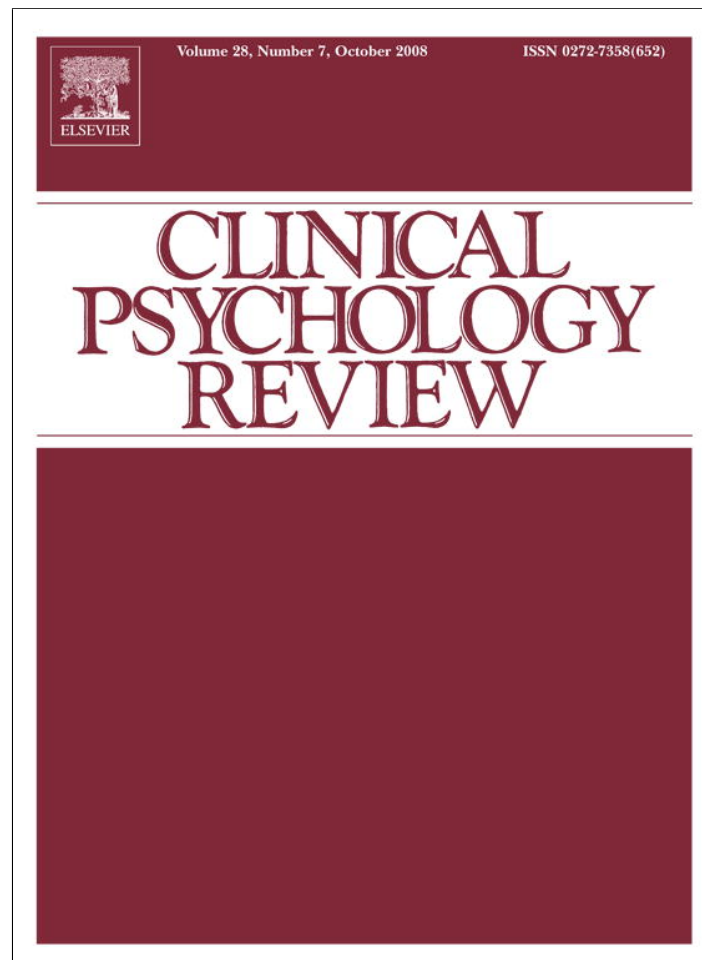


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# Clinical Psychology Review



## Attentional focus in social anxiety disorder: Potential for interactive processes

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### ABSTRACT

The two preeminent cognitive behavioral models of social anxiety [Clark, D.M., & Wells, A., (1995). A cognitive model of social phobia. In Heimberg, R.G., Liebowitz, M., Hope, D.A., and Schneier, F.R. (Eds.), *Social phobia: Diagnosis, assessment and treatment* (pp. 69–93). New York: Guilford Press.; Rapee, R.M., & Heimberg, R.G., (1997). A cognitive behavioral model of anxiety in social phobia. *Behaviour Research and Therapy*, 35, 741–756.] suggest that attention to threat stimuli is critical in the maintenance of social fear. However, Clark and Wells assert that socially anxious persons attend almost exclusively to negative thoughts and self-imagery during social situations, whereas Rapee and Heimberg contend that socially anxious persons simultaneously attend to these internal cues *and* external stimuli potentially indicative of negative evaluation, such as an audience member's facial expressions. Rapee and Heimberg further suggest that attention to external and internal cues during social situations should be interdependent, such that focus on one has causal implications for the experience of the other. The current review examines the nature of the literature as it supports the assertions of each of these models of social anxiety, with particular attention to differing predictions regarding attentional focus. We conclude that socially anxious persons engage in both internal and external focus throughout the course of a social situation; however, there are a number of significant limitations to the literature. Accordingly, directions for future research are considered.

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## 1. Introduction

Socially anxious persons commonly fear that they will behave in a way that will result in other people thinking they are weak, unintelligent or awkward, or that others will notice their anxiety. Implicit in this definition is the notion that the predominant concerns related to social anxiety are the fear of being negatively evaluated by others and the fear that one will behave in a way that will lead to such evaluation. Cues indicative of these outcomes may then be evident in others and in oneself, respectively.

Recently, social anxiety disorder has enjoyed increased attention from researchers, and cognitive behavioral frameworks have undeniably been most fecund in the study of this disorder. In the 1990s, two cognitive behavioral models of social anxiety were advanced and have served as the foundation for much of the research since that time. These models have emphasized the central role of attentional processes in the maintenance of social fear (Clark & Wells, 1995; Rapee & Heimberg, 1997). Clark and Wells suggest that self-focused attention is the central, if not only, critical attentional process that generates anxiety, impairs performance, and precludes the perception of information inconsistent with social fear. However, although Rapee and Heimberg (1997) similarly suggest that self-focused attention is critical in the maintenance of social anxiety, they also speak to the importance of vigilance to socially relevant threat stimuli in the environment, namely, cues of potential negative evaluation from audience members, a process that is not included in the Clark and Wells model. This difference between otherwise very similar models may have particularly important implications for the conceptualization of social anxiety. For instance, Clark and Wells' assertion that socially anxious persons reliably direct their attention toward internal (and effectively away from external) cues may suggest that, among socially anxious individuals, assessment of danger in social situations is independent of threat actually present in the environment. However, Rapee and Heimberg suggest that socially anxious individuals monitor both internal *and* external threat cues, although not in isolation. Rather, they predict a potential interactive relationship between close monitoring of the self and attention to environmental threat; for instance, attention to audience members' or interaction partners' socially evaluative behaviors may motivate socially anxious persons to monitor themselves more closely and critically to determine how likely their feared consequences are at any given moment.

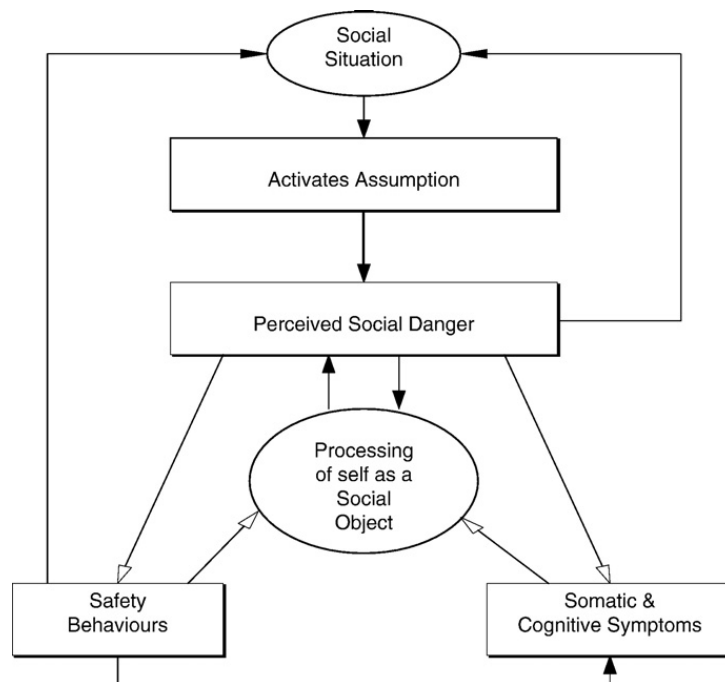
Two relatively separate empirical literatures have developed that provide support for the notion of attentional bias for threat stimuli over nonthreat alternatives in social anxiety. First, a number of studies have demonstrated the importance of *self*-focused attention in social anxiety, particularly to negative cognitions and negative self-images. Second, many studies have demonstrated that anxious persons are likely to attend preferentially to threat information in the environment, and this has been evident in persons with high levels of social anxiety, including those who meet criteria for a diagnosis of social anxiety disorder (see Amir & Foa, 2001, for a review). However, internal and external focus have been explored in relative isolation, providing little opportunity for the direct examination of the potential interactive relationship between attentional processes (although in social anxiety research, theorists are beginning to explore the possibility that different types of cognitive biases, e.g., interpretation biases and memory biases, interact in important ways; see Brendle & Wenzel, 2004; Hirsch, Clark, & Mathews, 2006). Bögels and Mansell (2004) comprehensively review both processes in social anxiety. However, they do not speculate on the potential for a more integrative model of attention in social anxiety, as delineated by Rapee and Heimberg (1997). Rather, they indirectly illustrate the relative isolation in which these two literatures have developed. The purpose of the current review is to examine the relative roles played by internal and external focus of attention in the two primary cognitive behavioral models of social anxiety, with consideration of areas in need of future empirical and theoretical development, particularly as relates to the potential interaction of different attentional processes. Although previous reviews (e.g., Bögels & Mansell, 2004) have underscored the integral roles of these processes, no review to this date has examined whether the accumulated evidence might support one cognitive behavioral model of social anxiety more strongly.

