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Metacognitive processes in social anxiety : a path analysis.

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METACOGNITIVE PROCESSES IN SOCIAL ANXIETY: A PATH ANALYSIS

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By the following Dissertation Committee:

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DEDICATION

This dissertation is dedicated to:

My loving wife, Kristen Hosey

My supportive parents, Jackie and Joe Helmer

&

My late brother, Travis Hosey

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ABSTRACT

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Social anxiety is prevalent and debilitating. Contemporary models of social anxiety posit that negative, self-focused thought aids in the maintenance of social anxiety symptoms. Although these models emphasize in-situation cognition, recent findings have linked two perseverative thought constructs, anticipatory processing (pre-event) and post-event processing (post-event), to social anxiety symptoms. The current study was designed to investigate whether these maladaptive thinking styles are perpetuated by the superordinate process of metacognition. In particular, three domains of metacognition were included in the current study: metacognitive beliefs, metacognitive monitoring, and metacognitive (attentional) control. A hypothesized model wherein these three metacognitive processes maintain social anxiety symptoms via anticipatory and post-event processing was tested using path analysis. Previously established direct and hypothesized indirect relationships within this model were evaluated. One hundred fifty four undergraduate students from a large Midwestern university participated in the study and provided self-report data regarding the mentioned constructs. Results indicate that, overall, this model was a good fit for the data. Contrary to expectations, a number of the

previously established direct relationships failed to reach statistical significance within the context of the path model. In terms of indirect relationships, only one pathway was significant. The indirect pathway between metacognitive beliefs and social anxiety symptoms via anticipatory processing was significant. Overall these findings suggest that cognitive phenomena associated with social anxiety interact dynamically. Moreover, these findings corroborate Wells' model of psychological distress as it suggests that metacognitive beliefs (positive and negative) held about anticipatory processing sustains it and, in turn, perpetuates symptoms of social anxiety.

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INTRODUCTION

Social anxiety disorder (SAD) has debilitating effects and is among the most common of all mental disorders with lifetime prevalence rates ranging from 3% to 13% (Kessler, Chiu, Demler, & Walters, 2005). Kessler and colleagues (2005) estimate the 1-year prevalence rate of social anxiety disorder to be 6.8%. Further, it is likely that, in addition to the number of people diagnosed with social anxiety disorder, even more suffer from a level of social anxiety that is high, but fails to reach diagnostic threshold. At least one study indicates that sub-clinical social anxiety was associated with significant functional impairment and garnered a higher 12-month prevalence rate than clinical levels of social anxiety (Fehm, Hoyer, Schneider, Lindemann, & Klusmann, 2008). Given the prevalence and debilitating effects of social anxiety delineating the processes that may aid in its development and maintenance warrants further exploration.

Contemporary models are predominantly cognitive and emphasize the role of self-focused thoughts and attention as a fundamental component of social anxiety disorder (Clark & Wells, 1995; Rapee & Heimberg, 1997). Individuals with high levels of social anxiety have been found to evidence a corresponding pattern of self-focused cognition (e.g. Hartman, 1984; Hirsch, Meynen, & Clark, 2004; Spurr & Stopa, 2003). Research in this area has largely focused on cognition that occurs during the social experience itself;

however, recent findings suggest that social anxiety is also associated with self-focused thought processes that occur both before and after the social event. The anticipation of a social experience appears to stimulate a worry-like process termed anticipatory processing (AP) in the socially anxious individual (e.g., Vassilopoulos, 2004). Following the social event, socially anxious individuals engage in post-event processing (PEP), a post-hoc review of the experience that focuses on negative appraisals of performance (Rachman, Grater-Andrew, & Shafran, 2000).

Although the predominant cognitive models of social anxiety disorder feature a description of cognitive content in the socially anxious individual, the models do not detail the cognitive processes that are potentially associated with this self-focused thought. In particular, the inclusion of process level phenomena such as perseverative thought in conceptual models of social anxiety will help to promote additional comprehensiveness to our understanding of the pathology. Factors that maintain these cognitive processes may shed yet more light on thinking in the socially anxious individual. In this vein, the presence of perseverative cognitive processes in social anxiety may be explained by metacognition, a process described by Flavell (1979) as the way we perceive and act on our own cognitive processes. More specifically, metacognition involves the knowledge of and beliefs about one's own cognitive processes, the ability to monitor them, and the capacity to operate on them (Efklides, 2008). The construct of metacognition may play a role in the development and/or maintenance psychopathology. For example, studies have linked metacognition to the perseverative thought in GAD and depression (Papageorgiou & Wells, 2001; Wells, 2005). Concordantly, an examination of this superordinate function in social anxiety may

compliment and build upon existing research that posits cognition as a primary component of social anxiety.

