AN INVESTIGATION OF THE ROLE OF COGNITION, METACOGNITION, AND THINKING PROCESSES IN SOCIAL ANXIETY

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Abstract

The current thesis has been prepared in journal format and it reports a systematic literature review, an empirical research study, and a paper on relevant critical reflections. Based on a hybrid cognitive and metacognitive model for social anxiety disorder and on a metacognitive approach to emotional difficulties, the main aim of the thesis was to investigate the potential contributions of metacognitive beliefs to social anxiety over and above that of cognitive beliefs.

To this effect, the systematic literature review investigated the nature and strength of the associations between social anxiety and two types of beliefs: cognitive beliefs, referred to as social beliefs, (i.e., conditional and unconditional self-beliefs, and high standards) and metacognitive beliefs (i.e., beliefs about thoughts and thinking processes). Cross-sectional, longitudinal and experimental studies were included, and correlation and regression coefficients, as well as results from group comparisons were extracted. Twenty three papers were reviewed using narrative synthesis. The results showed a robust positive association between social beliefs and social anxiety and suggested a possible mediation effect of cognitive processes. Metacognitive beliefs were also positively associated with social anxiety both directly and indirectly, through cognitive processes.

The empirical study expanded on these results by investigating the potential prospective associations between metacognitive beliefs and social anxiety. A sample of 156 university students and staff completed a battery of questionnaires twice, two months apart. Regression analyses showed that irrespective of social beliefs, metacognitive beliefs about the uncontrollability and dangerousness of thoughts were individual positive predictors of and explained additional variance in social anxiety two months later. This effect was partly mediated by self-focused attention. Social beliefs did not show a prospective individual contribution to social anxiety.

Following the above, the critical reflections paper focused on the process of conducting these studies. The adopted epistemological stance is discussed and the process of decision making during the various stages of research is expounded. The strengths and limitations, the findings in the context of wider research, and the implications for clinical practice and future research are discussed.

Declaration

No portion of the work referred to in the thesis has been submitted in support of an application for another degree or qualification of this or any other university or other institute of learning.

Dedications

"Με των γονιών μου την ευχή

κίνησα στη ζωή μου

Για κιόνα έχω δύναμη

όπου σταθώ μαζί μου.

Κι όσα όνειρα πραγματικά,

έκανα στη ζωή μου,

δε ξέχασα πως τα φτερά,

μου δωσαν οι γονείς μου"

To my parents

To Dr Alec Grant

My tutor, always

Paper 1: Systematic Review

Social cognition and metacognition in social anxiety: A systematic review

Abstract

Cognitive-behavioural and metacognitive approaches to emotional disorder implicate beliefs in social anxiety disorder (SAD), but the types of beliefs differ across these perspectives. Cognitive models have suggested that social beliefs about the self (i.e., high standards, conditional and unconditional beliefs) and beliefs about the evaluations of others are central. In contrast the metacognitive model gives centre-stage to metacognitive beliefs (i.e. positive and negative beliefs about worry and thoughts) that are considered to contribute to the maintenance of SAD. Despite an expanding research interest in this area, the evidence for such contributions has not yet been reviewed. The current study set out to identify and systematically review relevant cross-sectional, longitudinal and experimental investigations of the role of social and metacognitive beliefs in social anxiety. Clinical and non-clinical samples were included and correlation and regression coefficients as well as results from group comparisons (e.g., t-tests and ANOVAs) were extracted. Overall, 23 papers were located and reviewed using narrative synthesis. The results showed a robust positive relationship between social beliefs and social anxiety. However, this relationship appeared to be mediated by cognitive processes. Specific metacognitive beliefs were also found to positively contribute to social anxiety both directly and indirectly, through cognitive processes. The results are discussed in terms of the conceptualisation and treatment of social anxiety and suggestions for future research are made.

Introduction

Social anxiety disorder is characterised by an excessive fear of social situations, such as social interactions, being observed, and performing. People with SAD are often afraid of being negatively evaluated by others and respond by either avoiding social situations or by enduring them while experiencing extreme anxiety (American Psyciatric Association, 2013). SAD is a relatively common disorder in Western cultures, with a reported lifetime prevalence of 12.1% in the USA (Kessler, Berglund, et al., 2005; Ruscio et al., 2008) and 8.4% in Australia (McEvoy, Grove, & Slade, 2011). It appears to be less prevalent in Eastern countries and in Europe; For example, in a large sample from Germany, Italy, Portugal, Spain and the UK, lifetime prevalence was 4.4% (Ohayon & Schatzberg, 2010) and in East Asian surveys, prevalence rates were below 1% (see Hofmann, Asnaani, & Hinton, 2010 for a review). The age of onset has been found to be approximately 13 years (Kessler, Berglund, et al., 2005; McEvoy et al., 2011).

The impact of SAD can be severe; it has been associated with increased risk for subsequent depression (Beesdo et al., 2007) and with suicidal ideation, although suicidal attempts have been found to be mediated by comorbid disorders (Sareen et al., 2005). SAD can be comorbid with anxiety and mood disorders, impulse control disorders (Kessler, Chiu, Demler, & Walters, 2005) and alcohol dependence (Kessler, Chiu, et al., 2005; Schneier et al., 2010), and such comorbidity has been found to contribute to the persistence of SAD (Blanco et al., 2011). The disorder is associated with significant problems in social and occupational functioning (McKnight, Monfort, Kashdan, Blalock, & Calton, 2016).

The understanding and treatment of SAD has been advanced by recent models leading to effective conceptualisation and treatment (Clark & Wells, 1995; Rapee & Heimberg, 1997). One similarity among these models is a primary focus on cognition as a maintenance factor, such as negative attributions, interpretations, perceptions, automatic thoughts and beliefs. The current review focused on the beliefs emphasised 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 UK National Institute of Clinical

Excellence (NICE) guidelines (NICE, 2013). 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 (HS), conditional (CBs) and unconditional beliefs (UBs),

and particular cognitive processes (as described in more detail later).

High standards (e.g., "I must get everyone's approval" and "I must not let anyone

see I am anxious") were hypothesised to "generate anxiety because they are difficult, if not

impossible to achieve" (Clark & Wells, 1995, p.75). Conditional beliefs were defined as

assumptions in relation to social evaluation (e.g., "If I make mistakes, others will reject

me") and unconditional beliefs ("I am …" statements) were defined as stable self-beliefs

triggered in social evaluative situations. These beliefs can be ego-syntonic, in which case

they are likely to develop early in life or they may be ego-dystonic, in which case they are

more likely to develop following adverse social events. The authors linked the former type

with more generalised 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 non-clinical (Heeren, Wong, Ceschi, Moulds, & Philippot, 2014; Wong et al.,

2017; Wong & Moulds, 2011b, 2011c; Wong, Moulds, & Rapee, 2014) and clinical

samples (Wong et al., 2017; Wong et al., 2014). Nevertheless, these relationships appear to

be inconsistent in their predictive value for social anxiety (Holzman, Valentiner, &

McCraw, 2014). This could be because cognitive processes, which are also key in the

Clark and Wells (1995) model, such as anticipatory processing (e.g. worry) and the post-

mortem (e.g. rumination), mediate or moderate the relationships between social beliefs and

social anxiety.

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 or 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 post-event processing and post-event 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). There is considerable evidence suggesting that the post-mortem plays a role 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 (Clark & Wells, 1995). 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 worry and the post-mortem).

However, the centrality of and necessity for social beliefs in SAD is brought into question by the metacognitive model (Wells, 2009). Specifically, Wells and Matthews (1994) proposed that metacognitive beliefs are the central factor contributing to cognitive processes, such as worry and rumination, and to prolonged psychological distress (Wells & Matthews, 1994, 1996). Such beliefs have been characterised as "the neglected dimension of self-knowledge" (Wells & Matthews, 1994, p.307). They are defined as beliefs about one's own cognitive processes, such as positive beliefs that worry can help in problem solving and negative beliefs that worry is uncontrollable and dangerous (Wells, 2009; Wells & Matthews, 1994). 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 these beliefs have been explored.

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 disentangle and integrate the findings in relation to the role of social and metacognitive beliefs in 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 the impact of cognitive processes and avoidance behaviours on the relationship between these beliefs and social anxiety.

Method

We identified relevant studies through PsychINFO, PubMED, and the 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 4664 studies relevant to social beliefs and 2738 studies relevant to metacognitive beliefs (Figure 1). The final search was conducted on 28 October 2016. The results are presented in line with the PRISMA statement (where applicable) to ensure key information is reported (Moher, Liberati, Tetzlaff, Altman, & The, 2009).

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Inclusion criteria

We focused on studies that employed clinical and non-clinical samples of participants 17 years of age and older. Studies on non-clinical 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 non-clinical groups) were included provided that social anxiety or the beliefs of interest were the outcome variables.

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: 1) the focus of the paper was not on social anxiety or SAD, 2) 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), 3) the study report was not in English, 4) participants were below 17 years old, 5) the measured beliefs were not directly relevant to the Clark and Wells (1995) model (see below for more details), 6) 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 in which participants were not selected based on their social anxiety), 7) the beliefs were not measured by a questionnaire, and 8) the publication was not peer reviewed.

Moreover, 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: 1) if the items had not derived entirely or mainly from the Clark and Wells (1995) model, 2) if the items measured symptoms, perceptions, and negative automatic thoughts as opposed to beliefs, and 3) 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 (MIBS; Boden et al., 2012), the Social Phobic Belief scale (SPB; Bögels, unpublished), the Social Cognitions Questionnaire (SCQ; Wells, Stopa, & Clark, 1993), the Self-Beliefs in Social Anxiety scale (SBSA; Wong & Moulds, 2011b), the Schema Questionnaire (SQ; 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 (high standards and conditional beliefs) 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 unconditional beliefs (Wong et al., 2014). The application of the above exclusion criteria led to the exclusion of the STABS, the MIBS and the SQ. The SPB 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. In particular, "screening moderation tools" (Appendix 9) were developed that were used by both raters (the trainee and the colleague). These tools tabulated each study's identifying details and each exclusion criterion. Initially, the trainee screened each study's abstract and title against each of these criteria. If a study did not fulfil an exclusion criterion then the full-text was screened against the same criteria using the same tools. Once the trainee had completed the screening process, the colleague was asked to moderate 25% of the papers using the same procedure. Following this, a dummy variable was created with a value corresponding to each possible outcome based on the exclusion criteria and both rater's values were entered on SPSS. These values were then used to explore inter-rater reliability. The kappa coefficient was used to measure agreement between the two raters. There was substantial agreement for both social beliefs, $k = .78$ (n=279), $p < .0005$, 95% CI = .68 - .86 and metacognitive beliefs, $k = .71$, (n=174), $p < .0005$, 95% CI = .90 – 1.00. Any disagreements were resolved by discussion. Following the screening process, ten studies concerning metacognitive beliefs and 13 studies about social beliefs were included in the final sample (Figure 1).

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│             │   │ Records identified through│   │ Additional records        │
│Identification│  │ database searching        │   │ identified                │
│             │   │ Metacognitive beliefs,    │   │ through other sources     │
│             │   │ n = 2738                  │   │ Metacognitive beliefs,    │
│             │   │ Social beliefs, n = 4664  │   │ n = 2                     │
│             │   │                           │   │ Social beliefs, n = 1     │
└─────────────┘   └──────────────────────────┘   └──────────────────────────┘
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Figure 1: Selection flow chart

Quality assessment

The Quality Assessment Tool for Diverse Designs (QATSDD; 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 only on the actual results and was deemed appropriate because there was no intention to exclude studies based on their assessed quality. The QATSDD 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

Figure 1: Selection flow chart

The flow chart contents:

Identification
- Records identified through database searching: Metacognitive beliefs, n = 2738; Social beliefs, n = 4664
- Additional records identified through other sources: Metacognitive beliefs, n = 2; Social beliefs, n = 1

Screening
- Removed duplicates: Metacognitive beliefs, n = 642; Social beliefs, n = 656
- Records included in initial screening: Metacognitive beliefs, n = 2096; Social beliefs, n = 4008
- Records excluded based on reported exclusion criteria: Metacognitive beliefs, n = 2086; Social beliefs, n = 3995

Eligibility
- Full-text articles assessed for eligibility: Metacognitive beliefs, n = 20; Social beliefs: n = 95
- Full-text articles excluded, (with reasons): Metacognitive beliefs, n = 10 (7 because they did not use a questionnaire, 1 because they did not focus on social anxiety, 2 because they did not use a targeted research design) Social beliefs, n = 82 (37 because they did not use a questionnaire, 32 because they did not target Clark & Wells, 1995 beliefs, 1 because it did not focus on social anxiety, 12 because they did not use a targeted research design)

Included
- Studies included in quantitative synthesis: Metacognitive beliefs, n = 10; Social beliefs, n = 13

Quality assessment

The Quality Assessment Tool for Diverse Designs (QATSDD; 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 only on the actual results and was deemed appropriate because there was no intention to exclude studies based on their assessed quality. The QATSDD 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.

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 ANOVAs) 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 non-clinical samples. T-test and Cohen's d statistics were calculated from the reported Means and Standard Deviations when not available.

<div align="center">

Results

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Sample characteristics

Of the ten metacognitive belief studies, four were conducted in the UK (Dannahy & Stopa, 2007; Field & Cartwright–Hatton, 2008; Gkika & Wells, 2016; Wells & Carter, 2001), two in the USA (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 et al., 2017; Wong, McEvoy, & Rapee, 2016; Wong & Moulds, 2009, 2011a, 2011b, 2011c, 2012a, 2012b; Wong et al., 2014), one in Belgium and Switzerland (Heeren et al., 2014), and one in the USA (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., 2017; Wong et al., 2014) used clinical samples. The remaining samples consisted mainly of undergraduate students.

The total sample size was n = 3251 in studies that targeted social beliefs and n = 2126 in studies that targeted metacognitive beliefs. Information on study design, participant characteristics, and measures used for beliefs and social anxiety are 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 non-clinical 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).

Overall, the social anxiety measures used were: the Fear of Negative Evaluation scale (FNE; Watson & Friend, 1969), the Social Phobia Scale and Social Interaction Anxiety Scale (SPS; SIAS; Mattick & Clarke, 1998), the Liebowitz Social Anxiety Scale (LSAS; Liebowitz, 1987), the Social Phobia and Anxiety Inventory (SPAI; Turner, Beidel, Dancu, & Stanley, 1989) and the Social Phobia Inventory (SPIN; Connor et al., 2000).

Table 1: Characteristics and quality assessment of included studies

Metacognitive beliefs

Matching number for Tables 3 & 4, author, year	Design	Sample characteristic	Assessment tools (Social anxiety, metacognitive and social beliefs)	Statistical analyses	Quality assessment: Issues related to this review
1. *Wells & Carter, 2001*	Completion of questionnaires Group comparisons	• Clinical sample, n = 24 in each group • Five groups (Generalised Anxiety Disorder (GAD), Panic Disorder (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 & Stopa, 2006*	Experimental manipulation of anxiety (recorded conversation task)	• Undergraduate students, n = 123
		  o High in FNE, n = 25,
		    ▪ Mean age: 20.28 ($SD = 3.36$); 92% women
		  o 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 & 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 & 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 & Mould, 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	Correlations, regression analysis with PBRS-SA entered in the final Step and	The mediation analysis was not fully in line with the metacognitive model

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			Study 2: SAD: SPS, SIAS and Composite PBRS-SA	mediation analysis	
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 & 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, PB-PEP-Q	Correlations and regressions (including mediation analyses)	

8. *Vassilopoulos, Brouzos & Moberly, 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	
9. Gkika & Wells, 2016	Experimental manipulation of anticipatory processing	• University students, n = 80 • High in FNE divided in 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, Nordahl & Wells, 2016	Experimental manipulation of anxiety (conversation task).	• Clinical sample, n = 47 people with SAD based on the DSM-IV • Mean age: *M*= 27.95, *SD* = 8.36, 53% women	SAD: FNE, BCL (negative self-evaluation after the task) Metacognitive beliefs: MCQ-30		
		Social beliefs			
11. Wong & 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 & 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 & correlations	SBSA used as a total scale
13. Wong & 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 in 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 & 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 & 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 conceptualised as a predictor of social beliefs and not vice versa
16. Wong & 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

17. Wong & Moulds, 2012b	Two studies: Experimental manipulation of anticipatory processing and the post-mortem respectively (analytical versus experiential mode)	• University students, n = 169 • Study 1, n = 94 o 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 & Grisham, 2013	Experimental manipulation of the post-mortem following a group discussion task	• University students, n = 81
		  o High in Brief-FNE, n = 49,
		    ▪ Mean age: 19.83 (SD = 2.95); 71.43% women
		  o 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 x manipulation x 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/ 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, Valentiner & McCraw, 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, Moulds & Rapee,, 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 o 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, McEvoy & Rapee,, 2016	Cross-sectional online questionnaire study at two time-points (2nd 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 Hierarchical linear modelling (HLM) 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
		   o Mean Age = 33.71, SD = 11.09; 47.21% women
		• Community sample described as "confident", n = 67
		   o 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	

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.

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

Author and date	Main limitations	Quality score Rater 1	Quality score Rater 2
Studies on metacognitive beliefs			
Wells & Carter, 2001	• Sampling excluded comorbidities • A standardised 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 & Stopa, 2006	• 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 not-normal data were used in the analyses • Confounders not accounted for • No evidence of service user involvement	24	24

Field & 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 & 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 & Mould, 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 & 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., come p values are missing) • Some variables potentially overlapped • No evidence of service user involvement	24	
Vassilopoulos, Brouzos & Moberly, 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 & Wells, 2016	• Analogue sample • Power analysis not reported	26	

	• Not enough justification of the choice of measures • Confounders were not taken into account • Separation in high and low metacognitive beliefs groups • No control group • More detailed justification of the chosen method of analysis was needed • No evidence of service user involvement		
Nordahl, Nordahl & Wells, 2016	• Small sample • More detail regarding exclusion and inclusion criteria was 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 & 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	23	

	• 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		
Makkar & 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 "carry-over" effects of the first exposure to the waiting period to the second exposure	25	
Wong & 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 & 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	

Wong & 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 & 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 & 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 & 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 30secs, 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, Valentiner & McCraw, 2014	• Not clear hypotheses/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?)	20	

	• 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		
Wong, Moulds & Rapee,, 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, McEvoy & Rapee,, 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

Social beliefs in social anxiety

　　High standards. All correlations were based on cross-sectional data from non-clinical 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 et al., 2016; Wong & Moulds, 2009, 2011b, 2011c, 2012a; Wong et al., 2014) showed that HS 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) that found a relatively small, but significant, correlation ($r = .17$) with the LSAS. In this study the relationship between social anxiety symptoms and HS was higher when symptoms were measured with the FNE rather than 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 0.40.

Table 3: Correlations between social beliefs and social anxiety measures (superscripts indicate the corresponding papers on Table 1)

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

Note. SBSA, Social-Beliefs Related to Social Anxiety Scale; CBQ, Core-Beliefs Questionnaire; SIAS, Social Interaction Anxiety Scale; FNE, Fear of Negative Evaluation scale; SPS, Social Phobia Scale; LSAS, Liebowitz Social Anxiety Scale; Composite, Composite measure by averaging the z-scores for the SIAS and SPS; T1, Time 1; T2, Time 2; When two longitudinal studies available, parenthesis were used to highlight the results within each study; * p<.05; ** p<.01; *** p<.001.

High standards were also found to make a unique contribution to a composite social anxiety measure (FNE, SPS, and SIAS), $\beta = .26$, $t(218) = 4.29$, $p < .01$, when accounting for UBs and CBs together. All three belief types (HS, 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, HS entered in a regression analysis at Step 2, following the STABS subscales at Step 1, were individual predictors of the SPS ($\beta = .17$, $t(234) = 3.56$, $p < .01$) and explained additional variance in social anxiety (SPS), $\Delta F = 12.68$, 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 HS on SIAS (values were not reported).

