipatory Processing Questionnaire; PB-PEPQ = Positive Beliefs about Post-Event Processing Questionnaire; PBRS-SA = Positive Beliefs About Rumination Scale Adapted for Social Anxiety; PD = panic disorder; SAD = social anxiety disorder; SBSA = Self-Beliefs in Social Anxiety; SCQ = Social Cognitions Questionnaire; SIAS = Social Interaction Anxiety Scale; SPAI = Social Phobia and Anxiety Inventory; SPIN = Social Phobia Inventory; SPS = Social Phobia Scale.

TABLE 2 Quality assessment scores and main limitations (papers are presented in chronological order)

Author (date)	Main limitations	Quality Score Rater 1	Quality Score Rater 2
Studies on metacognitive beliefs			
Wells and Carter (2001)	Sampling excluded co-morbidities A standardized worry measure could have been used Power analysis not reported Confidence intervals not reported Current alphas not reported No evidence of service user involvement	26	
Dannahy and Stopa (2007)	Analogue sample Power analysis not reported Current alphas not reported; visual analogues scales were used Weak rationale for changing the MCQ Confidence intervals not reported The MCQ was administered only before the anticipated second interaction Some nonnormal data were used in the analyses Confounders not accounted for No evidence of service user involvement	24	24
Field and Cartwright-Hatton (2008)	Analogue sample (some data were lost) The hypotheses do not state the direction of the predicted relationships Power analysis not reported More detailed justification of used analysis was needed Confounders not accounted for No evidence of service user involvement	29	
McEvoy and Perini (2009)	Power analysis not reported Not enough detail regarding the stages of recruitment and allocation Not all psychometrics of the selected measures reported The study included compared two CBT groups with the addition of either ATT or relaxation, even though the introduction discusses that when additional techniques are added to CBT, results are shadowed and the authors state that relaxation might have an impact on attentional focus Unequal and small sample sizes; no discussion of the assumptions of the ANOVAs No clear justification for calculating change scores using the means Confidence intervals not reported No evidence of service user involvement	22	22
Wong and Moulds (2010)	Analogue sample No justification for the selection of the measures; more detail about their psychometric properties was needed Composite score was used The new measure of the post-mortem includes questions both about the present and the past; full psychometrics not reported Lack of conceptual clarity at times Confidence intervals not reported No evidence of service user involvement		
Fergus et al. (2013)	The hypotheses do not state the direction of the predicted relationships Power analysis not reported Unequal size numbers; only 13 participants in the SAD group Test–retest reliability not examined Regression analyses were used in small sample sizes More detailed justification of the method of analysis was needed Several confounders were not accounted for Confidence intervals not reported No evidence of service user involvement	26	25
Fisak and Hammond (2013)	Analogue sample The hypotheses do not state the direction of the predicted relationships Not enough detail about recruitment and data collection Not enough justification of the choice of measures and not all psychometrics reported Test–retest reliability not examined Confounder variables not accounted for Not all statistics reported (e.g., some p values are missing) Some variables potentially overlapped No evidence of service user involvement	24	

(Continues)

TABLE 2 (Continued)

Author (date)	Main limitations	Quality Score Rater 1	Quality Score Rater 2
Vassilopoulos et al. (2015)	Analogue sample Power analysis not reported Not enough justification of the choice of measures Unclear whether all measures were translated and back-translated More detailed justification of the chosen method of analysis was needed No evidence of service user involvement	27	
Gkika and Wells (2016)	Analogue sample Power analysis not reported Not enough justification of the choice of measures Confounders were not taken into account Separation in high- and low-metacognitive-belief groups No control group More detailed justification of the chosen method of analysis was needed No evidence of service user involvement	26	
Nordahl et al. (2016)	Small sample More details regarding exclusion and inclusion criteria were needed Power analysis not reported Not enough justification of the choice of measures Not all psychometric properties of the selected measures are reported There is no justification for the used analyses No control group A relatively large number of predictors are used in a small sample size Confidence intervals not reported No evidence of service user involvement Limited discussion of the study's limitations	24	
Studies on social beliefs			
Wong and Moulds (2009)	Analogue sample Power analysis not reported The rationale for choosing the questionnaires is not clear (e.g., why the FNE scale? why visual analogue scales?) A new scale (SBSA) is used; alphas are reported, but a factor analysis and test–retest reliability statistics are not reported There is no control group There is no justification for the used analyses The group sizes were unequal; a discussion about adherence to the assumptions of ANOVA would have been useful Confidence intervals not reported No evidence of service user involvement	23	
Makkar and Grisham (2011)	Analogue sample Power analysis not reported Small sample size ($n = 40$) used in a regression with nine predictor variables; no discussion of the assumptions of regression analyses Composite score was used; psychometrics not reported Confidence intervals not reported There is no justification for the used analyses No evidence of service user involvement No discussion of any carryover effects of the first exposure to the waiting period to the second exposure	25	
Wong and Moulds (2011a)	Analogue sample Power analysis not reported Not enough detail about how participants were recruited No rationale for choosing the questionnaires and no psychometrics are reported Visual analogue scales were used Small group sizes Confidence intervals not reported No evidence of service user involvement	23	24
Wong and Moulds (2011b)	Analogue sample Power analysis not reported Not enough detail about how participants were recruited Small period between Time 1 and Time 2 (9.15 days) Current alphas not reported Composite scores used in the analysis Confidence intervals not reported No evidence of service user involvement	27	

(Continues)

TABLE 2   (Continued)

Author (date)	Main limitations	Quality Score Rater 1	Quality Score Rater 2
Wong and Moulds (2011c)	The definition of "avoidance" is a bit broad and includes attentional biases, the post-mortem as an emotional avoidance strategy, safety behaviours and more Analogue sample Not enough detail about how participants were recruited and how data were collected No justification for the use of path analysis and mediation No evidence of service user involvement	24	
Wong and Moulds (2012a)	Analogue sample Not enough detail about how participants were recruited Power analysis not reported Current alphas not reported Composite score was used; psychometrics not reported No justification for the use of selected analysis Confidence intervals not reported No evidence of service user involvement	27	27
Wong and Moulds (2012b)	Analogue sample Power analysis not reported Not enough detail about how participants were recruited and how data were collected No rationale for choosing the questionnaires and no psychometrics are reported; visual analogue scales were used Confidence intervals not reported Not clear why the authors used a regression to control for anxiety and mode of processing rather than an ANCOVA No control group Confidence intervals not reported Very subtle differences between the two processing modes No evidence of service user involvement	22	
Makkar and Grisham (2013)	Not clear what the difference between PEP and AE-PEP is and whether the authors consider experiential processing as a different type of processing to PEP or as another type of PEP that is more concrete Analogue sample Not enough detail about how the data were collected Power analysis not reported The PEP period was controlled by prompts shown every 30 s, which might have limited PEP's analytical nature No justification for the use of selected analysis Confidence intervals not reported No evidence of service user involvement	28	
Heeren et al. (2014)	Analogue sample Specific hypotheses not reported Not enough detail about how participants were recruited (the sample included friends and acquaintances) The authors aimed for a community sample, but most participants were students No justification for using selected measures, no psychometrics and current alphas reported Power analysis not reported Small clinical sample Small period between Time 1 and Time 2 (10 days) No evidence of service user involvement	24	22
Holzman et al. (2014)	Unclear hypotheses and predictions Analogue sample, consisting of Caucasian and non-Hispanic people More detail on recruitment was needed (an assessment is mentioned, but not elaborated on) Power analysis not reported Not all psychometrics of the selected measures reported No justification for the use of the selected analysis (why not mediation analysis?) Interaction terms are entered in the same regression analysis as the individual variables (involved in the interaction); no discussion of what the impact of that might be The inclusion of one social anxiety measure as a covariate when predicting another could have been discussed Other confounders not taken into account (e.g., depression, anxiety) Confidence intervals not reported Limited discussion of study limitations No evidence of service user involvement	20	

