

# A Comprehensive Review of the Cognitive Determinants of Anxiety and Rumination in Social Anxiety Disorder

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Social anxiety disorder (SAD) is characterised by an intense fear of social situations in which the individual believes they may be negatively evaluated (American Psychiatric Association, 2013). A number of cognitive models (Clark & Wells, 1995; Hofmann, 2007; Rapee & Heimberg, 1997) have been proposed that provide frameworks for understanding the key cognitive processes involved in SAD. Negative rumination, which can be divided into pre- and post-event rumination, appears to be a key maintaining factor in the cycle of social anxiety. However, there are mixed findings regarding the cognitive predictors of post-event rumination and a lack of research regarding the consequences and predictors of pre-event rumination. Furthermore, there has been little empirical research investigating the effects of targeting negative rumination and state anxiety in social anxiety treatment. If the cognitive predictors of negative rumination can be determined then they can be targeted when designing interventions that aim to break the vicious cycle of social anxiety. The state of research investigating the cognitive determinants of state anxiety and negative rumination is reviewed and suggestions are made for continuing research.

■ **Keywords:** social anxiety disorder, state anxiety, rumination, treatment, literature review

## Social Anxiety Disorder

Social anxiety disorder (SAD) is characterised by a marked, or intense, fear or anxiety of social situations in which the individual may be negatively evaluated by others (American Psychiatric Association [APA], 2013). When an individual with SAD anticipates or encounters a feared social situation, they experience cognitive, behavioural, and physical symptoms of anxiety. Consequently, an individual with SAD will frequently avoid feared social situations, or endure them with intense fear (APA, 2013).

Social anxiety exists on a spectrum, anchored by shyness and avoidant personality disorder (Rapee & Spence, 2004), and so individuals who do not meet criteria for SAD may experience varying degrees of social anxiety (Turner, Beidel, Dancu, & Stanley, 1989). A diagnosis of SAD is only warranted when symptoms of anxiety and associated avoidance lead to significant interference with one's occupational or social functioning and additionally cause significant distress in daily life (APA, 2013). In this literature review, SAD will refer to individuals who satisfy diagnostic criteria in the fourth edition of the *Diagnostic and Statistical Manual of Mental Disorders*

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(DSM-IV-TR; APA, 2000) or DSM-5 (APA, 2013) for SAD, and social anxiety will be used in reference to subclinical levels of anxiety related to social evaluative situations.

SAD is a relatively common disorder that affects between 7% and 13% of individuals across their lifetime in Western cultures (Furmark, 2002). In Australia, SAD has a lifetime prevalence of 10.6% (12-month prevalence 4.2%; Crome et al., 2014). Median age at onset of SAD is typically early adolescence (Kessler et al., 2005), with onset of new cases of SAD beyond late adolescence uncommon and often secondary to another mental disorder (Grant et al., 2005; Neufeld, Swartz, Bienvenu, Eaton, & Cai, 1999). The aetiology of SAD is complex and has been attributed to an interplay between genetic vulnerability, biological processes, early temperament style, and environmental factors, most notably parent-child interactions and adverse social and life events (Rapee & Spence, 2004).

There appears to be high rates of comorbidity among individuals with SAD. In the Australian National Survey of Mental Health and Wellbeing, almost 70% of individuals with SAD were found to meet criteria for at least one other psychological disorder (Crome et al., 2014). Specifically, 39.3% of individuals with SAD met criteria for a comorbid affective disorder and 11.4% an alcohol use disorder (Crome et al., 2014). In the general population, higher rates of SAD are generally found in females than in males (with odds ratios ranging from 1.5 to 2.2; Fehm, Pelissolo, Furmark, & Wittchen, 2005).

When SAD was first included as a diagnostic category in DSM-III (APA, 1980), it was assumed to only result in a minimal disturbance of normal role functioning. However, more recent research has demonstrated that SAD is associated with higher rates of drug dependency and lower levels of employment, workplace productivity, and socioeconomic status (Patel, Knapp, Henderson, & Baldwin, 2002). SAD is also associated with low life satisfaction (Hambrick, Turk, Heimberg, Schneier, & Liebowitz, 2003) and more frequent suicidal ideation (Sareen et al., 2005), and predicts increased risk for depression (Beesdo et al., 2007).

The aim of the present review is to initially summarise the efficacious treatment for SAD before outlining in detail the cognitive models of SAD. The relationship between negative rumination and state anxiety with SAD is reviewed, as well as the cognitive determinants of anxiety and rumination in SAD. Methodological limitations of past research in this area are highlighted and directions for future research are suggested. It extends previous work (Penney & Abbott, 2014a) by including more recently published empirical data on state-based processes in SAD but also by reviewing a broader range of processes and the impact of treatment on these processes.

## Efficacious Treatments for Social Anxiety Disorder

The most common psychological therapy for SAD is cognitive behavioural therapy (CBT), which can be conducted in group or individual formats. CBT traditionally consists of cognitive restructuring and graded in vivo exposure to feared social situations. Clients are assisted by the therapist in identifying and challenging beliefs about their social competence and the true probability and consequences of experiencing negative evaluation. Additionally, graded exposure exercises are also undertaken that provide opportunities to confront avoided social encounters until the fear habituates. A recent meta-analysis that looked at the treatment effectiveness of CBT and its components reported that CBT interventions produced controlled effect sizes in

the 0.70–0.80 range on measures of social anxiety, general anxiety, and depression (Acarturk, Cuijpers, van Straten, & de Graaf, 2009). CBT has also been shown to have greater treatment effect sizes compared to other psychological therapies, as well as pharmacological interventions (Mayo-Wilson et al., 2014).