## 2. Cognitive behavioral models of social anxiety disorder

### 2.1. Clark and Wells (1995)

"A key component of our model is the idea that social phobics use interoceptive information to construct an impression of themselves, which they assume reflects what other people observe, and that this information is relatively more important than observation of others' actual behavior" (Clark & Wells, 1995, p. 82).

Clark and Wells contend that socially anxious individuals direct their attention in maladaptive ways (see Fig. 1). According to these theorists, the onset of anxiety symptoms for the socially anxious person begins with the detection of an audience. Individuals



**Fig. 1.** Clark's updated model of cognitive and behavioral processes that occur when a socially anxious person enters a social situation. Copyright 2001 John Wiley & Sons Limited. Reproduced with permission from Clark, D. M. (2001). A cognitive perspective on social phobia. In W. R. Crozier & L. E. Alden (Eds.), *International handbook of social anxiety: Concepts, research and interventions relating to the self and shyness* (p. 407). New York: John Wiley & Sons Ltd.

with social anxiety disorder possess dysfunctional beliefs and assumptions, including the belief that others hold high standards for one's social performance, conditional beliefs regarding social evaluation, and unconditional beliefs about the self. From these assumptions come negative cognitions, which tell the socially anxious individual that he is consistently at risk for behaving in a manner that will be considered (by others) flawed and unacceptable and that this behavior will result in rejection and/or the loss of esteem and worth. Therefore, the mere presence of others who might detect unacceptable behavior makes feared outcomes more likely. When an audience is detected and the social situation is thus realized, then begins an "anxiety programme [which is] automatically and reflexively activated" (Clark & Wells, 1995, p. 70). Clark and Wells emphasize that the activation of the anxiety program centers on a unidirectional but critical process: self-focused attention and creating the impression of oneself as a social object.

Initially, an individual with social anxiety disorder detects a potential audience, and his assumptions regarding the likelihood of social failure and its consequences are activated. Clark and Wells (1995) posit that the fear of negative outcomes (i.e., performing poorly and being evaluated negatively by the audience) triggers a crucial shift in attention. The person with social anxiety disorder begins closely monitoring *himself* in a process of detailed, self-focused observation. Because feared consequences are deemed probable, physiological arousal is likely to be elevated past homeostasis, and these physical cues become a major target of the shift in attentional focus. The individual uses this interoceptive information to create an impression of how he appears to his audience, which is mistakenly assumed to be an accurate representation of self-presentation. Furthermore, Clark and Wells claim that the socially anxious person does not look to his audience or interaction partners to determine how he is being received, but rather he attends to his own internal impression of himself and assumes this is how others see him. Because the elements used to build this impression are symptoms of anxiety, self-focus confirms the fears of coming across as ineffectual and flawed, and assuming that one's own self-evaluations are also held by others exacerbates the experience of social anxiety. For example, a woman with social anxiety disorder may approach a podium to deliver a speech to a sizeable audience and have a feeling of shakiness. According to Clark and Wells, she is likely to assume that the audience sees her hands shaking. Clark and Wells also suggest that such negative self-impressions can be experienced as vivid images of the self, as seen by the audience. For instance, this socially anxious individual may actually take an observer perspective (i.e., imagine herself as if through the eyes of an audience member) during her speech and "see herself" shaking violently. According to Clark and Wells, this vivid image is quite compelling because it seems to the person to be consistent with what an observer might see or think. Accordingly, the negative impression/image exacerbates social anxiety in the situation by leading the individual to perceive social danger as more likely and more imminent.

In addition to increased anxiety, Clark and Wells (1995) also suggest that self-focus is responsible for compromised social performance. The focus on internal impressions/images leaves fewer attentional resources available for the task at hand, interfering with the processing of the audience's behavior. For example, an individual with social anxiety disorder may focus more on an image of himself blushing than on what his supervisor is telling him to do on an upcoming project. According to Clark and Wells, self-focused attention not only precludes the perception of potentially positive feedback from the audience (and ensures perception of potentially negative cues), but it also siphons attention away from important sources of external information inherent to the task. This necessarily impairs performance and makes feared consequences more likely.

Extensive focus on internal experiences (i.e., images, interoception, and negative cognitions) leads the individual with social anxiety disorder to sense he is being perceived in a negative way; thus, he engages in a range of compensatory behaviors (Clark, 2001; Clark & Wells, 1995; Wells et al., 1995). Clark and Wells refer to these efforts as safety behaviors, as they are fundamentally intended to make negative evaluation less likely, and they are often directly related to interoceptive cues and cognitive impressions/images. For example, the man above who focuses on his blushing in the presence of his supervisor may hold his hands to his face to prevent his supervisor from noticing a change in skin coloration. Importantly, Clark and Wells suggest that in many instances, these behaviors make feared consequences *more* likely. For instance, the man holding his hands to his face may be drawing more attention to himself than he might otherwise. Furthermore, safety behaviors may require even greater self-focus, which may intensify the effects described above, and this man is likely to continue monitoring the feeling of warmth in his face and to continue to focus on an image of how red his face must look to his boss. Although beliefs about social situations in social anxiety disorder typically involve catastrophic embarrassment, rejection or loss of status, Clark and Wells claim that these outcomes are very unlikely in most social situations. However when these outcomes are not realized, socially anxious individuals are likely to attribute their success in “surviving” the encounter (i.e., the absence of true catastrophe) to their safety behaviors and not to their own abilities. Thusly, these compensatory behaviors preclude unambiguous disconfirmation of their negative beliefs while maintaining maladaptive behavior and cognition.

Clark and Wells (1995) also suggest that the processing of self and performance continues after the conclusion of the social encounter, leading up to the next. Post-event processing involves the individual's repeated consideration and potential reconstruction of his performance following a social situation (see review by Brozovich & Heimberg, *in press*). However, this ruminative process is also distorted by the nature of attentional focus during the situation. For instance, the available evidence regarding one's social performance is colored by impressions and images of oneself performing poorly with exaggerated anxiety. According to Clark and Wells, this further strengthens the social anxiety-relevant schema when the situation is processed at a later time.

What Clark and Wells did not include in their model was a component that predicts an attentional bias for external threat cues over other cues, such as a socially anxious person's greater likelihood of noticing one interaction partner yawning than another smiling and nodding. This attentional bias to external threat has been considered by other theorists to be particularly important in both general and social anxiety.

## 2.2. Rapee and Heimberg (1997)

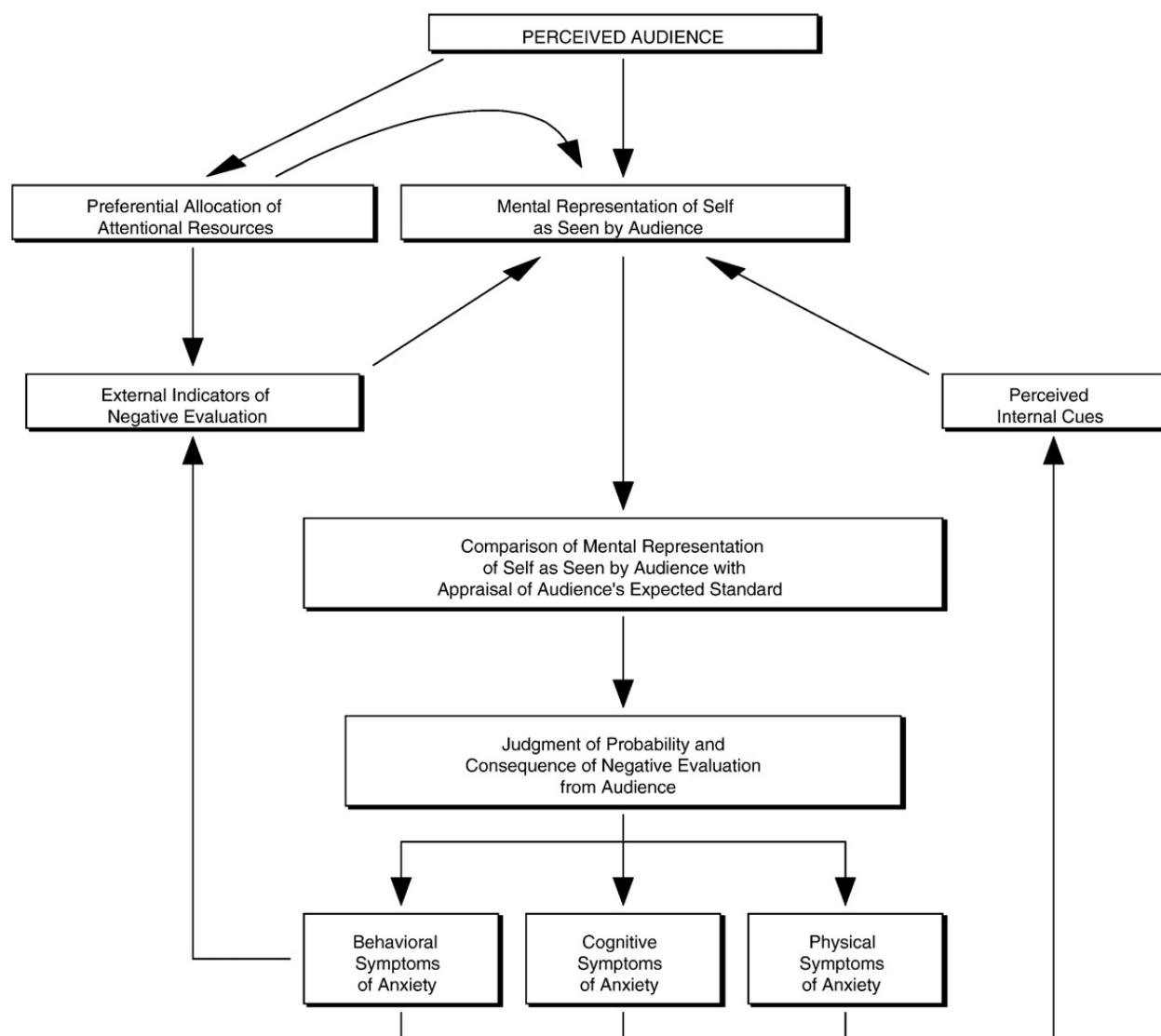
“On encountering a social situation, an individual forms a mental representation of his/her external appearance and behavior as presumably seen by the audience and simultaneously focuses his/her attentional resources onto both this internal representation and onto any perceived threat in the social environment...Attentional resources are allocated to the salient aspects of the self-image (generally those features which are relevant to the situation and potentially negative) and also to monitoring of potential external threat” (Rapee & Heimberg, 1997, pp. 742–743, see Fig. 2).