(Continues)

TABLE 2 (Continued)

Author (date)	Main limitations	Quality Score Rater 1	Quality Score Rater 2
Wong et al. (2014)	Small clinical sample Power analysis not reported No clear rationale for selecting the measures and not all psychometrics reported Small period between Time 1 and Time 2 (10 days) Confidence intervals not reported No evidence of service user involvement	32	
Wong et al. (2016)	Analogue sample Power analysis not reported Not all psychometrics of the selected measures reported Small period between Time 1 and Time 2 (4–12 days) Confidence intervals not reported No evidence of service user involvement	30	
Wong et al. (2017)	The community sample was recruited by asking for confident people Not all psychometrics of the selected measures reported Use of composite score Confidence intervals not reported Confounders, such as age and gender, not accounted for No evidence of service user involvement	29	31

Note. AE-PEP = abstract evaluative form of postevent processing; ANCOVA = analysis of covariance; ANOVA = analysis of variance; ATT = attention training technique; CBT = cognitive–behavioural therapy; FNE = Fear of Negative Evaluation scale; MCQ = Metacognition Questionnaire; PEP = postevent processing; SAD = social anxiety disorder; SBSA = Self-Beliefs in Social Anxiety.

TABLE 3 Correlations between social beliefs and social anxiety measures (superscripted numbers indicate the corresponding papers in Table 1)

	Social anxiety scale				
	SIAS	FNE	SPS	LSAS	Composite
Beliefs	Nonclinical samples				Clinical sample
High standards	.37**[14] .40**[20] T1: .41**[16] T2: .42**[16]	.47**[15] .50**[19] .61**[14] .65**[11] T1: .61**[16] T2: .62**[16]	.40**[14] .42***[21] (T1: .40**[16] T2: .51**[16]) (T1: .41**[22] T2: .39**[22])	.17**[19]	
Conditional beliefs	.54**[14] .54**[20] T1: .59**[16] T2: .55**[16]	.39**[19] .54**[15] .62**[14] .67**[11] T1: .63**[16] T2: .60**[16]	.54**[14] .58***[21] (T1: .58**[16] T2: .60**[16]) (T1: .53**[22] T2: .52**[22])	.07*[19]	
Unconditional beliefs	.50**[14] .62**[20] T1: .55**[16] T2: .59**[16]	.13**[19] .46**[15] .46**[14] .56**[11] T1: .51**[16] T2: .44**[16]	.41**[14] .60***[21] (T1: .47**[16] T2: .44**[16]) (T1: .58**[22] T2: .52**[22])	.15**[19]	
Total SBSA	.57**[14]	.46**[19] .68**[14]	.56**[14] .60***[21]	.06, ns[19]	
CBQ trait					.52***[23]
CBQ contingent					.48***[23]
CBQ other					.57***[23]

Note. CBQ = Core Beliefs Questionnaire; Composite = composite measure by averaging the z scores for the SIAS and SPS; FNE = Fear of Negative Evaluation scale; LSAS = Liebowitz Social Anxiety Scale; SBSA = Self-Beliefs in Social Anxiety; SIAS = Social Interaction Anxiety Scale; SPS = Social Phobia Scale; T1 = Time 1; T2 = Time 2. When two longitudinal studies are available, parenthesis were used to highlight the results within each study.

*$p < .05$.

**$p < .01$.

***$p < .001$.

conditions of anticipatory processing or the post-mortem. The experiential condition instructed participants to focus their attention on and describe their inner experiences in relation to a speech task, and the analytical condition instructed them to think about and understand their inner experiences, their causes, and their consequences. In the study that manipulated anticipatory processing, people high in FNE

3.4 | Social beliefs and cognitive processes

3.4.1 | Rumination

In relation to the potential effects of ruminative processes on social beliefs, people high in social anxiety (FNE) reported stronger CBs following a post-mortem task, compared with a distraction task, $F(1, 76) = 13.75$, $p < .01$, $\eta^2 = .15$ (Makkar & Grisham, 2013) and a decrease in UBs following a distraction task, $t(24) = 4.88$, $p < .01$, compared with a post-mortem task, $t(20) = 0.50$, $p = .62$, $F(1, 44) = 11.91$, $p < .05$, partial $\eta^2 = .21$ (Wong & Moulds, 2009). Moreover, the Wong and Moulds (2012b) study (described earlier) found that analytical rumination was associated with a decrease in UBs, $t(21) = 2.53$, $p = .02$, $d = 0.32$, compared with an experiential rumination task, $t(21) = −0.18$, $p = .86$, $d = 0.01$, in high socially anxious individuals, $F(1, 42) = 5.45$, $p = .02$, partial $\eta^2 = .12$. Finally, Makkar and Grisham (2011) found the total SBSA scale was a unique predictor of the post-mortem following a speech task, $\beta = .46$, $t(26) = 2.08$, $p < .05$, but not following a conversation task. It should be noted that the latter study ran a regression analysis with 12 predictors on a sample of 40 individuals, which may have limited its robustness and power. The authors also found significant and positive correlations between the SBSA ($r = .70$; $r = .53$) and SCQ ($r = .54$; $r = .58$) and the post-mortem, $p < .001$, following a speech task and a conversation task, respectively. The SBSA and SCQ also correlated with social anxiety measures (SPS, SIAS, and FNE), with correlations ranging between .36 ($p < .05$) and .68 ($p < .001$).

3.4.2 | Anticipatory processing

One study (Wong & Moulds, 2011a) found that in high socially anxious groups (FNE), HSs and CBs reportedly decreased following a distraction task, HSs, $t(19) = 2.72$, $p = .01$, $d = 0.61$, and CBs, $t(19) = 2.46$, $p = .02$, $d = 0.55$, and increased following an anticipatory processing task, HSs, $t(19) = −2.08$, $p = .05$, $d = 0.47$, and CBs, $t(19) = −2.28$, $p = .03$, $d = 0.51$. No such effects were found for the low socially anxious group. Returning to the Wong and Moulds (2012b) study, when engaging in experiential anticipatory processing, high socially anxious individuals (FNE) reported an increase in HSs, $t(25) = −2.52$, $p < .02$, $d = 0.19$, and CBs, $t(25) = −3.62$, $p < .01$, $d = 0.30$, compared with the analytical anticipatory processing condition that was associated with a decrease in HSs, $t(25) = 2.60$, $p < .02$, $d = 0.18$, and no change in CBs, $t(25) = .63$, $p = .54$, $d = 0.06$. No such effects were found in the low socially anxious group.

3.4.3 | Avoidance

In a nonclinical sample (Wong & Moulds, 2011c), HSs were found to be negative predictors (standardized parameter estimate = −0.14, $t = 2.11$, $p < .05$) and UBs positive predictors (standardized parameter estimate = 0.23, $t = 3.15$, $p < .01$) of behavioural avoidance in relation to social situations, whereas CBs were found to predict cognitive avoidance in relation to social situations (standardized parameter estimate = 0.22, $t = 2.47$, $p < .01$). When depression and anxiety are controlled for, the positive relationship between social anxiety (FNE) and behavioural avoidance in relation to social situations was partly mediated by UBs and the positive relationship between social anxiety and cognitive avoidance in relation to social situations was fully mediated by CBs. Nevertheless, it should be noted that these relationships were not entirely consistent with the Clark and Wells (1995) model that suggests that social anxiety (as an outcome variable) is maintained by avoidance (as an independent variable) and social beliefs.