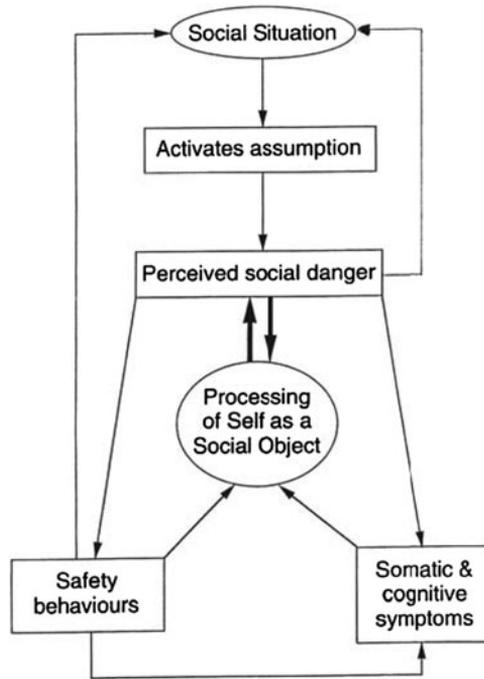
In the last decade or so, the more traditional CBT protocol for social anxiety has been expanded and ‘enhanced’ CBT programs for social anxiety developed and empirically tested (Clark et al., 2003; Rapee, Gaston, & Abbott, 2009). These enhanced treatment protocols differ from standard CBT in that they specifically target underlying processes proposed to maintain social anxiety by the models of SAD (i.e., Clark & Wells, 1995; Rapee & Heimberg, 1997) and exposure tasks that take more of a hypothesis-testing approach. The enhanced CBT programs have been found to have greater treatment effect sizes compared to medication (Clark et al., 2003), exposure coupled with relaxation (Clark et al., 2006), and standard CBT (Rapee et al., 2009). However, while these improved CBT programs appear to be effective in terms of overall symptom reduction, their effect on the specific cognitive processes they are theoretically targeting is less clear. While Rapee, Gaston, and Abbott (2009) did investigate the effects of enhanced CBT on some of the key processes in the models of SAD and found that changes in perceived cost of negative evaluation and negative mental representation may mediate treatment change, not all important maintaining factors were considered. One such maintaining factor that has not been specifically investigated as a mechanism of treatment change in these enhanced CBT protocols is negative rumination.

There has been considerable debate about whether the efficacy of exposure is improved by the addition of cognitive restructuring in social anxiety treatment. While some meta-analyses have found no evidence for additional benefits of combining exposure and cognitive interventions over exposure therapy alone (Feske & Chambless, 1995; Gould, Buckminster, Pollack, Otto, & Liang, 1997), others have reported that the effects of exposure can be increased with cognitive therapy (Taylor, 1996). Possible reasons for why the therapeutic benefits of cognitive therapy combined with exposure therapy is uncertain may include the fact that there are fewer trials investigating strictly cognitive interventions for SAD, possibly resulting in insufficient power for reliable conclusions to be drawn (Deacon & Abramowitz, 2004). Additionally, the failure to detect differences between cognitive therapy and exposure in these early meta-analysis may reflect the need for better cognitive-based interventions to be developed (Feske & Chambless, 1995).

While CBT is the treatment of choice for individuals with SAD, particularly enhanced CBT programs, there is still a need to improve the efficacy of its components, particularly its cognitive techniques. Improved understanding of key maintaining factors in the cycle of SAD is vital in order to ensure the continuing development of efficacious treatments. For example, the impact of targeting pre- and post-event rumination, which appear to be key maintaining factors in the vicious cycle of SAD, has received little empirical attention to date.

### Cognitive Models of SAD

A number of cognitive models (Clark & Wells, 1995; Hofmann, 2007; Rapee & Heimberg, 1997) have been proposed that provide structures for understanding the key cognitive processes involved in SAD. These models are primarily of state anxiety in that they describe a temporary response to a feared social event, as opposed to trait

**FIGURE 1**

Clark's (2001) cognitive model of social anxiety disorder (adapted from Clark & Wells, 1995). Note: Reproduced with permission from John Wiley and Sons.

social anxiety, which refers to an individual's relatively stable tendency to perceive social situations as anxiety provoking. However, the models predict that the cognitive processes engaged in during the socially threatening event will mediate an individual's trait level of social anxiety and their experienced state anxiety in a given social situation (Rapee & Abbott, 2007; Rapee & Heimberg, 1997). The three models are theoretically similar and posit how SAD may develop and be maintained through subjective processing of social information, irrational beliefs, safety behaviours, rumination, and avoidance of anxiety-provoking situations.

### *Clark & Wells (1995)*

Clark and Wells's (1995) cognitive model proposes that individuals with SAD interpret social situations in a threatening way due to a range of dysfunctional beliefs that they hold about themselves, others, and the social world. These dysfunctional beliefs include unreasonably high standards for social performance (e.g., 'I must appear intelligent and humorous'), as well as conditional beliefs about social evaluation (e.g., 'If I make a mistake others will reject me') and unconditional beliefs about themselves (e.g., 'I am inadequate'). These dysfunctional beliefs trigger an expectation of negative evaluation and consequently a range of cognitive, somatic, affective, and behavioural responses (Clark & Wells, 1995).

As illustrated in Figure 1 (note: an updated version of the original model by Clark, 2001, is displayed, which makes the role of safety behaviours more explicit),

Clark and Wells' (1995) model suggests that when an individual with SAD enters a social situation, maladaptive assumptions and unhelpful beliefs are triggered that lead to a fear that they are in danger of negative evaluation. Perceiving the social situation as threatening causes attention to be shifted towards a detailed monitoring and observation of themselves, which in turn leads to a greater focus on feared anxiety responses and further maladaptive processing of the social situation. The somatic and cognitive symptoms of anxiety that are focused on facilitate in creating a negative mental representation of the self; moreover, any social cues that do not support this representation are generally disregarded.

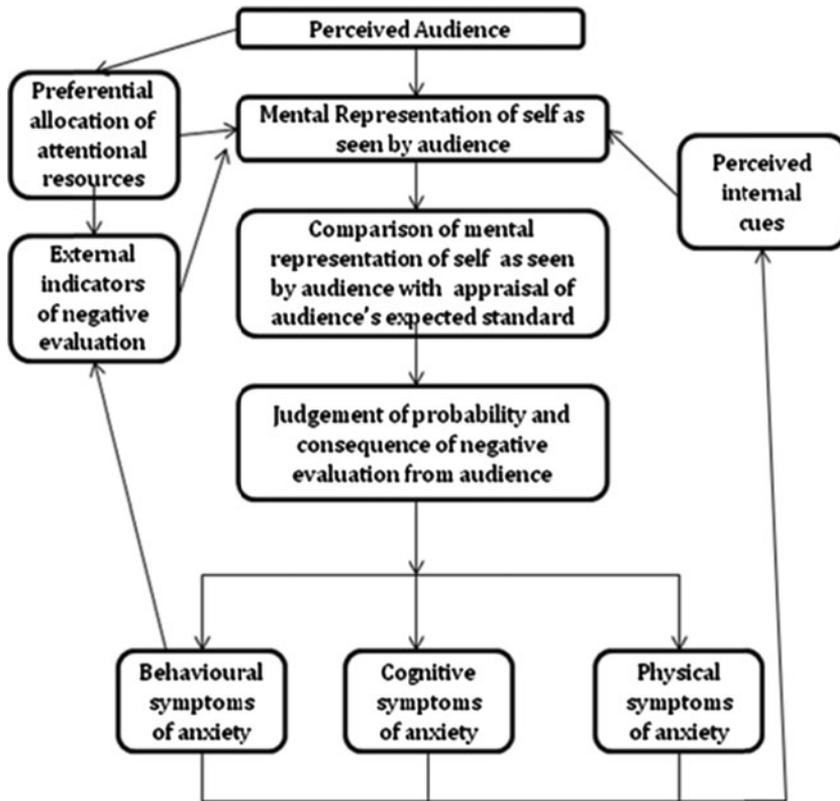
Clark and Wells (1995) also propose that individuals with SAD rely on a range of safety behaviours in the hope of reducing the risk of negative evaluation. These safety behaviours can involve internal mental processes (e.g., memorising things to say) or overt behaviours (e.g., avoidance). Safety behaviours play a role in the maintenance of SAD in a number of different ways: the individual fails to learn that a feared catastrophe is unlikely in the absence of the safety behaviour and attributes any social success to the use of the safety behaviour, learning to rely on them; the safety behaviour may produce the feared anxiety symptoms (e.g., hiding sweating by wearing a jacket, causing more sweating); engaging in the safety behaviour increases self-focused attention and accordingly reduced ability to attend to objective social information; and the safety behaviour may actually cause the feared result (e.g., contributes little to conversation to avoid saying something embarrassing, but by doing so may appear rude) (Clark, 2001; Clark & Wells, 1995).