In a fashion similar to Clark and Wells (1995), Rapee and Heimberg (1997) define social situations broadly, suggesting that the presence of a perceived audience may constitute significant threat. When these situations are encountered, individuals with social anxiety disorder experience fear because they assume that others are naturally critical, and negative evaluation, then, is probable. Also, individuals with social anxiety disorder consider being liked and regarded with high esteem as fundamentally important. In the presence of threat (i.e., after the detection of an audience), socially anxious individuals become increasingly vigilant for cues that would signal the realization of their feared outcomes, and they attend to several sources for possible information on the proximity of these outcomes: environmental cues, a mental representation of how they believe they appear to others, and cognitive, behavioral, and affective cues related to the severity of anxiety in the moment (Rapee & Heimberg, 1997).

First, individuals with social anxiety disorder commonly detect negative cues despite the presence of more positive alternative feedback (e.g., noticing one audience member frowning while 3 others nod and smile). Rapee and Heimberg (1997) cite evolutionary models that claim that socially anxious individuals are vigilant for cues of anger/aggression (which may signal the loss of status and access to resources; e.g., Öhman, 1996; Trower & Gilbert, 1989) and evidence of information processing biases observed in individuals with high trait anxiety (e.g., MacLeod, Matthews, & Tata, 1986). Vigilance for threat cues in the environment, according to Rapee and Heimberg, is similar in function to the vigilant internal focus prescribed by Clark and Wells (1995); in each case, the socially anxious individual scans for information regarding the likelihood of negative outcomes.

Similar to Clark and Wells (1995), Rapee and Heimberg (1997) suggest that the socially anxious individual focuses on an internal, mental representation of the self as seen by the audience. This representation may be an image or a vague sense of how one appears to others, which likely involves seeing oneself as if through the eyes of the audience. Rapee and Heimberg suggest that the mental representation of the self is a composite formed from a number of different sources. For instance, this image may be informed by a sense of how one generally appears to others (information obtained in mirrors, photographs, etc.) and past difficult experiences in social situations which are consistent with core beliefs and the self-schema (see Beck, 1976; Beck, Emery, & Greenberg, 1985). These inputs may constitute a “baseline image” (p. 745) that is modified by external and internal inputs during distancing social situations.

According to Rapee and Heimberg (1997), the mental representation of the self should be influenced by autonomic symptoms of anxiety, particularly those that may be visible to others, such as blushing and sweating. The socially anxious individual may also monitor his behavior (e.g., fidgeting, wiping one's brow) and exaggerate how this must appear to audience members, as well as what it must mean about his competence. Furthermore, socially anxious persons' behavior may also involve perceived social performance deficits, such as stuttering or coming across as “boring” or “quiet,” which would also be exaggerated in the mental representation of



**Fig. 2.** Rapee and Heimberg's (1997) cognitive behavioral model of social anxiety's generation and maintenance. Reprinted from *Behaviour Research and Therapy*, 35, R. M. Rapee & R. G. Heimberg, A cognitive behavioral model of anxiety in social phobia, page 743, with kind permission from Elsevier Science Ltd., The Boulevard, Langford Lane, Kidlington OX5 1GB, United Kingdom.

the self, and become foci of attention. Clearly both physiology and behavior are the objects of ongoing cognitive appraisal, which Rapee and Heimberg suggest involves negative thoughts about the internal components of the anxiety response. These cognitions feed back into the mental representation of the self and result in its readjustment in a negative direction, which is a cycle likely to be repeated multiple times over the course of an ongoing social situation.

Rapee and Heimberg (1997) assert that the socially anxious person's focus on external threat cues and the mental representation of the self as informed by internal anxiety symptoms (i.e., physiological, behavioral, and cognitive) exacerbates state anxiety and maintains social anxiety disorder. However, they also suggest that these processes do not operate in isolation and that each component interacts with the others in the form of a positive feedback loop. For instance, the biased detection of negative audience behaviors (e.g., frowning, yawning) would likely result in greater focus on the internal representation of the self (e.g., cognitions regarding how uninteresting one is or images of the self coming across as boring; also see Heimberg & Becker, 2002; Roth & Heimberg, 2001; Turk, Lerner, Heimberg, & Rapee, 2001). In line with Clark and Wells (1995), Rapee and Heimberg have also suggested that focus on the mental representation of the self should exacerbate internal sensations of anxiety. However, they have added that focus on the mental representation of the self should also affect the detection of negative audience behaviors. As an individual with social anxiety disorder looks to his mental representation for information about how he comes across, he necessarily sees a negatively biased caricature informed by anxious feelings and assumptions about others' evaluations when, realistically, the data needed to support such self-assessment cannot be obtained in ambiguous social situations. This person may then look to the audience to confirm his fears and is likely to find information consistent with his self-appraisals.

During social situations, the complex interaction of external and internal information typically provides the socially anxious person with evidence that his performance has fallen short in a number of ways. Having gathered such negative information from

various sources, the socially anxious individual then weighs the likelihood that his feared consequences will be realized (Rapee & Heimberg, 1997). To do this, he compares his evaluation of his performance to what he believes the audience expects of him. If the individual believes that he is unlikely to meet the expectations of the audience, he will be more likely to experience anxiety and fear of negative evaluation.

### 2.3. Implications of the models

Clark and Wells (1995) and Rapee and Heimberg (1997) have put forth models that are relatively similar in their emphasis on the role of the socially anxious individual's internal representations during social situations. However, the models do not converge on the phenomenon of vigilance for threat in the external environment. In fact, Clark and Wells clearly have not made a place for this process in their model, and their research group has stated repeatedly that internal self-focus is most important to the experience of anxiety and the poorer performance of socially anxious individuals (Clark, 2001; Clark & Wells, 1995; Stopa & Clark, 1993). Furthermore, Clark and Wells describe this process as an “anxiety programme” (p. 70), which suggests that the anxiety response is a closed system that does not incorporate new, incoming information which could moderate the response (Clark, 2001). What must follow from this is the interpretation that a change in the environment (e.g., a behavioral shift by the audience/interaction partner), perhaps even to be more positive toward or accepting of the anxious person, would have minimal impact on the socially anxious person's programmatic anxiety experience. However, it is unclear what is necessary to trigger the shift inward. Clark and Wells have suggested that the mere expectation of an audience is enough to compel the socially anxious individual to monitor himself, and Clark added that initial detection of a single negative audience behavior is sufficient, but these explanations do not easily accommodate the data suggesting attentional bias to threat cues in the environment (reviewed below).

Rapee and Heimberg (1997) have suggested that vigilance for negative, external social cues may also be a significant component of social anxiety disorder unto itself and serve as an input into self-focus, particularly during the formation or (re)calibration of the mental representation of the self as seen by others. In this model, a major implication is that changes in the nature of the environment, such as audience behavior, influence the anxious individual's mental representation/image of himself. However, this conclusion may only be drawn if one predicts a markedly different attentional process in the fear response of a person with social anxiety than described by Clark and Wells (1995). Namely, the socially anxious person must continue to be engaged with his audience throughout the social situation as he shifts attention between his mental representation of self as seen by others and vigilant observation of audience behaviors. As this occurs, each process is likely to be influenced by the other.