3.5 | Metacognitive beliefs in social anxiety

3.5.1 | Positive metacognitive beliefs

Positive beliefs about worry measured by the 30-item Metacognition Questionnaire (MCQ-30; Wells & Cartwright-Hatton, 2004), about the post-mortem (Positive Beliefs about Post-Event Processing Questionnaire [PB-PEPQ]; Fisak & Hammond, 2013), about general rumination in relation to social situations (Positive Beliefs About Rumination Scale Adapted for Social Anxiety [PBRS-SA]; Wong & Moulds, 2010), and about anticipatory processing (Positive Beliefs about Anticipatory Processing Questionnaire [PB-APQ]; Vassilopoulos et al., 2015) were positively and significantly correlated with social anxiety measures in nonclinical samples (Fisak & Hammond, 2013; McEvoy & Perini, 2009; Vassilopoulos et al., 2015; Wong & Moulds, 2010). Correlation coefficients were small to moderate ranging from .16 to .51 (all ps < .01; Table 4). Only one study explored the relationships between positive beliefs about worry (MCQ-30) and social anxiety within a sample of people with diagnosed SAD and found nonsignificant correlations (McEvoy & Perini, 2009).

Further exploration using regression analyses showed that positive beliefs about worry (MCQ-30) and about the post-mortem, along with post-mortem processing and negative beliefs about thoughts (MCQ-30), were unique predictors of social anxiety (PB-PEPQ, $\beta = .26$; MCQ-30 positive beliefs, $\beta = .13$, $p < .05$), whereas positive beliefs about general rumination (PBRS-SA, $\beta = .01$) were not (Fisak & Hammond, 2013). This suggests that metacognitive beliefs specific to the processes implicated in social anxiety show stronger relationships with social anxiety than some more general metacognitive beliefs. In line with this, another study conducted a hierarchical regression analysis with positive beliefs about the post-mortem and positive beliefs about general worry (MCQ-30) at Step 1 and added positive beliefs specific to anticipatory processing (PB-APQ) at Step 2 (Vassilopoulos et al., 2015). They found that even though both MCQ-30 and PBRS-SA positive beliefs were predictors of social anxiety at Step 1, when specific beliefs about anticipatory processing were accounted for, positive beliefs about general worry were no longer unique predictors ($\beta = .04$, ns), whereas PBRS-SA beliefs ($\beta = .20$, $p < .001$) and positive beliefs about anticipatory processing (PB-APQ, $\beta = .41$, $p < .001$) remained significant predictors. This study also found that positive beliefs about anticipatory processing were unique predictors ($\beta = .14$, $p < .05$) of social anxiety when controlling for anticipatory processing, positive beliefs about the post-mortem, and depression and explained additional variance in social anxiety, $\Delta F(1, 296) = 4.62$, $p = .03$. In this study, depression ($\beta = .37$, $p < .001$) and anticipatory processing ($\beta = .18$, $p < .01$) were also unique predictors.

Consistent with these findings, another study (Wong & Moulds, 2010) that used the PBRS-SA found that these beliefs were unique predictors of social anxiety when controlling for gender and depression ($\beta = .38$, $p ≤ .01$). Gender and depression were also unique predictors, and the addition of positive beliefs explained additional variance in social anxiety, R^2 change = 12.4%, $F(1, 246) = 40.74$, $p < .01$.

TABLE 4 Correlations between metacognitive beliefs and social anxiety measures (superscripted numbers indicate the corresponding papers in Table 1)

	Social anxiety scale							
	SIAS	SPIN	SPAI	SPS	FNE	Composite	SIAS	SPS
Beliefs	Nonclinical samples						Clinical samples	
MCQ-P	.16**[8]	.43**[7]					.13, ns[4]	.16, ns[4]
MCQ-N		.47**[7]					.21, ns[4]	.22, ns[4]
MCQ-CC							.18, ns[4]	.11, ns[4]
MCQ-CS							−.10, ns[4]	.13, ns[4]
MCQ-NC							.26*[4]	.26*[4]
PB-PEPQ		.51**[7]						
CAS-I							.30**[6]	
PBRS-SA	.19***[8] .28**[5]	.35**[7]		.39**[5]	.46**[5]	.36**[5]		
PB-APQ	.31***[8]							
III			.23***[3]					

Note. CAS-I = Cognitive Attentional Syndrome 1 scale; Composite = composite measure by averaging the z scores for the SIAS and SPS; FNE = Fear of Negative Evaluation scale; III = Interpretation of Intrusions Inventory; MCQ-CC = 30-item Metacognitions Questionnaire, cognitive confidence subscale; MCQ-CS = 30-item Metacognitions Questionnaire, cognitive self-confidence subscale; MCQ-N = 30-item Metacognitions Questionnaire, uncontrollability and dangerousness beliefs subscale; MCQ-NC = 30-item Metacognitions Questionnaire, need to control thoughts subscale; MCQ-P = 30-item Metacognitions Questionnaire, positive beliefs subscale; PB-APQ = Positive Beliefs about Anticipatory Processing Questionnaire; PB-PEPQ = Positive Beliefs about Post-Event Processing Questionnaire; PBRS-SA = Positive Beliefs About Rumination Scale Adapted for Social Anxiety; SIAS = Social Interaction Anxiety Scale; SPAI = Social Phobia and Anxiety Inventory; SPIN = Social Phobia Inventory; SPS = Social Phobia Scale.

$^*p < .05.$

$^{**}p < .01.$

$^{***}p < .001.$

Furthermore, positive beliefs about the post-mortem (PBRS-SA) were unique predictors (β = .22, p < .05) of social anxiety when controlling for gender, depression, and general repetitive thinking and explained additional variance in social anxiety, R^2 change = 3.8%, F (1, 119) = 5.76, p = .02. Repetitive thinking was also a unique predictor (β = .22, p < .05).

Moreover, in line with the metacognitive model, mediation relationships were found. In particular, the post-mortem partially mediated the relationship between PB-PEPQ and social anxiety (z = 4.39, p < .001; Fisak & Hammond, 2013) and anticipatory processing partially mediated the relationship between positive beliefs about anticipatory processing and social anxiety when controlling for depression (95% CI [0.02, 0.13]; Vassilopoulos et al., 2015). Another mediation analysis found that positive beliefs about the post-mortem mediated the relationship between social anxiety and repetitive thinking (Wong & Moulds, 2010). Nevertheless, this analysis was not directly based on the metacognitive model, which would predict instead that the post-mortem would be the mediator of the relationship between positive beliefs about the post-mortem and social anxiety.

However, positive beliefs about general worry were found to not differ between people high and low in social anxiety (FNE scores), t (48) = 1.62, p = .11, d = 0.46 (Dannahy & Stopa, 2007) and between people with diagnosed SAD and a control group (Wells & Carter, 2001). It should be noted that the relationship with social-anxiety-specific metacognitive beliefs may be enhanced due to criterion overlap in measures referring to social anxiety, a factor that does not confound associations with general metacognitive belief measures (e.g., MCQ-30). Such criterion overlap may also

enhance the relationships between social cognition and social anxiety measures.

3.5.2 | Negative metacognitive beliefs

Negative beliefs about the uncontrollability and dangerousness of thoughts (Table 4) positively and significantly correlated with social anxiety (r = .47, p < .01) in a cross-sectional nonclinical sample (Fisak & Hammond, 2013), but not in a clinical sample (r = .21 with SIAS and r = .22 with SPS, ns; McEvoy & Perini, 2009).