Clark and Wells (1995) also suggest that individuals with SAD experience anticipatory processing prior to a social situation. This pre-event rumination involves recalling past failures and engaging in negative self-imagery, causing the individual to enter the social situation in a negative self-focused processing mode in which they anticipate failure. Following the social situation the individual then engages in a 'post-mortem' of the event. Such post-event rumination is typically focused on negative self-perception, perceived failure, and the retrieval of other past social failures that consolidates their belief that they are socially incompetent. The more negatively the individual appraises their performance in a social situation, the greater the frequency of post-event rumination (Clark & Wells, 1995).

### *Rapee & Heimberg (1997)*

Rapee and Heimberg (1997) also proposed a model for the cognitive processes that maintain SAD. As seen in Figure 2, the model hypothesises that individuals with SAD attach critical importance to receiving positive appraisals by others, though they assume that others are inherently critical. When a social situation is anticipated or entered, individuals with SAD form a mental representation of their external appearance, as presumably seen by the audience, which is based on memories from past social situations, internal cues (e.g., physical symptoms) and external cues (e.g., audience feedback). Attentional resources are then allocated to their mental representation, as well as any perceived threat in the social environment (e.g., signs of boredom from the audience).

Rapee and Heimberg (1997) go on to hypothesise that individuals with SAD form a prediction about the standard of performance that the audience will expect of them. This prediction is then compared to their mental representation, and if a discrepancy is detected, the individual will anticipate that negative evaluation from the audience

**FIGURE 2**

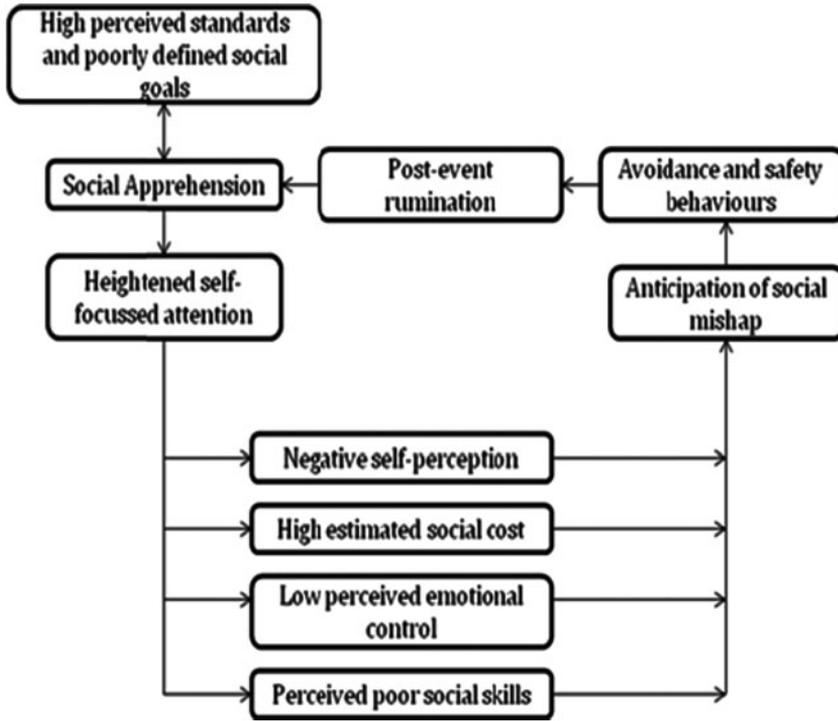
Rapee and Heimberg's (1997) cognitive-behavioural model of social anxiety disorder.  
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is probable and that this will have negative social consequences for them. This in turn results in behavioural, cognitive, and physical symptoms of anxiety that serve to reinforce the individual's negative mental representation, creating a vicious cycle.

While this model is similar to the Clark and Well's (1995) model in many respects, one noticeable difference is that Rapee and Heimberg's (1997) model does not explicitly reference pre- and post-event rumination. However, it can be inferred from the model that an individual with SAD not only expects negative evaluation from others and forms a negative self-image of the self during a social situation, but also when anticipating a social situation and reflecting upon it afterwards. Furthermore, the importance of rumination was acknowledged in an update of this model (Heimberg, Brozovich, & Rapee, 2010).

### *Hofmann (2007)*

Hofmann (2007) combines aspects of the two previous models and attempts to expand on them further. Figure 3 outlines Hofmann's (2007) model, which posits that individuals with SAD are apprehensive of social situations due to having unrealistic social standards and poorly defined social goals. Upon entering or anticipating a social



**FIGURE 3**

Hofmann’s (2007) model of social anxiety disorder.

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situation, individuals with SAD allocate their attentional resources inwards and form a negative self-image of themselves which they believe to be accurate. Because of this, they view themselves negatively as a social object, overestimate the consequences of behaving in a way they perceive to be inept, believe they have little control over their anxiety and that this will be noticed by others, and view their social skills as inadequate to cope with the social situation. Accordingly, they anticipate social mishap and so revert to safety behaviours, creating a positive feedback loop. Upon leaving the social situation, an individual with SAD will likely then engage in negative post-event rumination, which revolves around anxious feelings and negative self-perceptions, and is a similar process to that described by the Clark and Wells’ (1995) model. The consolidation of this memory leads to future anticipatory processing in which thoughts are dominated by memories of past failures, leading to the maintenance of SAD.