## 3. Internal focus in social anxiety

### 3.1. Defining self-focus in social anxiety

Several studies suggest that self-focused attention is associated with negative affect (Burgio, Merluzzi, & Pryor, 1986). Ingram (1990) defined self-focused attention as “an awareness of self-referent internally generated information that stands in contrast to an awareness of externally generated information derived through sensory receptors” (p. 156). In the psychopathology and social psychology literatures, self-focus is commonly defined as either private or public (Fenigstein, Scheier, & Buss, 1975). Private self-focus involves goals that are autonomous and egocentric, which do not require a consideration of others' reactions to one's behavior. Public self-focus, on the other hand, is related to behaviors that take into account the reactions, needs, or desires of others and thus is necessarily influenced by the aim for social consensus or a consideration for how one's actions influence others' perceptions of oneself (Carver & Scheier, 1987). Accordingly, public self-focus may be associated with positive and adaptive self-monitoring as well as the self-focus common to social anxiety, such as negative assumptions made regarding others' assessment of one's own blushing or sweating. Although such a bifurcation of self-focus is typically considered a matter of trait self-focus (i.e., self-consciousness), the split between private and public may be seen in state self-focus as well (Carver & Scheier, 1987; Mor & Winquist, 2002).

Social anxiety appears to be strongly related to public self-focus. For example, Hope and Heimberg (1988) found a significantly stronger relationship between public self-consciousness (i.e., trait self-focus related to others' perceptions) as measured by the Self-Consciousness Scale (SCS; Fenigstein et al., 1975) and self-reports and naïve observers' ratings of social anxiety. Schlenker and Leary (1982) contend that heightened public self-focus may be a prerequisite for significant social anxiety (also see Buss, 1980). They suggest that social anxiety is the product of a discrepancy between the desire to make an impression on others and the doubt that one can do so. Therefore heightened public self-focus may make an individual *more* aware of the image he wants to convey in a social situation, which results in greater efforts toward impression management and greater vulnerability to social anxiety.

As suggested by Clark and Wells (1995) and Rapee and Heimberg (1997), the excessive public self-focus common to social anxiety may detract to some degree from external focus on tasks at hand, which has been demonstrated in both the social anxiety and test anxiety literatures (see Hartman, 1983; Wine, 1971; respectively). Research in the field of cybernetics has also suggested that internal and external focus are discrete processes requiring attentional resources and that allocation to one area reduces resources available for the other (Carver, 1979). Kimble and Zehr (1982) reported that participants who scored high on a measure of trait self-focus remembered significantly less information from a social interaction than participants who scored low. Similarly, Hope, Heimberg, and Klein (1990a) found that socially anxious individuals were less accurate in their recall of partner information than nonanxious controls after a social situation (see also Hope, Sigler, Penn, & Meier, 1998). The implications for social anxiety are that one would be attending to how he comes across to his audience through self-monitoring of a number of self-relevant domains (see below), and if sufficient attentional resources were allocated to this self-monitoring, social *performance* would be expected to

suffer (Clark & Wells, 1995; Rapee & Heimberg, 1997). For example, a socially anxious woman who is attending to physiological sensations of nervousness as she attempts to discern whether her trembling is noticeable to others may not attend adequately to the topic of a conversation. Rapee and Heimberg also contend that attentional focus to external threat cues may produce the types of performance deficits often attributed to internal focus. However, less research has explored this premise.

Although it has been linked to social anxiety, public self-focus is a broad and multifaceted construct (Mor & Winquist, 2002). These facets are evident in the examples offered above. Specifically, self-focus can be tied to cognitive, affective (including physiological), and behavioral components. For instance, someone high in public self-focus may experience cognitions about how he is being perceived (e.g., “They think I am performing horribly”) as well as vivid self-focused imagery (e.g., “seeing” oneself blushing). In addition, these facets may overlap, such that someone who is high in public self-focus may monitor self-generated imagery about his posture or mannerisms, experience negative cognitions about how he looks, and then alter his behavior to address these cognitive self-appraisals. Each of these facets has received attention in empirical research and will be addressed in turn. Empirical evidence has also implicated the causal nature of these processes; these data will be reviewed as well.

### 3.2. Negative cognition and self-focus in social anxiety

Overall, negative thoughts have been demonstrated to be particularly important to the morbidity of social anxiety (see Bruch, Heimberg, & Hope, 1991). While engaged in social situations, socially anxious persons experience negative self-evaluation with thoughts such as “I am being boring” (Beidel, Turner, & Dancu, 1985; Cacioppo, Glass, & Merluzzi, 1979, Glasgow & Arkowitz, 1975), and they experience a higher proportion of negative thoughts than positive thoughts (Cacioppo et al., 1979; Heimberg, Bruch, Hope, & Dombeck, 1990), as well as more negative thoughts than nonanxious individuals (Dodge, Hope, Heimberg, & Becker, 1988).

Although these studies suggest that self-focused cognition might be particularly important in social anxiety, they only measured inward direction and thus offered no potentially competing evidence for focus on the audience. Daly, Vangelisti, and Lawrence (1989) directed a sample of high and low speech-anxious participants to deliver a presentation to an audience, who evaluated their performance. The high anxiety participants were found to pay less attention to their environments and also experienced more negative, self-focused cognitions than the low anxious group. The high anxious group also performed more poorly than the low anxious group (as determined by the audience), and focus on self and negative self-relevant cognitions was negatively correlated with audience and self-ratings of performance.

Stopa and Clark (1993) further explored cognition related to social anxiety, but directed participants to provide open-ended responses (i.e., spoken and written narratives) regarding their cognitions during a role-played social situation. These responses were later rated on valence (positive versus negative) and were classified as self-focused (e.g., self-evaluative thoughts such as “I’m boring”; p. 264) or audience-focused (e.g., thoughts regarding evaluation by the audience “She thinks I’m boring”; p. 264). Stopa and Clark found that during a social interaction the individuals with social anxiety disorder experienced a significantly greater number of negative thoughts than anxious and nonanxious controls. Importantly, Stopa and Clark reported that nearly all listed cognitions were self-focused and thus not related to the confederate’s evaluation of the participant. Lastly, Stopa and Clark predicted that socially anxious individuals would not only experience self-focused cognitions, but would also demonstrate impaired external attention for their environment during the speech, evidenced by difficulty recalling non-evaluative environmental information (e.g., the clothing worn by the study confederate). This prediction was based on the theory that increased self-focused attention would usurp overall attentional resources. Although this effect has been demonstrated (Hope et al., 1990a), Stopa and Clark (1993) did not find support for their prediction, as anxious and nonanxious participants did not differ in their recall of external information.

Mahone, Bruch, and Heimberg (1993) employed a thought-listing protocol with an unselected group of male undergraduate students and examined the content of self- and other-relevant (both were requested) thoughts recorded by these participants before a conversation with an attractive female confederate. Negative self-thoughts were inversely related to self-efficacy ratings before and during the social interaction, and were positively correlated to anxiety ratings during the interaction. Perceptions of the positive attributes of the female were predictive of objectively rated signs of anxiety. Mahone et al. suggest that both self-focused and other-focused thoughts play significant roles in social situations, including positive perceptions of others. However, this study forced participants to list both self- and other-focused cognitions, whereas Stopa and Clark allowed for a more naturalistic recording of thoughts. In addition, Mahone et al. did not assess participants’ possible cognitions regarding the audience’s evaluation of them. However, in a recent study of the thoughts provided by socially anxious clients in preparation for exposure to feared situations in cognitive behavioral group therapy (Hope, Burns, Hayes, Herbert, & Warner, *in press*), reported thoughts did often focus on the evaluations of the other. The four most commonly coded categories, accounting for two-thirds of more than 900 reported thoughts, were *Performance* (e.g., “I won’t make a good impression.”), *Negative Outcome* (e.g., “He won’t want to talk to me.”), *Other-labeling* (e.g., “She’ll think I’m an idiot.”), and *Symptoms* (e.g., “I’ll be embarrassed.”).