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 (HS, UBs and CBs) explained additional variance in SPS, $\Delta R^2 = .02$, $p < .05$ (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 amongst the SBSA subscales, however it could also be 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 conditions of anticipatory processing or the post-mortem. In the study that manipulated anticipatory processing, people high in FNE reported stronger HS ($M = 21.65$, $SD = 7.81$, in the analytical condition, and $M = 22.29$,

$SD = 7.01$, in the experiential condition) compared with people low in FNE ($M = 12.29$, $SD = 5.83$, in the analytical condition, and $M = 14.59$, $SD = 5.91$, in the experiential condition), $F = 38.14$, $p < .01$, partial $\eta^2 = .30$. Similarly, in the study that manipulated the post-mortem, people high in FNE reported stronger HS ($M = 24.77$, $SD = 7.24$, in the analytical condition, and $M = 24.59$, $SD = 5.75$, in the experiential condition) compared with people low in FNE ($M = 10.53$, $SD = 6.36$, in the analytical condition, and $M = 12.13$, $SD = 6.58$, in the experiential condition), $F = 96.07$, $p < .01$, partial $\eta^2 = .58$. These results related to pre-induction scores, i.e., after informing participants that they would need to give a speech and before engaging in anticipatory processing or the post-mortem. Only one study (Wong et al., 2014) compared a large group of undergraduate students (n=235) with 33 people with a diagnosis of SAD and found that the clinical group reported significantly stronger HS beliefs ($M = 26.79$, $SD = 7.48$) than the non-clinical group ($M = 18.81$, $SD = 9.36$), $F = 21.97$, $p < .001$, $d = .94$.

Conditional beliefs. CBs were also found (Heeren et al., 2014; Holzman et al., 2014; Wong et al., 2016; Wong & Moulds, 2009, 2011b, 2011c, 2012a; Wong et al., 2014) to positively and significantly correlate with measures of social anxiety (Table 3). Correlation coefficients were moderate to large and ranged between .39 and .63 with the exception of the Heeren et al. (2014) study that found a small, but significant, correlation ($r = .07$, $p < .05$) with the LSAS. Possible explanations are reported above (HS section).

In terms of their predictive value, CBs were unique cross-sectional predictors of a composite social anxiety measure (FNE, SIAS, and SPS), $\beta = .38$, $t(218) = 5.18$, $p < .01$, when entered in a regression model simultaneously with the other SBSA subscales. They were also unique predictors of the SPS when controlling for the STABS subscales at Step 1, $\beta = .21$, $p < .01$. However, similar to findings with HS, they were not unique predictors of the SIAS or the SPS when controlling for the post-mortem, self-focused attention, their interaction and social interaction anxiety (Holzman et al., 2014). The potential for confounded results has been discussed in the previous section.

Returning to the study that manipulated anticipatory processing in people with high and low social anxiety (Wong & Moulds, 2012b) and similar to HS, high socially anxious people reported stronger CBs than low socially anxious people following a social threat (High FNE: $M = 27.81$, $SD = 12.90$ in the analytical condition and $M = 31.04$, $SD = 13.86$, in the experiential condition, Low FNE: $M = 10.14$, $SD = 8.56$, in the analytical condition and $M = 14.24$, $SD = 8.29$, in the experiential condition), $F = 59.50$, $p < .01$, partial $\eta^2 = .40$ (Wong & Moulds, 2012b). In the study that manipulated the post-mortem, the results were similar (High FNE: $M = 33.32$, $SD = 15.62$, in the analytical condition and $M = 34.73$, $SD = 11.27$, in the experiential condition, Low FNE: $M = 9.73$, $SD = 9.05$, in the analytical condition and $M = 12.20$, $SD = 11.58$, in the experiential condition), $F = 63.91$, $p < .01$, partial $\eta^2 = .48$ (Wong & Moulds, 2012b). Consistently, CBs in a clinical sample were found significantly stronger ($M = 40.92$, $SD = 11.08$) than those in a non-clinical sample ($M = 20.21$, $SD = 15.07$), $F = 57.89$, $p < .001$, $d = 1.54$ (Wong et al., 2014).

Unconditional beliefs. Similarly to the results of HS and CBs, the findings from cross-sectional studies on UBs (Heeren et al., 2014; Holzman et al., 2014; Wong et al., 2016; Wong & Moulds, 2009, 2011b, 2011c, 2012a; Wong et al., 2014) also indicated positive and significant correlations with measures of social anxiety (Table 3). Correlation coefficients were moderate to large and ranged between .41 and .62 with the exception of Heeren et al. (2014), who found small, but significant, correlations with the FNE ($r = .13$, $p < .01$) and the LSAS ($r = 15$, $p < .01$). Possible explanations are reported in the HS section of the results above. Consistently, UBs measured by the CBQ (Wong et al., 2017) were found to moderately correlate with a social anxiety composite measure (SIAS and SPS), with correlation coefficients ranging from .48 to .57, $p < .001$ (Table 3). These associations remained significant when controlling for depression (with coefficients ranging between .28 and .48, $p < .001$).

UBs were also found to be unique predictors of a composite social anxiety measure (FNE, SIAS and SPS), $\beta = .19$, $t(218) = 3.04$, $p < .01$, when entered in a regression model simultaneously with the other SBSA subscales (Wong & Moulds, 2011b). However, they were not unique predictors of the SPS (Wong et al., 2014) when controlling for the STABS subscales at Step 1, $\beta = .04$, $t = .49$, $p > .05$ (the STABS subscales remained as significant predictors). Moreover, similar to HS and CBs, another cross-sectional analysis found that UBs were not unique predictors of the SIAS or the SPS when controlling for the post-mortem, self-focused attention, their interaction, and social interaction anxiety (Holzman et al., 2014).

Finally, three studies found significant differences between high and low social anxiety groups (Wong & Moulds, 2012b) and between clinical and non-clinical samples (Wong et al., 2017; Wong et al., 2014). Similar to the findings on HS and CBs, high socially anxious people reported stronger UBs than low socially anxious people following a social threat (High FNE: $M = 13.08$, $SD = 6.30$ in the analytical condition and $M = 15.73$, $SD = 7.40$, in the experiential condition, Low FNE: $M = 8.33$, $SD = 4.53$, in the analytical condition and $M = 8.10$, $SD = 5.20$, in the experiential condition), $F = 28.82$, $p < .01$, partial $\eta^2 = .24$ (Wong & Moulds, 2012b). In the study that manipulated the post-mortem, the results were similar (High FNE: $M = 17.95$, $SD = 8.13$, in the analytical condition and $M = 16.50$, $SD = 6.81$, in the experiential condition, Low FNE: $M = 5.60$, $SD = 4.69$, in the analytical condition and $M = 7.53$, $SD = 5.72$, in the experiential condition), $F = 46.96$, $p < .01$, partial $\eta^2 = .40$ (Wong & Moulds, 2012b). One clinical sample (Wong et al., 2014) reported significantly stronger UBs ($M = 19.61$, $SD = 7.87$) than a non-clinical sample ($M = 8.97$, $SD = 7.92$), $F = 52.34$, $p < .001$, $d = 1.35$, while another clinical sample (Wong et al., 2017) reported stronger UBs measured by the CBQ subscales compared with a non-clinical sample, all $F_s > 86.33$, $p_s < .001$, d_s ranging between 1.87 and 2.14. These differences remained significant when controlling for depression, all $F_s > 22.19$, $p_s < .001$, and employment status, all $F_s > 21.45$, $p_s < .001$.

Social beliefs and cognitive processes

Rumination. In relation to the potential effects of ruminative processes on social beliefs, people high in social anxiety (FNE) reported stronger CBs following a rumination 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 rumination task, $t(20) = .50$, $p = .62$, $F(1, 44) = 11.91$, $p < .05$, 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, $t(21) = 2.53$, $p = .02$, $d = .32$, compared with an experiential rumination task, $t(21) = .-18$, $p = .86$, $d = .01$, in high socially anxious individuals, $F(1,42) = 5.45$, $p = .02$, partial $\eta^2 = .12$. Finally, the total SBSA scale was found to be 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 (Makkar & Grisham, 2011). 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 (Makkar & Grisham, 2011) 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 and a conversation task, respectively. The SBSA and SCQ also correlated with social anxiety measures (SPS, SIAS and FNE), with correlations ranging between $r = .36$, $p < .05$, and $r = .68$, $p < .001$.

Anticipatory processing. One study (Wong & Moulds, 2011a) found that in high socially anxious groups (FNE), HS and CBs reportedly decreased following a distraction task (HS; $t(19) = 2.72$, $p = .01$, $d = .61$, CBs; $t(19) = 2.46$, $p = .02$, $d = .55$) and increased following an anticipatory processing task (HS; $t(19) = -2.08$, $p = .05$, $d = .47$, CBs; $t(19) = -2.28$, $p = .03$, $d = .51$). 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 HS

($t(25) = -2.52$, $p < .02$, $d = .19$) and CBs ($t(25) = -3.62$, $p < .01$, $d = .30$) compared with the analytical anticipatory processing conditions that was associated with a decrease in HS ($t(25) = 2.60$, $p < .02$, $d = .18$) and no change in CBs ($t(25) = .63$, $p = .54$, $d = .06$). No such effects were found in the low socially anxious group.

Avoidance. In a non-clinical sample (Wong & Moulds, 2011c), HS were found to be negative predictors (standardised parameter estimate = -.14, $t = 2.11$, $p < .05$) and UBs positive predictors (standardised parameter estimate = .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 (standardised parameter estimate = .22, $t = 2.47$, $p < .01$). When controlling for depression and anxiety, 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.

Metacognitive beliefs in social anxiety

Positive metacognitive beliefs. Positive beliefs about worry measured by the MCQ-30 (Wells & Cartwright-Hatton, 2004), positive beliefs about the post-mortem (PB-PEPQ; Fisak & Hammond, 2013), about general rumination in relation to social situations (PBRS-SA; Wong & Moulds, 2010) and about anticipatory processing (PB-APQ; Vassilopoulos et al., 2015) were positively and significantly correlated with social anxiety measures in non-clinical 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 $p_s < .01$ (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 non-significant correlations (McEvoy & Perini, 2009).

Table 4: Correlations between metacognitive beliefs and social anxiety measures (superscripts indicate the corresponding papers on Table 1)

Beliefs	SIAS	SPIN	SPAI	SPS	FNE	Composite	SIAS	SPS
	Social anxiety scale							
	Non-clinical 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. SIAS, Social Interaction Anxiety Scale; SPAI, Social Phobia and Anxiety Inventory; SPIN, Social Phobia Inventory; FNE, Fear of Negative Evaluation scale; SPS, Composite, Composite measure by averaging the z-scores for the SIAS and SPS; MCQ-P, Metacognitions Questionnaire 30-positive beliefs subscale; MCQ-N, Metacognitions Questionnaire 30-uncontrollability and dangerousness beliefs subscale; MCQ-CC, Metacognitions Questionnaire 30-cognitive confidence subscale; MCQ-CS, Metacognitions Questionnaire 30-cognitive self-confidence subscale; MCQ-NC, Metacognitions Questionnaire 30-Need to control thoughts subscale; PB-PEPQ, Positive Beliefs about Post-Event Processing Questionnaire; PBRS-SA, Positive Beliefs about Rumination-Social Anxiety; PB-APQ, Positive Beliefs about Anticipatory Processing Questionnaire; CAS-I, Cognitive Attentional Syndrome scale-1; III, Interpretation of Intrusions Inventory; * p<.05; ** p<.01; *** p<.001.

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, $\beta = .01$) 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 rumination (adapted for social anxiety) 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 rumination in relation to social situations 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. Furthermore, positive beliefs about rumination (PBRS-SA) were unique predictors ($\beta = .22$, $p < .05$) 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 ($\beta = .22$, $p < .05$).

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 [.02, .13] (Vassilopoulos et al., 2015). Another mediation analysis found that positive beliefs about rumination 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 that rumination would be the mediator of the relationship between positive beliefs about rumination and social anxiety.

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=.46, (Dannahy & Stopa, 2007) and between people with diagnosed social anxiety disorder 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. Moreover, it's worth noting that one study (Dannahy & Stopa, 2007) used a modified version of the MCQ-30 that targeted positive beliefs about thinking helping in problem-solving, negative beliefs about the uncontrollability of thoughts, cognitive self-consciousness, and imagery.

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 non-clinical sample (Fisak & Hammond,

2013), but not in a clinical sample, $r = .21$ with SIAS and $r = .22$ with SPS, ns (McEvoy & Perini, 2009).

A regression analysis (described in the previous section) on non-clinical data showed that these negative beliefs about the uncontrollability and dangerousness of thoughts ($\beta = .21$, $p < .05$), along with positive beliefs about worry (MCQ-30), positive beliefs about the post-mortem, and post-mortem processing, were unique predictors of social anxiety when controlling for all other variables, whereas positive beliefs about general rumination (PBRS, $\beta = .01$) were not (Fisak & Hammond, 2013).

Finally, people with high social anxiety (FNE) and people diagnosed with social anxiety disorder 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 with a non-clinical control group (MCQ; Cartwright-Hatton & Wells, 1997), $t = 2.86$, $p = .006$, $d = .83$, respectively (Dannahy & Stopa, 2007; Wells & Carter, 2001).

Other metacognitive beliefs. Only one study explored the relationship between other metacognitive beliefs and social anxiety in a non-clinical sample (Field & Cartwright–Hatton, 2008). These beliefs related more to obsessive-compulsive disorder and were termed interpretations of 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 "trans-diagnostic" 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 trans-diagnostic factor, but not directly of social anxiety when the trans-diagnostic factor was removed, $\beta = .06$, ns (possibly because of their non-specificity 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 (CAS-I; Wells, 2009) was also positively correlated with social anxiety, $r = .30$, $p < .01$, (Table 4). However, the CAS-I 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 imagery, t(43)=2.46, p=.02, d=.61, (MCQ-30 modified) compared with people with low social anxiety (Dannahy & Stopa, 2007) however, people diagnosed with social anxiety disorder reported similar superstition/ punishment/ responsibility beliefs (MCQ; Cartwright-Hatton & Wells, 1997) compared with a control group, $t = 1.39$, $p = .16$, $d = .40$.

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 x belief interaction effect, $F(1.33, 98.33) = 3.80$, $p = .04$, $\eta^2 = .05$, that showed that 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 $= .48 - 5.51$. However after the speech, their anxiety remained relatively stable whereas people with weaker positive metacognitive 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 to engage in a conversation with a confederate and then score themselves on a negative self-evaluation scale, 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 versus 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, $\beta = -.31$, $t = -2.04$, $p < .05$.

Discussion

The current review set out to investigate the relationships between social and metacognitive beliefs, as defined by Clark and Wells (1995) and Wells and Matthews (1994) respectively, and social anxiety. The main focus was on correlational or 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; anticipatory processing, self-focused attention, and the post-mortem, as well as avoidance were explored as these factors have been implicated in the maintenance of social anxiety.

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 et al., 2016; Wong & Moulds, 2009, 2011b, 2011c, 2012a; Wong et al., 2014) 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 controlling for other beliefs related to social anxiety, only HS 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 strong positive relationship between these beliefs and social anxiety that is perhaps mediated by or the result of specific cognitive processes. It should be noted that these findings were based mainly on non-clinical samples. Only one study compared a clinical with a non-clinical group and found that the former 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 rumination may give rise to both negative social beliefs and to social anxiety, an effect that would be consistent with the metacognitive model.

In line with this, the current review highlighted certain effects of cognitive processes on social beliefs in people with high levels of social anxiety. In particular, 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 analytical post-mortem style of processing was associated with a decrease in UBs compared with an experiential post-mortem task (Wong & Moulds, 2012b). Similarly, anticipatory processing was associated with increased HS and CBs and distraction with decreased beliefs in this domain (Wong & Moulds, 2011a), whereas analytical anticipatory processing was associated with a decrease in HS and experiential with an increase in HS and CBs (Wong & Moulds, 2012b). These results were not found for people with low levels of social anxiety.

It might be that the post-mortem and anticipatory processing led to stronger social beliefs compared with distraction. However, this seemed to apply for more experiential modes of processing compared with analytical, perhaps due to the potential relationship between the induced experiential mode and self-focused states. Analytical forms of processing were found beneficial in comparison to experiential forms in terms of HS and UBs. This finding is 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 not be consistent as such beliefs are considered to effect social anxiety through in-situation processes, such as 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.

Some mediation analyses were conducted (Wong & Moulds, 2011c), but they utilised social anxiety as a predictor and the social beliefs as mediators, which is not consistent with the cognitive or metacognitive model. HS and UBs were unique predictors of behavioural avoidance and CBs were unique predictors of cognitive avoidance. Social anxiety predicted behavioural and cognitive avoidance partially through UBs and CBs, respectively. But as discussed above, further studies are needed to explore whether the 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 is consistent with the metacognitive model of emotional difficulties and raises a question about whether more direct effects would be achieved by targeting the cognitive processes instead.

Metacognitive beliefs

The current review explored the role of metacognitive beliefs in social anxiety. 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 non-clinical samples (Fisak & Hammond, 2013; Vassilopoulos et al., 2015; Wong & Moulds, 2010). In clinical samples, only two measures have been used (MCQ-30 and 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 non-clinical 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 non-clinical 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 it's time-course and are worthy of further exploration.

Nevertheless, in non-clinical 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 which are not eliminated when controlling for these other variables as 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 to more generic metacognitive beliefs, such as beliefs about general worry (Vassilopoulos et al., 2015), but such studies might capitalise 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 role of other more general metacognitive beliefs in 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, negative self-evaluation and in enabling exposure strategies. So far, only two studies have investigated whether changes in metacognitive beliefs had an effect in changes in social anxiety following the delivery of CBT (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 measures 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 were associated with reduction in social anxiety measures (SIAS and SPS), while reduction in these beliefs and in beliefs about the need to control thoughts were associated with 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. The authors 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 (Nordahl et al., 2016).

Strengths and weaknessess in the reviewed studies

The above results should be interpreted within the context of the quality assessment for each study (Table 2), although the authors recognise the potential for assessment bias. 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, whether the assumptions for the relevant staistical 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 non-clinical 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 pre and post-treatment scores and found that reductions in negative metacognitive beliefs about the uncontrollability and dangerousness of thoughts were associated with reductions in social anxeity following cognitive-behavioural therapy (McEvoy & Perini, 2009). Nevertheless, to the authors knowledge, no studies have directly manpipulated social or metacognitive beliefs to explore causal relationships between these and social anxiety. Future research should target this area.

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 areas of cognition, such as interpretations, perceptions, and judgments. Nevertheless, this approach was deliberately chosen because the treatment based on the Clark and Wells (1995) model has been recommended by the NICE 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.

Another limitation was the exclusion of "grey literature" (e.g., conference papers, unpublished data, theses, and books), which might have contributed to publication bias (Hopewell, Clarke, & Mallett, 2006; Torgerson, 2006). The main reason for excluding grey literature in the current study was the complicated nature of reporting it, which includes conference abstracts and unpublished data that would require substantially more time than was available to collect and quality assess. Moreover, it has been argued that grey literature

might not adhere to the same scientific rigor as peer reviewed publications and that often, there are inconsistencies between conference abstracts and the respective published studies (Hopewell, Clarke, & Mallett, 2006). However, there is insufficient evidence that overall, grey literature is of lower quality than peer reviewed research (Hopewell, Clarke, & Mallett, 2006). It is therefore noted that due to the publication bias (that means that any grey literature with non-significant results might have been excluded from peer-reviewed journals) the exclusion of grey literature from the current review might have resulted in the magnification or exaggeration of the reported effects and relationships (Hopewell, Clarke, & Mallett, 2006; Torgerson, 2006). Therefore, future reviews should consider the inclusion of grey literature to limit this bias.

In addition, it is worth noting that even though systematic reviews offer certain advantages compared with narrative reviews, such as that they examine pre-defined research questions and their methodologies should be replicable, nevertheless they fail to synthesise the data in robust and reliable way. A meta-analysis would have been able to provide more reliable estimates and to further investigate whether the reported relationships and effects sizes were consistent across the studies. Moreover, in the event where the effects and relationships varied significantly across the data, a meta-analysis would have been able to quantify the extent of that variance. Therefore, future research should focus on using meta-analytic methods to explore whether the relationships reported in the current review are consistent and reliable and to compare the reported estimates in relation to each type of belief.

A final limitation was the inclusion of clinical and non-clinical studies in the review. However, the latter issue can be defended by the data showing that non-patients with high social anxiety and patients with SAD are alike.

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 of SAD.

Future studies are required that directly assess the relative contributions of social beliefs and metacognitive beliefs to social anxiety. This is an important clinical question because the results could change the focus of assessment and treatment. For now, the data appears to suggest that models of social anxiety may need to be revised to consider the direct and indirect effects of metacognitive knowledge on social anxiety in social situations.

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Paper 2: Empirical Research

Metacognition and Social Anxiety: A prospective study

Abstract

Cognitive models of social anxiety disorder assign an important role to beliefs about the social self (e.g. "I'm boring") in driving social anxiety. However, the metacognitive model hypothesises that metacognitive beliefs about the self (e.g. "I cannot control my thinking") are more important to the development and maintenance of disorder. The current study explored the potential prospective contributions of these different beliefs in social anxiety. One-hundred and fifty-six university students and staff completed a battery of questionnaires twice, two months apart. Regression analyses showed that irrespective of social beliefs, Time 1 negative metacognitive beliefs about the uncontrollability and dangerousness of thoughts were individual prospective positive predictors of Time 2 social anxiety. This effect was partly mediated by self-focused attention at Time 2. The results suggest that a consideration of negative metacognitive beliefs in social anxiety might enhance conceptualisation and treatment.