Hoffman’s model overlaps with Clark and Wells’ (1995) model in that it highlights the role of safety behaviours and rumination in the maintenance of SAD, as well as proposing that individuals with SAD hold a negative mental picture of themselves as a social object, which elicits anxiety symptoms when they encounter a threatening social situation. Additionally, Hofmann’s (2007) model also aligns with Rapee and Heimberg’s (1997) notion of heightened anxiety when the individual believes there is a discrepancy between their social performance and the perceived high standards

required, as well as emphasising the role of overestimating the probability and cost of a feared negative outcome.

### Summary of the Cognitive Models for Social Anxiety Disorder

All three cognitive models of SAD (Clark & Wells, 1995; Hofmann, 2007; Rapee & Heimberg, 1997) outline a range of cognitive processes that contribute to the development, and ultimately the maintenance, of SAD. The cognitive processes discussed in the three models are theoretically similar and can largely be summarised into the following: (1) performance appraisals, involving the self-appraisal of perceived performance, which is usually negative relative to those low in social anxiety; (2) self-efficacy, the discrepancy between one's *perceived* abilities as inadequate and the high *perceived* expected standard for the social interaction; (3) threat appraisals, in which the probability and consequences of a feared negative social outcome are typically overestimated; (4) self-imagery, which is one's impression of themselves as a social object and is often negative and seen from an observer's perspective; (5) self-focused attention, where attention is shifted from others to a detailed monitoring of themselves and their internal anxiety-related responses; (6) self-concept, which involves conditional and unconditional beliefs about oneself (e.g., 'I am inadequate'); and (7) rumination, a repetitive and detailed analysis of anticipated or experienced negative experiences before and/or following a social situation.

While all three models outline the processes maintaining state social anxiety, Rapee and Heimberg (1997) posit that these cognitive processes should be similar irrespective of whether an individual anticipates a social situation, encounters one, or is engaging in a 'post-mortem' after the event. In other words, the cognitive processes that the models theorise should occur during a social situation for an individual with SAD should also be evident when an individual engages in pre- and post-event rumination. However, this remains unascertained, and there is some contradictory data to suggest that the cognitive processes outlined actually have differing importance depending on what stage of the social situation the individual with SAD is experiencing. Specifically, recent research has reported that there are a number of cognitive processes that predict pre-event rumination in social anxiety; however, only threat appraisals were found to predict post-event rumination for the same sample (Penney & Abbott, 2014b). While the cognitive models of SAD suggest that the cognitive process are equally important in predicting state anxiety, and pre- and post-event rumination in relation to a social event, the empirical literature discussed below suggests this may not entirely be the case.

### State Anxiety in SAD

Cognitive models of SAD outline the processes that socially anxious individuals engage in when confronted with social or performance situations. In addition, these models consequently explain why socially anxious individuals experience state social anxiety. While the cognitive processes outlined above all theoretically explain why an individual with SAD experiences heightened anxiety in a feared social situation, there has been little empirical testing of these hypothesised mediational relationships. Rapee and Abbott (2007) published one of the few studies to have done so, creating a state anxiety measure to assess 'anxiousness' in relation to a speech task. Path analysis indicated that characteristic social anxiety predicted state anxiety directly and through its relationships with inappropriate attentional focus (i.e., self-focused

attention), performance appraisals, and threat appraisals (Rapee & Abbott, 2007). A further study by Penney and Abbott (2014b) employed hierarchical regression modelling and found that unique variance in state anxiety for a speech task was best predicted by heightened threat appraisals, self-efficacy, and pre-event rumination.

## Rumination in SAD

According to the models of SAD, negative rumination perpetuates negative beliefs about past and future social performance and serves to consolidate a negative self-perception into long-term memory (Clark & Wells, 1995; Hofmann, 2007; Rapee & Heimberg, 1997). While rumination can be constructive (e.g., when thinking about a future public speaking task an individual prepares general things to say and imagines a positive outcome), negative rumination is experienced excessively, and almost exclusively, by individuals with SAD before a feared social situation and following it (Abbott & Rapee, 2004; Vassilopoulos, 2004).

Rumination was originally defined as an intrusive and repetitive thinking process that revolved around the causes, implications, and symptoms of one's own distress (Nolen-Hoeksema & Morrow, 1991). While originally investigated in the context of depression (Nolan, Roberts, & Gotlib, 1998; Nolen-Hoeksema, 2000), experimental support for the role of negative rumination in SAD has begun to accumulate more recently. Given the apparent high comorbidity between SAD and depression (Kessler, Stang, Wittchen, Stein, & Walters, 1999), it has been speculated whether it is depression or anxiety symptoms that most contribute to the frequency, and associated distress, of negative rumination. While Abbott and Rapee (2004) found that depression is not a unique predictor of negative rumination following a speech task, other research has concluded that the relationship between social anxiety and negative rumination following a social interaction is stronger in those with elevated depressive symptoms (Kashdan & Roberts, 2007). However, while this potential interactive relationship between SAD and depressive symptoms for negative rumination is still to be clarified, the ruminative process in SAD remains a conceptually differing construct from that in depression. As discussed by Penney and Abbott (2014a), the Clark and Wells (1995) model hypothesises that rumination in SAD concentrates on negative self-perception, negative self-imagery and past perceived social failures, while the response styles theory (Nolen-Hoeksema, 1991) proposes that rumination in depression revolves around the actual depressive symptoms. It is likely that rumination in SAD and depression overlap in that both involve some degree of repetitive thinking that is focused on symptoms of general distress and is experienced as uncontrollable, but it appears that rumination in SAD is triggered and dominated by recollections of a specific social situation that has taken place, as opposed to purely revolving around distressing symptoms, which is primarily the case in depression. Therefore, while depression and social anxiety may possibly share a synergistic effect in predicting rumination, the structure of the rumination is distinct in these differing, albeit often comorbid, disorders (Penney & Abbott, 2014a).

There has been discussion in the literature about whether rumination is essentially a form of worry (see Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008; and Smith & Alloy, 2009, for a review of this topic). Both rumination and worry are intrusive forms of thought often focused on negative affect; they are significantly associated with depression and anxiety (Fresco, Frankel, Mennin, Turk, & Heimberg, 2002) and are also highly correlated with each other (Fresco et al., 2002; Watkins, Moulds,

& Mackintosh, 2005). However, a number of distinct differences separate these two related constructs. Worry appears to involve more future orientated thoughts (i.e., ‘What if . . . ?’; Watkins et al., 2005), often focusing on problem solving (Papageorgiou & Wells, 1999) and preparation for the perceived threat. On the other hand, rumination focuses on the past (i.e., ‘Why did this happen?’; Watkins et al., 2005), is highly negative (often with a focus on loss; Nolen-Hoeksema et al., 2008), and often serves the purpose of gaining a deeper understanding of the situation that triggered the negative rumination (Watkins, 2004). Thus, while worry and rumination are highly related, they appear to be distinct constructs that serve different purposes.