In order to advance our conceptual understanding of social anxiety, the current study proposed and tested a model of social anxiety, and provided an initial test of the paths of this proposed model. The proposed path model aims to 1) reaffirm the link between perseverative thought and social anxiety, and 2) link three metacognitive processes (beliefs, monitoring/awareness, control) to social anxiety via perseverative thought. To provide empirical context for the proposed model, several areas of research were integrated. First, two preeminent cognitive models of social anxiety are reviewed to introduce cognition as a fundamental component of pathological social anxiety. Because limited research exists regarding perseverative thought in social anxiety, the perseverative thought processes of worry in GAD and rumination in depression are discussed as analogues of anticipatory and post-event processing so as to provide a theoretical framework for the model. Next, self-focused perseverative thought, both pre and post-event, in social anxiety is discussed as informed by the two mentioned theoretical models and as compared to worry and rumination in GAD and depression. The construct of metacognition was explored as a maintenance factor for maladaptive perseverative thought common to anxiety and depression. Preliminary findings linking metacognitive processes to perseverative thought in social anxiety are reviewed. This literature provides the foundation for a test of the proposed model which considers the self-focused thought in social anxiety to be perseverative and offers metacognition as a possible maintenance factor for this perseverative thought.

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1. Cognitive Models of Social Anxiety

Currently, there exist two preeminent theoretical models of social anxiety that emphasize cognition, the first proposed by Clark and Wells (1995) and the second by Rapee and Heimberg (1997). These models have garnered substantial support and largely focus on distorted thought content, cognitive interpretations of physiological arousal, and attention allocation. Although they do not discuss what factors may account for the presence of these cognitive processes specifically, these two cognitive models provide a scientific basis for exploring potential maintenance process for the maladaptive thought associated with social anxiety. Further, though these models deal with social anxiety disorder specifically, subsequent research has extended these findings to subclinical populations.

1.1 Clark and Wells' cognitive model of social anxiety (1995)

Clark and Wells (1995) posited that socially anxious individuals believe that, in social situations, they are likely to behave in an inept and embarrassing manner, and that this "ineptitude" will have significant consequences in terms of social status, self-worth, and the viability of their social relationships generally. According to the authors, this perception initiates an "anxiety program" in which socially anxious individuals focus their attention, disproportionately, on interoceptive information when immersed in a social situation. That is, when the prospect of evaluation is present, persons with social anxiety disorder tend to shift their focus inward, engaging in detailed monitoring and observation of existing negative self-schemas, negative cognitions, and physiological anxiety cues (Spurr & Stopa, 2002). Clark and Wells (1995) suggested that the socially anxious individual becomes preoccupied with internal experiences (i.e., somatic

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responses, social-evaluative thoughts) and this preoccupation disrupts the capacity to process social cues with any degree of objectivity. Individuals with social anxiety, it is posited, rely upon their own negative self-perceptions and physiological experiences as the primary source of information about their competence in social situations. Interoceptive information gleaned from this self-focused attention is used to develop a mental representation of themselves that they assume to be consistent with how they are actually viewed by others (Hofmann, 2007). This largely negative self-focused attention serves to enhance the aversiveness of the social experience and insinuates that social situations are dangerous thus maintaining the experience of social anxiety (Clark, 2001; Wells, Clark, Salkovskis, & Ludgate, 1995).

Research has generally supported the tenets of the model. Using a social conversational paradigm, Stopa and Clark (1993) found that individuals with social anxiety disorder reported more negative self-evaluative thoughts (e.g., "I'm stupid") than individuals with other anxiety disorders or non-anxious controls, but did not report more negative evaluative thoughts that referenced the conversational partner (e.g., "he thinks I'm stupid"). These results suggest that the socially anxious individual relies on internal, self-referencing information to determine social performance rather than external information derived from the social environment. Results of another study show that persons with SAD experienced intrusive, recurrent, and negative self-images that they believed were accurate when their attention was self-focused (Hackmann, Clark, & McManus, 2000). In an interesting experimental study, Wells and Papageorgiou (1998b) showed that individuals with SAD report less anxiety and fewer negative beliefs about themselves following a feared social situation when instructed to focus their attention

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toward the external environment compared to when they were instructed to "merely" staying in the feared situation. These results suggest that the negative self-focus associated with SAD contributes to the anxiety experience. In addition, Hirsch and Mathews (2000) found that, when presented with a potentially social anxiety provoking situation, persons with SAD do not show the positive inferential bias that has been shown in non-anxious individuals. The researchers interpreted this finding as evidence of the socially anxious individual's tendency to refer to interoceptive information and existing negative self-evaluative beliefs, rather than external cues, when making inferences about social competence.