Keywords: social anxiety; cognition; metacognition; beliefs; cognitive processes

Running Head: Prospective relationships between metacognition and social anxiety

Introduction

Social anxiety can be conceptualised as a fear of social interactions and of negative evaluation by others that ranges on a continuum from mild to extreme, the latter including social anxiety disorder (Acarturk, de Graaf, van Straten, Have, & Cuijpers, 2008; Filho et al., 2010; Kessler et al., 2003). Social Anxiety disorder (SAD) can be debilitating and involves avoidance of social situations and levels of distress that interfere with daily functioning (American Psyciatric Association, 2013). SAD has been associated with increased risk of subsequent depression (Beesdo et al., 2007) and with significant problems in social and occupational functioning (McKnight, Monfort, Kashdan, Blalock, & Calton, 2016). Moreover, elements of social anxiety, such as fear of negative evaluation, have been associated with other disorders, including bulimic attitudes in a nonclinical sample (Gilbert & Meyer, 2005) and delusional thinking in nonclinical and clinical samples with psychosis (Kinoshita et al., 2011). Therefore, understanding the mechanisms involved can have wide implications.

Recent cognitive models have advanced the treatment of SAD and improved clinical outcomes (Clark & Wells, 1995; Heimberg & Rapee, 1997). The Clark and Wells treatment, in particular, is cited in NHS National Institute Clinical Excellence guidelines (NICE, 2013) as the most effective treatment. According to this model, social anxiety is caused by a combination of cognitive and behavioural factors, including a shift to internally focused attention in social situations, processing of a distorted and negative image of the self, and unhelpful safety behaviours. These processes impair social performance and prevent the individual from having experiences that unambiguously challenge negative beliefs and can exacerbate anxiety symptoms. In addition, the model specifies that worry before entering social situations (termed anticipatory processing) and rumination occurring afterwards (the post-mortem) maintain negative processing of the self. These factors are traced back to underlying beliefs and assumptions about the self as a social object (e.g. "I'm boring; I sound stupid").

The model is supported by data from empirical studies that have shown anticipatory processing to involve negative predictions interfering with concentration (Vassilopoulos, 2004) and to have a negative effect on social anxiety and on state anxiety in relation to social tasks (see Wong, 2016, for a review). The post-mortem has been found to be positively associated with social anxiety and low mood, although certain types of this processing have also been suggested to have a "calming" effect (Wong, 2016). The post-mortem also appears to be stronger in people with social anxiety disorder than in people with other disorders (Perera, Rowa, & McCabe, 2016). Finally, self-focused attention has been positively associated with social anxiety (Clark & McManus, 2002; Mansell, Clark, & Ehlers, 2003; Woody, 1996).

The Clark and Wells (1995) model draws on the metacognitive model of psychological disorder (Wells & Matthews, 1994) and on other influences, notably Beck's (1976) cognitive model. However, whilst Clark and Wells (1995) place self-focused attention and the role of worry and rumination in the context of schemas or beliefs about the social self, the metacognitive model views such beliefs as triggers or outputs of processing, and assigns greater importance to beliefs about cognition in driving self-processing, worry and rumination.

Consistent with the metacognitive approach, Nordhal, Nordahl and Wells (2016) showed that negative self-evaluation in a subsequent social interaction task was predicted by positive metacognitive beliefs concerning worry. In addition, positive beliefs about ruminative processing and worry (Fisak & Hammond, 2013; Vassilopoulos, Brouzos, & Moberly, 2015), negative metacognitive beliefs (Fisak & Hammond, 2013; Gkika & Wells, 2016; Wells & Carter, 2001), and beliefs about the need to control thoughts (McEvoy & Perini, 2009) have been positively associated with social anxiety. Moreover, reductions in social anxiety following cognitive-behaviour therapy (CBT) have been positively associated with reductions in negative metacognitive beliefs about the

uncontrollability and dangerousness of thoughts (McEvoy, Mahoney, Perini, & Kingsep, 2009; McEvoy & Perini, 2009).

The identification of the nature of the belief domains that predict social anxiety and related processes is of some importance as it is likely to determine the focus of case conceptualisation and treatment. To this end the present study was designed to test the contribution of social self-schemas (hereafter referred to as social beliefs) as they are specified in the Clark and Wells (1995) model and any additional contribution of metacognitive beliefs as specified by Wells and Matthews (1994). The main hypothesis was that within a two-month period, metacognitive beliefs at Time 1 would be positive predictors of social anxiety at Time 2 while controlling for social beliefs and social anxiety at Time 1 and they would explain additional variance in social anxiety over and above these variables. In line with the metacognitive model, it was also predicted that the effects of metacognitive beliefs on social anxiety would be mediated by the cognitive processes. In particular, both models propose that cognitive processes consisting of self-focused attention, anticipatory processing, and the post-mortem can be involved in the maintenance of social anxiety with particular importance given to self-focused attention. In this study each of these processes was measured with the aim of testing potential mediation effects on metacognitive beliefs.

Methods

Participants

Power calculations were conducted to estimate the required sample size. For regression analyses, with up to eight predictors, a power of .8, probability level of .05 and an anticipated medium effect size of .15, the required sample was 122. Taking into account an estimated 35-45% drop-out rate, 288 UK University students and staff completed the first phase of the study, of which 156 completed the second phase (i.e. completed the questionnaires at both time-points). Demographic characteristics are presented in Table 1.

There were no statistically significant differences in any of the demographic variables between the participants, who completed both parts and those, who did not.

Table 1: Demographic characteristics of the initial (Time 1) and final samples (Times 1 & 2)

		Initial sample; *N = 288*	*Full sample (completers of both phases of the study), N = 156*
Age		24.91 (*SD* = 9.77)	25 (*SD* = 9.95)
Gender		236 (81.9%) women	128 (82.1%) women
Status	Singe	223 (77.4%)	121 (77.6%)
	Married	30 (10.4%)	20 (12.8%)
	Divorced	9 (3.1%)	5 (3.2%)
	Widowed	2 (.7%)	0
	Separated	1 (.3%)	0
Ethnicity	British	183 (63.5%)	102 (65.4%)
	Any white	37 (12.8%)	19 (12.2%)
	Chinese	12 (4.2%)	4 (2.6%)
	Any Asian	14 (4.9%)	6 (3.8%)
	Indian	9 (3.1%)	5 (3.2%)
	Other	33 (11.5%)	20 (12.8%)
Employment	Full-time student	214 (74.3)	113 (72.4%)
	Full-time employed	48 (16.7)	28 (17.9%)
	Part-time student	12 (4.2%	6 (3.8%)
	Part-time employed	13 (4.5)	8 (5.1%)
	Self-employed	1 (.3%)	1 (.6%)

Measures

The Liebowitz Social Anxiety self-report Scale (LSAS; Liebowitz, 1987) was used to measure anxiety in social situations. The scale consists of two subscales measuring how much anxiety participants feel when in a range of social situations and how frequently they avoid it on a Likert scale ranging from 0 = "None" to 3 = "Severe" and from 0 = "Never" to 3 = "Usually", respectively. In a clinical sample, the scale has shown good stability ($r = 0.79$, $p < 0.01$ for anxiety, and $r = 0.83$, $p < 0.01$, for avoidance) and reliability with Cronbach's $\alpha > .79$ (Baker, Heinrichs, Kim, & Hofmann, 2002). In the current sample, Cronbach's α was .94 for the anxiety subscale and .93 for avoidance at Time 1 and .94 for anxiety and .93 for avoidance at Time 2.

The short Metacognitions Questionnaire (MCQ-30; Wells & Cartwright-Hatton, 2004) was used to measure metacognitive beliefs. The scale consists of five subscales: negative beliefs about the dangerousness and uncontrollability of thoughts (hereafter referred to as negative metacognitive beliefs), beliefs about the need to control thoughts, positive beliefs about worry, cognitive confidence, and cognitive self-consciousness. The beliefs are rated on a Likert scale ranging from 1 = "Do not agree at all" to 4 = "Agree very much". The scale's internal consistency has been found excellent (Cronbach's $\alpha = .93$) for the whole scale, and ranging from .72 to .93 for the subscales. Test-retest reliability over a period of 22 to 118 days was found acceptable to good with correlations of .75 for the whole scale, and ranging from .59 to .87 for the subscales (Wells & Cartwright-Hatton, 2004). In the current sample, Cronbach's α ranged between .82 and .91 for all subscales at both Time points.

Social beliefs were measured using an amended version of the Self-Statements during Public Speaking scale (SSPS; Hofmann & Dibartolo, 2000) and the belief subscale of the Social Phobia Rating Scale (SPRS; Wells, 1997). The instructions of the SSPS were modified to address general social situations instead of just public speaking. This scale consists of two 5-item subscales of positive and negative self-statements that occur while

in social situations, such as "I feel awkward and dumb; they're bound to notice". They are rated on a Likert scale ranging from 0 = "Do not agree at all" to 5 = "Agree extremely". The scale has shown good internal consistency with Cronbach's αs ranging from .75 to .86. In the current study, only the negative subscale was used and its Cronbach's α was .87 for Time 1 and .88 for Time 2. The SPRS-belief subscale asks people to rate how much they believe certain negative thoughts when in social situations on a scale of 0 = "Do not believe the thought" to 100 = "Completely convinced the thought is true". In the current sample, Cronbach's α was .95 for Time 1 and .94 for Time 2.

Anticipatory processing was measured using the Anticipatory Social Behaviours Questionnaire (ASBQ; Hinrichsen & Clark, 2003). This scale consists of 12 items measuring anxious anticipation and worry about forthcoming social situations on a Likert scale ranging from 0 = "Never" to 3 = "Always". The authors have found it to have good reliability with Cronbach's α = .88 and in the current sample, α was .88 for both Time points.

The post-mortem was measured using the Post-Event Processing Questionnaire-Revised (McEvoy & Kingsep, 2006) that consists of 9 items. The first item measures state anxiety and the remaining items comprise a scale of ruminative thinking in relation to past social events rated on a visual analogue scale (0-100) The authors found its reliability to be good with Cornbach's α = .87. In the current sample, α was .91 at Time 1 and .92 at Time 2.

Finally, self-focused attention was measured using the Focus of Attention Questionnaire (FAQ; Woody, Chambless, & Glass, 1997). The self-focused subscale was used in the analyses that consists of five items, such as "I was focusing on what I would say or do next" rated on a Likert scale ranging from 1 = "Not at all" to 5 = "Totally". The authors have found its reliability Cronbach α to be acceptable (.76) and in the current sample, α was .80 for Time 1 and .85 for Time 2.

Procedure

Participants were recruited using the University's online research volunteering system, email announcements, and posters placed in University premises. The study was approved by the University's ethics committee (ref: ethics/020316) and as compensation, participants were offered course credits (Psychology students only) and the opportunity to participate in a prize draw for four high street vouchers worth £30, £30, £20, and £20, respectively.

The study involved completing the same questionnaires twice. Two months after the first completion, participants were sent email reminders to complete the questionnaires again. Only two reminders were sent (if needed) one week apart. Fifty-four per cent (54%) of the initial sample completed the questionnaires twice. The mean time between the first and second completion was 66.5 days ($SD = 9.07$). The questionnaires were administered online.

Overview of analysis

The assumption of normality was explored by investigating skewness and kurtosis values, histograms, and the Kolmogorov-Smirnov statistics. Time 1 and 2 social anxiety was normally distributed. However, other variables were not. Therefore non-parametric tests were used when social anxiety was not the dependent variable (i.e., in correlations).

Spearman's rho correlations were calculated to explore the relationships between all variables. Given the size of the sample and research findings that suggest that not all metacognitive beliefs play a role in social anxiety, it was decided to use regression analysis to select the metacognitive beliefs to be included in the final analyses. A linear regression analysis was conducted with all metacognitive beliefs at Time 1 as predictors of social anxiety at Time 2. The results showed that only negative metacognitive beliefs, $\beta = .48$, $t = 5.37$, 95% CI = $.79 - 1.70$, $p < .0001$, were individual predictors. This is consistent with previous findings that have implicated these beliefs in social anxiety (Dannahy & Stopa, 2007; Fisak & Hammond, 2013; Gkika & Wells, 2016; Wells & Carter, 2001)**.** Subsequent

analyses therefore retained the negative metacognitive beliefs as predictors. Similarly, a linear regression analysis was conducted with the two social belief scales at Time 1 as predictors of social anxiety at Time 2. Both scales were individual predictors, SPRS-beliefs, $\beta = .51$, $t = 5.15$, 95% CI = $.01 - .03$, $p < .0001$, and SSPS-negative, $\beta = .21$, $t = 2.11$, 95% CI = $.03 - 1.10$, $p = .04$. Therefore, these beliefs were also retained for further analyses.

To explore the hypotheses that metacognitive beliefs would be prospective predictors of social anxiety and explain additional variance in social beliefs, hierarchical regression analyses were conducted to control for the variance explained by social anxiety at Time 1 (Step 1) and social beliefs at Time 1 (Step 2). Negative metacognitive beliefs at Time 1 were entered in Step 3. The question here was whether the increment in variance explained on this step was significant. A further step was then added to the model; the cognitive processes (ASBQ, FAQ-self, and PEPQ) at Time 2, which are features of both the cognitive and metacognitive models. These were entered on the final step because they are considered to be caused by beliefs and mediate the effects of them.

Finally, we followed up the regression analysis with path analysis to explore the hypothesised mediation. As described below, amongst the cognitive processes, the regression analyses indicated only self-focused attention as a significant contributor to social anxiety and therefore, only this variable was retained for the subsequent mediation analyses. This meant that only observed variables were to be used and therefore, path analysis was the most appropriate way of analysing mediation (instead of structural equation modelling that requires latent variables to be included).

Results

Sample representativeness and changes in social anxiety over time

To explore whether the sample that completed the questionnaires at both Time points was representative of the sample at Time 1, Mann-Whitney U tests were conducted for all variables. There were no significant differences in any of the variables, with the exception of anticipatory processing. This was greater amongst completers of both parts of the study: non-completers, $M = 9.75$, $SD = 4.5$, completers, $M = 17.53$, $SD = 7.45$, $U = 476.5$, $SE = 85.64$, $p = .03$. Paired t-tests between social anxiety at Time 1 and Time 2 revealed that amongst completers, social anxiety showed a small reduction at Time 2 compared with Time 1, Time 1 $M = 32.29$, $SD = 14.21$, Time 2 $M = 30.92$, $SD = 14.42$, $t(155) = 2.02$, 95% CI $= .03 – 2.71$, $p = .04$.

Correlational relationships and descriptive statistics

All correlations were positive and significant (Table 2), with the exception of: Time 1 positive metacognitive beliefs with social anxiety at Time 1 and Time 2; Time 1 and 2 cognitive confidence with Time 1 and 2 cognitive self-consciousness; and Time 2 positive metacognitive beliefs with Time 2 post-mortem. Means and standard deviations are reported in Table 2.

Table 2: Correlational relationships between social anxiety and predictor variables, means (and standard deviations)

Time 1	T2 S.Anxiety M = 30.92 (14.42)	T1MCQ-Positive M = 11.61 (4.51)	T1MCQ-Negative M = 14.72 (5.54)	T1MCQ-CogC M = 12.05 (4.74)	T1MCQ-CogSelfC M = 15.39 (4.46)	T1MCQ-Need M = 12.14 (4.23)	T1SPRS-Beliefs M = 705.61 (370.54)	T1SSPS-Negative M = 13.29 (5.48)	T1ASBQ M = 18.45 (7.83)	T1FAQ Self M = 13.08 (4.66)	T1PEPQ M = 266.48 (214.29)
T1 S.Anxiety M = 32.29 (14.21)	.85**	.09, ns	.50**	.23*	.30**	.40**	.70**	.61**	.55**	.59**	.60**
T2 S.Anxiety		.14, ns	.57**	.20*	.37**	.43**	.67**	.62**	.58**	.59**	.60**
T1MCQ-Positive			.30**	.20*	.38**	.42**	.21*	.30**	.38**	.24*	.24*
T1MCQ-Negative				.25*	.54**	.60**	.67**	.61**	.67**	.61**	.56**
T1MCQ-CogC					.08ns	.22*	.21*	.27**	.21*	.23*	.26**
T1MCQ-CogSelfC						.52**	.39**	.39**	.58**	.39**	.40**
T1MCQ-Need							.43**	.41**	.61**	.48**	.49**
T1SPRS-Beliefs								.81**	.68**	.72**	.67**
T1SSPS-Negative									.63**	.69**	.63**
T1ASBQ										.72**	.65**
T1FAQ											.61**

Time 2	T2 S.Anxiety	T2MCQ positive M = 11.84 (4.59)	T2MCQ-Negative M = 14.37 (5.15)	T2MCQ-CogC M = 11.90 (4.81)	T2MCQ-CogSelfC M = 14.66 (4.60)	T2MCQ-Need M = 11.38 (4.24)	T2SPRS-Beliefs M = 693.78 (354.53)	T2SSPS-Negative M = 13.67 (5.37)	T2ASBQ M = 17.53 (7.30)	T2FAQ Self 13.03 (4.95)	T2PEPQ M = 270.19 (219.82)
T2 S.Anxiety		.17*	.39**	.19*	.28**	.32**	.68**	.54**	.50**	.52**	.44**
T2MCQ-Positive			.27**	.17*	.42**	.43**	.30**	.37**	.36**	.31**	.14, ns
T2MCQ-Negative				.25**	.59**	.62**	.61**	.59**	.62**	.53**	.41**
T2MCQ-CogC					.10, ns	.32**	.28**	.30**	.23**	.23**	.19*
T2MCQ-CogSelfC						.51**	.46**	.42**	.52**	.44**	.26**
T2MCQ-Need							.54**	.48**	.64**	.55**	.42**
T2SPRS-Beliefs								.84**	.64**	.70**	.52**
T2SSPS-Negative									.62**	.65**	.45**
T2ASBQ										.69**	.43**
T2FAQ											.54**

Note. T1, Time 1; T2, Time 2; S.Anxiety, social anxiety; MCQ-Positive, positive beliefs about worry; MCQ-Negative, negative beliefs about the uncontrollability and dangerousness of thoughts; MCQ-CogC, cognitive confidence; MCQ-CogSelfC, cognitive self-confidence; MCQ-Need, beliefs about the need to control thoughts; SPRS-Beliefs, social beliefs measured with the SPRS; SSPS-Negative; social beliefs measured with the SSPS; ASBQ, anticipatory social behaviour questionnaire, FAQself= self-focused attention measured with the FAQ; PEPQ, post-event processing questionnaire-revised; * ≤ .01; ** ≤ .001; ns = non-significant.

Hypothesis 1: Prospective predictors of social anxiety

Multicollinearity was explored. Correlations above .85, VIF values ≥10, and tolerance values ≤ .1 were set as indicators of multicollinearity. The results raised no such concerns, except from the anticipated high correlation between Time 1 and Time 2 social anxiety. The analysis was initially conducted with gender as a predictor on the first step. Gender did not have a significant effect (β = -.52, t = -.64, p = .52, 95% CI = -7.89 – 4.01) and therefore, the analysis was repeated excluding gender. The analysis (Table 3) controlled for Time 1 social anxiety at Step 1, the two Time 1 social belief variables were entered in Step 2, Time 1 negative metacognitive beliefs were entered in Step 3, and Time 2 cognitive processes in Step 4.

The results showed that on Step 2, the addition of social beliefs to the model significantly increased the variance explained (increment = 3%). The addition of negative metacognitive beliefs led to a further small, but significant increase (1%). On the final step the inclusion of self-focused attention, the post-mortem, and anticipatory processing resulted in a further significant 5% explained variance. Thus, the results support the hypothesis that negative metacognitions prospectively contribute to anxiety when social beliefs are controlled. On step 3 of the model, negative metacognitive beliefs, but not the social beliefs, made significant individual contributions to social anxiety. The contribution of negative metacognitive beliefs became non-significant on step 4 when cognitive processes at Time 2 were entered. This was expected as these are considered to be mediators. On the final step, self-attention from amongst the mediators emerged as the unique predictor.