Negative rumination is one of the key processes involved in pre- and post-event processing. The cognitive models of SAD consider the role of two related but separate types of negative rumination: negative rumination following a social situation, which for the purposes of this review will be known as post-event rumination; and negative anticipatory processing before a social situation, which will be known as pre-event rumination. While the association between post-event rumination and social anxiety has been widely investigated in the social anxiety literature, the role of pre-event rumination has attracted less empirical research to date. However, it is imperative to consider both pre- and post-event rumination when refining interventions for SAD, as well as the differing cognitive processes that may predict them.

### Post-Event Rumination

Post-event rumination begins when an individual absorbs themselves in a repetitive and detailed review of subjective negative experiences following a social situation (Chen, Rapee, & Abbott, 2013). This ruminative process typically revolves around intrusive images and thoughts regarding perceived failures, as well as adverse images of themselves that were experienced during the event (Clark & Wells, 1995). A review examining negative rumination and its role in SAD concluded that post-event rumination preserves social anxiety by consolidating negative impressions the individual may hold about themselves as a social being, preserving negative memories of past perceived social failures, and by leading to negative assumptions about future social situations (Brozovich & Heimberg, 2008). Further studies have conformed the maintenance role.

A number of studies have demonstrated an association between higher levels of social anxiety and greater levels of post-event rumination following a social situation (Dannahy & Stopa, 2007; Edwards, Rapee, & Franklin, 2003; Mellings & Alden, 2000). An additional study reported that post-event rumination maintained state social anxiety in participants following a speech task when compared to participants who engaged in distraction following the speech task, a finding independent of the participants’ levels of trait social anxiety (Wong & Moulds, 2009). The design of the above studies all involved instructing participants to partake in a controlled social situation, normally a speech task or a social interaction, before completing a self-report, post-event rumination questionnaire (or a visual analogue scale that was utilised in Wong & Moulds, 2009) at a later time point. This methodology allows the researchers to exert experimental control over the social situation encountered and is common practice in experimental studies investigating negative rumination in social anxiety. However, the studies referenced above utilised a non-clinical student sample, making it unclear if these findings can be generalised to individuals with SAD. To address this, empirical research has begun to investigate, and further confirm, the role of post-event

rumination by using samples of individuals with a DSM diagnosis of SAD (Abbott & Rapee, 2004; Kocovski & Rector, 2008; Lapsa & Rector, 2011; Penney & Abbott, 2014b; Perini, Abbott, & Rapee, 2006; Rapee & Abbott, 2007). In a study by Abbott and Rapee (2004), participants with a diagnosis of SAD were reported to be more likely to underestimate their performance, compared to non-anxious controls, which resulted in more extensive negative rumination following an impromptu speech task. Furthermore, negative rumination was proposed to further reinforce negative self-appraisals of performance that were maintained during the week post-speech task for the SAD group, while the control group showed improved perceptions over the same time period.

While the cognitive models stipulate the role of post-event rumination in the cycle of SAD (Clark & Wells, 1995; Hofmann, 2007; Rapee & Heimberg, 1997), and the literature has subsequently established a strong association between social anxiety and post-event rumination, it is also important to consider the predictors of negative rumination. If the cognitive predictors of negative rumination can be determined, then they can be targeted when designing interventions that aim to address the role of negative rumination in the development and maintenance of SAD.

### *Predictors of Post-Event Rumination*

As stated above, the cognitive models of SAD are models of state social anxiety; however, the cognitive processes involved have been proposed to be similar whether an individual anticipates a social situation or reflects upon it afterwards (Rapee & Heimberg, 1997). Of the cognitive processes hypothesised by the models, performance and threat appraisals, fear of negative evaluation, self-imagery, self-efficacy, and self-focused attention have been considered in the literature as predictors of post-event rumination in social anxiety. It should be noted that while this review focused on the cognitive predictors of negative rumination, it is apparent that other factors, such as type of social situation (Kiko et al., 2012; Kocovski & Rector, 2007), may also potentially explain variance in negative rumination in social anxiety.

According to the cognitive models of SAD, individuals with SAD are usually prone to anxiety in social situations due to an assumption that they cannot perform adequately (Clark & Wells, 1995; Hofmann, 2007; Rapee & Heimberg, 1997). It needs to be noted that individuals with SAD do not necessarily perform worse than non-anxious individuals in social situations (Rapee & Lim, 1992); rather, they seem to be biased towards a negative perception of performance due to a focus on inaccurate sources of input (Clark, 2001; Clark & Wells, 1995). Despite this evidence that most individuals with SAD have adequate social skills, numerous studies have confirmed the association between increased levels of social anxiety and poorer self-ratings of performance (Abbott & Rapee, 2004; Dannahy & Stopa, 2007; Mellings & Alden, 2000; Rapee & Lim, 1992). Performance appraisals are the most researched predictor of post-event rumination in social anxiety and have been proposed to likely be the most unique predictor of post-event rumination within clinical samples of SAD participants (Penney, 2014). In a study by Perini et al. (2006), participants were instructed to complete a 3-minute speech task immediately followed by a subjective measure of public speaking performance, as well as a self-report, post-event rumination questionnaire 1 week later. It was found that the individuals' performance appraisal in a speech task completely mediated the relationship between their level of social anxiety and the amount of post-event rumination engaged in during the week

following the speech. Further highlighting the importance of performance appraisals in the negative rumination process, when perception of performance was statistically controlled for, social anxiety ceased to be related to negative post-event rumination (Perini et al., 2006). Further research by Rapee and Abbott (2007) reports that this relationship may actually be bidirectional, whereby cognitive biases regarding perception of one's performance will lead the individual to ruminate more negatively about the event, which in turn leads to an augmentation of the negative representation of their performance in long-term memory.