Similar findings have also been reported in subclinical populations. In a study by Pozo and colleagues (1991), self-focused attention in persons with high social anxiety was found to interfere with their ability to interpret social feedback. That is, individuals with high social anxiety construed others' reactions to them more negatively than did less socially anxious individuals. Further evidence of self-focused attention was provided by Daly, Vangelisti, and Lawrence (1989) who conducted a study in which they showed that high speech-anxiety individuals were less attentive to their social environments and experienced more negative, self-focused cognitions than did low speech-anxious individuals during a speech task. The implications of these studies is further supported by research conducted by Hope, Heimberg, and Klein (1990). In this undergraduate study, researchers asked participants (females of high and low social anxiety) to engage in a social-evaluative interaction, after which they were asked to recall the details of the event. The researchers found that high self-focused attention was associated with poor

recall for the event in socially anxious individuals. These results were subsequently

corroborated in a similar study by Hope and colleagues (1998).

1.2 Rapee and Heimberg's cognitive-behavioral model of social anxiety (1997)

Rapee and Heimberg (1997) proposed a model of social anxiety disorder that is

generally consistent with the model offered by Clark and Wells (1995). In this model,

socially anxious individuals possess a negative representation of the self as they believe

others view them and use this as a referent when entering a social situation. Attention is

preferentially allocated to internal negative mental representations of the external self,

interoceptive information, and perceived threats in the environment. Predictions are

made about social performance, audience expectations, and whether these expectations

can be met (Roth & Heimberg, 2001). Social anxiety is also related to an overestimation

of the likelihood and consequences of negative social evaluation. Finally, the level of

anxiety experienced in the social situation varies as a function of the "predicted

probability and consequences of negative evaluation" which fluctuates in accordance

with fluctuations in the previously mentioned stages of the model (Rapee & Heimberg,

1997, p. 749). This model assumes, generally, that the socially anxious person engages

in thought focused primarily on the salient (negative) aspects of the self-image when

confronted with an anxiety stimulating social experience as well as perceived threat in the

environment.

The two models are similar insofar as the socially anxious individual is

hypothesized to derive her notion of social competence via internal cues such as

physiological arousal and negative mental representations of the self. As mentioned

previously, there is empirical support for these hypotheses (Daly, et al., 1989; Hackmann,

et al., 2000; Hirsch & Mathews, 2000; Hope, Heimberg, et al., 1990; Hope, et al., 1998; Pozo, et al., 1991; Wells & Papageorgiou, 1998b). However, the main point of distinction is that the Rapee and Heimberg model also emphasizes the socially anxious individual's hypervigilance for threat cues in the environment. That is, the socially anxious individual tends to perceive negative social feedback from others despite the presence of more positive social feedback. For example, the socially anxious individual, according to the model, is likely to notice one angry (or neutral) face in a group while ignoring positive responses, such as smiles. This selectively gathered information confirms the fears of the socially anxious individual and corroborates the negative mental representations of the self (Schultz & Heimberg, 2008).

The tendency of socially anxious individuals to selectively attend to perceived threat in the environment has garnered substantial empirical support in the literature. Research using the Stroop task has shown that individuals with SAD selectively attend to perceived social threat in the environment (e.g., Hope, Rapee, Heimberg, & Dombeck, 1990; Lundh & Öst, 1996; Maidenberg, Chen, Craske, & Bohn, 1996). The gist of these findings is that individuals with SAD show a longer latency to name the color of a presented social-threat word than when they are presented with a neutral or threatening word that is not socially based. Numerous studies have utilized a dot-probe paradigm wherein various facial expressions replace social-threat words as the target stimulus. These studies have garnered mixed results. That is, some studies have shown that individuals with SAD as well as nonclinical high social anxiety individuals respond more slowly to dots presented following negative faces (Pishyar, Harris, & Menzies, 2004), while some results suggest slower responding to dots following any faces in socially

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anxious individuals (Chen, Ehlers, Clark, & Mansell, 2002). Other findings suggest

faster responding to dots following the presentation of faces of any kind (Sposari &

Rapee, 2007). Although these findings seem difficult to reconcile, hypervigilance for

threat (as indicated by faster responding) and avoidance of threat (as indicated by slower

responding) can, and likely do co-occur. That is, hypervigilance for threat is a

precondition for avoidance of that same threat and, as such, it is not surprising that

findings have been mixed in this area.