Overall, it is apparent that cognition in social anxiety is negative and focused on the self, which supports Clark and Wells’ (1995) and Rapee and Heimberg’s (1997) assertions that individuals with social anxiety are more focused on themselves during social situations than nonanxious persons. However, these results are not definitively supportive of Clark and Wells’ and Stopa and Clark’s (1993) claim that self-focused attention is *more* important to social anxiety than other-focused attention. Mahone et al.’s results appear to indicate a role for other-focused cognition; unfortunately, they do not address evaluation by others. In addition, it seems that some cognitions rated by Stopa and Clark as self-focused might also be considered other-focused. “I’m boring” (p. 264) may be understood as “I’m boring myself” (clearly self-focused) or “I’m boring her” (clearly other-focused). Clearly, Hope et al. (*in press*) uncovered many other-focused thoughts in their analysis of clients’ in-session reports. Lastly, unlike Hope et al. (1990a),

Stopa and Clark did not find that their anxious group was less able to recall environmental information, given their elevated self-focus compared to nonanxious persons. Although there appears to be abundant support for the hypothesis that there is substantial impairment in social performance related to an internal focus of attention, this explanation alone may be insufficient, as Rapee and Heimberg have also predicted impaired social performance attributable to focus of attention on both internal *and* external threat. In other words, vigilance for one's own visible blushing *and* vigilance for frowns or audience disinterest may interfere with the perception of more consequential environmental information such as the topic of conversation.

### 3.3. Physiological symptoms, self-focused imagery and social anxiety

#### 3.3.1. Background

A central tenet of cognitive psychopathologists has been that the operation of an anxiety schema is predicated upon the *meaning* of threat and its consequences. According to cognitive theory, individuals with anxiety disorders commonly see catastrophe resulting from contact with feared situations. For example, panic attacks in panic disorder are feared and situations are avoided because the person assumes/predicts that his pounding heart and tightness in his chest are not the symptoms of anxiety but of myocardial infarction; this assessment exacerbates anxiety and the symptoms of the attack (Clark, 1986). According to Beck (1976), such crucially important meaning elements can be successfully (and perhaps efficiently) accessed through imagery (also see Lang, 1977, 1979), Clark and Wells (1995) and Rapee and Heimberg (1997) have indicated that imagery may be a central aspect of self-focus in social anxiety as well. Fear imagery in social anxiety often concerns one's own appearance, particularly as it relates to the fear of demonstrating visible symptoms of anxiety. Indeed, Johannsson and Öst (1982) found that individuals with social anxiety disorder are particularly attentive to increased physiological symptoms of anxiety, and McEwan and Devins (1983) found that socially anxious individuals who experience a number of physical symptoms are especially likely to believe that their anxiety is noticeable to others. However, although the models agree on the baseline content of self-images, they disagree on what determines the content and valence of the images as ongoing social situations unfold; this point is discussed below.

#### 3.3.2. Negative self-imagery and the observer perspective

As noted, emphasis has been placed on the processing of the self as “a social object” (Clark & Wells, 1995, p. 72) or “as presumably seen by [the] audience” (Rapee & Heimberg, 1997, p. 742). Because social threat may be evident in one's own poor performance or visible anxiety symptoms, these models predict that focus may be directed toward negative self-imagery, but as seen by others. Clark and Wells suggest that much of the increased self-focus in social anxiety would be achieved by seeing oneself in negative imagery from an observer perspective (i.e., as if through the eyes of the audience) as opposed to a field perspective (i.e., as if through one's own eyes). Less directly, Rapee and Heimberg also emphasize that socially anxious individuals monitor negative impressions of themselves as someone in the audience might see them. Although cognitions have been shown to reflect self-focus during social situations (e.g., Stopa & Clark, 1993), a socially anxious person actually “seeing” himself as he speaks to an audience is a very clear demonstration of attentional focus. Therefore the observer perspective has been studied rather extensively, and results have been consistent.

Several studies have explored the nature of self-focused imagery in social anxiety with the use of semi-structured interviews. Hackmann, Surawy, and Clark (1998) found that persons with social anxiety disorder were more likely than controls to report *spontaneously* occurring images during anxiety-provoking social situations, meaning that these images were likely to occur without clear cues (beyond the presence of an audience and increased anxiety). Compared to controls, the images described by the socially anxious participants were more negative, more anxiety provoking, and more likely to be seen from the observer perspective. These results were replicated by Hackmann, Clark, and McManus (2000), who also demonstrated that *particular* negative, self-referent images are likely to recur over time during new social situations. Furthermore, these images were often experienced for a number of years and were linked to specific social memories reported by the participants. Over half (57%) of participants reported that they were not socially anxious before the occurrence of the recalled situation, and 81% of participants recalled that the event occurred no longer than one year after the onset of their social anxiety.

Wells, Clark, and Ahmad (1998), Coles, Turk, Heimberg, and Fresco (2001), and Wells and Papageorgiou (1999) asked socially anxious individuals and persons without social anxiety to recall recent social situations and to rate these occasions on the perspective of the imagery that came to mind, on a continuum ranging from  $-3$  (*entirely looking out through my eyes*; field perspective) to  $+3$  (*entirely observing myself from an external point of view*; observer perspective). In all three studies, socially anxious persons were more likely to take the observer perspective during social situations, whereas persons with less social anxiety were more likely to take a field perspective. Coles et al. further demonstrated that this perspective may vary *within* socially anxious persons, such that highly anxiety-provoking social situations were associated with higher ratings of the observer perspective for individuals with social anxiety disorder than situations that evoke medium or low levels of social anxiety. Also, viewing the self from an observer perspective appears to be specific to social anxiety, more so than in other forms of anxiety disorder (e.g., agoraphobia; Wells & Papageorgiou, 1999). Thus, overall, self-focus is an important and unique process in social anxiety.

#### 3.3.3. Causal effects of self-focus – general manipulation

Studies examining cognition, physiological symptoms, and imagery have established that self-focused attention is a robust phenomenon among socially anxious individuals. Clark and Wells (1995) and Rapee and Heimberg (1997) have also suggested that

increased self-focus in social anxiety disorder has negative causal implications for anxiety and social performance, which has been confirmed by a number of studies.

Burgio et al. (1986), Woody (1996), Hofmann and Heinrichs (2003), Bögels and Lamers (2002), and Bögels, Rijsemus, and De Jong (2002) manipulated self-focus in individuals high in social anxiety (e.g., with the presence of video cameras, mirrors, etc). In part, socially anxious participants in the self-focus conditions were concerned more about escape and less about performing well (Burgio et al., 1986) and had greater anticipatory anxiety and poorer objective performance (Woody, 1996). Similarly, Bögels and Lamers' (2002) self-focused participants reported higher anxiety.

Hofmann and Heinrichs (2003) and Bögels et al. (2002) report findings discrepant from those above. In their studies, mirrors were used with the intention of inducing self-focus. Hofmann and Heinrichs' participants with generalized social anxiety disorder listed fewer negative personality characteristics than the nonanxious controls. Hofmann and Heinrichs suggest that this result is inconsistent with Clark and Wells' (1995) model, as increased self-focused attention (attributed to presence of the mirror) did not result in greater negative self-perception. If the mirror acted as an external/environmental source of information which socially anxious participants used to adjust their self-perceptions, this conclusion may be more consistent with Rapee and Heimberg's (1997) claim that external information is important in the modulation of the mental representation of the self (also see Lundh & Öst, 1996). Similarly, Bögels et al. (2002) also did not find the presence of mirrors to induce self-focus in a manner consistent with predictions. Nevertheless, overall these studies demonstrate self-focus' strong and unique association with elevated social anxiety. The studies reviewed below demonstrate that this process of self-focused attention is likely responsible for much distress and interference related to elevated social anxiety.

#### 3.3.4. Causal effects of self-focus: manipulating physiology, perspective, and imagery

A number of studies have also found that negative self-focus can be particularly disruptive to social performance. Specifically, socially anxious persons who are informed that their physical anxiety level (e.g., heart rate) is increasing during a social situation (regardless of the veracity of this information) report greater subjective anxiety and more negative cognitions about the situation's outcome than if they are told their physical symptoms are diminishing (Wells & Papageorgiou, 2001). It has also been shown that an individual's purposeful use of an observer perspective (compared to a field perspective) during a social situations results in more frequent negative cognitions, greater use of safety behaviors, and poorer subjective self-evaluation of performance, regardless of one's overall level of social anxiety (Spurr & Stopa, 2003).

The content of self-images is also thought to be causally related to social outcomes. Specifically, holding in mind negative self-images during a social situation has been found to result in greater anxiety, beliefs that anxiety symptoms are more visible to a social partner, and subjective self-ratings of one's performance as poorer (compared to when holding in mind neutral images; Hirsch, Clark, Mathews, & Williams, 2003). Further, evidence suggests that socially anxious individuals rate the experience of negative self-imagery and its related dysfunction as familiar and ego-syntonic (Hirsch et al., 2003; Vassilopoulos, 2005a). These negative self-images, thought to be specific to social anxiety, even result in disrupted performance that it is detectable to social partners, as they are more likely to rate social interactions less enjoyable when their partner holds in mind negative (rather than neutral) self-images (Hirsch, Meynen, & Clark, 2004). Thus, although self-focus may indeed be a product of social anxiety (by definition, social anxiety is fear of with how one is perceived), it also acts to worsen it. Self-focused attention then is not simply epiphenomenal, but rather an integral process that works to exacerbate and maintain this complex disorder.