Clark and Wells (1995) propose that individuals with SAD falsely assume that it is likely they will behave in an unacceptable way and that this behaviour will have disastrous consequences in terms of their social status. Threat appraisals, which consist of this overestimation of probability and consequences of a feared social outcome, play a significant role in the maintenance of SAD (see Nelson, Lickel, Sy, Dixon, & Deacon, 2010 for a review) and appear to mediate treatment outcome (McManus, Clark, & Hackmann, 2000). While most studies that consider the predictors of negative rumination in social anxiety do not include measures of threat appraisals, rather focusing on performance appraisals, threat appraisals have also been reported to predict increased levels of negative rumination following a speech task in a select few studies. One such study by Rapee and Abbott (2007) found that trait social anxiety was related to negative post-event rumination via the cognitive processes of performance and threat appraisals. Furthermore, a study by Penney and Abbott (2014b) reported that of their theorised predictors of negative rumination (i.e., self-appraisal of performance, threat appraisals, self-efficacy, and state anxiety) only threat appraisals explained unique variance in post-event rumination following a speech task. This finding is surprising given the breadth of research supporting performance appraisals as a predictor of negative rumination and is yet to be replicated. The authors speculate that the rationale for this finding is that threat appraisals likely share substantial variance with performance appraisals, though they account for unique variance in negative post-event rumination when uncertain negative outcomes have yet to be confirmed (e.g., negative rater feedback; Penney & Abbott, 2014b).

Fear of negative evaluation has also been reported to share a correlational relationship with increased levels of post-event rumination in a sample of socially anxious participants (Dannahy & Stopa, 2007; Edwards et al., 2003). While two studies have looked at the predictive relationship between higher fear of negative evaluation and greater post-event rumination (Fehm, Schneider, & Hoyer, 2007; Zou & Abbott, 2012), they have reported mixed findings. A study by Fehm et al. (2007) found that higher fear of negative evaluation is a significant predictor of post-event rumination after social situations but not after phobic situations. Conversely, Zou and Abbott (2012) reported that fear of negative evaluation is not a unique predictor of post-event rumination when compared to other variables, including trait social anxiety, state anxiety, depression, and performance appraisal. Greater weight is given to the findings by Zou and Abbott (2012) as, unlike Fehm et al. (2007), only individuals diagnosed with clinical SAD were included as participants and there was experimental control over the social situation encountered. Given these mixed findings, it remains to be ascertained if fear of negative evaluation is a unique predictor of negative rumination in social anxiety, over and above other potential predictors.

The cognitive processes of self-imagery (i.e., negative images of the self) and self-efficacy (i.e., discrepancy between the perceived high standards required for the

social situation and one's belief in whether they can attain these) both play an important role in the maintenance of social anxiety according to the models of SAD (Clark & Wells, 1995; Hofmann, 2007; Rapee & Heimberg, 1997). However, little research has investigated whether these cognitive processes share a predictive relationship with post-event rumination in social anxiety. In terms of self-imagery, a sole study by Makkar and Grisham (2011) reported that for participants both high and low in social anxiety, those instructed to hold a negative self-image during a brief speech task experienced more negative post-event rumination compared to those instructed to hold a relaxed self-image. However, a non-clinical student sample was used in this study, and immediately before completing a post-event rumination questionnaire participants were told they would have to complete another speech task, possibly inducing inflated post-event rumination frequency responses. The predictive relationship between self-efficacy and post-event rumination is also uncertain, with Penney and Abbott (2014b) reporting that self-efficacy does not explain unique variance in post-event rumination, but does so in pre-event rumination. Given this sparsity of research, the predictive utility of these cognitive processes for post-event rumination needs to be further researched.

In order to obtain an integrative perspective on the processes that may predict post-event rumination in a clinical population of SAD participants, Chen, Rapee, and Abbott (2013) conducted a structural equation model showing two primary pathways that provided best fit for their data. The first path showed that trait social anxiety directly predicts negative post-event rumination following an impromptu speech task. The second pathway showed that trait social anxiety predicts negative post-event rumination via its relationships with an individual's perception of speech performance, confirming the importance of performance appraisals, as well as self-focused attention. Self-focused attention, where attention is shifted towards a detailed monitoring of oneself, has previously been proposed to have a causal relationship with negative rumination (Gaydukevych & Kocovski, 2012), though this was based on correlation findings in a non-clinical sample, and so this finding by Chen et al. (2013) provides greater support of a predictive relationship. Interestingly, threat appraisal was not reported to be a significant predictor of post-event rumination in the final model, which is in contrast to Penney and Abbott (2014b), who reported that higher perceptions of threat during a speech task was the sole variable that explains unique variance in negative post-event rumination.

While the association between post-event rumination and social anxiety is well established, there is clearly still uncertainty regarding the cognitive predictors of post-event rumination in social anxiety. While performance appraisals traditionally appear to be the most likely unique predictor of negative post-event rumination (Penney, 2014), research by Penney and Abbott (2014b) suggests that threat appraisals may also explain unique variance. Further research is needed to determine the unique and/or shared role of these processes in predicting negative post-event rumination, as well as the role of other cognitive processes hypothesised by the cognitive models of SAD that have received less attention to date.

### Pre-Event Rumination

Both Hofmann's (2007) and Clark and Wells' (1995) cognitive models of SAD outline how individuals with SAD engage in anticipatory processing, referred to in this review as pre-event rumination, before encountering a feared social situation.

Hofmann's (2007) model proposes that post-event rumination ultimately leads to pre-event rumination, which involves preoccupation with thoughts regarding past failures and ultimately accounts for the maintenance of the problem. Clark and Wells's (1995) model goes into more detail and suggests that before a feared social situation, socially anxious individuals will carefully consider what they anticipate will happen in the social situation, leading to anticipatory anxiety, with thoughts dominated by memories of past failures, possible negative images of themselves when in the social situation, and predictions of poor performance. This may result in avoidance of the situation altogether, but if the socially anxious individual does enter the social situation, they will likely do so in a negative self-focused processing mode (Clark & Wells, 1995). Additionally, this pre-event rumination may also lead the socially anxious individual to engage in a range of safety behaviours before the social event (e.g., rigidly plan what they say; Hinrichsen & Clark, 2003).

Pre-event rumination in social anxiety appears to have more overlap with worry than post-event rumination as it is more future-orientated (e.g., 'What if I embarrass myself at the party?'). However, anticipatory processing is considered a type of rumination in this review, as opposed to a form of worry, due to still being largely preoccupied with memories of past social situations and the meaning of past perceived social failures (e.g., 'Why do I keep embarrassing myself at parties?'). The intrinsic motive to gain more insight into the causes of one's distress is a key feature of negative rumination (Nolen-Hoeksema et al., 2008). Pre-event rumination also tends to be specific to an upcoming social situation, and while worry is also future focused, it is not always linked to a specific event. It is apparent, though, that the conceptual differences between worry and pre-event rumination specifically are yet to be empirically determined and is an avenue for future research.