Table 3: Prospective predictive relationships between negative metacognitive beliefs, social beliefs, and cognitive processes with social anxiety

Variables	ADj R²	ΔR²	p	B	SE B	β	t	95% CI	p
Step 1	.68	.68	<.0001						
T1 S.Anxiety				.84	.05	.82	18.14	.75 – .93	<.0001
Step 2	.70	.03	.001						
T1 S.Anxiety				.67	.06	.66	10.68	.55 – .80	<.0001
T1SPRSbeliefs				.07	.00	.15	1.87	.00 – .01	.06
T1SSPSneg				.23	.20	.09	1.13	-.17 – .62	.26
Step 3	.71	.01	.02						
T1 S.Anxiety				.66	.06	.65	10.67	.54 – .79	<.0001
T1SPRSbelief				.00	.00	.08	.99	-.00 – .01	.32
T1SSPSneg				.16	.20	.06	.81	-.23 – .55	.42
T1MCQ-N				.37	.15	.14	2.42	.06 – .67	.02
Step 4	.75	.05	<.0001						
T1 S.Anxiety				.62	.06	.61	10.72	.51 – .74	<.0001
T1SPRSbeliefs				.00	.00	.03	.40	-.00 – .00	.69
T1SSPSneg				-.01	.19	-.00	-.05	-.38 – .36	.96
T1MCQ-N				.15	.15	.06	1.00	-.14 – .44	.32
T2ASBQ				.16	.12	.08	1.30	-.08 – .40	.20
T2FAQself				.68	.18	.23	3.69	.32 – 1.05	<.0001
T2PEPQ				.00	.00	.01	.14	-.00 – .00	.89

Note. T1, Time 1; T2, Time 2; S.Anxiety, social anxiety measured with the LSAS; SPRSbelief, social beliefs measured with the SPRS; SSPSneg, social beliefs measured with the SSPS; MCQ-N, negative beliefs about the uncontrollability and dangerousness of thoughts; ASBQ, anticipatory social behaviour questionnaire, FAQself, self-focused attention measured with the FAQ; PEPQ, post-event processing questionnaire-revised.

Hypothesis 2: Mediation effects

Given that only negative metacognitive beliefs and self-focused attention made significant contributions, path analysis was used with these variables as observed variables to test mediation. The data did not violate the assumption of multivariate normality (Univariate Skewness ranged between .10 and .34, $M = .21$; Univariate Kurtosis ranged between -.77 and -1.23, $M = -.93$; Multivariate Kurtosis = -1.47; Mardia's normalised estimate = -1.68). Therefore, the standardised estimates were interpreted and reported. Bootstrapping (1000 samples) was also employed to obtain the significance levels in relation to the indirect paths (Byrne, 2016). In line with the mediation hypothesis (Figure 1), Time 1 negative metacognitive beliefs were a significant predictor of Time 2 self-focused attention, Path estimate, .56, $SE = .06$, $CR = 8.46$, $p = < .0001$. Time 2 self-focused attention was a significant predictor of Time 2 social anxiety, Path estimate, .48, $SE = .20$, $CR = 6.41$, $p = < .0001$. Finally, Time 1 negative metacognitive beliefs were a significant predictor of Time 2 social anxiety, Path estimate, .30, $SE = .18$, $CR = 4.43$, $p = < .0001$. This effect was lower than the direct effect of negative metacognitive beliefs on social anxiety without taking into account self-focused attention, Path estimate, .58, $SE = .17$, $CR = 8.88$, $p = < .0001$. The indirect effect of Time 1 negative metacognitive beliefs to social anxiety at Time 2 through self-focused attention at Time 2 was significant with an estimate of .27 ($SE = .04$), 95% CI = 19 – 37, $p = .002$.
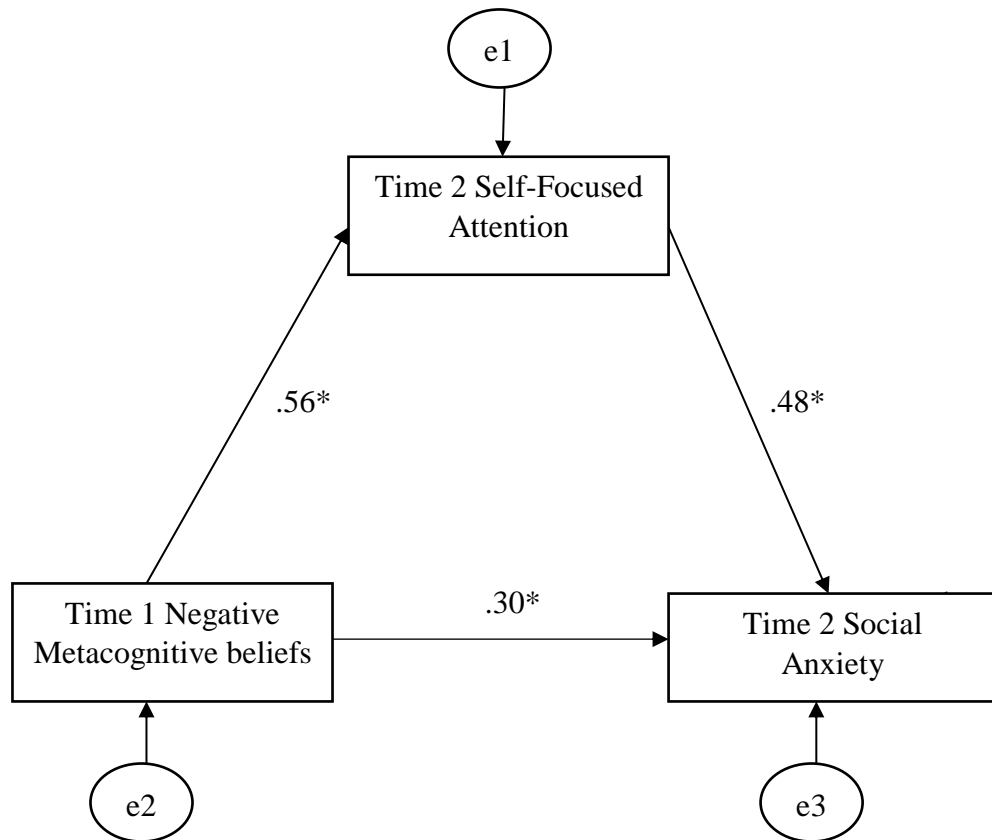
Figure 1: The mediation effect of negative metacognitive beliefs at Time 1 on social anxiety at Time 2 through self-focused attention at Time 2, $* < .0001$; e = error

Discussion

This study set out to investigate the prospective contributions of metacognitive beliefs to social anxiety. In line with the first hypothesis and the metacognitive model (Wells & Matthews, 1994), when controlling for Time 1 social anxiety, Time 1 negative metacognitive beliefs were found to be individual but small positive predictors of social anxiety two months later. The path analysis showed that this relationship was partly mediated by self-focused attention at Time 2. This is consistent with cross-sectional findings that these beliefs were significant positive predictors of social anxiety (Fisak & Hammond, 2013) and with studies showing that people with high levels of social anxiety and with a diagnosis of SAD have reported stronger such beliefs compared with people

with low levels of social anxiety and without a diagnosis, respectively (Dannahy & Stopa, 2007; Wells & Carter, 2001). The current findings highlight the prospective and possibly causal nature of these relationships and they also suggest that the temporal association is partly dependent on more proximal covariances between social anxiety and self-attention. It should be noted however that the additional variance explained by metacognition was only 1%. This may indicate that the influence is small and unimportant, but the results should be viewed in the broader context of the hierarchical model tested.

Specifically, there was little variation in anxiety over the re-test interval and controlling for initial anxiety levels severely restricts the range of unexplained variance on subsequent steps of the model. The results should also be interpreted in the context of the unexpected finding that social beliefs were not predictive of social anxiety at Time 2. Taken together these results provide evidence of proof of concept; that metacognitions can prospectively predict anxiety but issues concerning the absolute importance of these variables remains to be established.

The finding that positive metacognitive beliefs did not predict social anxiety was somewhat unexpected. However, the relationships between these beliefs and social anxiety have been mixed, with some studies finding significant positive relationships between positive beliefs about anticipatory processing and about the post-mortem and social anxiety (Fisak & Hammond, 2013; Vassilopoulos et al., 2015; Wong & Moulds, 2010) and one study finding non-significant relationships in a clinical sample (McEvoy & Perini, 2009). Moreover, another study found that positive metacognitive beliefs did not change after group CBT and were not related to symptom reductions (McEvoy et al., 2009). This could be due to mediated effects through anticipatory processing (Vassilopoulos et al., 2015) and the post-mortem (Fisak & Hammond, 2013). Future prospective studies should explore this hypothesis further as the current sample size did not allow for such exploratory analyses.

A potentially important finding was that social beliefs (schemas) did not show a significant prospective contribution to social anxiety when taking social anxiety at Time 1

into account. This contradicts previous findings of significant positive relationships between such beliefs and social anxiety (Heeren, Wong, Ceschi, Moulds, & Philippot, 2014; Holzman, Valentiner, & McCraw, 2014; Wong, McEvoy, & Rapee, 2016; Wong & Moulds, 2009, 2011a, 2011b; Wong, Moulds, & Rapee, 2014). The current finding could be because of the conceptual overlap between social anxiety and social beliefs that did not allow for sufficient additional variance to be predicted over and above social anxiety at Time 1.

Another reason for this finding could be that the relationships between social beliefs and social anxiety are complex and may be dependent on other processes or mediated by cognitive processes. In line with this, one cross-sectional study controlled for the post-mortem and self-focused attention and found that social beliefs did not have an additional predictive value (Holzman et al., 2014). Finally, in line with the metacognitive model (Wells, 2009), this finding could be the result of social beliefs being the product of cognitive processes (rather than the cause) and therefore, their prospective contribution is diminished. One study has offered indirect support to this notion by showing that in people with a diagnosis of SAD, positive beliefs about worry and the perspective taken during a conversation task were positive predictors of negative self-evaluative beliefs (Nordahl et al., 2016).

Self-focused attention at Time 2 was also a significant positive predictor of later social anxiety. This suggests that consideration of self-focused attention in social anxiety can be central and it is consistent with findings that metacognitive techniques that tackle self-focused attention, such as the attention training technique and situational attentional refocusing, help reduce social anxiety and for some people, it led to their symptoms not fulfilling the diagnostic criteria following treatment (Vogel et al., 2016).

Contrary to predictions and previous findings that have implicated anticipatory processing and the post-mortem in social anxiety (Perera et al., 2016; Vassilopoulos, 2004, 2005; Wong, 2016), the current study did not show a prospective predictive value of these

variables in social anxiety. One reason might be that these processes are specific to social anxiety disorder and therefore a clinical sample was needed to explore their effects. It is also likely that these processes are involved more in the maintenance of social anxiety rather than in its cause. Consistent with this idea, each set of processes (self-attention, post-mortem, anticipatory processing) showed moderate positive correlations with social anxiety in the cross-sectional data sets at both Time 1 and Time 2.

Following the above, the current findings should be considered in light of certain limitations. First, the sample consisted of University students and staff and social anxiety was viewed on a continuum. Therefore, the findings could not be generalised to clinical samples. However, the sample allows for interpretation in the context of social anxiety irrespective of diagnoses. Nevertheless future studies are needed to explore whether these effects are replicable in clinical samples. Second, even though the sample size was adequate for the reported analyses, it restricted more exploratory analysis that could have explored mediating and moderating effects of more variables within the model. Therefore, the selected variables were based on theoretical grounds and on the reported regression analyses at the expense of a broader exploratory model that could have included a greater range of metacognitive and social beliefs. Nevertheless, it is advised that statistical methods, such as regression analyses and path analyses are not used in an exploratory fashion. Finally, even though multicollinearity was addressed, there were issues of conceptual overlap between social beliefs and the concept of social anxiety, which renders it challenging to explore the relationships between the two concepts and between them and other variables.

In conclusion, the current study has highlighted the prospective contribution of negative metacognitive beliefs and of self-focused attention to social anxiety. The results suggest that the conceptualisation and treatment of social anxiety could benefit from the consideration of both concepts. Therefore, even though current treatment protocols incorporate techniques that target self-focused attention, it might be beneficial to include

techniques that aim to modify negative metacognitive beliefs as well. Future studies are needed to explore this further.

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Paper 3: Critical Reflection

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Introduction

Social anxiety disorder (SAD) was first classified as an anxiety disorder in the DSM-III (American Psyciatric Association, 1980). Currently, SAD is defined as a "marked and persistent fear of one or more social or performance situations in which the person is exposed to unfamiliar people or to possible scrutiny by others. The individual fears that he or she will act in a way (or show anxiety symptoms) that will be humiliating or embarrassing" (American Psyciatric Association, 2013, p.417). The fear is almost always encountered in the feared situation and it leads to either avoidance or significant distress that interferes with the individual's emotional, social, and occupational life. In DSM-III, SAD was considered a relatively "rare" disorder however, more recently it has been found prevalent in Western cultures, with lifetime rates of 12.1% in USA (Kessler et al., 2005; Ruscio et al., 2008), 8.4% in Australia (McEvoy, Grove, & Slade, 2011) and 4.4% in Europe (Ohayon & Schatzberg, 2010).

In Eastern and Asian countries lifetime prevalence has been found to be below 1% (Hofmann, Asnaani, & Hinton, 2010), which is lower than in Western countries. Cultural reasons have been suggested for this difference. In particular, it has been argued that prior to the 19th century, social anxiety was considered a positive characteristic indicative of thoughtfulness and self-reflection (Hickinbottom-Brawn, 2013). As Western societies developed to value individualism and enterprise (in the mid to end 19th century), expectations changed to include self-promotion of individual strengths and achievements that required confidence and enthusiasm. This cultural turn might have led to societal implications that included the conceptualisation of "social anxiety" as a disorder and to its rapid increase in recent decades (Hickinbottom-Brawn, 2013). Nevertheless, another explanation could be that social anxiety has been under-reported in Eastern cultures.

SAD can be chronic, with a mean duration of 19-20 years (Acarturk, de Graaf, van Straten, Have, & Cuijpers, 2008; Wittchen, Fuetsch, Sonntag, Muller, & Liebowitz, 2000)

and debilitating. Current research has found that SAD can have a severe negative impact on mood (Beesdo et al., 2007) and social and occupational functioning (McKnight, Monfort, Kashdan, Blalock, & Calton, 2016). The national institute of clinical excellence (NICE, 2013) advises that cognitive-behavioural therapy should be the treatment of choice for SAD and that one of the best supported treatments is based on the Clark and Wells (1995) model of social anxiety.

This model drew on cognitive theory (Beck, Emery, & Greenberg, 2005) and metacognitive approaches to emotional difficulties (Hartman, 1983; Wells & Matthews, 1994) to develop an innovative conceptualisation of SAD. In particular, the model suggested that people with SAD hold negative social beliefs and assumptions about themselves, others and social situations that are triggered in feared social situations. Such beliefs can be high standards (e.g., "I should never show any signs of anxiety"), and conditional (e.g., "If I show any signs of anxiety people will think I'm stupid") and unconditional self-beliefs (e.g., "I am different"). The model hypothesised that these beliefs give rise to negative automatic thoughts and self-focused attention (self-scrutiny as well as focusing on an observer-perspective self-image) that in turn leads to increased anxiety and the use of coping behaviours, such as avoidance and safety behaviours that can be unhelpful.

Clark and Wells (1995) also emphasised the role of certain cognitive processes in SAD. In particular, the authors suggested that people with SAD engage in a worry-like process, termed anticipatory processing, before a forthcoming social event. This leads to anxiety and self-focused processing and often increases the likelihood of avoidance. In addition, people with SAD often engage in a "post-mortem", a ruminative activity in relation to past social events that is negatively biased and focused on perceived failures. This process can lead to hopelessness and depression. During a social situation, people with SAD typically becomes highly self-focused in an attempt to monitor and adjust social

performance. This can lead to increased anxiety and safety behaviours that can sometimes draw negative attention (e.g., by being too quiet and avoiding eye contact).

Although there has been extensive research that supports the theory (see Clark & McManus, 2002, for a review) and clinical implications of this model (NICE, 2013), to date, there has been no systematic review of the model's assertions in relation to the role of social beliefs in social anxiety. Moreover, despite the links to metacognitive theory and the emphasis on cognitive processes, there has been little focus on the factors that might maintain these processes; i.e., a key feature of the metacognitive model, the role of metacognitive beliefs, has been ignored (A. Wells, 2009; Wells & Matthews, 1994). This seems particularly important because central to the metacognitive model is the idea that excessive self-focused attention is driven by metacognitive beliefs. These beliefs are positive and negative beliefs about one's own thoughts and cognitive processing (e.g., beliefs that worry can be helpful or that certain thoughts can be dangerous). Consistent with the metacognitive model, it is now well established that such beliefs are positively associated with mental health problems (Bouman & Meijer, 1999; Morrison, Wells, & Nothard, 2002; Roussis & Wells, 2006; Solem, Myers, Fisher, Vogel, & Wells, 2010; Spada & Wells, 2010), including social anxiety (Dannahy & Stopa, 2007; Vassilopoulos, Brouzos, & Moberly, 2015; Wells & Carter, 2001). Nevertheless, research has been limited and it remains unclear whether consideration of these beliefs should be included in our understanding of SAD.

Following the above, two studies were conducted to explore the role of cognition, metacognition, and thinking processes (e.g. self-focused attention) in social anxiety. The first study was a systematic literature review of the role of social (cognitive) and metacognitive beliefs in social anxiety. The second explored whether the addition of metacognitive beliefs in the model of SAD improves our understanding of social anxiety and its maintenance. The current paper presents relevant reflections on the epistemological and

ontological stances considered in the studies and the critical appraisal of the process of this research as well as personal reflections on the research process

Epistemological stance

The current research was developed within the context of critical realism. Unlike the interpretivist stance that assumes no "reality" outside of the interaction between the individual and the society, critical realism assumes that although concepts and phenomena might be influenced by social contexts, there are formed phenomena that are considered contextually "real" and can therefore be investigated. This stance is considered post-positivist and it differs from the traditional positivist stand that assumed one "reality", uninfluenced by personal biases and social contexts (Bracken, 2010; Dieronitou, 2014).

Some of the advantages of this epistemological stance are that it allows for broader explorations of phenomena, and for the development of norms and the current status of evidence-based practice. It is highly aligned to quantitative methodology, without rejecting qualitative methodologies within the context of mixed methods (Bracken, 2010). Some of the disadvantages of this stance are that it fails to account for all individual differences and the "reality" within each person, which in psychology can be very important in terms of developing empathy and a deeper understanding, for example, through auto-ethnography (Bracken, 2010; Dieronitou, 2014). Moreover, it does not directly address the relational nature of certain phenomena (Mackay & Petocz, 2011). To address this, the current paper is written within the spirit of acknowledging that the current contribution to the research is influenced by its epistemological stance and constitutes only one approach to developing knowledge and the understanding of the explored concepts.

Reflections on the systematic review (paper 1)

Rationale

Research findings have suggested that in CBT for SAD, behavioural strategies were more broadly effective than cognitive restructuring techniques (Hope, Heimberg, & Bruch, 1995; Longmore & Worrell, 2007), although this result has not been consistent (Mattick, Peters, & Clarke, 1989). Moreover, preliminary evidence suggested that techniques that combine cognitive and behavioural interventions, such as behavioural experiments, might be advantageous compared with cognitive techniques or exposure alone (McManus, Van Doorn, & Yiend, 2012; McMillan & Lee, 2010). While the debate (Hofmann, 2008; Longmore & Worrell, 2007; Worrell & Longmore, 2008) about the cognitive and behavioural contributions in treatment is unresolved, other areas of research have questioned the centrality of cognitive factors, emphasising instead the role of metacognition (Wells, 2009; Wells & Matthews, 1994) and arguing for more metacognition-based interventions. In line with this, preliminary findings have shown that a brief treatment protocol based on the Clark and Wells (1995) model, but more aligned with the metacognitive approach, is promising in the treatment of SAD (Nordahl et al., 2016; Wells & Papageorgiou, 2001).

Following these observations, it was decided to review the role of cognition (and in particular of social beliefs, such as high standards, and conditional and unconditional beliefs) in SAD according to the Clark and Wells (1995) model and to explore whether metacognitive beliefs also play a role. In line with this, the aim of the systematic review was to explore the nature (e.g., direct or indirect; positive or negative) and the strength of the relationships between cognitive (hereafter referred to as social beliefs) and metacognitive beliefs, and social anxiety.

Due to the quantitative nature of the targeted data, a quantitative systematic methodology was selected as opposed to a narrative review because the latter, although it offers the opportunity of a broader and more in-depth review of a topic, is more vulnerable

to biased interpretations of the findings by the authors (Garg, Hackam, & Tonelli, 2008). A meta-analysis was not considered appropriate for the purposes of the research question that targeted both correlational and group comparison data, although to facilitate the interpretation of the findings, missing effect sizes were calculated (Higgins & Green, 2011).