In their regression analysis, Fisak and Hammond (2013) showed that negative beliefs about the uncontrollability and dangerousness of thoughts (β = .21, p < .05), along with positive beliefs about worry (MCQ), positive beliefs about the post-mortem, and positive beliefs about post-mortem processing, were unique predictors of social anxiety in a nonclinical sample when controlling for all other variables, whereas positive beliefs about general rumination (PBRS-SA, β = .01) were not.

Finally, people with high social anxiety (FNE) and people diagnosed with SAD reported stronger negative metacognitive beliefs compared with people with low social anxiety (MCQ-30 modified), t (48) = 6.33, p < .01, d = 1.79, and compared with a nonclinical control group (MCQ; Cartwright-Hatton & Wells, 1997; t = 2.86, p = .006, d = .83; Dannahy & Stopa, 2007; Wells & Carter, 2001).

3.5.3 | Other metacognitive beliefs

Only one study explored the relationship between other metacognitive beliefs and social anxiety in a nonclinical sample (Field & Cartwright-

Hatton, 2008). These beliefs related more to obsessive–compulsive disorder and were termed interpretations of intrusions, that is, beliefs about the overimportance of intrusive thoughts and the need to control intrusions (Obsessive Compulsive Cognitions Working Group, 2001). The authors conducted two structural equation modelling analyses to test whether these beliefs, along with trait rumination, obsessive beliefs, worry, and shame, were associated with social anxiety and whether such association was best modelled as a single higher order variable representing a *transdiagnostic* concept combining all the variables or as individual contributions made separately by each variable. The interpretations of intrusions were found to correlate positively and significantly with social anxiety (Table 4) and to be unique predictors ($\beta = .69$, $p < .001$) of the integrative transdiagnostic factor, but not directly of social anxiety when the transdiagnostic factor was removed ($\beta = .06$, ns; possibly because of their nonspecificity to social anxiety).

In a clinical sample, a significant and positive correlation ($r = .26$, $p < .05$) was found between beliefs about the need to control thoughts (MCQ-30) and social anxiety (McEvoy & Perini, 2009). A mixed scale of positive and negative metacognitive beliefs as well as cognitive processes and avoidance behaviours (Cognitive Attentional Syndrome [CAS]-I; Wells, 2009) was also positively correlated with social anxiety ($r = .30$, $p < .01$; Table 4). However, the CAS-1 did not have predictive value in social anxiety when controlling for a similar concept defined as psychological inflexibility (partial $r = .06$, ns; Fergus et al., 2013). Indeed, these two concepts were highly correlated ($r = .63$, $p < .01$), although not as much as to suggest that they were indistinguishable.

Finally, comparison studies showed that people with high social anxiety (FNE) reported stronger beliefs concerning lack of cognitive self-confidence, $t(48) = 6.53$, $p < .01$, $d = 1.85$, and about imagery, $t(43) = 2.46$, $p = .02$, $d = 0.61$ (MCQ-30 modified), compared with people with low social anxiety (Dannahy & Stopa, 2007). However, people diagnosed with SAD reported similar superstition–punishment–responsibility beliefs (MCQ; Cartwright-Hatton & Wells, 1997) compared with a control group ($t = 1.39$, $p = .16$, $d = 0.40$).

3.6 | Metacognitive beliefs and cognitive processes

One study (Gkika & Wells, 2016) engaged people with high social anxiety (FNE) in anticipatory processing or distraction before delivering a speech and found a significant Time × Belief interaction effect, $F(1.33, 98.33) = 3.80$, $p = .04$, $\eta^2 = .05$: People with strong positive beliefs about worry (MCQ-30) reported decreased anxiety before the speech compared with people with weaker beliefs in this domain, $t(34) = 2.43$, $p = .02$, 95% CI [0.48, 5.51]. However, after the speech, their anxiety remained relatively stable whereas people with weaker positive metacognitive beliefs reported a reduction in anxiety, $t(43) = 4.81$, $p < .0005$, 95% CI [5.80, 14.15]. Negative metacognitive beliefs about the uncontrollability and dangerousness of thoughts (MCQ-30) were associated (main effect) with greater anxiety overall (i.e., regardless of anticipatory processing, distraction, and whether they were measured before or after the speech), $F(1, 74) = 4.95$, $p = .03$, $\eta^2 = .06$.

Moreover, in a clinical sample, Nordahl et al. (2016) asked participants to engage in a conversation with a confederate and then score

themselves on a negative self-evaluation scale. In this study, positive beliefs about worry (MCQ-30) were significantly and positively associated with negative self-evaluation ($r = .45$, $p = .006$), whereas negative metacognitive beliefs (MCQ-30) were not ($r = .13$, ns). Neither type of metacognitive belief was associated with the perspective taken (observing the situation vs. observing the self) during the speech (MCQ-positive: $r = .08$, ns; MCQ-negative: $r = .08$, ns). Further analysis revealed that positive beliefs about worry were unique predictors of and explained additional variance (13.5%) in negative self-evaluation ($\beta = .35$, $t = 2.31$, $p < .05$), along with the perspective taken during the social task ($\beta = .37$, $t = 2.53$, $p < .05$) and age ($\beta = -.31$, $t = -2.04$, $p < .05$).

4 | DISCUSSION

The current review set out to investigate the relationships between social beliefs and metacognitive beliefs, as defined by Clark and Wells (1995) and Wells and Matthews (1994), respectively, and social anxiety. The main focus in such studies was found to be on correlational and predictive relationships as well as on potential differences between groups with different levels of social anxiety. In addition, the relationships between such beliefs and cognitive processes, namely, anticipatory processing, self-focused attention, and the post-mortem, as well as avoidance have been explored as these factors have been implicated in the maintenance of social anxiety.

4.1 | Social beliefs

In line with the Clark and Wells (1995) model, the findings suggest that social beliefs significantly and positively correlated with measures of social anxiety (Heeren et al., 2014; Holzman et al., 2014; Wong & Moulds, 2009, 2011b, 2011c, 2012a; Wong et al., 2014, 2016) and predicted social anxiety when not accounting for other variables (Wong & Moulds, 2011b). This result was found for several measures of social anxiety (Table 1), which strengthens its robustness. However, when other beliefs related to social anxiety were controlled for, only HSs and CBs were unique predictors of social anxiety. Moreover, when controlling for the post-mortem and self-focused attention, individual social beliefs were not predictive of social anxiety. These results suggest a robust and moderate positive relationship between these beliefs and social anxiety that is perhaps fully mediated by or the result of specific cognitive processes. It should be noted that these findings were based mainly on nonclinical samples. Only one study compared a clinical group with a nonclinical group and found that the clinical group reported stronger social beliefs than the latter (Wong et al., 2014). Further research is needed to explore potential mediators of the relationship between social beliefs and social anxiety and to replicate the findings in samples of people with diagnosed SAD. It may be the case that the relationship between social beliefs and social anxiety is an effect of the variance that social beliefs and social anxiety share with specific cognitive processes. Thus, the actual contribution of social beliefs to social anxiety beyond a role of cognitive processes might be questioned. Indeed cognitive processes, such as the post-mortem, may give rise to both negative social beliefs and social anxiety.