One study that has investigated the relationship between pre-event rumination and social anxiety instructed a student sample to recall a past social situation before asking them about their bodily sensations, thoughts, and mental images experienced before the social situation (Hinrichsen & Clark, 2003). This study reported that participants high in social anxiety were more likely to recall past perceived social failures, interpret bodily sensations as negative, experience catastrophisation of thoughts, and experience negative images from an observer's perspective when anticipating the social situation, compared to low socially anxious individuals. Another study by Wong and Moulds (2011) had participants complete either an anticipatory processing or distraction induction task before giving a brief speech. The study found that highly socially anxious participants reported more self-reported anxiety, had increased scores on a measure of skin conductance (a psychophysiological indicator of heightened threat) and reported greater endorsement of high standard and conditional beliefs after engaging in anticipatory processing as opposed to distraction (Wong & Moulds, 2011).

Early studies that investigated pre-event rumination in social anxiety (Brown & Stopa, 2006; Hinrichsen & Clark, 2003; Mansell & Clark, 1999; Vassilopoulos, 2004, 2005; Wong & Moulds, 2011) all utilised a non-clinical student population, making it unclear if these results can be generalised to a clinical population. Furthermore, and as discussed by Penney and Abbott (2014a), the student participants were divided into high and low social anxiety groups by using the Fear of Negative Evaluation Scale (FNE; Watson & Friend, 1969) or its abbreviated version, the Brief Fear of Negative Evaluation (BFNE; Leary, 1983). While the BFNE is frequently used as a trait measure of social anxiety (Modini, Abbott, & Hunt, 2015), it is strictly a

measure of cognitions related to social anxiety and not an appropriate diagnostic tool in isolation. To date, only one study, by Penney and Abbott (2014b), has addressed these limitations. Participants with a principle diagnosis of SAD were instructed to complete an impromptu speech task and told that it would be rated for performance by independent judges. It was found that, compared to non-anxious controls, participants with SAD were more likely to engage in pre-event rumination in the week before the speech task, as well as post-event rumination during the following week (Penney & Abbott, 2014b). It was also reported that participants with SAD who watched a video of a high standard speech a week before completing their own speech task engaged in more pre-event rumination compared to those who watched a video of a low-standard speech, which is line with the cognitive models (Hofmann, 2007; Rapee & Heimberg, 1997) that suggest low self-efficacy plays a role in the cycle of negative rumination and SAD.

### *Predictors of Pre-Event Rumination*

There is a lack of research regarding the cognitive predictors of pre-event rumination, especially when compared to the greater attention that post-event rumination has received (Penney, 2014). While there is reportedly a correlational relationship between performance appraisals and pre-event rumination in social anxiety (Brown & Stopa, 2006; Vassilopoulos, 2005), only one study has looked at the predictors, as opposed to the correlates, of pre-event rumination in social anxiety (Penney & Abbott, 2014b). However, it has been noted that both pre- and post-event rumination appear to be similar processes in that both revolve around memory of past events, observer-perspective imagery, recurrency and intrusiveness (Vassilopoulos, 2004). Thus, the cognitive predictors that appear to be predictors of post-event rumination, such as performance and threat appraisals, may also be able to be generalised as predictors for pre-event rumination in social anxiety, as models of SAD would suggest.

The study by Penney and Abbott (2014b), which tested a clinical sample of participants with SAD, aimed to identify predictors of pre- and post-event rumination in social anxiety and then compare and contrast them using hierarchical regression models. This study found that anticipated self-appraisals of performance, threat appraisal, self-efficacy, and state anxiety explained unique variance in pre-event rumination. Since only threat appraisals were found to predict levels of post-event rumination in this study, both stages of rumination may not be as similar as has been theorised elsewhere (Vassilopoulos, 2004) and may in fact exhibit differing cognitive profiles.

Further research is clearly needed to expand the limited research into the cognitive predictors of pre-event rumination in social anxiety and to determine if pre- and post-event rumination share similar or differing cognitive predictors. While a confirmatory structural equation model has been conducted to assess the cognitive predictors of post-event rumination in social anxiety (Chen et al., 2013), this methodology has yet to be used to examine potential cognitive predictors of pre-event rumination in social anxiety. A structural equation model would provide further clarity in understanding the pre-event rumination process in social anxiety.

### **Role of Rumination in Mediating Treatment Effects for SAD**

As negative rumination, both pre-event and post-event, is a key maintaining factor of SAD (Clark & Wells, 1995; Hofmann, 2007; Rapee & Heimberg, 1997) targeting this

cognitive process in treatment may potentially have an impact on the vicious cycle of SAD to reduce social anxiety symptoms. Clark and Wells (1995) recognised this and recommended that the role of negative rumination in the maintenance of SAD should be discussed with the socially anxious patient and then effectively 'banned'. However, in the 20 years since, little clinical research has expanded on this recommendation and designed specific interventions to decrease or eliminate negative rumination and its associated effects.

The efficacy of CBT for SAD, particularly enhanced CBT, is well established and discussed in greater detail earlier. To date there is evidence from three studies that CBT programs can reduce negative rumination in SAD (Abbott & Rapee, 2004; McEvoy, Mahoney, Perini, & Kingsep, 2009; Price & Anderson, 2011). In highlighting the importance of negative rumination in treatment outcome, it has also been reported that greater levels of post-event rumination is related to a poorer treatment outcome in terms of social anxiety symptoms (Price & Anderson, 2011) but that reductions in post-event rumination is associated with reduced symptoms in social anxiety (McEvoy et al., 2009). Abbott and Rapee's (2004) was the first study to consider the effect of CBT programs on negative rumination in SAD. This study reported that following a 12-week CBT program, individuals with SAD reported significantly less post-event rumination following a speech task than they had prior to treatment. While a promising finding, the authors point out that the participants may have ruminated less about the speech task following treatment because it was the second exposure they had had to the speech task. While exposure is an important component of CBT, the unique effect of the cognitive reappraisal strategies taught during treatment on reducing negative rumination are unclear. Additionally, it is unclear in this study, as well as the others investigating the effects of CBT on negative rumination (McEvoy et al., 2009; Price & Anderson, 2011), which particular component of CBT plays the greatest part in reducing negative rumination, with Price and Anderson (2011) explicitly recommending that future studies aim to determine this.