Search strategy

Based on the finding that analogue populations have been found to show similar symptom patterns to people with a diagnosis of SAD (Stopa & Clark, 2001), it was decided to view social anxiety on a continuum (ranging from low levels of social anxiety, to sub-threshold and high levels of social anxiety and then, to diagnosed SAD) and include both clinical and non-clinical samples. This was also consistent with research that found that sub-threshold SAD stood in the middle in terms of comorbidity, anxiety, and psychosocial impairment compared with a control group and a group with SAD (Filho et al., 2010) and with findings that as the number of social fears increased so did the severity of SAD (Acarturk et al., 2008).

The keywords and inclusion criteria were identified following a workshop on conducting systematic reviews, and through exploration of the current literature and discussions within the research team. The selected keywords for the two searches on social beliefs and metacognitive beliefs (belief* and metacog*, respectively) aimed at being broad enough (in comparison to keywords, such as "cognitive beliefs" and "metacognitive beliefs") to allow for the identification of all literature relevant to these concepts and social anxiety.

The inclusion and exclusion criteria narrowed the data down to the two targeted models, i.e., the Clark and Wells (1995) model and the S-REF model (Wells & Matthews, 1994). As discussed above, the former was selected because according to the NICE (2013) guidelines, it is the leading model in the treatment of SAD and it has been found more effective than medication (Clark et al., 2003), with effect sizes ranging from 2.14 to 2.53

(McEvoy, 2007). Exploration of the available measures of social beliefs led to the development of further exclusion criteria to maintain conceptual adherence to the Clark and Wells (1995) model (see exclusion criteria section in paper 1). The S-REF model was selected as the leading metacognitive model for anxiety and depression (A. Wells, 2009). To improve the coherence of the review and adhere to time limitations only peer-reviewed studies published in English were included.

Quality assessment

A quality assessment of the included papers was considered important given that the quality of the presented findings is influenced by the quality of the methodologies adopted to derive the results (K. Wells, 2009). However, research has shown that there is no agreement about which assessment tool would be most appropriate to use, due to a lack of extended research in the reliability and validity of available tools (Deeks et al., 2003; Moher et al., 1995). In effect, it has been found that many tools can have poor inter-rater reliability (Herbison, Hay-Smith, & Gillespie, 2006). Therefore, it was decided to conduct a quality assessment to inform the interpretation of the findings, but not to exclude any studies based on their quality score.

Following the above, a range of assessment tools were explored. Tools, such as the Effective Public Health Practice Project (Thomas, Ciliska, Dobbins, & Micucci, 2004) and the JBI Critical Appraisal Checklist for Analytical Cross Sectional Studies (Joanna Briggs Institute, 2016) were excluded because of their emphasis on trials and experimental designs. In particular, given that the current review targeted a variety of survey and experimental designs, the Quality Assessment Tool for Studies with Diverse Designs (Sirriyeh, Lawton, Gardner, & Armitage, 2012) was used. This tool has shown good reliability, inter-rater reliability and face validity (Sirriyeh et al., 2012); however, it should be noted that the score is reduced when certain information (e.g., the psychometric properties of the measures and the place and time of recruitment) are not fully reported. Given that certain journals have a

limited word count, papers might have omitted this information and therefore their quality scores are affected. This supported the decision to avoid excluding papers based on their quality score. To further safeguard against personal biases, 25% of the papers were assessed by a colleague independent of the research team and any discrepancies were resolved by discussion. Overall, there was high agreement between the raters (please, see page 32).

Data synthesis

In line with the research aim, the synthesis involved the extraction of correlation and regression coefficients (as indicators of the magnitude of the relationships between beliefs and social anxiety) and comparison statistics (as indicators of potential differences in belief in groups with different levels of social anxiety). Given that the models suggest that such relationships are mediated by cognitive processes (e.g., anticipatory processing) and avoidance, relevant data were also included and synthesised.

The approach to data synthesis followed the guidance to narrative synthesis for systematic reviews (Popay et al., 2006; Rodgers et al., 2009) and included the following steps: 1. Ensuring adherence to the examined theoretical models (Clark & Wells, 1995; Wells & Matthews, 1994); 2. Developing a preliminary synthesis by tabulation, grouping and clustering results by an initial textual description that was discussed with the supervisory team; 3. Exploring the relationships between and within the studies in terms of their quality assessment, methodological characteristics, main findings and effect sizes, and; 4. Assessing the robustness of the synthesis by critical reflection of the process and discussion with the supervisory team.

Minimising bias

The Centre for Reviews and Dissemination (2009) suggests that to minimise bias in conducting quantitative systematic reviews, the processes of study selection and quality assessment need to be explicit, transparent, and documented clearly to ensure replicability. The studies should be included based on pre-determined selection criteria that derive from

the research questions and aims and that have been standardised in a way that is reliable. In line with this, screening forms were created to enable the raters to use the same inclusion and exclusion criteria (Appendix 9). Any discrepancies were discussed and kappa coefficients were calculated to explore inter-rater reliability (please, see page 20). The quality assessment was conducted by employing a standardised tool (please, see page 102).

Conclusions and future research

The findings suggested a robust relationship between the targeted social beliefs and social anxiety. However, this relationship appeared to be influenced by the cognitive processes. The findings also highlighted a promising role of metacognitive beliefs in social anxiety. In particular, metacognitive beliefs were found to have direct and indirect positive effects on social anxiety. Nevertheless, a question remained about whether there might be potential interactions between social and metacognitive beliefs and whether the incorporation of the latter in the conceptualisation of social anxiety would have additional value. The empirical study set out to investigate this further.

Given the conceptual overlap between the different aspects of cognition among the various models of SAD (Clark & Wells, 1995; Hofmann, 2008; Moscovitch, 2009; Rapee & Heimberg, 1997; Wong & Rapee, 2016), it would be useful for future research to explore similarities and differences and review their suggested contribution to the disorder. To date, only one systematic review attempted this, but it was limited to the concept of self-beliefs and schemas (excluding assumptions, high standards and other types of cognitions) within the context of self-focused cognition (Gregory & Peters, 2016).

Reflections on the empirical research (paper 2)

Rationale

The S-REF model (Wells & Matthews, 1994) has highlighted the role of information processing mechanisms in chronic emotional dysregulation. The model suggested that internal triggers (such as intrusive thoughts and images) activate metacognitive regulatory mechanisms. These can be declarative, in the form of metacognitive knowledge (e.g., metacognitive beliefs) that are stored in long-term memory. This type of knowledge regulates the configuration that is applied to triggering cognitions. The configuration suggested to lead to emotional disorder is termed the cognitive-attentional syndrome (CAS) and it involves prolonged engagement in repetitive thinking (e.g., worry and rumination), threat monitoring (e.g., self-focused attention), safety behaviours, and avoidance.

In SAD, this approach has been integrated in the Clark and Wells (1995) model that emphasised the maintaining role of anticipatory processing, the post-mortem, and self-focused attention. However, the potential role of metacognitive knowledge appears to have been neglected. Such beliefs have been found to play a role in SAD (Vassilopoulos et al., 2015; Wells & Carter, 2001; Wong & Moulds, 2010) and the systematic literature review found that their consideration might be useful in the conceptualisation of the disorder and thus, in its treatment. To explore this further, the current study used a prospective questionnaire-based design with two time-points to investigate whether metacognitive beliefs explained additional variance in social anxiety independently of social beliefs and tested the direct and indirect effects of such beliefs involving cognitive processes.

Public involvement: Community Liaison Group (CLG) consultation

The CLG consists of people in the community, who have had direct (as service users) or indirect (e.g., as carers) experience of the NHS mental health services. The group's aim is to ensure that clinical psychology training reflects the needs and perspectives of the community. Their role involves offering lectures, contributing to the academic curriculum,

mentoring trainees, offering research consultation, and more. A consultation session concerning the empirical study was held on the 14th of August 2015 with the aim of discussing its relevance to potential service users and the choice of questionnaires for use in the study (Appendix 3).

The process involved a useful discussion of the theoretical models under investigation and their clinical implications. The CLG members wondered whether the study would be more relevant if a clinical sample was used. This was carefully considered and discussed in terms of the adopted view of social anxiety on a continuum (see search strategy section above) as well as its occurrence in people with other diagnoses, such as schizophrenia (Michail, 2013). Following this discussion, it was agreed to continue with the University sample, but acknowledge generalisability limitations and scope for future research. Moreover, it was agreed to include appropriate recommendations in the event of distress in participants following the completion of the questionnaires.

Research subcommittee and ethical approval

Initially, the research proposal was submitted to the clinical psychology programme's research subcommittee for consideration. The panel consisted of academic staff attached to the programme, a member of the CLG, and a trainee representative. The meeting was held on the 12th of October 2015, following which some clarifications were requested in terms of: 1) the differences between the Clark and Wells (1995) and the Wells and Matthews (1994) models, 2) the use of structural equation modelling to explore mediation, and 3) the justification of the selected timeframe between Time 1 and Time 2 points (Appendix 4). To clarify these, the trainee was asked to attend another subcommittee on the 16th of November 2015, following which the clarifications (Appendix 5) were approved (Appendix 6).

The protocol was then submitted to the University's Research Ethics Committee on the 2nd of March 2015. The committee requested minor amendments and grammatical

corrections (Appendix 7) and the final version was approved on the 16th of March 2015 (Appendix 8). On reflection, the subcommittee appeared to adopt a viva-like approach asking for a detailed defence of the selected methods and statistics, whereas the ethics committee drew the trainee's attention to the value and feasibility of the study and on the consistency across the submitted materials (e.g., participant information sheets, email advertisements, etc) to improve clarity for the participants.

Choice of measures and of assessment time-points

A prospective design with two time-points was adopted to investigate whether cognitions and metacognitions would predict social anxiety over two months. The research subcommittee's suggestion to increase this to six months was carefully considered. However, due to the majority of participants being University students, this was not feasible as students could graduate or drop out of the University in the meantime. The two-month period would allow for potential fluctuation of the symptoms given that students engaged in a variety of social and academic activities. Moreover, this time-frame has been adopted in similar studies (e.g., Bird, Mansell, Dickens, & Tai, 2013; Slavish & Graham-Engeland, 2015). It also ensured that data collection (which was partly reliant on the University's Research Participation Scheme for Course Credits available only after September 2015) would be completed by January 2017, allowing for the thesis to be submitted in April.

There were a variety of uncontrolled factors that could influence participants' responses between the two time-points. It was expected that the large number of participants and the test-retest reliability of the measures (as reported in the literature) would moderate this effect. The selected measures were closely linked to the explored concepts and had good psychometric properties.

The methods section in Paper 2 presents the psychometric properties of these measures, excluding the Social Cognitions Questionnaire (SCQ; Wells, Stopa, & Clark, 1993). This is a 22-item measure of social beliefs grouped in two subscales: negative self

beliefs, and fear of performance failure. This scale has shown excellent internal consistency, good convergent validity, and adequate discriminant validity. In the present study at Time 1, Cronbach's α was .94 for the full scale, .94 for the negative beliefs subscale, and .83 for the fear of performance subscale. At Time 2, Cronbach's α was .95 for the full scale, .95 for the negative beliefs subscale, and .85 for the performance subscale. This questionnaire was omitted from Paper 2 as it was not used in the analyses. The reason was that many participants left it incomplete, therefore resulting in missing values that would have reduced the sample size to $N = 144$. Given that the psychometric properties of the used questionnaires were equally good, it was decided to omit the SCQ from the analyses.

Recruitment process

Recruitment was initiated through the research volunteering service of the University of Manchester. In September 2015, the University's Research Participation Scheme for Course Credits started and Psychology students were then offered three credits for their participation. Participants were also offered the opportunity to enter a prize draw for four high street vouchers worth £20, £20, £30 and £30, respectively. Moreover, the study was advertised to staff and students at the University of Bolton; 48% of the final sample was in Manchester, 5.1% was in Bolton and the remaining did not report a location. There were no statistically significant differences in terms of location in the measured variables. The recruitment was completed on the 2nd of February 2017 and the required numbers (see power analysis section on the empirical paper) were achieved ($N = 156$).

Data analysis

Given the hypothesis about additional independent contributions of metacognitive beliefs to social anxiety beyond social beliefs, hierarchical regression analyses were used. Following this, path analysis was used to test the hypothesis that the effect of metacognitive beliefs on social anxiety was mediated by self-focused attention. It was deemed necessary to divert away from an initial aim to compare the two models (cognitive and metacognitive)

due to the unexpected result that social beliefs did not have an individual contribution to social anxiety and therefore, including them in the model to compare it with a metacognitive one would be inappropriate.

Path analysis is a powerful test for mediation and it allows for model modification (Newsom, 2015). Therefore, it is able to extract more information compared to regression alone. In particular, compared to regression-based analyses, path analysis allows for the exploration of more complex models with more variables and provides bootstrapped confidence intervals for indirect paths, thus testing mediation and addressing issues of non-normally distributed data (Warner, 2013). The current path analysis was informed by theory and by the regression analyses. This meant that only observed variables could be used as opposed to latent variables. This was considered necessary, but also a limitation because the incorporation of latent variables would have allowed for even stronger analysis using structural equation modelling.

Results and implications for future research

The results showed that metacognitive beliefs about the uncontrollability and dangerousness of thoughts (negative metacognitive beliefs) were significant positive prospective predictors of social anxiety and that this effect was partly mediated by self-focused attention at Time 2. Their contribution explained small additional variance in social anxiety over and above social beliefs.

These results were consistent with the S-REF model (Wells & Matthews, 1994) that suggests that metacognitive beliefs and cognitive processes play a role in emotional disorder. In particular, the findings highlighted that negative metacognitive beliefs can predict social anxiety over a two-month period directly and through increased self-focused attention at Time 2. This was also consistent with the Clark and Wells (1995) model that places self-focused attention at the centre of the maintenance of SAD and with previous cross-sectional findings that metacognitive beliefs had a predictive positive value in social

anxiety and were reported more strongly by people with high social anxiety compared with people with low social anxiety (Cartwright-Hatton & Wells, 1997; Dannahy & Stopa, 2007; Fisak & Hammond, 2013; Gkika, 2011; Wells & Carter, 2001).

Following the above, interventions that target these beliefs and self-focused attention should be beneficial in reducing social anxiety. Even though there is preliminary evidence that tackling self-focused attention can be associated with improvements in social anxiety (Vogel et al., 2016), techniques targeting metacognitive beliefs remain to be investigated. It is recommended that future studies should address this gap.

The unexpected finding that social beliefs did not make a significant contribution to social anxiety was discussed in the empirical paper. Briefly, it might be that the effects of such beliefs were complex (e.g., mediated and moderated by other variables) and would require a larger sample for further investigation. Nevertheless, it was of interest that a conceptual overlap between social beliefs and social anxiety was observed. Based on the diagnostic criteria for SAD, the symptoms for the disorder include a fear of negative evaluation and of scrutiny (American Psyciatric Association, 2013) that is often interpreted as beliefs about being negatively judged and negative beliefs about the self in social situations. Therefore, many measures of social anxiety symptoms (as discussed in the literature review) include scales of beliefs and vice versa. This creates the potential for confounding results in relation to the measures of social anxiety and social beliefs. In the present study attempts were made to reduce this effect by using the Liebowitz Social Anxiety Scale (Liebowitz, 1987), which does not directly assess beliefs (it only asks how anxious people have felt in various social situations).

Clinical implications

The findings suggest that the consideration of negative metacognitive beliefs might be useful in the conceptualisation and treatment of social anxiety. For example, a belief that worry is uncontrollable and can make one sick could be directly contributing to

increased social anxiety as it highlights the risk of being unable to control thoughts and their negative consequences (e.g., being sick) that could result in social embarrassment and negative evaluation (e.g., being perceived as weak or awkward). Moreover, such a belief is likely to divert one's attention towards the self and towards the thoughts that are perceived as uncontrollable and dangerous, thus increasing self-focused attention that is implicated in the maintenance of the disorder.

Following the above, the conceptualisation of negative metacognitive beliefs as factors leading to self-focused attention within the context of social anxiety might be useful. These could be considered alongside the social beliefs in the Clark and Wells (1995) model, although the current findings raised a question about the nature and the strength of these beliefs' contribution.

In terms of treatment, metacognitive techniques (A. Wells, 2009) that directly target negative metacognitive beliefs and self-focused attention should be considered. These might include experiments and exposure work aimed at reinforcing external attention and Socratic questioning aimed at investigating and modifying negative metacognitive beliefs. Behavioural experiments testing the validity of these beliefs might also be beneficial (e.g., worry postponement experiments).

Through this research and through exposure to various theoretical approaches and models on this course, it became apparent that there are different ways of approaching the same concept. Similarly, service users may have their own theories and understanding of the problem and these might not only be influenced by their social context, but indeed "created" by it (Hickinbottom-Brawn, 2013). From that perspective, therapy that does not address the social context might be experienced as disempowering and stigmatising, with expectations of the individual to engage in constant self-monitoring by using tools offered by psychologists and therapists (Hickinbottom-Brawn, 2013). Nevertheless, the metacognitive model has been described by its founder (A. Wells, as communicated in a

conference) as "not a deficit model". It is a model that conceptualises "normal" cognitive and metacognitive processes that interfere with natural healing and it assumes that every individual has the ability to "heal" themselves (i.e., to find ways to feel better and overcome difficulties) provided they "could leave themselves alone" (i.e., not engage in prolonged worry, rumination, and threat monitoring). This approach could perhaps counter-balance concerns about disempowerment and stigmatisation.

Dissemination strategy

To disseminate the findings, the first and second papers have been submitted to peer reviewed journals (please, see pages 12 and 69, respectively). Moreover, the second paper has been accepted as an open paper (oral presentation) at the British Association for Behavioural and Cognitive Psychotherapies annual conference that will be held in Manchester on 25-28 July 2017.

Personal reflections

Prior to embarking on the current doctorate in clinical psychology, I had completed an MSc in Cognitive Psychotherapy and had worked as an accredited CBT therapist. My experience included working with in adults, who were experiencing mild to moderate psychological problems. During my practice, which was mainly private, I worked with people with social anxiety using predominantly the Clark and Wells (1995) model. My clinical experience was that the model was effective and well received by service users, although careful consideration of cultural adaptations was often necessary.

My interest in the area led me to embark on a relevant PhD that investigated the potential role of the metacognitive approach to social anxiety (Gkika, 2011). This provided me with a deeper understanding of both the cognitive and metacognitive models and with an opportunity to identify research gaps in terms of the conceptualisation of SAD and its treatment. Briefly, the results showed that negative metacognitive beliefs were individual predictors of social anxiety beyond anticipatory processing, the post-mortem, and self-

focused attention, that this effect was partly mediated by cognitive processes, and that these beliefs were predictive of attentional bias towards words related to somatic symptoms perceived as negative in a dot-probe task. Nevertheless, my PhD focused on cross-sectional data that limited the opportunities to explore the validity of the explored constructs and effects over time. Moreover, the final study of my PhD (Gkika & Wells, 2015) suggested that a metacognitive technique (namely detached mindfulness) was more effective than thought evaluation in reducing worry, negative beliefs, and self-focused attention. This finding raised questions about the respective contributions of metacognitive and social beliefs to social anxiety.

The current studies explored these questions further. The literature review highlighted that even though both types of beliefs have been found to be positively associated with social anxiety, the effects of social beliefs appeared to be influenced by cognitive processes, such as worry and rumination. On the contrary, metacognitive beliefs have been found to have both direct and indirect effects. Furthermore, the empirical study was able to demonstrate such effects and highlight their prospective nature.

These results have expanded my understanding of both the cognitive (Clark & Wells, 1995) and metacognitive models (Wells & Matthews, 1994) in relation to social anxiety. On the one hand, it appears that negative metacognitive beliefs have a robust cross-sectional and prospective positive relationship with social anxiety that is both direct and indirect through self-focused attention, but the magnitude of such a relationship requires further study as it may only be small and perhaps inconsequential. However, if the relationship is important it might be useful to consider metacognition in the formulation and treatment of social anxiety. On the other hand, social beliefs and other factors, such as anticipatory processing and the post-mortem, might have more complicated indirect effects or only cross-sectional effects that require further research to be fully untangled.

Therefore, the current research has contributed to my understanding and academic and professional development in both providing answers and in raising further questions. My skills as a researcher have been broadened by the process of designing, carrying out, analysing, reflecting on, and reporting this piece of research. It has been interesting to explore specific hypotheses (e.g., specific predictive relationships between variables) and also debate theoretical and conceptual considerations (e.g., about the concept and diagnosis of social anxiety) in supervision. As Mackay and Petocz (2011) have highlighted: "For all the sophistication of modern methods, the exact status of what it is that is under examination, the mental somethings that the theories point to and the methods supposedly reveal, is never far from debate and challenge" (p. 32).