In line with this, the current review highlighted certain effects of cognitive processes on social beliefs in people with high levels of social anxiety. For example, the post-mortem was associated with increased CBs compared with distraction (Makkar & Grisham, 2013), whereas distraction was associated with a decrease in UBs (Wong & Moulds, 2009). Moreover, an increase in HSs and CBs was associated with engaging in anticipatory processing (Wong & Moulds, 2011a). These findings are consistent with the Clark and Wells (1995) model and the prediction that anticipatory processing contributes to negative beliefs. However, the results that such beliefs do not contribute to social anxiety beyond such processes would be inconsistent, as such beliefs are considered to affect social anxiety through in-situation processes, such as worry and negative automatic thoughts. Future studies are needed to explore this prediction. Moreover, the reviewed studies did not directly address the mediation–moderation effects in relation to the role of social beliefs on social anxiety via the cognitive processes.

The reported mediation analyses (Wong & Moulds, 2011c) utilized social anxiety as a predictor and social beliefs as mediators, which is not consistent with the cognitive or metacognitive model. Social anxiety predicted behavioural and cognitive avoidance partially through UBs and CBs, respectively. But as discussed above, further studies are needed to explore whether social beliefs affect social anxiety through negative automatic thoughts and avoidance, as predicted by the Clark and Wells (1995) model.

These results suggest that social beliefs play a role in social anxiety, but they appear to be more related to specific cognitive processes rather than directly to anxiety. This may be more consistent with the metacognitive model of emotional difficulties in which social beliefs are seen as the trigger or outputs of processes characterized by worry and rumination. It raises a question about whether more direct treatment effects would be achieved by targeting the cognitive processes instead of the beliefs directly. The implications of this could involve greater emphasis on the maintaining role of cognitive processes in the conceptualization of social anxiety and on directly targeting these through metacognitive interventions, such as attention training and detached mindfulness (Wells, 2009). In line with this, preliminary studies have explored the effects of metacognitive interventions in social anxiety with promising results (Gkika & Wells, 2015; Vogel et al., 2016; Wells & Papageorgiou, 2001).

4.2 | Metacognitive beliefs

The findings suggest that positive metacognitive beliefs about worry, anticipatory processing, and the post-mortem and negative beliefs about the uncontrollability and dangerousness of thoughts significantly and positively correlated with social anxiety in nonclinical samples (Fisak & Hammond, 2013; Vassilopoulos et al., 2015; Wong & Moulds, 2010). In clinical samples, only two measures have been used (the MCQ-30 and the CAS-I). The results showed that beliefs about the need to control thoughts (McEvoy & Perini, 2009) and positive and negative metacognitive beliefs along with cognitive processes and avoidance measured by the CAS-I (Fergus et al., 2013) were positively associated with SAD. Moreover, one study (Wells & Carter, 2001) found that people with a diagnosis of SAD reported greater negative

beliefs about the uncontrollability and dangerousness of thoughts (MCQ) compared with a nonclinical control group.

The finding that positive metacognitive beliefs (MCQ-30) did not correlate with social anxiety in clinical samples might be because the measure used was not specific to metacognitive beliefs about social-anxiety-related processes. Alternatively, it might be that these beliefs do not play a role in social anxiety or that their role is mediated or moderated by other factors. Consistent with the latter hypothesis, in a nonclinical sample, these beliefs were associated with a decrease in anxiety just before giving a speech, but a maintenance in anxiety after the speech was over (Gkika & Wells, 2016). This suggests that these beliefs might have a dual role in social anxiety depending on the situation and its time course and are worthy of further exploration. Furthermore, the metacognitive model gives priority to negative metacognitive beliefs in the generation of psychological disorder.

In nonclinical samples, positive metacognitive beliefs were found to be unique predictors of social anxiety when controlling for cognitive processes, depression, and gender (Fisak & Hammond, 2013; Vassilopoulos et al., 2015; Wong & Moulds, 2010). They were also found to predict negative self-evaluation following a social interaction in a clinical sample, although negative metacognitive beliefs were not significant predictors. This might have been because such effects were fully mediated by other variables, such as the post-mortem, which was not measured (Nordahl et al., 2016). These studies also found that cognitive processes (such as anticipatory processing, the post-mortem, and the self-observing perspective) contributed to social anxiety. This suggests that there are more direct effects of positive metacognitive beliefs on social anxiety that are not eliminated when controlling for these other variables; this appears to be the case with social beliefs. It could be that the relationship between social beliefs and social anxiety is more sensitive to processes, such as anticipatory processing or the post-mortem, which would be consistent with the metacognitive model that asserts that general beliefs arise out of cognitive processes rather than being direct contributors to emotional disorder. The data also suggested that metacognitive beliefs specific to the processes implicated in social anxiety might have greater effects compared with more generic metacognitive beliefs, such as beliefs about general worry (Vassilopoulos et al., 2015), but such studies might capitalize on measurement overlap.

Despite this caveat, in line with the metacognitive model (Wells, 2009; Wells & Matthews, 1994), cross-sectional studies have found mediated relationships between social-anxiety-specific metacognitions, processes, and anxiety. In particular, positive beliefs about the post-mortem had an effect on social anxiety partially through the post-mortem (Fisak & Hammond, 2013) and positive beliefs about anticipatory processing had an effect on social anxiety partially through anticipatory processing (Vassilopoulos et al., 2015).

Finally, the review highlighted preliminary evidence of a positive association between other more general metacognitive beliefs and social anxiety, such as low cognitive self-confidence and beliefs about imagery (Dannahy & Stopa, 2007), interpretations of intrusions (Field & Cartwright-Hatton, 2008), and beliefs about the need to control thoughts (McEvoy & Perini, 2009).

These findings are mixed, and interpretation is difficult due to the use of different measures and different designs. Nevertheless, there

appear to be significant direct and indirect relationships between metacognitive beliefs and social anxiety. This would suggest that addressing these beliefs might be beneficial, especially in reducing anticipatory processing, the post-mortem, self-focused attention, and negative self-evaluation and in enabling exposure strategies. So far, only two studies have investigated whether changes in metacognitive beliefs had an effect on changes in social anxiety following the delivery of cognitive–behavioural therapy (McEvoy, Mahoney, Perini, & Kingsep, 2009; McEvoy & Perini, 2009). One study found that reductions in negative beliefs about the uncontrollability and dangerousness of thoughts were associated with reductions in one (of two) social anxiety measure and in the post-mortem. Moreover, these beliefs along with beliefs about the need to control thoughts and the total score of the MCQ-30 were associated with reductions in depression. Reduction in the post-mortem was also associated with changes in beliefs about the need to control thoughts (McEvoy et al., 2009). The other study found that reduction in negative beliefs about the uncontrollability and dangerousness of thoughts was associated with a reduction in social anxiety measures (SIAS and SPS), whereas reduction in these beliefs and in beliefs about the need to control thoughts was associated with a reduction in depression (McEvoy & Perini, 2009).

Finally, we found one study that explored the potential relationships between metacognitive and social beliefs, specifically, negative self-evaluation. Nordahl et al. (2016) used a prospective design and found that positive metacognitive beliefs about worry were positively associated with subsequent negative self-evaluation following social interaction in a clinical sample.

The current findings suggest that the conceptualization of social anxiety might benefit from a consideration of metacognitive beliefs as initiating and maintaining factors in cognitive processes leading to social anxiety. Consequently, modification of these beliefs through metacognitive therapy interventions (e.g., worry postponement experiments and verbal reattribution of metacognitive beliefs) might be helpful in treatment. More research is needed to explore this further.

4.3 | Strengths and weaknesses in the reviewed studies

The above results should be interpreted within the context of the quality assessment for each study (Table 2), although the potential for assessment bias needs to be acknowledged. Most studies were of moderate quality with adequate sample sizes and moderate to large effect sizes. However, most did not report power analyses, confidence intervals, and whether the assumptions for the relevant statistical tests were adhered, and on some occasions, effect sizes needed to be calculated by the current authors. Moreover, no studies reported having consulted service users in relation to the aims or the process of investigation, and the measures were self-report and often modified or based on visual analogue scales.