#### 3.4. Conclusions

Clark and Wells (1995) and Rapee and Heimberg (1997) constructed cognitive behavioral models of social anxiety that assign a role of significant importance to self-focused attention. Altogether, research findings are consistent with these models of social anxiety. However, divergent conclusions may be drawn from these results. For instance, Hackmann et al. (1998, 2000) have reported the spontaneous and recurrent nature of self-images in social anxiety, and these researchers have claimed that the consistency with which particular images are recalled may be indicative of the anxiety "programme" (p. 70) described by Clark and Wells (1995). Accordingly, the socially anxious individual encounters a social situation and experiences the stereotypical image of himself, which becomes the exclusive focus of his attention for the duration of the ongoing social encounter. Because the socially anxious person does not acquire information from his environment to determine how he is being received, he looks to his own self-image from the observer perspective to draw conclusions about his own performance and to decide whether his feared outcome (negative evaluation) was realized (Wells et al., 1998; Wells & Papageorgiou, 1999). Therefore, by the nature of the findings related to self-focused attention, a typical fear response in social anxiety operates as a closed system based on past memories and present symptoms of anxiety, incorporating little or no environmental information, and thus maintaining social fears as the individual is unable to see that feared consequences are actually not realized (Clark, 2001).

No direct evidence yet exists to confirm this assertion. Rapee and Heimberg (1997) contend that self-focused attention does not operate in the same type of closed system proposed by Clark and Wells (1995; Clark, 2001). Rather, based on Rapee and Heimberg's predictions, it is suggested here that self-focused attention is modulated by the nature of audience behaviors that are perceived by the socially anxious person. Although the self-image that is an object of focus during a social situation may indeed be based on the recurrence of a stereotypical social memory and the experience of physiological symptoms, these inputs are unlikely to operate alone in an internal, closed circuit.

## 4. Attentional bias to external threat

### 4.1. Vigilance for negative evaluation: detection of external threat in social anxiety

Threat recognition as a broad cognitive construct has very fundamental implications for humans. Quick detection of cues that indicate danger improves an organism's chances of survival, which naturally affords it greater opportunity to breed. This is as true for humans as it is true for other species. According to cognitive models of fear and anxiety (e.g., Beck et al., 1985), the detection of cues that imply the imminence of threat is one of the first and most vital aspects of fear (also see Bar-Haim, Lamy, Pergamin, Bakermans-Kranenburg, & van IJzendoorn, 2007).

A number of studies have demonstrated that socially anxious persons are vigilant for threat in their environment. Several paradigms have been utilized to test this effect, including modified Stroop color-naming tasks, probe detection tasks (using words and faces as social threat stimuli), face-in-the-crowd detection paradigms, eye tracking, and naturalistic role-play (e.g., speaking to an audience) tasks. These studies, reviewed in this section, fall into two major categories. First, a number purport to investigate relatively straightforward vigilance for threat in the social environment, suggesting that socially anxious persons demonstrate a bias for social threat stimuli over neutral stimuli, even when such cues are presented outside of conscious awareness. However, some of these studies have not demonstrated clear evidence for attentional vigilance, and some investigators (e.g., Mansell, Clark, Ehlers, & Chen, 1999) have contended that the findings of these studies may suggest that socially anxious persons are *avoidant* of social threat stimuli in a manner consistent with the predictions in Clark and Wells' (1995) model of social anxiety. Second, across the paradigms used to study attention in social anxiety, several have been modified to address, somewhat more directly, attention to oneself and to the external social environment. For example, several studies using the probe detection paradigm have included two or more stimulus onset asynchronies (SOAs; e.g., 500ms and 1250ms) to assess whether socially anxious persons demonstrate evidence of hypervigilance for environmental threat or whether their vigilance is merely evident when they are immediately presented with threat stimuli but not after (i.e., potentially representative of initial vigilance and subsequent avoidance, although other interpretations are available, as well).

### 4.2. Difficulty ignoring threat: the modified Stroop task

A number of studies have shown that socially anxious participants are particularly slow to color-name social threat words. Mattia, Heimberg, and Hope (1993) demonstrated that socially anxious persons were slower to color-name social threat words than nonthreat words whereas nonanxious controls did not show this effect. Other Stroop research suggests that individuals with social anxiety disorder might also demonstrate an attentional bias toward self-relevant physical threat stimuli if these threats were potentially visible to an audience (represented by social anxiety-relevant threat words such as *blushing*) rather than those that are not (e.g., *breathless*; Spector, Pecknold, & Libman, 2003). Several studies have also demonstrated specificity of the Stroop effect in social anxiety by comparing socially anxious persons to participants with other anxiety disorders and nonanxious controls. Hope, Rapee, Heimberg, and Dombeck (1990b), Becker, Rinck, Margraf, and Roth (2001), and Maidenberg, Chen, Craske, Bohn, and Bytritsky (1996) all found socially anxious persons to be slower color-naming words specifically related to social threat than other anxiety-related threats, including threats common to panic disorder, generalized anxiety disorder, and health anxiety. Interestingly, the presence of depression or dysphoria appears to undo this attentional bias in social anxiety. Grant and Beck (2006) found that persons high in social anxiety and low in depression took longer to color-name social threat words, but those with high social anxiety and high depression showed no bias.

### 4.3. Allocating attention to threat in the environment: face-in-the crowd tasks, eye-tracking, and probe detection

Gilboa-Schechtman, Foa, and Amir (1999) presented participants with social anxiety disorder and nonanxious controls with matrices composed of photographs of a human face (taken from the same person). Participants were told to look at each matrix and decide as quickly as possible whether all of the faces were similar or if there was a dissimilar face in the crowd. The faces themselves expressed neutrality or a number of different emotions including anger, disgust, and happiness. The social anxiety group evidenced an attentional bias (speeded reaction times) when detecting an angry face in a neutral crowd compared to a happy face in a neutral crowd and were significantly more distracted than controls when searching angry crowds for neutral faces; however, they were also slower than controls when searching happy crowds. Therefore, both negative and positive facial expressions distracted socially anxious participants more than they did controls. Gilboa-Schechtman et al. suggest that, to persons with high levels of social anxiety, expression of positive emotion (i.e., smiling) may connote ridicule as opposed to more innocuous general happiness, which may be as undesirable as anger-related negative evaluation. Horley, Williams, Gonsalvez, and Gordon (2003, 2004) employed an infrared corneal reflection technique to record the visual scanpaths of participants with social anxiety disorder and those with no psychiatric diagnoses when presented with pictures of faces expressing sadness, happiness, and neutrality. Socially anxious individuals spent less time than controls scanning salient facial features such as eyes, noses, and mouths. Further, this finding was more prominent in response to sad and neutral faces than happy faces. Garner, Mogg, and Bradley (2006) reported similar results when tracking eye movements with a camera. Taken altogether, eye tracking results tentatively suggest that persons with social anxiety disorder may engage in both attentional vigilance and avoidance, as they initially direct their gaze toward threat, before diverting it.

Studies using probe detection paradigms have generally employed words or pictures of faces as social threat stimuli. However, studies using words have found somewhat nonspecific evidence of allocation of attention to environmental threat stimuli. [Asmundson and Stein \(1994\)](#) were the first to employ a probe detection task in the study of attentional bias in social anxiety disorder. Their socially anxious group was faster to detect probes following social threat words. [Musa, Lepine, Clark, Mansell, and Ehlers \(2003\)](#) conducted a probe detection study using words as stimuli, with participants with social anxiety disorder, social anxiety disorder with concurrent depression, and nonanxious/nondepressed controls. The results of this study are in line with those of [Grant and Beck \(2006\)](#) using the Stroop task and show rather clearly that those individuals with social anxiety disorder without concurrent depression demonstrated an attentional bias *toward* social threat stimuli. Although socially anxious participants with a concurrent depressive disorder had more severe social anxiety than their nondepressed counterparts, they did not show an attentional bias effect.

Several studies using words as social threat stimuli have not clearly demonstrated attentional bias in social anxiety (e.g., [Horenstein & Segui, 1997](#); [Amir, Elias, Klumpp, & Przeworski, 2003](#)). Thus, in probe detection paradigms in the study of social anxiety, the use of words as social threat stimuli has produced mixed findings. [Mogg and Bradley \(2002\)](#) suggested that the use of pictures in probe detection tasks may be more ecologically valid, arguing that pictures of facial expressions may be closer to naturalistic social evaluation than words, and therefore may provide clearer findings in the study of attentional bias to threat. They employed a probe detection task with face stimuli (demonstrating threatening, neutral, or happy expressions) presented to participants who were selected based on trait anxiety scores. Faces were presented for just 17ms, after which faces were masked (before the probe appeared), to test the hypothesis that anxious persons are able to detect environmental threat even when it occurs outside awareness. Anxious participants demonstrated a clear allocation of attention toward the location of threat.