Final conclusions

The current critical appraisal provided the opportunity to reflect on the process of research and re-piece the different stages of it together to view it within the context of the growing knowledge in relation to social anxiety. It has armed me with further skills in conducting quantitative research while considering and integrating knowledge deriving from other methods and epistemological stances. Finally, it has helped me develop my skill in critically appraising research and in considering its clinical implications in relation to my future clinical practice as a clinical psychologist.

This piece of research was considered within the context of its epistemological standpoint and is viewed as only one contributing factor within the pluralism of research paradigms. Quantitative research of this nature can be viewed as "a tendency… to reduce people to their diagnostic parts in a 'capture and tame' way [that] serves to strip individuals of their humanity… and reduces them to the specific thoughts and moods prioritised as important by research authors"(Grant, Biley, & Walker, 2014). To avoid this, it is worth noting that research should be accompanied and enriched by individual accounts of personal experiences of social anxiety in order to develop a deeper understanding of it.

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   Example: In a 1989 article, Gould explains Darwin's most successful. . .
4. **Specific citations of pages or chapters follow the year** .
   Example: Emily Bronte "expressed increasing hostility for the world of human relationships, whether sexual or social" (Taylor, 1988, p. 11).
5. **When the reference is to a work by two authors, cite both names each time the reference appears** .
   Example: Sexual-selection theory often has been used to explore patters of various insect matings (Alcock & Thornhill, 1983) . . . Alcock and Thornhill (1983) also demonstrate. . .

6. **When the reference is to a work by three to five authors, cite all the authors the first time the reference appears. In a subsequent reference, use the first author's last name followed by** *et al* **. (meaning "and others")** .
   Example: Patterns of byzantine intrigue have long plagued the internal politics of community college administration in Texas (Douglas *et al* ., 1997) When the reference is to a work by six or more authors, use only the first author's name followed by *et al* . in the first and all subsequent references. The only exceptions to this rule are when some confusion might result because of similar names or the same author being cited. In that case, cite enough authors so that the distinction is clear.

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   Example: Jesse Moore (telephone conversation, April 17, 1989) confirmed that the ideas. . .

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   - Differentiate works by the same author and with the same publication date by adding an identifying letter to each date: (Bloom, 1987a, 1987b)
   - List works by different authors in alphabetical order by last name, and use semicolons to separate the references: (Gould, 1989; Smith, 1983; Tutwiler, 1989).

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References should be prepared according to the Publication Manual of the American Psychological Association (6th edition). This means in text citations should follow the author-date method whereby the author's last name and the year of publication for the source should appear in the text, for example, (Jones, 1998). The complete reference list should appear alphabetically by name at the end of the paper.

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Book edition
Bradley-Johnson, S. (1994). Psychoeducational assessment of students who are visually impaired or blind: Infancy through high school (2nd ed.). Austin, TX: Pro-ed.

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Appendix 2: International Journal of Cognitive Therapy Guide for Authors

INSTRUCTIONS TO AUTHORS

The *International Journal of Cognitive Therapy* is the official journal of the International Association for Cognitive Psychotherapy (IACP), a professional, scientific, interdisciplinary organization whose mission is to facilitate the utilization and growth of cognitive therapy as a professional activity and scientific discipline.

The journal is devoted to advancing all scientific and clinical aspects of cognitive therapy, including rigorous research on cognitive factors and vulnerabilities in psychological disorders, mediating processes in treatment outcome, cognitive assessment and treatment, expert perspectives on specific clinical problems and populations, and critical issues in translating research to practice.

We welcome articles of the following types:
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2. Theoretical papers and particularly innovative contributions to theory or extensions of current theory
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4. Reports on new treatment manuals that describe their procedures and contributions in relation to previous ones
5. Literature reviews and meta-analyses
6. Special thematic issues

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TABLES should be submitted in Excel. Tables formatted in Microsoft Word's Table function are also acceptable. (Tables *must not* be submitted using tabs, returns, or spaces as formatting tools.)

FIGURES *must* be submitted separately as graphic files (in order of preference: tif, eps, jpg, bmp, gif; note that PowerPoint is *not* acceptable) in the highest possible resolution. Figure caption text should be included in the article's Microsoft Word file. All figures must be in black & white.

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SAMPLE REFERENCES

Davis, C. G., & McKearney, J. M. (2003). How do people grow from their experience with trauma or loss? *Journal of Social & Clinical Psychology, 22*(5), 477-492.

Dweck, C., & Wortman, C. (1982). Learned helplessness, anxiety and achievement. In H. Kron & L. Laux (Eds.), *Achievement, stress, and anxiety* (pp. 93-125). Washington, DC: Hemisphere Publishing Group.

Roelofs, J., Meesters, C., Ter Huurne, M., Bamelis, L., & Muris, P. (2006). On the links between attachment style, parental rearing behaviors, and internalizing and externalizing problems in nonclinical children. *Journal of Child and Family Studies, 15*, 331-344.

An annual award will be given by the IACP to any empirical article in the journal that the editors and IACP Board judge to have contributed the most original breakthrough research of the year. A similar competitive award may be given to articles in another category such as review articles, theoretical articles, or case studies. These awards will consist of a certificate from the IACP given in recognition of the accomplishment, a mention in the following volume of the *International Journal of Cognitive Therapy*, and a cash award of $150.00.

Appendix 3: CLG consultation form

Community Liaison Group 1ˢᵗ yr Trainees Research Consultation meetings

In order to prepare for responding and advising on your LSRP within the limited time available it would be very helpful if you could provide some advance information.

Your name …Styliani (Stella) Gkika……………..

Supervisors… Adrian Wells & Anja Wttkowski…………………………………..

Date & time of your slot booked…14 August 2015…
Apologies, but I can't remember the time. Could you please send me an email with the time of the meeting?

Brief rough idea of the nature of your proposed study. (If possible please attach any written details available)

My study will aim to investigate the metacognitive model (Wells, 2009) and its application to social anxiety. It will probably build on my PhD studies that explored the role of metacognition in social anxiety. The plan is to do a psychometric study to explore whether the metacognitive model helps explain state and trait social anxiety and whether it explains it better than the cognitive model. The idea is to use structural equation modelling so large samples will be needed and therefore, I plan to use a student sample of University students and staff. Outcome measures will probably be measures of trait and state social anxiety and the variables tested will be anticipatory processing, post-event processing, self-focused attention, negative automatic thoughts, beliefs and metacognitive beliefs. I might ask people to complete these in different time points according to the model. I will probably use the University's online survey system to make it easier for people to participate.

What advice or contribution might you be seeking from the CLG? (continue overleaf if required)

About the usefulness of the study (e.g., its clinical implications) and perhaps whether the chosen questionnaires seem to be helpful and relevant.

Many thanks Yvonne Awenat (CLG Co-ordinator)

Please place in my pigeon hole in reception at least 2 weeks prior to your slot

Appendix 4: Research subcommittee's initial comments

Dear Stella,

Re: Research Sub-Committee – 12th October 2015
Title: Modelling the metacognitive versus cognitive approach to social anxiety

Thank you for presenting your Large Scale Research Proposal to the Research Sub-Committee Meeting on 12thOctober 2015. You proposed to examine a very interesting issue and in order to develop your proposal further, the Sub-Committee requests that you make the following changes to your study:

- Provide a strong rationale for why this study is needed and what it will add to the literature.
- Clarify how this study will differ from your previous PhD study.
- Clarify the difference between the two models you plan to compare. The models appear to differ in terms of the activation of metacognitive beliefs only but this needs to be clarified further in the proforma to ensure it is clear for others, including the ethics committee.
- As the two models you plan to compare include vicious cycles, the proposed models cannot be tested using SEM directly. At present, it appears that the main difference between the models is the fact that metacognitive beliefs is a mediator in the metacognitive model. Consider using mediation analysis or provide a clear rationale why SEM is the best approach.
- Consider focusing on the predicative validity of the model for change in symptoms through the use of two assessment time points. Consider if a 6-month- follow up period is feasible.
- Clarify you are familiar with SelectSurvey to ensure you can collect data online. Consider having the most important measures at the beginning. Seek support from Austin if necessary.
- Consider the inclusion of a statistician as part of the research team.

The Committee would like to see a revised proposal addressing these points, along with a detailed letter outlining the changes you have made using the above points to structure your letter (i.e., repeat the points made above verbatim and address each one by outlining the changes you have made and where they can be found in the revised proposal by highlighting or underlining those in the revised proposal).

In order for the Committee to evaluate your changes, **please submit your modified proposal via email to Tracey Hepburn (tracey.hepburn@manchester.ac.uk) no later than 09:00am on Monday 2nd November** in time to be considered at the Sub-Committee meeting on 16th November 2015.

Thank you again for submitting your protocol to the Committee and we are looking forward to receiving another amended version and discussing it _**with you in attendance**_ at the next meeting on 16th November 2015.

Yours sincerely,
Dr Anja Wittkowski
Senior Lecturer in Clinical Psychology
Interim Research Director
Panel B Chair, Research Sub-Committee

Appendix 5: Clarifications based on the research subcommittee's comments

Research Sub-Committee
Division of Clinical Psychology
2nd Floor, Zochonis Building
School of Psychological Sciences
The University of Manchester
Oxford Road
Manchester, M13 9PL

16th November 2015

Dear Members of the Research Sub-Committee,

Thank you for your thoughtful and considerate feedback regarding my Large Scale Research Proposal. I have discussed the committee's helpful comments with my supervisors and have responded to each point below. The proforma has also been amended to reflect these changes (highlighted in bold).

- Provide a strong rationale for why this study is needed and what it will add to the literature.

   The study will explore whether the metacognitive approach can augment our understanding of social anxiety as presented by the cognitive approach. There is preliminary evidence that metacognitive beliefs play a role in social anxiety, however this evidence is mainly based on cross-sectional designs and mediation analyses. The present study will employ a longitudinal design and structural equation modelling that allows for more powerful mediation analyses as well as for model modification and rearrangement of variables to explore which pathways (i.e. model) fit the data best. Exploration of the conceptualisation of social anxiety can improve our understanding of the disorder and its treatment. This has now been clarified in the introduction and statistical analysis sections.

- Clarify how this study will differ from your previous PhD study.

   My PhD studies explored the relationships between metacognitive beliefs, preservative thinking, and social anxiety using cross-sectional designs and regression analyses that limit the ability to test causal predictors. The current project will employ a longitudinal design and structural equation modelling to improve these limitations. This has now been clarified in the introduction section.

- Clarify the difference between the two models you plan to compare. The models appear to differ in terms of the activation of metacognitive beliefs only but this needs to be clarified further in the proforma to ensure it is clear for others, including the ethics committee.

  The two pathways differ mainly in the role of metacognitive beliefs. In particular, the metacognitive model suggests that that the relationship between negative thoughts and social anxiety is dependent on metacognitive beliefs which act as mediators or as moderators of the effects of self-focus attention and safety behaviours. The cognitive model suggests no role of metacognitive beliefs and views cognitions as the main mediators. This has now been clarified in the introduction and statistical analysis sections.

- As the two models you plan to compare include vicious cycles, the proposed models cannot be tested using SEM directly. At present, it appears that the main difference between the models is the fact that metacognitive beliefs is a mediator in the metacognitive model. Consider using mediation analysis or provide a clear rationale why SEM is the best approach.

  After careful consideration of the above suggestion and examination of relevant literature in relation to SEM (e.g., Warner, 2013; Byrne, 2009; Fowler et al., 2011; Hesse et al., 2015) it was decided that structural equation modelling is the best method for exploring the stated hypotheses. That is because SEM offers the opportunity to apply complex theoretical models on observed data and test goodness of fit of models (hypothesis 1) and it provides bootstrapped confidence intervals for indirect paths thus permitting rearranging variables to explore which pathways fit the data best. This way, SEM allows for the exploration of mediation as well as of reciprocal relationships and vicious cycles. This has now been clarified in the statistical analysis section. Using SEM does not exclude the possibility of follow-up analyses of mediator/moderator effects.

- Consider focusing on the predicative validity of the model for change in symptoms through the use of two assessment time points. Consider if a 6-month- follow up period is feasible.

  It is acknowledged that a variety of uncontrolled factors might influence participants' social anxiety levels between the two time-points. The large number of participants and the test-retest reliability of the measures should moderate this effect. Due to

participants being University students and staff, it was not considered feasible to allow for six months between the two assessments as students might graduate and leave the University in the meantime or decide to drop out. It was decided to allow for two months between the assessments. Nevertheless, this will be addressed as a limitation of the study.

The retest reliability of the measures has now been included in the measures section.

- Clarify you are familiar with SelectSurvey to ensure you can collect data online. Consider having the most important measures at the beginning. Seek support from Austin if necessary.

  This has now been clarified in the procedure section.

- Consider the inclusion of a statistician as part of the research team.

Richard Emsley has been contacted by email and Adrian Wells' PhD student, Lora Capobianco, who has been using SEM as part of her projects, has also been approached. This has been clarified in the statistical analyses section.

Thank you for your time and consideration
Yours Sincerely,

Styliani Gkika
Trainee Clinical Psychologist

Appendix 6: Letter of approval by research subcommittee

17 November 2015 16:57

Dear Stella

Research Subcommittee – 16th November 2015

Thank you for attending the Research Subcommittee meeting on *16th November 2015*. The committee were satisfied that the revisions made were appropriate and in accordance with the feedback from the meeting of 12th October 2015 and you may now proceed with your research as set out in your revised proposal.

For the purposes of ethical scrutiny by relevant NHS and/or University bodies, this letter may be taken as confirmation that your research proposal has been independently reviewed and that it is considered to meet necessary scientific and methodological standards.

On behalf of the Research Subcommittee, we wish you good luck with your research work.

Yours sincerely
Dr Anja Wittkowski
Senior Lecturer in Clinical Psychology, Interim Research Director
Panel B Chair, Research Sub-Committee

A hard copy for your records will also be posted to you:
Tracey Hepburn
ClinPsyD Programme Secretary
Section for Clinical and Health Psychology , 2nd Floor, Zochonis Building, University of Manchester, Oxford Road, Manchester, M13 9PL
Tel: 0161 306 0400

Appendix 7: Research ethics committee's initial requests

<u>Research Ethics Review Summary Sheet</u>

Application reference number: 16060 (Gkika et al)

Reviewer: Several minor issues with the PIS, consent form and adverts to be addressed and a couple of clarification points to raise but no major issues.

Major issues:

Question number	

Points of clarification:

Question number	
PIS	The researcher plans to remove the identifying code after the second reminder email but before completion of the questionnaires. How then will the second set of questionnaires be linked to the first? I suspect the researcher means that the code will be removed from the personal information (consent forms, email addresses etc) but not the data? Please clarify. Amend if incorrect.
PIS and consent	Might two be required? One for online participants, one for paper responders (e.g. the consent form is not formatted appropriately for the online study). May just need to edit CF as they will not be able to initial boxes.
	Have the questionnaires been piloted and if so is 40 mins an accurate amount of time?

Minor issues:

Question number	Change required
6	Start date has passed
8	The justification is not entirely appropriate for a lay person with several terms undefined (e.g. cognitive restructuring, anticipatory processing)

9	"Everyone 18 years and older will be invited…." It is not clear what is meant by this. Q. 16 states that participants will be staff and students at the University, this should be clearly stated at question 9.
28	Participants can presumably use home computers /take the paper versions home to complete.
40.2	Will the supervisors and Richard Emsley and team have access to the data? Amend to reflect this if so and include details of where they are based.
PIS 1	1. Does not state that people other than the researcher will be given access to the data. If this is the intention this should be inserted. 2. Typo in last paragraph of first page "such thinking…. **is** can play a role" 3. Page 2: "the demographic **sheet**"* Replace with 'questionnaire' (or something that does not imply a paper method). This section does not state that questionnaires can be completed either online or on paper. Likewise the data collection paragraph could be confusing as it refers to electronic data and paper data but potential participants haven't been informed how they will complete questionnaires. *also used in online announcement and poster 4. "data will be coded and held confidentia**lly**" 5. Should state how many course credits will be received (although the deadline for credits will likely be passed by the time the study starts)
PIS 2	Should probably state that participants will be completing the same questionnaires as they have previously.
Consent form	1. Online participants cannot 'sign' the consent form and may not be able to initial. Presumably they will check boxes to indicate agreement? Amend to reflect the action required. 2. For online participants the PIS is not "attached". Amend wording. 3. Item 3 says that participants can withdraw at any time which is at odds with the application and the PIS. Please amend. 4. Item 5: it is not clear what is meant by "data analysis processes". Perhaps better to state that data will be kept for use in future studies 5. Will the researcher sign? If not, remove.
Advert	1. States that participants can withdraw "at any point" which is not correct 2. States that "personal information" is not required. It is not clear what is meant by this. Contact details in the form of email addresses are requested and are a requirement of the study (as detailed in the consent form) which might be regarded as 'personal' 3. Should not include prize details
Reminder email	Incorrectly states that participants "can withdraw at any point"

9		How would placing packs of questionnaires in buildings work? We are uncomfortable with the idea of leaving boxes with such data unattended, could it be at a staffed reception or similar?
18.1		Are no potential participants (students) taught by the researchers?
		CF what is the treatment/service mentioned? If copy and paste, please amend.
		Remove value of prize from advert
		App 5 was this review conducted by an applicant?

Appendix 8: Approved protocol and approval letter

MANCHESTER
1824

The University of Manchester

Application form for ethical approval of a research project by a

University Research Ethics Committee

The University Research Ethics Committees meet on a weekly basis between September and July each year. All applications must be submitted to our office by the end of June or it will not be considered until September. We would therefore recommend sending your form to your designated Signatory no later than the middle of June. Please see here for the calendar of UREC meetings. The normal expectation is that your application will be reviewed in the third week after submission by the School/Institute Signatory. Please note that the School/Institute signatory process aims to take an average of 10 working days.

Guidance on completing the form

This form should be completed by the Principal Investigator(s). For student research, the Supervisor must provide guidance to the student on the application and sign off the form.

Guidance can be found by clicking on the links provided with some sections. Additionally, guidance can be found here.

The form must be completed **succinctly** and in **plain, jargon-free English** so that committee members, who may not be familiar with your academic discipline, are able to understand it.

Applicants are asked to forward all supporting papers in **one document**, preferably in a PDF format. Experience indicates that it is easy for separate documents to get misplaced as they are transferred from one office to another during the review process.

Submitting the form

Your form must be submitted to the UREC via your assigned School/Institute Signatory. Please see here for a list of current Signatories

Checklist of documentation to include

Please DO NOT include CVs

- ☒ **Participant Information Sheet**

- ☒ **Consent form**

- ☐ **Letters to gatekeepers (i.e. those from whom permission is required such as employer or data custodian) if applicable**

- ☒ **Questionnaire (if using)**

- ☐ **Interview/focus group schedule (if using)**

- ☒ **Any advertisements/flyers/posters to be used**

- ☐ **Research Protocol (if applicable)***

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SECTION A – Administrative information

** Do you also need to obtain NHS R&D approval?

☐ Yes ☒ No

**If yes, have you already contacted your <u>University sponsor</u> regarding NHS R&D approval?

☐ Yes ☐ No

<mark>IMPORTANT: You MUST contact your University sponsor regarding NHS R&D approval PRIOR to submitting a UREC application. Any UREC applications submitted prior to contacting your University sponsor will be returned.</mark>

1. **Title of the research:**

Modelling a metacognitive versus a cognitive approach to social anxiety

2. **Investigator(s)** *(nb. In the case of postgraduate student applications the supervisor is always the joint investigator):*

	Student	1st Supervisor/Staff	2nd Supervisor/Staff
Title	Dr	Prof	Dr
Surname	Gkika	Wells	Anja
First name	Styliani	Adrian	Wittkowski
Post		Professor of Clinical and Experimental Psychology	Senior Lecturer in Clinical Psychology
Qualifications	Ph.D Psychology. University of Manchester MSc Cognitive Psychotherapy, University of Brighton BSc Psychology, University of Crete, Greece	Ph.D Clinical Psychology, Aston University M.Sc. Clinical Psychology. Leeds University Diploma in Cognitive Therapy, University of Pennsylvania B.Sc (Hons) Aston University	Clin. Psy. D. University of Manchester (2001) MPhil Clinical Psychology University of Manchester (2000) BSc (Hons) Psychology (1st) University of Manchester (1996)
School/Unit	School of Psychological Sciences, Section for Clinical and Health Psychology	School of Psychological Sciences, Section for Clinical and Health Psychology	School of Psychological Sciences, Section for Clinical and Health Psychology
Contact Address	Second Floor, Zochonis Building Brunswick Street Manchester M13 9PL	Department of Clinical Psychology, Rawnsley Building Manchester Royal Infirmary Oxford Road, Manchester, M23 9LT	2nd Floor Zochonis Building Brunswick Street Manchester M13 9PL
Email address	styliani.gkika@postgrad.manchester.ac.uk	adrian.wells@manchester.ac.uk	anja.wittkowski@manchester.ac.uk
Telephone	07432640937	+44 (0)161 276 5399	+44 (0)161 306 0400

3

3. **School contact (if applicable):** The School/Institute Signatory will receive a copy of the outcome of the ethical review, *If the School wishes anyone else to receive a copy, the relevant details should be entered here.*

   Name:

   Post:

   Email address:

4. **Is this study, or any part of this study a student project?**   (Yes) No

   If Yes what degree is it for? Clinical Psychology Doctorate (ClinPsyD)

5. **Please provide the names and email addresses of any academic staff or students involved, other than those named at 2 above:** N/A

SECTION B – Details of Project

6. **When will the data collection take place?** (*If your research will be conducted outside the UK borders, please specify the duration for each country*)

   Start date: March 2016

   End date: March 2017

7. **What is the principal research question?**

The principal aim is to test the structure of a metacognitive model (Wells, 2009) for social anxiety against an established cognitive-behavioural model (Clark & Wells, 1995). The principal hypothesis is that there will be a statistically significant difference in fit between the metacognitive and cognitive-behavioural models for social anxiety with the former explaining more variance in social anxiety than the latter and providing a better fit of the overall data.