Finally, the majority of the studies used nonclinical samples and cross-sectional designs, therefore not allowing for inferences to be made regarding any causal relationships between the beliefs and social anxiety. One exception was a controlled trial that compared pretreatment and posttreatment scores and found that reductions in negative metacognitive beliefs about the uncontrollability and dangerousness of

thoughts were associated with reductions in social anxiety following cognitive–behavioural therapy (McEvoy & Perini, 2009). Nevertheless, to the authors' knowledge, no studies have directly manipulated social or metacognitive beliefs to explore causal relationships between these and social anxiety. Future research should target this area.

4.4 | Limitations

The main limitation of the current review is that it focused on beliefs closely related to only two models (Clark & Wells, 1995; Wells & Matthews, 1994) at the exclusion of other broader areas of cognition, such as interpretations, perceptions, and judgments. We deliberately chose this approach because the treatment based on the Clark and Wells (1995) model has been recommended by National Institute of Clinical Excellence (2013) guidelines as one of the most effective available, and therefore, we chose this as the benchmark approach and a reference for reviewing the possible effects of metacognitive beliefs. Future reviews are needed to explore other types of cognition deriving from different models of social anxiety.

Other limitations include the exclusion of grey literature and of studies in languages other than English, which might have contributed to publication bias (Hopewell, Clarke, & Mallett, 2005; Torgerson, 2006). Although the inclusion of clinical and nonclinical studies in the review could be seen as a possible limitation, data show that the patterns in symptoms in people with high social anxiety and people with SAD are alike. Finally, only 25% of the selected articles were quality assessed by a second and independent reviewer. This was because the quality assessment score would have no impact on the selection of the papers and it was considered that 25% of the papers would suffice to uncover any major discrepancies indicative of bias. If there had been major discrepancies, the second reviewer would have assessed the remaining papers. However, given the high level of agreement, this was not deemed necessary.

5 | CONCLUSION

In conclusion, social beliefs were found to contribute to social anxiety, although this might be dependent on specific cognitive processes. The results are consistent with the Clark and Wells (1995) model of social anxiety. However, metacognitive beliefs remain "the neglected dimension of self-knowledge" (Wells & Matthews, 1994, p. 307), with fewer studies focusing on the relationship between positive metacognitive beliefs and social anxiety and fewer still focusing on negative metacognitive beliefs. Nevertheless, there is preliminary evidence that metacognitive beliefs had both direct and indirect effects (through the cognitive processes) on social anxiety. This result is consistent with the Wells and Matthews (1994) metacognitive model of psychological disorder, and it suggests that these beliefs should be considered in the assessment and treatment of SAD.

Future studies that directly assess the relative contributions of social beliefs and metacognitive beliefs to social anxiety are required. This is an important clinical question because the results could change the focus of assessment and treatment. For now, the data appear to suggest that the conceptualization of social anxiety may need to be

revised to include the direct and indirect effects of metacognitive knowledge on social anxiety in social situations.

ORCID

Styliani Gkika http://orcid.org/0000-0003-2474-439X
Anja Wittkowski http://orcid.org/0000-0003-3806-0183
Adrian Wells http://orcid.org/0000-0001-7713-1592

REFERENCES

American Psychiatric Association (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: Author.

Bailey, R., & Wells, A. (2015). Metacognitive beliefs moderate the relationship between catastrophic misinterpretation and health anxiety. *Journal of Anxiety Disorders*, *34*, 8–14. https://doi.org/10.1016/j.janxdis.2015.05.005

Beck, A. T., Emery, G., & Greenberg, R. L. (2005). *Anxiety disorders and phobias: A cognitive perspective*. New York, NY: Basic Books.

Beesdo, K., Bittner, A., Pine, D. S., Stein, M. B., Höfler, M., Lieb, R., & Wittchen, H. U. (2007). Incidence of social anxiety disorder and the consistent risk for secondary depression in the first three decades of life. *Archives of General Psychiatry*, *64*(8), 903–912. https://doi.org/10.1001/archpsyc.64.8.903

Boden, M. T., John, O. P., Goldin, P. R., Werner, K., Heimberg, R. G., & Gross, J. J. (2012). The role of maladaptive beliefs in cognitive–behavioral therapy: Evidence from social anxiety disorder. *Behaviour Research and Therapy*, *50*(5), 287–291. https://doi.org/10.1016/j.brat.2012.02.007

Brozovich, F., & Heimberg, R. G. (2008). An analysis of post-event processing in social anxiety disorder. *Clinical Psychology Review*, *28*(6), 891–903. https://doi.org/10.1016/j.cpr.2008.01.002

Cartwright-Hatton, S., & Wells, A. (1997). Beliefs about worry and intrusions: The meta-cognitions questionnaire and its correlates. *Journal of Anxiety Disorders*, *11*(3), 279–296. https://doi.org/10.1016/S0887-6185(97)00011-X

Clark, D. M., & Wells, A. (1995). A cognitive model of social phobia. In R. G. Heimberg, M. R. Liebowitz, F. R. Hope, & F. R. Schneier (Eds.), *Social phobia: Diagnosis, assessment, and treatment* (pp. 69–93). New York, NY: Guilford.

Connor, K. M., Davidson, J. R. T., Churchill, L. E., Sherwood, A., Weisler, R. H., & Foa, E. (2000). Psychometric properties of the social phobia inventory (SPIN). *The British Journal of Psychiatry*, *176*(4), 379.

Dannahy, L., & Stopa, L. (2007). Post-event processing in social anxiety. *Behaviour Research and Therapy*, *45*(6), 1207–1219. https://doi.org/10.1016/j.brat.2006.08.017

Fergus, T. A., Valentiner, D. P., McGrath, P. B., Gier-Lonsway, S., & Jencius, S. (2013). The cognitive attentional syndrome: Examining relations with mood and anxiety symptoms and distinctiveness from psychological inflexibility in a clinical sample. *Psychiatry Research*, *210*(1), 215–219. https://doi.org/10.1016/j.psychres.2013.04.020

Field, A. P., & Cartwright-Hatton, S. (2008). Shared and unique cognitive factors in social anxiety. *International Journal of Cognitive Therapy*, *1*(3), 206–222. https://doi.org/10.1521/ijct.2008.1.3.206

Fisak, B., & Hammond, A. N. (2013). Are positive beliefs about post-event processing related to social anxiety? *Behaviour Change*, *30*(1), 36–47. https://doi.org/10.1017/bec.2013.4

Gkika, S., & Wells, A. (2015). How to deal with negative thoughts? A preliminary comparison of detached mindfulness and thought evaluation in socially anxious individuals. *Cognitive Therapy and Research*, *39*(1), 23–30. https://doi.org/10.1007/s10608-014-9637-5

Gkika, S., & Wells, A. (2016). The impact of metacognitive beliefs and anticipatory processing on state anxiety in high socially anxious individuals in a speech task. *Journal of Experimental Psychopathology*, *7*(4), 588–600.