[Mansell et al. \(1999\)](#) and [Chen, Ehlers, Clark, and Mansell \(2002\)](#) presented socially anxious and low anxious participants with pictures of positive, neutral, and negative (displaying anger, disgust, fear, or sadness) faces preceding probes by 500ms. However, the design of these studies differed from previous research in that pictures of faces were paired with pictures of household objects such as clocks, sofas, and vacuum cleaners (rather than other faces). In Mansell et al.'s study, half of the participants in each group were told that they would deliver a controversial speech to an audience (and to locate evaluative behaviors in audience members) after their participation in the probe detection task; Chen et al. offered no such manipulation. In their no-speech condition, Mansell et al. found that socially anxious participants showed no evidence of attentional bias and did not differ from low anxious controls; however, when threatened with a speech, results were in line with the findings of Chen et al.'s study: anxious participants demonstrated *slowed* reaction times to probes following both positive and negative faces. The authors of both studies concluded that their results were indicative of attentional *avoidance* of faces and support [Clark and Wells' \(1995\)](#) assertion that individuals with social anxiety disorder direct their attention away from external threat (and possibly toward internal threat cues, although this was not directly assessed). Although happy faces are not generally thought to convey negative evaluation, Mansell et al. echo the statement by [Gilboa-Schechtman et al. \(1999\)](#) that socially anxious persons might construe such cues as indications of ridicule.

[Mansell et al. \(1999\)](#) and [Chen et al. \(2002\)](#) state that, although the results of their respective studies are dissimilar from other probe detection studies of attentional bias that utilized words as social threat stimuli (see [Asmundson & Stein, 1994](#); [Musa et al., 2003](#)), their methodologies are more ecologically valid and their results are more likely to be consistent with naturalistic social experiences (e.g., meeting with someone face-to-face). It is important to note, however, that although the color-naming task and probe detection tasks using words may not be similar to actually meeting a stranger or giving a speech, words themselves may be at least comparable in ecological validity to pictures of faces, given the importance that particular self-labels hold as part of the cognitive schemata of socially anxious persons. Therefore, words related to negative evaluation or negative core beliefs may be more personally relevant to a socially anxious individual than pictures of unfamiliar faces that have no personal significance. Individuals with social anxiety disorder are often most adept at differentiating pictures of angry faces and actual angry faces that are actually directed at them. Importantly, the notion that pictures of faces are especially ecologically valid has yet to be subjected to empirical validation. Last, the social threat manipulation employed by [Mansell et al. \(1999\)](#) may have actually served as a distraction for the socially anxious persons, who may have been more engaged with the thought of future social evaluation than with the task at hand.

[Sposari and Rapee \(2007\)](#) utilized the same method and stimuli as [Mansell et al. \(1999\)](#) with the intention of testing the vigilance-avoidance hypothesis with a sample of participants diagnosed with generalized social anxiety disorder. However, for threat induction, their participants were told that they would give a speech, but *not* that they would be asked to locate audience behaviors (so that they would ostensibly not begin engaging in such behaviors during the probe detection task at a rate higher than what would occur naturally). Sposari and Rapee found that participants demonstrated a pronounced attentional bias for emotional faces over nonsocially-relevant objects, more so than controls. These results directly contradict those of [Mansell et al. \(1999\)](#) and [Chen et al. \(2002\)](#), and support [Rapee and Heimberg's \(1997\)](#) assertion that social anxiety is marked by vigilance to environmental threat.

Overall, the literature suggests that socially anxious persons deploy attentional resources to their environment in the search for threat stimuli that are consistent with their fears of negative evaluation. However, a number of studies reviewed above (e.g., [Mansell et al., 1999](#)) have found evidence that might be understood as consistent with a vigilance-avoidance attentional process. In the [Clark and Wells \(1995\)](#) model of social anxiety, the implication is that attention maybe initially vigilant, but then is very quickly diverted away, in avoidance of threat, perhaps in a manner inconsistent with attentional bias as it is put forth by [Rapee and Heimberg \(1997\)](#). Therefore an area of literature has developed (reviewed below) which considered both internal and external attentional processes in social anxiety. Unfortunately, these paradigms are overly reliant on arbitrarily established SOAs.

#### 4.4. Studies addressing both internal and external attentional bias in social anxiety

With a dot-probe task, [Vassilopoulos \(2005b\)](#) presented health and social threat words, positive social words, and neutral words to university students high and low in fear of negative evaluation at two different SOAs: 200ms and 500ms. Socially anxious participants, compared to low anxious controls, demonstrated an attentional bias toward *all* emotional words (including positive social words and both types of threat words) at the 200ms SOA. At the longer SOA, socially anxious participants were slower than controls to attend to all emotional words. These results partially support the vigilance–avoidance theory of attentional bias in social anxiety, although, the effects were not specific for social threat words. However, the results should be interpreted with caution, as depression was not accounted for in the study's design and [Vassilopoulos](#) showed that high levels of depression were associated with the avoidance of social threat stimuli (also see [Grant & Beck, 2006](#); [Musa et al., 2003](#)).

[Mogg, Philippot, and Bradley \(2004\)](#), also using a dot-probe task, measured response times for individuals with social anxiety disorder and nonanxious controls with the intention of examining the time course of attentional bias and testing the vigilance–avoidance hypothesis. The shorter SOA, 500ms, was selected to represent initial attentional orientation to task stimuli (angry, happy, neutral faces), as has been done in previous research. The longer SOA (1250ms) was chosen to allow for attentional shift to assess for ongoing vigilance versus avoidance of threat. Stimuli in this study were not masked at either SOA. The social anxiety sample showed very clear attentional bias for threat faces compared to happy and neutral faces at initial attentional orientation, whereas the control participants did not, although controls' self-reported scores of fear of negative evaluation were correlated with threat vigilance. At the longer SOA, socially anxious participants did not show significant evidence of vigilance or avoidance and were similar to controls in this regard. [Mogg et al.](#) conclude that these results offer tentative evidence for vigilance and avoidance in clinical social anxiety; however, socially anxious persons were not significantly *slower* to detect social threat cues in this experiment, which is perhaps a required condition to make a more conservative conclusion of avoidance.

Although it is clear that socially anxious persons' attentional vigilance was not evident at 1250ms, the probe detection paradigm does not allow for further speculation about this finding. Also, given that anxious persons demonstrate allocation of attention to threat at much shorter SOAs (e.g., 17ms; [Mogg & Bradley, 2002](#)), it is possible that the 500ms SOA utilized in this study was too long to serve as an adequately sensitive index of initial orientation of attention to threat, which suggests that the interpretation of vigilance–avoidance effects in this study should be made only with caution. Although probe detection tasks with multiple SOAs allow for tentative testing of the vigilance–avoidance hypothesis in social anxiety, the implications of the above studies' findings cannot be drawn directly to the predictions made by [Clark and Wells \(1995\)](#) and [Rapee and Heimberg \(1997\)](#).

Therefore, [Mansell, Clark, and Ehlers \(2003\)](#) modified the probe detection task to account for this potential attentional shift. They utilized a probe detection task similar to those employed by [Mansell et al. \(1999\)](#) and [Chen et al. \(2002\)](#) and also instructed participants to remain vigilant for internal probes. To measure attention to internal cues, [Mansell et al.](#) utilized bogus physiological assessment devices. Participants were told the device would monitor their physical anxiety level, and that when this level increased sufficiently, they would receive a slight vibration to the index and middle fingers of their left hand. In reality, these internal probes were not related to physiological responses but were programmed to occur at particular points during the task. Finally, half of the participants in each group received a stress induction (notification of a speech to be given later). [Mansell et al.](#) only found bias to any probes in the high fear of negative evaluation group and only when they were threatened with a speech. Under such circumstances, these individuals directed their attention away from the onscreen cues and toward tactile cues (showing slowed reaction times to onscreen probes when stimulated with bogus notification of internal cues). There was not evidence to suggest that this tendency occurred during particular trials such that anxious participants might be more likely to direct attention inward when presented with an emotional face. [Mansell et al.](#) interpret this non-finding to mean that the focus of attention to internal cues is a stable phenomenon that would make an interaction effect between external and internal cues less likely. In other words, once started, attentional bias to internal cues is unlikely to be broken in the service of attending to external cues.

Although this study was one of only a few that claims to directly address attention to external and internal threat cues, the nature of the simulation of internal threat (in this case bogus notification of increased arousal) makes the results difficult to interpret. First, the physiological activation that participants believed was being monitored was relatively undifferentiated; specifically, it is unknown if this arousal was linked to the possibility that persons would experience *visible* anxiety (see [Spector et al., 2003](#)). Second, the closeness of the vibration to the natural experience of increased physiological activity is unlikely, given the limited amount of time participants were allotted to make the association and without the presence of an unconditioned stimulus. Lastly, the notification of increased physiological arousal may be less important to socially anxious persons not engaged with an audience.