The study also aims to explore the following questions:

- Do metacognitions (metacognitive beliefs about thinking processes) predict social anxiety over and above social cognitions (beliefs about the social self and about social performance)?
- Is the relationship between social cognitions moderated by metacognitions and/or mediated/moderated by worry, rumination, and self-focused attention?

8. **What is the academic justification for the research?** (*Must be in language comprehensible to a lay person*)

Social anxiety disorder is a prevalent and debilitating anxiety disorder that has been associated with decreased quality of life and has been found to be chronic if left untreated. Recently, the National Institute of Clinical Excellence (NICE) recommended cognitive-behavioural therapy (CBT) as a first line treatment for adults with social anxiety disorder. The recommended therapy was based on influential cognitive models for social anxiety, such as the Clark and Wells (1995) and Rapee and Heimberg (1997) models. These models have conceptualised the various mechanisms implicated in the maintenance of social anxiety, such as worry, rumination, self-focused attention, negative automatic thoughts, unhelpful social beliefs and assumptions, safety behaviours and avoidance.

The Clark and Wells (1995) treatment appears to be the most efficacious, and draws on several theoretical models including the metacognitive model (Wells & Matthews, 1994; Wells, 2009). The metacognitive model of emotional disorder suggests that social anxiety is maintained by inflexible and prolonged cognitive mechanisms, such as worry and rumination that are regulated by metacognitive beliefs (beliefs about thinking processes, such as worry, i.e., "worrying helps me problem solve"). According to the metacognitive model, negative cognitions, are viewed as the outcome or trigger of prolonged self-focused negative thinking, which is the main cause of distress. This thinking style is thought to

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result from metacognitive knowledge rather than the negative social knowledge that is presented in the Clark and Wells model.

Following the above, it can be argued that metacognitive interventions can have a more direct impact on the maintaining factors of social anxiety. In line with this, one study found that both cognitive restructuring (a cognitive technique that aims to identify and modify negatively biased thoughts) and detached mindfulness (a metacognitive therapy technique) had a positive impact on anxiety, worry, self-focused attention, and negative beliefs in highly socially anxious students, however detached mindfulness was superior overall (Gkika & Wells, 2015). This supports the metacognitive model in asserting that metacognitive techniques can have a more direct effect. Another study found that the effectiveness of group CBT on social anxiety and depression was associated with changes in metacognitive beliefs (McEvoy, Mahoney, Perini & Kingsep, 2009).

Moreover, previous studies conducted as part of the trainee's PhD (Gkika, 2011) have shown that negative metacognitive beliefs were positive predictors of social anxiety, while positive metacognitive beliefs showed a negative predictive relationship with social anxiety. Mediation analyses showed that negative metacognitive beliefs had both a direct effect on social anxiety and an indirect effect through anticipatory processing (a type of worry about forthcoming social situations) and post-event processing (a type of rumination about past social performance).

As these findings were based mainly on cross-sectional designs that limit causal inference and the strength of the predictions, the current project aims to explore these relationships further by employing a longitudinal design that allows for the exploration of stronger predictions and structural equation modelling that allows for more in-depth mediation analyses by examining the pattern of associations within a model and how the combination of metacognition and cognition and the maintenance mechanisms are associated with social anxiety.

The above suggests that the metacognitive model might offer an improved explanation of the maintenance of the disorder. This assertion remains to be tested. Therefore, the present study aims to investigate whether the metacognitive model can offer an improved explanation of social anxiety than the cognitive model. The results should be able to advance current conceptualisations of social anxiety and inform further research on the relevant theoretical models and their interventions.

9. **Give a brief summary of the design and methodology of the planned research. It should be clear exactly what will happen to the research participant, how many times and in what order. Describe any involvement of research participants, participant groups or communities in the design of the research.** *(This section must be completed in simple language and should be no longer than half a page. A research protocol is __NOT__ a substitute for information provided on the UREC form and should only be submitted for clinical trials. In addition, please do not attach grant proposals).*

The study will be in two parts (Figure 1): Participants will be invited to complete eight questionnaires and a demographic questionnaire (please, see Appendix 1) using the University's online survey system and paper questionnaires. They will be asked to fill in the questionnaires at two time points, which will be two months apart. Completion of the questionnaires should take 30-40 minutes each time.

University staff and students 18 years old and over will be invited to participate. There will be no need to screen for fluent knowledge of English; people, who will be able to read and understand the participant information and consent forms (please, see Appendix 2) should be able to complete the questionnaires. Participants will be recruited through posters (Appendix 3) and through the University of Manchester's Research Volunteering Section (http://www.studentnet.manchester.ac.uk/volunteer/) using the weekly MHS announcement system (please, see Appendix 4). Packs of paper questionnaires will also be placed in University buildings (with permission); the trainee researcher's contact details will be on the participant information sheet/page to arrange collection.

The data will be coded and kept separate to the participants' identifiable information. Participants will be asked to consent to be contacted by email (Appendix 7) to remind them to complete the second part of the study (which involves completing the same questionnaires again). They will be informed that they will receive two reminders one

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week apart. After the second completion, the identifiable code will be erased and the data will become anonymous (i.e. there will be no link between any identifiable information and the data. Please note that the codes will remain on the anonymous data themselves). People interested in the findings of the study will be invited to contact the trainee researcher to request a summary. To compensate participants for completing both parts of the study, they will be given the choice of either course credits (Psychology students only) or entering a prize draw for the possibility of winning High Street vouchers worth £20, £20, £30 and £30 (a total of £100).

Participants are informed about the study through the MHS announcement system and posters and are provided the link to further information or the pack of questionnaires

The link leads to the information sheet and consent form

Participants are asked to consent to be contacted by email to remind them to complete the second part of the study two months later.

Participants complete the demographic and eight more questionnaires. This should take 30-40 minutes

Two months after the first completion, participants are sent an email with the link to the second part of the study that includes the same eight questionnaires. After completion, participants are asked to choose whether they would prefer to be compensated with course credits or the opportunity to participate in the prize draw.

Figure 1: The methodology of the study

10. **How has the scientific quality of the research been assessed?** *(Tick all that apply)*

☒ Internal review (e.g. involving colleagues, academic supervisor)

☐ Review within a multi–centre research group

☐ Independent external review

☐ Review within a commercial company

☐ None external to the investigator

☒ Other, e.g. in relation to methodological guidelines *(give details below)*

If relevant, describe the review process and outcome. If the review has been undertaken but not seen by the researcher, give details of the body which has undertaken the review:

The study has been reviewed and approved by the ClinPsyD Research Sub-committee. Please, see Appendix 5.

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11.1 Does the research involve the administration of any physically invasive procedures, physical testing or psychological intervention (apart from the administration of standard psychological tests)?

☐ Yes ☒ No

If No, proceed to 11.2   If Yes, please ensure you complete Section F

11.2 Does the research involve human blood or tissue samples? If you are unsure, please see here for guidance relating to HTA.

☐ Yes ☒ No

If No, proceed to 11.3

11.3 Does the research involve interviewing participants or focus groups?

☐ Yes ☒ No

If No, proceed to 11.4

If Yes, please describe briefly how they will be conducted

11.4 Does the research involve the administration of questionnaires?

☒ Yes ☐ No

If No, proceed to 11.5

If Yes, please describe the process of delivery and collection

The questionnaires will be administered through the University's online survey system, SelectSurveyNet (https://survey.ls.manchester.ac.uk/). SelectSurveyNet saves the collected data automatically. The link to the participant information sheet/page, consent form, and questionnaires will be advertised using the University's online research announcement system and by posting posters in strategic positions in University premises (e.g., on announcement boards at Coupland building, Zochonis building, residence halls, etc). If requested, paper copies of the questionnaires will also be available with the trainee researcher's contact details to arrange safe collection of the confidential data (the researcher will meet the participant in University premises, collect the data and transfer safely in a locked cabinet). All data will be kept confidential on University computers; hard copies will be held secure in locked cabinets in Rawnsley building.

11.5 Is statistical sampling relevant to this research?

☒ Yes ☐ No

If No, proceed to 11.6

If Yes, please answer the following questions:

11.5.1   Has the protocol submitted with this application been the subject of review by a statistician independent of the research team? Select one of the following:

☐ Yes – copy of review enclosed

☐ Yes - details of review available from the following individual or organisation (give contact details)
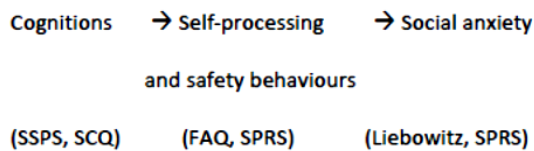
☒ No – justify below

Power calculations were conducted by the trainee researcher using the methods suggested by MacCallum et al (1996; 1997; 2006) and Kim (2005) through the online calculator for GFI available here: http://timo.gnambs.at/en/scripts/powerforsem. The number of variables was 20, significance level was .05, desired power was .80, GFI (H0) was .95 and GFI (H1) was .90. The degrees of freedom are best estimated when the models are complete using the equation P(p+1)/2 to calculate the known parameters, in this case 136, and the final model diagram to calculate the unknown parameters. Given that the final model is not constructed yet, different estimations of the unknown parameters were made and power analyses were conducted for each of these. The required sample sizes ranged between 110 and 150. Therefore and in anticipation of some drop-out rate (estimated at 25%), a sample size of 200 people was considered appropriate.

11.5.2 If relevant, specify the statistical experimental design and why it was chosen.

The design is longitudinal and structural equation modelling will be used to test the two models as follows:

- **CBT model (Clark & Wells, 1995):**

Cognitions → Self-processing → Social anxiety

       and safety behaviours

(SSPS, SCQ)   (FAQ, SPRS)   (Liebowitz, SPRS)

- **Metacognitive model (Wells, 2005):**

Cognitions (SSPS, SCQ)

↓

Metacognitions → Self-processing → Social anxiety

       and safety behaviours

(MCQ-30)   (FAQ, SPRS)   (Liebowitz, SPRS)
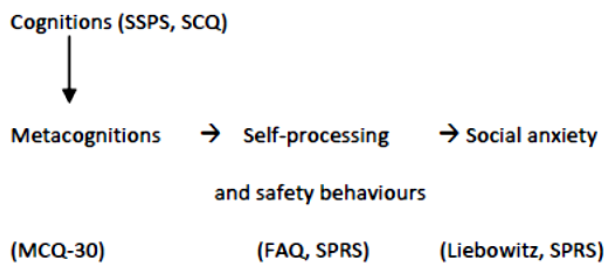
The administered questionnaires (please see table below for abbreviations) will measure the variables involved in the maintenance of social anxiety as proposed by the examined two models:

Latent variables/concepts	Questionnaires (predictors of latent variables)
Social cognitions	SSPS (2 subscales); SCQ (3 subscales)
Metacognitions	MCQ-30 (5 subscales)
Self-Processing	FAQ (2 subscales); SPRS-Item 1
Avoidance & safety behaviours	Liebowitz-avoidance subscale; SPRS-Items 2 & 4
Repetitive thinking	ASBQ (2 subscales); PEPQ
Anxiety	Liebowitz-distress subscale (trait); SPRS-Item 1 (state)

8

- **Exploratory moderated relationship**

Cognitions------→ Self processing/ Safety Behaviours/Repetitive thinking-→ Social Anxiety

↑

Metacognitive beliefs
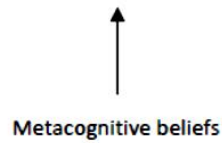
- **Exploratory mediated relationship**

Cognitions-→ metacognitive beliefs→ self-processing/Safety Behaviours/Repetitive thinking→ Social anxiety

11.6 If you are not using statistical sampling how was the number of participants decided upon?

N/A

11.7 Describe the methods of analysis (statistical or other appropriate methods, e.g. for qualitative research) by which the data will be evaluated to meet the study objectives.

Structural Equation Modelling (SEM) was chosen as the most appropriate statistical method to test the metacognitive model against the cognitive-behavioural model. SEM allows for theoretical models to be applied to observed data and evaluates their goodness of fit. It is a powerful test for mediation and it allows for model modification as well if necessary. Therefore, SEM is able to extract more information compared to regression and mediation analyses. In particular, compared to regression-based analyses, SEM allows for the exploration of more complex models with more variables and provides bootstrapped confidence intervals for indirect paths, thus testing mediation and addressing issues of not normally distributed data (Warner, 2013). SEM also offers the opportunity for exploration of reciprocal relationships (e.g., Fowler et al., 2011) and vicious cycles (e.g., Hesse et al., 2015) by allowing for rearranging variables to explore which pathways fit the data better.

In terms of the first hypothesis, the comparison of fit will be investigated using χ^2 tests, the root mean square error of approximation and the comparative fit index.

In terms of the exploratory questions, we will be testing associations between variables both within (cross-sectional relationships) and across the two time-points (cross-lagged relationships). Our prediction that involves the mediation of metacognitive beliefs will be tested by examining the pattern of associations within the specific directional pathways leading from cognition through metacognition to repetitive thinking and safety behaviours. Moderator effects will also be tested using SEM (Sauer & Dick, 1993; Little et al., 2007).

12.1 What do you consider to be the main ethical issues which may arise with the proposed study?

I. The selected questionnaires are broadly used and are considered safe and non-intrusive; it is unlikely the participants will feel distressed by the topics addressed.

II. The data will be collected online and in paper format and participants' names and contact details will be required

III. Given the longitudinal nature of the study, participants will need to be contacted more than once and this can be perceived as unpleasant or intrusive by some people

9

12.2 What steps will be taken to address the issues raised in question 12.1?

I. The participant information sheet (PIS) will provide information about the questionnaires and sample questions. Participants will always have the option to not start the survey or to discontinue at any time without having to give an explanation. At the end of the PIS, contact details of support lines and organisations will be provided. If participants have any questions in relation to the study or the questionnaires, they will be advised to contact the trainee researcher. Should participants wish their data to be withdrawn from the study, they will be advised that they can do this after the first part of the study, but after the second completion, the data will be made anonymous and therefore, withdrawal will be impossible.

II. All data will be stored on University computers; paper questionnaires will be stored in locked cabinets. Any identifiable information will be kept separate to the responses to the questionnaires as follows: Each participant will be allocated a code. The code will be written on the identifiable information and on the questionnaires, but the identifiable information will be kept separate to the rest of the data. Two months after the first completion, participants will be contacted to complete the questionnaires again. Following the second completion (or three weeks after the second reminder) the codes with the person's identifiable information will be deleted and the data will be made anonymous.

III. The PIS will provide information about the longitudinal nature of the study and the consent form will ask participants for consent to be contacted in two months with the link to the second part of the study. They will be contacted by email (Appendix 7) and they will be informed that they will be contacted twice, one week apart. Following the second reminder, they will not be contacted further.

12.3 What qualifications/experience do the researchers have relevant to the conducting of this research? (*For details about requirements for specific types of research click here*)

- The trainee has completed her PhD on the role of metacognition in social anxiety at the University of Manchester and is therefore familiar with research in the field. In particular, during her PhD training, she completed six studies that, similar to the current study, involved recruiting from the University's student and staff population. The studies were all quantitative and involved similar questionnaires to the current study. Two of the studies were psychometric in nature. The trainee is also familiar with the theory and practice of cognitive-behavioural therapy; she is an experienced cognitive psychotherapist, accredited by the British Association of Behavioural and Cognitive Psychotherapies. She has also worked as a lecturer for five years, during which she has supervised MSc students (in cognitive-behavioural psychotherapies) in their research projects.

- Prof Adrian Wells is an experienced researcher and one of the founders of metacognitive theory and therapy. He has extensive experience in research and numerous publications in the field of both cognitive-behavioural therapy and metacognitive therapy: http://www.psych-sci.manchester.ac.uk/staff/AdrianWells

- Dr Anja Wittkowski is an experienced researcher with many publications:

Research experience: (*Summary of research experience, including the extent of your involvement. Refer to any specific clinical or research experience relevant to the current application.*)

My research interests follow from my clinical work as a clinical psychologist on the regional psychiatric, inpatient Mother and Baby Unit at Wythenshawe Hospital in Manchester UK. They centre broadly on antenatal and postpartum psychological difficulties, including postnatal depression and problems in the mother-infant relationship. Current research projects focus on the assessment of the mother-infant bond and the impact of mental health difficulties (in particular depressive and psychotic illnesses) on this relationship. The influence of maternal attitudes and expectations on maternal sensitivity and responsiveness towards her infant is of particular interest to me. At present I am particularly interested in examining the effectiveness of psychological and parenting interventions in the treatment of women with perinatal mental health problems

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and the impact these improvements have on the mother-infant relationship. I am a co-applicant and the Manchester Lead for the National Institute Health Research Public Health Research funded THRIVE trial (2013-2018). I supervise two Research Assistant for THRIVE.

Research training: *(Details of any relevant training in the design or conduct of research, for example in the Clinical Trials Regulations, Good Clinical Practice, consent or other training appropriate to non-clinical research. Give the date of the training.)*

For over 14 years, I have been a research active academic at the University supervising postgraduate students. At present I am supervising four final and three 2nd year doctoral trainee projects, one MRes student, 2 PhD students and one undergraduate student. All are due to submit on time. I completed Research Governance training and hold a current Good Clinical Practice Certificate (16.10.14). I am the current ClinPsyD Research Director for the Manchester training programme and regularly act as internal examiner and external examiner (e.g., at the University of Lancaster, The University of Melbourne, and the University of Western Australia in 2015 alone).

13. Has this or a similar application been previously considered by a Research Ethics Committee in the UK, the European Union or the European Economic Area?

O Yes

● No

If Yes give details of each application considered, including:

Name of Research Ethics Committee or regulatory authority:
Decision and date taken:
Research ethics committee reference number:

SECTION C – Details of participants

14. How many participants will be recruited? *(If there is more than one group, state how many participants will be recruited in each group. For international studies, say how many participants will be recruited in __each country__ and in total. Please ensure you clearly state the total number of participants)*

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15. Age range of participants *(Please note that an upper age limit is not required and should only be stated if a proper justification can be provided for doing so. In addition, it is standard to stipulate that participants must be at least 16 to participate in research projects. If you will be using participants who are younger you will need to justify their inclusion)*

Over 18 years

16. What are the principal inclusion criteria for participants? *(Please justify)*

University students and staff will be invited to complete the survey.

There will be no need to screen for fluent knowledge of English; people, who will be able to read and understand the participant information sheet and consent forms should be able to complete the questionnaires.

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17. What are the principal exclusion criteria for participants? *(Please justify)*

This study views social anxiety on a continuum and is aiming for a large variation and, therefore, there will be no exclusion criteria and no need for screening participants. Structural equation modelling uses a similar rationale to regression analyses and therefore, a large variation provides more opportunity for exploration of the relationships between the variables. Moreover, the inclusion of all levels of social anxiety will allow for regression and correlation analyses in the unlikely event that recruitment fails to reach the necessary numbers.

18.1   Will the participants be from any of the following groups? *(Tick all that apply)*

☒   Adult healthy volunteers (i.e. not under medical care for a condition which is directly relevant to the application)

☐   Children under 16

☐   Adults with learning difficulties

☐   Adults who have a terminal illness

☐   Adults with mental illness (particularly if detained under mental health legislation)

☐   Adults with dementia

☐   Adults in care homes

☐   Adults or children in emergency situations

☐   Prisoners

☐   Young offenders

☐   Those who could be considered to have a particularly dependent relationship with the researcher, e.g. students taught or examined by the researcher.