Hartman, L. M. (1983). A metacognitive model of social anxiety: Implications for treatment. *Clinical Psychology Review*, *3*(4), 435–456. https://doi.org/10.1016/0272-7358(83)90023-5

Heeren, A., Maurage, P., Rossignol, M., Vanhaelen, M., Peschard, V., Eeckhout, C., & Philippot, P. (2012). Self-report version of the Liebowitz Social Anxiety Scale: Psychometric properties of the French version. *Canadian Journal of Behavioural Science*, *44*(2), 99–107. https://doi.org/10.1037/a0026249

Heeren, A., Wong, Q. J. J., Ceschi, G., Moulds, M. L., & Philippot, P. (2014). Probing the structural validity of the Self-Beliefs in Social Anxiety Scale (SBSA): Adaptation and validation in a French-speaking community sample. *Canadian Journal of Behavioural Science/Revue Canadienne des Sciences du Comportement*, *46*(4), 506–513. https://doi.org/10.1037/a0035295

Hinrichsen, H., & Clark, D. M. (2003). Anticipatory processing in social anxiety: Two pilot studies. *Journal of Behavior Therapy and Experimental Psychiatry*, *34*(3–4), 205–218. https://doi.org/10.1016/S0005-7916(03)00050-8

Holzman, J. B., Valentiner, D. P., & McCraw, K. S. (2014). Self-focused attention and post-event processing: Relevance to social performance anxiety and social interaction anxiety. *Journal of Cognitive Psychotherapy*, *28*(1), 72–82. https://doi.org/10.1891/0889-8391.28.1.72

Hopewell, S., Clarke, M., & Mllett, S. (2005). Grey literature and systematic reviews. In H. R. Rothstein, A. J. Sutton & M. Borenstein (Eds). *Publication bias in meta-analysis: Prevention, assessment and adjustments* (pp. 49–72). West Sussex, England: Wiley.

Kessler, R. C., Berglund, P., Demler, O., Jin, R., Merikangas, K. R., & Walters, E. E. (2005). Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the national comorbidity survey replication. *Archives of General Psychiatry*, *62*(6), 593–602. https://doi.org/10.1001/archpsyc.62.6.593

Kessler, R. C., Chiu, W., Demler, O., & Walters, E. E. (2005). Prevalence, severity, and comorbidity of 12-month DSM-IV disorders in the national comorbidity survey replication. *Archives of General Psychiatry*, *62*(6), 617–627. https://doi.org/10.1001/archpsyc.62.6.617

Liebowitz, M. R. (1987). Social phobia. *Modern Problems of Pharmacopsychiatry*, *22*, 141–173.

Makkar, S. R., & Grisham, J. R. (2011). The predictors and contents of post-event processing in social anxiety. *Cognitive Therapy and Research*, *35*(2), 118–133. https://doi.org/10.1007/s10608-011-9357-z

Makkar, S. R., & Grisham, J. R. (2013). The effect of post-event processing on mood, self-beliefs, and interpretive biases. *Journal of Experimental Psychopathology*, *4*(4), 368–386. https://doi.org/10.5127/jep.030912

Mattick, R. P., & Clarke, J. C. (1998). Development and validation of measures of social phobia scrutiny fear and social interaction anxiety. *Behaviour Research and Therapy*, *36*(4), 455–470.

McEvoy, P. M., Grove, R., & Slade, T. (2011). Epidemiology of anxiety disorders in the Australian general population: Findings of the 2007 Australian National Survey of Mental Health and Wellbeing. *Australian and New Zealand Journal of Psychiatry*, *45*(11), 957–967. https://doi.org/10.3109/00048674.2011.624083

McEvoy, P. M., Mahoney, A., Perini, S. J., & Kingsep, P. (2009). Changes in post-event processing and metacognitions during cognitive behavioral group therapy for social phobia. *Journal of Anxiety Disorders*, *23*(5), 617–623. https://doi.org/10.1016/j.janxdis.2009.01.011

McEvoy, P. M., & Perini, S. J. (2009). Cognitive behavioral group therapy for social phobia with or without attention training: A controlled trial. *Journal of Anxiety Disorders*, *23*(4), 519–528. https://doi.org/10.1016/j.janxdis.2008.10.008

McKnight, P. E., Monfort, S. S., Kashdan, T. B., Blalock, D. V., & Calton, J. M. (2016). Anxiety symptoms and functional impairment: A systematic review of the correlation between the two measures. *Clinical Psychology Review*, *45*, 115–130. https://doi.org/10.1016/j.cpr.2015.10.005

Mills, A. C., Grant, D. M., Lechner, W. V., & Judah, M. R. (2013). Psychometric properties of the anticipatory social behaviours questionnaire. *Journal of Psychopathology and Behavioral Assessment*, *35*(3), 346–355. https://doi.org/10.1007/s10862-013-9339-4

Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., & The, P. G. (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA statement. *The British Medical Journal*, *339*, b2535. https://doi.org/10.1136/bmj.b2535

Morrison, A. P., Wells, A., & Nothard, S. (2002). Cognitive and emotional predictors of predisposition to hallucinations in non-patients. *British Journal of Clinical Psychology*, *41*(3), 259–270. https://doi.org/10.1348/014466502760379127

Musa, C., Kostogianni, N., & Lepiene, J.-P. (2004). The Fear of Negative Evaluation Scale (FNE): Psychometric properties of the French version. *L'Encephale*, *30*(6), 517–524. doi: ENC-12-2004-30-6-0013-7006-101019-ART2

National Institute of Clinical Excellence. (2013). Social anxiety disorder: Recognition, assessment and treatment. Retrieved from https://www.nice.org.uk/guidance/CG159.

Nolen-Hoeksema, S., Wisco, B. E., & Lyubomirsky, S. (2008). Rethinking rumination. *Perspectives on Psychological Science*, *3*(5), 400–424. https://doi.org/10.1111/j.1745-6924.2008.00088.x

Nordahl, H. M., Nordahl, H., & Wells, A. (2016). Metacognition and perspective taking predict negative self-evaluation of social performance in patients with social anxiety disorder. *Journal of Experimental Psychopathology*, *7*(4), 601–607. https://doi.org/10.5127/jep.055616

Obsessive Compulsive Cognitions Working Group (2001). Development and initial validation of the obsessive beliefs questionnaire and the interpretation of intrusions inventory. *Behaviour Research Therapy*, *39*(8), 987–1006.

Ohayon, M. M., & Schatzberg, A. F. (2010). Social phobia and depression: Prevalence and comorbidity. *Journal of Psychosomatic Research*, *68*(3), 235–243. https://doi.org/10.1016/j.jpsychores.2009.07.018

Papageorgiou, C., & Wells, A. (2001). Metacognitive beliefs about rumination in recurrent major depression. *Cognitive and Behavioral Practice*, *8*(2), 160–164. https://doi.org/10.1016/S1077-7229(01)80021-3

Rapee, R. M., & Heimberg, R. G. (1997). A cognitive–behavioral model of anxiety in social phobia. *Behaviour Research and Therapy*, *35*(8), 741–756. https://doi.org/10.1016/S0005-7967(97)00022-3

Ruscio, A. M., Brown, T. A., Chiu, W. T., Sareen, J., Stein, M. B., & Kessler, R. C. (2008). Social fears and social phobia in the United States: Results from the National Comorbidity Survey Replication. *Psychological Medicine*, *38*(1), 15–28. https://doi.org/10.1017/S0033291707001699

Schneier, F. R., Foose, T. E., Hasin, D. S., Heimberg, R. G., Liu, S. M., Grant, B. F., & Blanco, C. (2010). Social anxiety disorder and alcohol use disorder co-morbidity in the National Epidemiologic Survey on alcohol and related conditions. *Psychological Medicine*, *40*(6), 977–988. https://doi.org/10.1017/S0033291709991231

Sirriyeh, R., Lawton, R., Gardner, P., & Armitage, G. (2012). Reviewing studies with diverse designs: The development and evaluation of a new tool. *Journal of Evaluation in Clinical Practice*, *18*(4), 746–752. https://doi.org/10.1111/j.1365-2753.2011.01662.x