[Pineles and Mineka \(2005\)](#) also attempted to measure external and internal focus of attention in persons with high social anxiety, with a design similar to [Mansell et al.'s \(2003\)](#). The authors also did not find evidence of attentional bias to external threat cues in the high anxiety group. They concluded that these results are particularly supportive of [Clark and Wells' \(1995\)](#) claim that internal threat cues are of greater importance than external threat cues. However, [Pineles and Mineka's](#) findings may also be open to alternative interpretation. Specifically, both external and internal cues were presented to participants externally, which may limit the generalizability of the findings, as socially anxious persons in actual social situations typically become aware of internal threat cues via interoception. Also, the faces presented to the participants in external threat trials may not have been as evocative as the presence of actual audience members demonstrating positive or negative evaluation.

Only one study in the social anxiety literature has studied attentional bias using a live audience. [Veljaca and Rapee \(1998\)](#) directed participants high and low in social anxiety to record positive and negative audience behaviors while giving a speech. Audience members in this study were confederates who emitted prescribed positive (e.g., smiling and nodding) or negative (e.g.,

frowning and yawning) behaviors at moments determined (online, by the confederates) to be most appropriate during the speech, with the provision that they demonstrate one evaluative behavior per minute. Participants with high social anxiety were not only more accurate than controls at detecting negative audience behaviors, they were also more liberal in determining what constituted negativity. Furthermore, the control group was more accurate than the anxious group in detecting positive audience behaviors. Therefore, vigilance for social threat was clearly demonstrated in a relatively naturalistic task, and this vigilance for external threat continued through the task, suggesting some degree of sustained attention to the audience despite the fact that the high social anxiety group evidenced greater public self-consciousness scores than the control group. This finding seems to contradict the contentions of Clark and Wells (1995), Clark (2001), Stopa and Clark (1993), Mansell et al. (1999), Chen et al. (2002), and Mansell et al. (2003), which state that after socially anxious individuals detect threat in their environment (or simply detect an audience in general), they turn their attention inward and focus less on negative audience behaviors, and that this is a process that continues relatively unbroken until the social situation has come to an end. Veljaca and Rapee's results are particularly encouraging because they support online attentional bias in social anxiety with what is still perhaps the most ecologically valid paradigm utilized in the literature.

Perowne and Mansell (2002) report concern that Veljaca and Rapee's (1998) audience members' evaluative behaviors were left to their discretion in an unstandardized fashion. According to Perowne and Mansell, this methodology may have allowed for participants' behaviors to contaminate the role-play by indirectly evoking more or less positive or negative feedback. Given these concerns, Perowne and Mansell asked participants high and low in social anxiety to deliver a speech to an audience that was reportedly watching them live, via a closed circuit television. However, the audience had been previously taped, and all participants received the same audience feedback. During the taping, the audience members were trained to demonstrate differing evaluative behaviors. High socially anxious persons believed the audience judged their performance more negatively than the control group did. Also, the high socially anxious group selectively discriminated audience members who evaluated them negatively (on a recall task after the study), whereas the control group selectively discriminated the audience members who evaluated them positively. However, there was no evidence that the high anxiety group selectively detected particular audience behaviors that would indicate negative evaluation or that the low anxious group selectively detected positive audience behaviors. In fact, all emotional behaviors were better detected than neutral behaviors in both groups, and these ratings were consistent with those of independent raters of audience behavior. High socially anxious participants did not demonstrate less external focus of attention, contrary to the authors' predictions. However, Perowne and Mansell did find that high socially anxious participants reported more self-focus during the speech than did controls.

Perowne and Mansell (2002) conclude that the anxious group's selective detection of negative audience members but inability to detect particular audience behaviors emitted by these confederates is evidence of initial detection of negative evaluation followed by avoidance of external cues with preference for internal representations of threat. However, the control group was also unable to detect particular audience behaviors indicative of positive evaluation, and this is unlikely to be attributable to attentional avoidance given their low anxiety and the ostensible lack of threat. Furthermore, there is not evidence that the anxious group was less focused on external cues than the control group. Therefore, some of Perowne and Mansell's conclusions drawn from the study's data may be open to other interpretations. Pozo, Carver, Wellens, and Scheier (1991) conducted a study with a similar design (upon which Perowne & Mansell's, 2002, study was based); however, the experimental and control group performed no differently on these ratings, failing to indicate vigilance for either internal or external negative social cues.

#### 4.5. Conclusions

In their discussion, Mansell et al. (1999) have posited that, although Veljaca and Rapee's results appear to support Rapee and Heimberg's (1997) claim that socially anxious persons engage in vigilance for environmental threat, Veljaca and Rapee directed their participants to be aware of audience evaluation. Therefore, Mansell et al. (1999) suggest that probe detection studies may be more reliable assessments of attentional process in social anxiety given that they have not actually required participants to attend to threat, but rather measured the naturalistic course of attentional focus. Mansell et al. (1999) conclude that probe detection tasks parallel natural social situations in this way, such that socially anxious persons are not explicitly told to look for environmental threat and thus are apt to monitor themselves and their own internal threat cues (i.e., cognitions, physiology, and imagery). It is suggested here, however, that given the understanding of social anxiety schemata described by both cognitive behavioral models of social anxiety (Clark and Wells, 1995; Rapee & Heimberg, 1997), socially anxious persons regularly expect to encounter feared outcomes in social situations, and direction to attend to this may not be any more unnatural than asking them to deliver a speech.

### 5. General discussion and directions for future research

Clear conclusions regarding attentional process in social anxiety are not possible given the nature of the research conducted thus far, as several of the paradigms used to explore attention in social anxiety are limited. For instance, debate about the nature of attentional vigilance and avoidance is based primarily on information processing paradigms that assess attention allocation over very short periods of time. Furthermore, attentional avoidance is claimed to be a significant part of the social anxiety fear response (e.g., Mansell et al., 1999). However, the evidence for this conclusion is not reliably based on significantly slowed attention to threat cues at longer periods of time. If one accepts that the study of these processes must be validated with more ecologically valid methodologies that present socially anxious persons with naturalistic feared situations and outcomes (e.g., a live audience), then vigilance for external threat has received the most significant support in the literature (Veljaca & Rapee, 1998). Ongoing attentional

avoidance of social threat stimuli in the environment with unbroken attention for internal threat cues has not been demonstrated beyond indirect measurement (e.g., Mansell et al., 1999; Perowne & Mansell, 2002) and reliance on ecologically limited methodologies (Mansell et al., 2003).

Mansell et al. (1999, 2003) report that socially anxious persons are likely to direct their attention away from social threat cues such as pictures of emotional (and possibly evaluative) faces, particularly when these participants are threatened with the prospect of delivering a speech to an audience (also see Amir et al., 1996). Mansell et al. (1999, 2003) suggest that social threat (in this case an upcoming speech) leaves socially anxious persons more likely to attend to internally generated threat cues, such as their own interoception or self-imagery. However, it is not clear that the participants in these studies are in fact directing their attention away from external threat toward internal threat. A more parsimonious explanation may be that socially anxious individuals expecting to give a speech are simply thinking about this looming threatening situation and not adequately attending to the probe detection task at hand, regardless of the stimuli presented to them. Furthermore, it is not always wise to suggest what is occurring on the basis of what is not – we know that vigilance is not always maintained in some of these studies, but we simply do not know well where (if anywhere) attention has been directed. This conclusion makes an interpretation of reaction times more difficult, particularly within the conceptual framework of attentional vigilance versus avoidance.

The nature of attentional focus in social anxiety clearly requires direct investigation. With evidence independently supportive of external and internal focus in social anxiety, investigation of the interaction of these processes during social situations may best elucidate the discrepancies between Clark and Wells (1995) and Rapee and Heimberg (1997). Because Clark and Wells, Clark (2001), Stopa and Clark (1993) and Mansell et al. (2003) describe attention in social anxiety to be consistently focused on the self throughout the duration of a social situation, interaction of this internal monitoring of the self and monitoring of external cues of threat is unlikely, if not impossible. Because Rapee and Heimberg posit that such an interaction is not just likely, but that it is also a critical process that maintains socially anxiety, socially anxious persons who encounter a positive (or at least less critical audience) should demonstrate less focus on mental representations of themselves and that focus should be less negative as well. For example, it is predicted here that socially anxious persons encountering a less critical audience should be less likely to experience negative self-imagery, negative self-evaluative cognitions, and self-monitoring than socially anxious persons encountering a more critical audience. Of course, this claim presupposes that socially anxious persons remain vigilant to external threat cues during social situations (despite the content of audience feedback) as well as self-focused.

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