☐   Other vulnerable groups

Please note: If an adult participant is not able to give informed consent (eg through mental capacity or is unconscious) or if a prisoner or young offender is involved in health related research ethical review should be undertaken by an appropriate NHS Research Ethics Committee.

18.2 If you will be using participants other than healthy volunteers please justify their inclusion:

N/A

19.   How will the potential participants be identified, approached and recruited? *(Where research participants will be recruited via advertisement, please append a copy to this application)*

Participants will be recruited through the University of Manchester's Research Volunteering Section (http://www.studentnet.manchester.ac.uk/volunteer/) using the weekly MHS announcement system (Appendix 4). Posters will also be used (Appendix 3). There will be no need to screen for fluent knowledge of English; people, who will be able to read and understand the participant information and consent forms (please, see Appendix 2) should be able to complete the questionnaires. Packs of paper questionnaires will also be placed in University buildings (with permission); the trainee researcher's contact details will be on the participant information sheet/page to arrange collection.

Due to the trainee researcher's previous work as a lecturer at the University of Bolton, she has approached lecturers involved in conducting research at that University to explore the possibility of recruiting from there as well if needed. At this stage, initial permission has been obtained (please see Appendix 6). The final and formal permission will be requested after the project has been approved by the University of Manchester's ethics committee.

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20. **Will individual research participants receive** *reimbursement of expenses* **or any other** *incentives* **or** *benefits* **for taking part in this research?**

☒ Yes ☐ No

(If yes, indicate how much and on what basis this has been decided)

Participants will be given the choice of either course credits (Psychology students only) or entering a prize draw for the possibility of winning High Street vouchers worth £20, £20, £30 and £30. This was decieded to compensate participants for their time and effort in participaning in both parts of the study.

21. **What is the expected total duration of participation in the study for each participant?** *For ethnographic research focussing on one or more groups rather than individual participants, indicate the approximate period of time over which research will focus on particular groups*

60-80 minutes overall (30-40 minutes for each completion of the questionnaires).

22. **What is the potential benefit to research participants?**

Participants will be contributing to the advancement of our understanding of social anxiety and its treatment. If interested, they can request a summary of the findings once the study is completed.

23. **Will any benefit or assistance, which the participant would normally have access to, be withheld as part of the research?**

☐ Yes ☒ No

(If yes, give details and justification)

SECTION D – Consent

24.1 **Will informed consent be obtained from the research participants?**

☒ Yes ☐ No

If Yes, give details of how consent will be obtained. Give details of your experience in taking consent and of any particular steps to provide information to participants before the study takes place eg information sheet, videos, interactive material.

If participants are recruited from any of the potentially vulnerable groups listed in Question 19.1, give details of extra steps taken to assure their protection. Describe any arrangements to be made for obtaining consent from a legal representative.

If consent is not to be obtained, please explain why not.

A consent form will follow the participant information. On the online version, if the participants do not consent, they won't be able to carry on with the study. On the paper version, participants will need to sign the consent form before returning the questionnaires.

The trainee has gained experience in taking consent for research during her PhD at the University of Manchester, when she conducted six studies involving participants recruited from the University's student and staff population. Moreover, through her clinical practice as an accredited cognitive-behavioural therapist and as a trainee clinical psychologist, she has gained experience in obtaining informed consent for delivering therapy and for recording sessions for supervision and assessment.

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24.2 Will a signed record of consent be obtained?

☒ Yes ☐ No

If not, please explain why not. Please append any consent forms to this application.

Please, see consent form in Appendix 2

25. How long will the participant have to decide whether to take part in the research? (*If less than 24 hours please justify*)

There is no time limit between reading the participant information and completing the first pack of questionnaires. Participants can use as much time as they need to read the information and contact the researcher with any questions before completing the questionnaires. Two months after the first completion, participants will be re-sent the information and asked to follow a link to complete the questionnaires again. They will be asked to do this within two weeks (Appendix 7).

26. What arrangements have been made for participants who might not adequately understand verbal explanations or written information given in English, or who have special communication needs? (*e.g. translation, use of interpreters etc.)*

Participants who will be able to read and understand the participant information and consent forms should be able to complete the questionnaires. If there are any difficulties, they can chose to discontinue without having to give an explanation.

SECTION E – RISKS AND SAFEGUARDS

27. Activities to be undertaken (*This should be in the form of a brief list, such as answering a questionnaire, being interviewed*)

- Answering a questionnaire

28. Where will the research/data collection take place?

- University computers
- University premises
- Participants can use their own computers (e.g., at home) or take the paper versions at home to complete

29.1 What are the potential adverse effects, risks or hazards for research participants, including potential for pain, discomfort, distress, inconvenience or changes to lifestyle for research participants? Are they any greater than those that would arise from normal social interaction?

No risks are envisaged greater than those that would arise form a normal social interaction. The selected questionnaires are broadly used and are considered safe and non-intrusive; however some participants might feel distressed by the topics being addressed.

29.2 Could individual or group interviews/questionnaires raise any topics or issues that might be sensitive, embarrassing or upsetting, or is it possible that criminal or other disclosures requiring action could take place during the study (e.g. in the application of screening tests for drugs)?

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☒ Yes ☐ No

If yes, provide your distress policy/give details of procedures in place to deal with these issues:

As mentioned above, the questionnaires might raise some distress.

The participant information sheet (PIS) will provide information about the questionnaires and sample questions. Participants will always have the option to not start the survey or to discontinue at any time without having to give an explanation. At the end of the PIS contact details of support lines and organisations will be provided. If participants have any questions in relation to the study or the questionnaires, they will be advised to contact the trainee researcher.

29.3 What precautions have been taken to minimise or mitigate the risks identified above? *(Please note that researchers must provide a specific time point at which participants can no longer withdraw their data e.g. at the time of publication or at the point of anonymising transcriptions)*

The questionnaires are broadly used and are considered safe. To the researcher's knowledge, they haven't been associated with incidents of distress.

Should participants wish their data to be withdrawn from the study, they will be advised that they can do this after the first part of the study, but after the second completion, the data will be made anonymous and therefore, withdrawal will be impossible.

30.1 What is the potential for adverse effects, risks or hazards, pain, discomfort, distress, or inconvenience to the <u>researchers</u> themselves? *(If any)*

N/A

30.2 What precautions have been taken to minimise or mitigate the risks identified above? *(If the research means working alone in a location which is not public, semi-public or otherwise risk-free, please describe your lone worker policy or append a copy)*

N/A

31. ☒   I confirm that any adverse event requiring a radical change of method or design, or even abandonment of the research, will be reported to the Committee.

SECTION F – MEDICAL INTERVENTION

<u>This section need only be completed by applicants whose project involves any form of medical or other therapeutic intervention or any physically invasive procedures, physical testing or psychological intervention (apart from the administration of standard psychological tests) (i.e. you answered 'Yes' to question 12.1)</u>

32. Drugs and other substances to be administered (if applicable)

Indicate status, eg full product licence, CTC, CTX. Attach: evidence of status of any unlicensed product; and Martindales Phamacopoeia details for licensed products

DRUG	STATUS	DOSAGE/FREQUENCY/ROUTE

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33. Procedures to be undertaken

Details of any invasive procedures, and any samples or measurements to be taken. and/or any psychological tests etc. What is the experience of those administering the procedures?

34. Will any procedures which are normally undertaken be withheld?

35.1 Will the research participants' General Practitioner be informed that they are taking part in the study?

☐ Yes ☐ No

If No, explain why not

35.2 If you answered yes to question 35.1, will permission be sought from the research participants to inform their GP before this is done?

☐ Yes ☐ No

If No, explain why not

36. What are the criteria for electively stopping research prematurely?

SECTION G – Data protection and confidentiality

37.1. Will the research involve any of the following activities at any stage (including identification of potential research participants)? *(Tick all that apply)*

Storage of personal data on any of the following:

☒ Storage of personal data on manual files

☐ Storage of personal data on laptops or other personal computers

☒ Storage of personal data on University computers

☐ Storage of personal data on NHS computers

☐ Storage of personal data on private company computers

☐ Use of audio/visual recording devices

☒ Use of personal addresses, postcodes, faxes, e-mails or telephone numbers

☐ Electronic transfer by magnetic or optical media, e-mail or computer networks

☐ Examination of medical records by those outside the NHS, or within the NHS by those who would not normally have access

☐ Sharing of data with other organisations

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☐ Export of data outside the European Union

☐ Publication of direct quotations from respondents

☐ Publication of data that might allow identification of individuals

37.2 Please provide details of how you plan to store and protect the study data as stated in 37.1 above.

Any paper copies will be stored in locked cabinets in Rawnsley building, floor 2

Any electronic data will be stored in University computers under the trainee's secure account

38. What measures have been put in place to ensure confidentiality of personal data? Give details of what encryption or other anonymisation procedures will be used and at what stage? *Note: the University requires all personal data stored electronically to be held on wholly managed University servers or to be encrypted.*

Identifiable information will be coded and kept separate to the rest of the data

All electronic data will be held on wholly managed University servers

39. Where will the analysis of the data from the study take place and by whom will it be undertaken?

It will take place on University's computers and it will be undertaken by the trainee researcher

Richard Emsley (statistician) has also confirmed that somebody from his group will provide statistical support for this project if needed. Prof Adrian Wells's PhD student, Lora Capobianco, who has been using SEM as part of her projects has also been approached and can offer peer support.

40.1 Who will control and act as the custodian for the data? *Note: for a student project this must be a supervisor or a permanent member of staff*

The first supervisor, Prof Adrian Wells

40.2 Who will have access to the data and where are they based?

The trainee researcher will have access to all the data at all stages of the study

The supervisors and statistician will have access to the anonymised dataset. Prof. Adrian Wells (supervisor) is based on Rawnsley building at the Manchester Royal Infirmary, M23 9LT (floor 2); Dr Anja Wittkowski (supervisor) is based in Zochonis building, Brunswick Street, M13 9PL (floor 2); Richard Emsley (statistician) is based in 1.304 Jean McFarlane building, Oxford Road, M13 9PL.

40.3 Will the data be stored for use in future studies? If yes, has this been addressed in the consent process?

Yes, the anonymised data will be stored for use in future studies. This has been addressed in the consent form.

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41. For how long will the data from the study be stored?

     5   Years

Note: the University requires non-medical data to be held for a minimum of 5 years and medical data to be held for a minimum of 10 years after the completion of the research. Some funding bodies require storage for longer periods.

42. What arrangements are in place to ensure participants receive any information that becomes available during the course of the research that may be relevant to their continued participation?

N/A

43. What arrangements are in place for monitoring the conduct of the research by parties other than the researcher?

N/A

Will a data monitoring committee be convened?

☐ Yes

☒ Not relevant

SECTION H – Conflict of Interest

44.1 Will individual *researchers* receive any personal payment over and above normal salary and reimbursement of expenses for undertaking this research?

☐ Yes ☒ No

If Yes, indicate how much and on what basis this has been decided:

44.2 Does the principal researcher or any other investigator/collaborator have any direct personal involvement (e.g. financial, share-holding, personal relationship etc.) in the organisation sponsoring or funding the research that may give rise to a possible conflict of interest?

☐ Yes ☒ No

If Yes, give details:

45. Will the host organisation or the researcher's department(s) or institution(s) receive any payment of benefits in excess of the costs of undertaking the research?

☐ Yes ☒ No

If Yes, give details:

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SECTION I - Reporting Arrangements

46. How is it intended the results of the study will be reported and disseminated? *(Tick as appropriate)*

- ☒ Peer reviewed academic journals
- ☐ Book or contribution to a book
- ☐ Other published outlets e.g. ESRC or Cochrane Review,
- ☒ Thesis/dissertation
- ☒ Conference presentation
- ☐ Internal report
- ☒ Other e.g. deposition in University Library

47. How will the results of research be made available to research participants and communities from which they are drawn?

- ☐ Presentation to participants or relevant community groups
- ☒ Written feedback to research participants
- ☐ Other e.g. videos, interactive website

48.1 Will dissemination allow identification of individual participants?

☐ Yes ☒ No

If No, proceed to 49

If Yes, indicate how these individuals' consent will be obtained:

Interested participants can contact the researcher for a summary of the findings. At that stage, the data will be anonymised (there will be no link between the data and the participant).

48.2 Will dissemination involve publication of extended direct quotations from identified participants and/or distribution of audiovisual media in which identified participants play leading roles?

☐ Yes ☒ No

If No, proceed to 49

If Yes, indicate how the participants' possible Intellectual Property or Performance Rights in these outputs will be negotiated. Where relevant, attach a model of the release form that will be used.

48.3 Are special arrangements needed to provide indemnity and/or compensation in the event of a claim by, or on behalf of, participants on grounds such as libel, breach of confidence and infringement of Intellectual Property or Performance Rights?

No

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SECTION J – Funding

49. Has external funding for the research been secured?

☐ Yes ☒ No

If Yes, give details of funding organisation(s) and amount secured and duration:

Organisation:

UK contact:

Amount (£):

Duration: Months

SECTION K – Confirmation of Application

Note: Student applications must also be signed by their supervisor

Signature(s) of applicant(s):

Styliani Gkika

_____   24. 01. 2016

SIGNATURE (Name in italics is sufficient)   **DATE**

Styliani Gkika, trainee clinical psychologist

NAME AND POST OF APPLICANT (PLEASE PRINT)

Signature of 1st supervisor (if applicable):

Adrian Wells   **12-01-2016**

_____   _____

SIGNATURE (Electronic signature is required)   **DATE**

Prof Adrian Wells

NAME AND POST OF SUPERVISOR (PLEASE PRINT)

Anja Wittkowski, Senior Lecturer in Clinical Psychology

Signature of 2nd supervisor (if applicable):

Anja Wittkowski   17/01/2016

SIGNATURE (Electronic signature is required)   **DATE**

Prof Adrian Wells

NAME AND POST OF SUPERVISOR (PLEASE PRINT)

Please note: Once complete, please submit this application form and ALL supporting documentation to your signatory for review. Please DO NOT send directly to Research.Ethics@manchester.ac.uk or your application will be returned to you.

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Ref: ethics/020316

Research Governance, Ethics and Integrity

2nd Floor Christie Building

Dr. Styliani Gkika

School of Psychological Sciences

The University of Manchester
Oxford Road

Date   March 16, 2016

Manchester

M13 9PL

Tel: 0161 275 2206/2674

Email: research.ethics@manchester.ac.uk

Dear Dr. Gkika

Study title: Gkika: Modelling a metacognitive versus a cognitive approach to social anxiety 16060

Research Ethics Committee [3]

I write to thank you for coming to meet the Committee on the 2nd of March 2016. I am pleased to confirm a favourable ethical opinion for the above research on the basis described in the application form and supporting documentation as submitted and approved by the Committee.

This approval is effective for a period of five years. If the project continues beyond that period an application for amendment must be submitted for review. Likewise, any proposed changes to the way the research is conducted must be approved via the amendment process (see below). Failure to do so could invalidate the insurance and constitute research misconduct.

You are reminded that, in accordance with University policy, any data carrying personal identifiers must be encrypted when not held on a secure university computer or kept securely as a hard copy in a location which is accessible only to those involved with the research.

Reporting Requirements:

You are required to report to us the following:

1. Amendments
2. Breaches and adverse events
3. Notification of Progress/End of the Study

Feedback

It is our aim to provide a timely and efficient service that ensures transparent, professional and proportionate ethical review of research with consistent outcomes, which is supported by clear, accessible guidance and training for applicants and committees. In order to assist

us with our aim, we would be grateful if you would give your view of the service that you have received from us by completing a feedback sheet
https://survey.manchester.ac.uk/pssweb/index.php/153715/lang-en

We hope the research goes well.
Yours sincerely,

Mr. Adrian Jarvis
Secretary to University Research Ethics Committee

Appendix 9: Screening moderation tools

The screening tools are below. Please, screen on title and abstract first and then on the full text. The codes/categories for each step (screening on title/abstract and screening on full text) are mutually exclusive so only tick one for each step. Also, they are prioritised. So, for example, if a paper's focus is not on social anxiety/phobia then you tick that and you don't need to go any further (most papers will be in this category); if a paper is on social anxiety/phobia, but it's not in English, you tick the "Exclude if not in English" box and you don't need to go further, and so on. The ones you include on full text will need to be further categorised, but the idea is the same; the categories are mutually exclusive. There are a couple of example below.

Metacognitive beliefs search

Screen on title and abstract (for each paper tick your chosen code/category on the basis of the title & abstract)							
Paper identifier (e.g., title or DOI)	Exclude if focus on not social anxiety/phobia (e.g., exclude test anxiety, fear of blushing and studies that focus on anxiety in general or on other disorders. The question is, does the study offer statistics on social anxiety/phobia? If not, then it's out)	Exclude if not in English	Exclude if not peer reviewed (for example if it's a book or a thesis)	Exclude if participants are below 18	Exclude if the metacognitive beliefs measured are not consistent with the Wells& Matthews model (e.g., if the paper is on education (they have their own metacognitive theories)	Exclude if the research design is not the targeted one (that is if the design does not include correlations /regressions /SEM and/or comparisons of means (t-tests, ANOVAs, etc. For example, exclude qualitative designs, and reviews).	Include on title and abstract
Example: PubMed No8: Metacognition moderates the relationship between dysfunctional self-appraisal and social functionin	√ (the title says that it's on schizophrenia. No need to look further, e.g., no need to check if the metacogs are the Wellsian ones, etc)						

g in prolonged schizophrenia independent of psychopathology.							
Example: PubMed No 9: [Examination of the Metacognitive Model of Depression in a Turkish University Student Sample].	√ (As above. If it was on social phobia then it would have still been excluded on the basis that it's in Turkish)						
Example: Mindfulness and the attenuation of post-event processing in social phobia: an experimental investigation.							√ (The abstract does not say whether they measured metacognitive beliefs or not and it sounds like the mindfulness they used is not detached mindfulness. Nevertheless, better safe than sorry, I've included it at this stage).

Screen on full text (for the papers you included below, tick your chosen code/category on the basis of the full text)					
Paper identifier (e.g., title or DOI)	Exclude if metacognitive beliefs are not measured (or were not measured with a questionnaire or were not Wellsian)	Exclude if the results are not on social anxiety/phobia	Exclude if the research design is not the targeted one (i.e., if the design does not include correlations/ regressions/SEM and/or comparisons of means (t-tests, ANOVAs, etc. For example, exclude case studies, qualitative designs, and reviews).	Exclude if not peer reviewed (for example if it's a book or a thesis)	Include on full text
Example: Mindfulness and the attenuation of post-event processing in social phobia: an experimental investigation.	√ (they didn't measure metacognitive beliefs)				

Social beliefs search

The procedure is the same as above. Here are the screening tools.

Screen on title and abstract (for each paper tick your chosen code/category on the basis of the title & abstract)								
Paper ID (e.g., title or DOI)	Exclude if focus not onsocial anxiety/ phobia (e.g., exclude test anxiety, and studies that focus on anxiety in general or on other disorders)	Exclude if the focus is on stuttering	Exclude if the focus is on fear of blushing	Exclude if not in English	Exclude if participants are below 18	Exclude if not peer reviewed	Exclude if the beliefs measured are not consistent with the Clark & Wells model (e.g., if on perfectionistic beliefs, perceptions, etc)	Exclude if the research design is not the targeted one (that is if the design does not include correlations/regressions/ SEM and/or comparisons of means (t-tests, ANOVAs, etc. For example, qualitative designs, and reviews)	Include on title and abstract
Example: Further examination of the cognitive conceptualizations of the social phobia subtypes and avoidant personality						√ (it's a dissertation)			

disord er									
Exam ple: Differ entiati ng social phobia and panic disord er: A test of core beliefs									√ (these core beliefs could be consiste nt with the Clark & Wells uncondit ional beliefs; the abstract does not specify)

Screen on full text (for the papers you included below, tick your chosen code/category on the basis of the full text)						
Paper identifier (e.g., title or DOI)	Exclude if beliefs are not measured (or are not measured with a questionnaire)	Exclude if the beliefs are about emotions	Exclude if it's mostly on Negative Automatic Thoughts (instead of beliefs)	Exclude if the beliefs are not consistent with the Clark & Wells model	Exclude if the research design is not the targeted one (social anxiety is not the DV or participant selection was not based on social anxiety/phobia)	Include on full text
Example: Differenti ating social phobia and panic disorder: A test of core beliefs				√ (They only used the BFNE that does not measure Clark&We lls beliefs –nor does it measure core beliefs as they suggest on the title)		