A study by Shikatani, Antony, Kuo, and Cassin (2014) investigated the effectiveness of a specific CBT component, cognitive restructuring, on reducing negative rumination in social anxiety. Individuals with high social anxiety scores were randomly assigned to a cognitive restructuring, mindfulness, or control condition and then instructed to complete a 3-minute impromptu speech task. In the cognitive restructuring condition, participants were provided with psychoeducation on anxiety and instructed on ways to identify and challenge their thoughts before completing a thought monitoring record specific to their thoughts about their speech performance. Results of the study showed that participants in the cognitive restructuring condition reported significantly less post-event rumination (both degree and associated distress), state anxiety, and reduced probability and cost biases, compared to the control condition. Interestingly, the effectiveness of the mindfulness condition on reducing state anxiety and post-event rumination was equivalent to the cognitive restructuring condition, suggesting that mindfulness is potentially also a beneficial strategy to employ when attempting to reduce post-event rumination (Shikatani et al., 2014). This is in line with other research that found that brief mindfulness training can reduce distress and negative affect associated with post-event rumination in social anxiety (Cassin & Rector, 2011). Limitations of the study by Shikatani et al. (2014) included that post-event rumination questionnaires were administered 1 day after the speech task and intervention, possibly not allowing enough time for changes in cognitive processes to take place. Furthermore, only the social phobic section of the Structured Clinical

Interview for the DSM-IV (First, Spitzer, Gibbon, & Williams, 1996) was administered, likely resulting in the inclusion of participants who had a principal diagnosis other than SAD.

While there are promising preliminary findings that cognitive restructuring and mindfulness strategies can reduce post-event rumination in socially anxious individuals, to date no study has investigated the effects of such interventions on pre-event rumination. Pre-event rumination causes a socially anxious individual to enter the social situation in a negative self-focused processing mode, which in turn triggers a number of additional cognitive biases (Clark & Wells, 1995). Targeting pre-event rumination in treatment may counteract dysfunctional thinking prior to entering the situation, reducing anticipatory anxiety, and lead to greater willingness to attend and engage in the social situation. Given that pre- and post-event rumination may be theoretically similar (Vassilopoulos, 2004) and that there is preliminary evidence that cognitive restructuring strategies can reduce post-event rumination (Shikatani et al., 2014), it can be tentatively hypothesised that such strategies may also reduce pre-event rumination. Cognitive restructuring interventions that directly target pre-event rumination need to be developed and tested on a clinical sample of individuals with SAD in order to determine their efficacy in decreasing or eliminating the role that negative rumination plays in maintaining SAD.

### Limitations of Past Research and Future Research Implications

The role of negative rumination — in particular, post-event rumination — in SAD has received progressively more attention in recent years. However, methodological shortcomings exist within this field of research that detract from confidence in the findings. Most notably, a number of studies have used a non-clinical sample (typically undergraduate students) instead of participants diagnosed with SAD, making it unclear if results can be generalised to a clinical population. Studies that have used a non-clinical sample (e.g., Hinrichsen & Clark, 2003; Mansell & Clark, 1999; Vassilopoulos, 2005) often used the FNE or BFNE to select participants for high and low socially anxious groups, which is problematic as these scales are not true diagnostic measures of SAD. Furthermore, few cognitive factors are even assessed, outside of fear of negative evaluation, and when they are assessed, such as performance appraisals, they are typically done so in isolation from other cognitive factors. It is also apparent that some studies have asked participants to recall a past social situation to instigate post-event rumination (e.g., Fehm et al., 2007), which does not allow experimental control over the social situation.

While the majority of the research in this topic has been devoted to establishing the consequences of post-event rumination in social anxiety, research regarding the predictors of post-event rumination has more recently begun to accumulate. It is apparent though that among the empirical studies that have attempted to ascertain the potential predictors of post-event rumination, there are mixed findings, particularly in regard to the shared and unique role of performance and threat appraisals (Chen et al., 2013; Penney & Abbott, 2014b). While contradictory findings are certainly not a limitation per se, further research is needed to better understand the impact, direction and interaction of these cognitive processes when considering their role in maintaining post-event rumination and ultimately SAD. Additionally, other cognitive processes hypothesised by the models of SAD appear to have received much less attention as predictors of post-event rumination and warrant further research.

Pre-event rumination also appears to be a key maintaining factor of SAD, yet there is a scarcity of research investigating its consequences or its predictors. Similarly, this also appears to be the case for anticipatory and in-situation state anxiety. To date, few studies have used an experimental design and a state-based social task (e.g., impromptu speech; social interaction) in an attempt to ascertain the predictors of pre-event rumination (Penney & Abbott, 2014b) and state anxiety (Penney & Abbott, 2014b; Rapee & Abbott, 2007). While the study by Penney and Abbott (2014b) reported a number of potential predictors for both these important processes, these findings need to be replicated, optimally with a larger sample size. Furthermore, a structural equation model has yet to be conducted to assess the relationship between hypothesised cognitive processes in the models of SAD, pre-event rumination, and social anxiety. This statistical modelling procedure would provide an integrative perspective on the cognitive predictors of pre-event rumination in social anxiety.

Perhaps the most striking oversight in the negative rumination and social anxiety literature is the lack of research investigating the effects of targeting rumination in social anxiety treatment. Given that the importance of rumination in the maintenance of SAD was first proposed over 20 years ago (Clark & Wells, 1995), it is surprising that few studies have investigated the efficacy of specific interventions on reducing negative rumination. While one study reported that cognitive restructuring and mindfulness strategies can reduce post-event rumination in socially anxious individuals (Shikatani et al., 2014), no study to date has looked at the effects of targeting pre-event rumination. Given the need for more powerful cognitive restructuring interventions, it seems feasible to design such interventions to focus on key cognitive processes of SAD, such as pre-event rumination, in an attempt to break its vicious cycle of pre-event rumination, anticipatory and in-situation anxiety, and subsequent post-event rumination.

## Conclusion

While the association between post-event rumination and social anxiety has been established in both clinical and non-clinical groups, there is still debate regarding the cognitive processes that may predict post-event rumination, especially regarding the shared and unique role of the cognitive processes of performance and threat appraisals. Pre-event rumination in social anxiety has received considerably less attention to date, and while it appears to be an equally important factor in the cycle of SAD, the size and direction that hypothesised cognitive processes share with pre-event rumination remains unascertained. If the cognitive predictors of negative rumination, both pre-event and post-event, can be determined then they can be specifically targeted when refining interventions for SAD.

While CBT is the most efficacious treatment for SAD, few studies have considered its effectiveness in reducing negative rumination. This is most apparent in terms of pre-event rumination, with no research considering the effects of interventions (cognitive restructuring, mindfulness, or otherwise) on levels of pre-event rumination. Interventions that directly target pre-event rumination need to be developed and trialled on a clinical sample of individuals with SAD in order to have evidence-based strategies that specifically address the role that negative rumination plays in the development and maintenance of SAD.

## Declaration of Interest

None.

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