Solem, S., Myers, S. G., Fisher, P. L., Vogel, P. A., & Wells, A. (2010). An empirical test of the metacognitive model of obsessive-compulsive symptoms: Replication and extension. *Journal of Anxiety Disorders*, *24*(1), 79–86. https://doi.org/10.1016/j.janxdis.2009.08.009

Spada, M. M., & Wells, A. (2010). Metacognitions across the continuum of drinking behaviour. *Personality and Individual Differences*, *49*(5), 425–429. https://doi.org/10.1016/j.paid.2010.04.011

Stopa, L., & Clark, D. M. (2001). Social phobia: Comments on the viability and validity of an analogue research strategy and British norms for the Fear of Negative Evaluation Questionnaire. *Behavioural and Cognitive Psychotherapy*, *29*(4), 423–430. https://doi.org/10.1017/S1352465801004039

Torgerson, C. J. (2006). Publication bias: The Achilles' heel of systematic reviews? *British Journal of Educational Studies*, *54*(1), 89–102. https://doi.org/10.1111/j.1467-8527.2006.00332.x

Turner, S. M., Beidel, D. C., Dancu, C. V., & Stanley, M. A. (1989). An empirically derived inventory to measure social fears and anxiety: The Social Phobia and Anxiety Inventory. *Psychological Assessment: A Journal of Consulting and Clinical Psychology*, *1*(1), 35–40.

Turner, S. M., Johnson, M. R., Beidel, D. C., Heiser, N. A., & Lydiard, R. B. (2003). The Social Thoughts and Beliefs Scale: A new inventory for assessing cognitions in social phobia. *Psychological Assessment*, *15*(3), 384–391. https://doi.org/10.1037/1040-3590.15.3.384

Vassilopoulos, S. P. (2005). Anticipatory processing plays a role in maintaining social anxiety. *Anxiety, Stress, & Coping*, *18*(4), 321–332. https://doi.org/10.1080/10615800500258149

Vassilopoulos, S. P., Brouzos, A., & Moberly, N. J. (2015). The relationships between metacognition, anticipatory processing, and social anxiety. *Behaviour Change*, *32*(2), 114–126. https://doi.org/10.1017/bec.2015.4

Vogel, P. A., Hagen, R., Hjemdal, O., Solem, S., Smeby, M. C. B., Strand, E. R., ... Wells, A. (2016). Metacognitive therapy applications in social anxiety disorder: An exploratory study of the individual and combined effects of the attention training technique and situational attentional refocusing. *Journal of Experimental Psychopathology*, *7*(4), 608–618. https://doi.org/10.5127/jep.054716

Watson, D., & Friend, R. (1969). Measurement of social–evaluative anxiety. *Journal of Consulting and Clinical Psychology*, *33*(4), 448–457.

Wells, A. (2009). *Metacognitive therapy for anxiety and depression*. New York, NY: Guilford.

Wells, A., & Carter, K. (2001). Further tests of a cognitive model of generalized anxiety disorder: Metacognitions and worry in GAD, panic disorder, social phobia, depression, and nonpatients. *Behavior Therapy*, *32*(1), 85–102. https://doi.org/10.1016/S0005-7894(01)80045-9

Wells, A., & Cartwright-Hatton, S. (2004). A short form of the metacognitions questionnaire: Properties of the MCQ-30. *Behaviour Research and Therapy*, *42*(4), 385–396. https://doi.org/10.1016/s0005-7967(03)00147-5

Wells, A., & Matthews, G. (1994). *Attention and emotion: A clinical perspective*. Hove, UK: Psychology Press.

Wells, A., & Matthews, G. (1996). Modelling cognition in emotional disorder: The S-REF model. *Behaviour Research and Therapy*, *34*(11–12), 881–888. https://doi.org/10.1016/S0005-7967(96)00050-2

Wells, A., & Papageorgiou, C. (2001). Brief cognitive therapy for social phobia: A case series. *Behaviour Research and Therapy*, *39*(6), 713–720. https://doi.org/10.1016/S0005-7967(00)00036-X

Wells, A., Stopa, L., & Clark, D. M. (1993). *Social cognitions questionnaire*. Unpublished manuscript, Department of Psychiatry, Oxford University, Oxford, UK.

Wilson, J. K., & Rapee, R. M. (2006). Self-concept certainty in social phobia. *Behaviour Research and Therapy*, *44*(1), 113–136. https://doi.org/10.1016/j.brat.2005.01.006

Wong, Q. J. J., Gregory, B., Gaston, J. E., Rapee, R. M., Wilson, J. K., & Abbott, M. J. (2017). Development and validation of the Core Beliefs Questionnaire in a sample of individuals with social anxiety disorder. *Journal of Affective Disorders*, *207*, 121–127. https://doi.org/10.1016/j.jad.2016.09.020

Wong, Q. J. J., McEvoy, P. M., & Rapee, R. M. (2016). A comparison of repetitive negative thinking and post-event processing in the prediction of maladaptive social-evaluative beliefs: A short-term prospective study. *Journal of Psychopathology and Behavioral Assessment*, *38*(2), 230–241. https://doi.org/10.1007/s10862-015-9506-x

Wong, Q. J. J., & Moulds, M. L. (2009). Impact of rumination versus distraction on anxiety and maladaptive self-beliefs in socially anxious

individuals. *Behaviour Research and Therapy*, *47*(10), 861–867. https://doi.org/10.1016/j.brat.2009.06.014

Wong, Q. J. J., & Moulds, M. L. (2010). Do socially anxious individuals hold positive metacognitive beliefs about rumination? *Behaviour Change*, *27*(2), 69–83. https://doi.org/10.1375/bech.27.2.69

Wong, Q. J. J., & Moulds, M. L. (2011a). Impact of anticipatory processing versus distraction on multiple indices of anxiety in socially anxious individuals. *Behaviour Research and Therapy*, *49*(10), 700–706. https://doi.org/10.1016/j.brat.2011.07.007

Wong, Q. J. J., & Moulds, M. L. (2011b). A new measure of the maladaptive self-beliefs in social anxiety: Psychometric properties in a non-clinical sample. *Journal of Psychopathology and Behavioral Assessment*, *33*(2), 273–284. https://doi.org/10.1007/s10862-010-9208-3

Wong, Q. J. J., & Moulds, M. L. (2011c). The relationship between the maladaptive self-beliefs characteristic of social anxiety and avoidance. *Journal of Behavior Therapy and Experimental Psychiatry*, *42*(2), 171–178. https://doi.org/10.1016/j.jbtep.2010.11.004

Wong, Q. J. J., & Moulds, M. L. (2012a). Does rumination predict the strength of maladaptive self-beliefs characteristic of social anxiety over time? *Cognitive Therapy and Research*, *36*(1), 94–102. https://doi.org/10.1007/s10608-010-9316-0

Wong, Q. J. J., & Moulds, M. L. (2012b). Processing mode during repetitive thinking in socially anxious individuals: Evidence for a maladaptive experiential mode. *Journal of Behavior Therapy and Experimental Psychiatry*, *43*(4), 1064–1073. https://doi.org/10.1016/j.jbtep.2012.05.002

Wong, Q. J. J., Moulds, M. L., & Rapee, R. M. (2014). Validation of the self-beliefs related to social anxiety scale: A replication and extension. *Assessment*, *21*(3), 300–311. https://doi.org/10.1177/1073191113485120

Young, J., & Brown, G. (1989). *Schema questionnaire*. Unpublished manuscript, Cognitive Therapy Centre of New York, New York, NY.