1.3 Conclusions and Limitations

Though there is some theoretical divergence between them, the two models

discussed in this review are in agreement that cognitive processes, such as attention and

distorted mental representations of the self, are primary sources of dysfunction in social

anxiety. It is unclear, however, what mechanisms provide for the perpetuation of

cognitive dysfunction. Both of the models reviewed here rightly acknowledge the

importance of cognitive processes, however, the authors concentrate primarily on thought

content. These models include discussion of the self-focused nature of thought content in

social anxiety that does, in some ways, provide a higher order or process level description

of cognition in social anxiety. The primary focus of these models, however, remains

content oriented. For example, thoughts like "I'm going to embarrass myself" are posited

as common to social anxiety and distress producing. However, the influence of the

overall thinking style or process, within which these thoughts occur, remains uncertain.

That is, the specific thought itself (e.g., "I'm going to embarrass myself") occurs as a

transient experience, at some point, for most people. It is the way in which the socially

anxious individual responds to this dysfunctional thought that may be of consequence. A

possible distinction between the individual with social anxiety and the individual without

social anxiety is the coping strategy employed in response to the negative thought.

Whereas the non-anxious individual experiences passing discomfort relative to the

negative thought, the socially anxious person appears to inflexibly respond to it with

prolonged cognitive activity.

Cognitive activity in psychological disorder has been studied in this vein. In

particular, worry and rumination in GAD and depression, respectively, have been

conceptualized as perseverative thinking styles. Given the relative wealth of work in

these areas, research regarding worry and rumination provides a theoretical backdrop for

a discussion of perseverative thought in social anxiety. Further, a review of work in these

areas includes an examination of the underlying mechanisms that are charged with

regulating and maintaining perseverative thought. Because social anxiety literature is

quite limited in this area, an examination of worry in GAD and rumination in depression

provide the best available empirical basis for an examination of possible maintenance

factors for maladaptive thought in social anxiety.

2. Perseverative thought in psychopathology

As evidenced by the two mentioned theoretical models, social anxiety is

characterized, in large part, by maladaptive thought. Maladaptive thought has also been

shown to be a primary component of other forms of psychopathology. Cognition in GAD

and depression has begun to garner attention, not only in terms of maladaptive content,

but also in terms of a maladaptive, perseverative style or process. Perseverative

cognition is largely self-focused and has been described as the repeated activation of

cognitive representations of psychological stressors that results in the prolonging of

psychological distress (Brosschot, Gerin, & Thayer, 2006; Brosschot, Pieper, & Thayer, 2005). The following is a review of two perseverative thought processes associated with psychopathology, worry and rumination. As will be discussed in a later section, the cognitive processes of AP and PEP in social anxiety are qualitatively similar to worry and rumination insofar as AP is future oriented worry about a social situation, while PEP is a post hoc ruminative review of a past social event. Given these similarities, and the availability of research in these areas, worry and rumination provide the best available empirical context for a study of the processes that may aid in the maintenance of maladaptive thought in social anxiety.

2.1 Worry

According to DSM-IV-TR excessive worry, or apprehensive expectation, is a cardinal feature of generalized anxiety disorder (DSM-IV-TR; APA, 2000). Although worry is a process common to the human experience, pathological worry as is found in generalized anxiety disorder (GAD) is qualitatively distinct in terms of increased frequency, intensity, and perceived uncontrollability (Craske, Rapee, Jackel, & Barlow, 1989). The process of worry involves repetitive thought, and associated negative affect, about possible future threats (McLaughlin, Borkovec, & Sibrava, 2007). Research suggests that this worry is an anticipatory and uncontrollable chain of thoughts laden with negative affect that deal with an uncertain outcome and may be a cognitive strategy used to avoid the full experience of fear (Borkovec, 1994; Borkovec, Robinson, Pruzinsky, & DePree, 1983).

Borkovec's (1994) avoidance theory of worry in GAD stipulates that individuals with GAD engage in worry to avoid threat by preparing for future "threats" or preventing

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them entirely. This belief promotes a self-fulfilling prophecy in which the worry behavior is reinforced because the feared event is unlikely to occur in the first place (Roemer & Borkovec, 1993). This perpetuates the worry behavior ad infinitum because it has ostensibly prevented the threat and thus the negative affect associated with the feared threat. Borkovec's conceptualization of worry as an avoidance coping strategy has received empirical support. An experimental study conducted by Borkovec and Hu (1990) showed that worry was associated with autonomic inflexibility. In this study, participants were instructed to imagine a phobic speech scene 1 of 3 conditions: neutral thinking, relaxed thinking, or worried thinking. The participants were asked to engage in the designated form of thinking prior to the imagined scene. The researchers measured participants' cardiovascular response as an approximation of the negative affect or anxiety associated with the phobic scene. Results indicated that individuals in the worried thinking condition evidenced a reduced cardiovascular response to the phobic imagery. The researchers interpreted this result as evidence of worry functioning as avoidance of negative affect. Additional research found similar phenomena for individuals with GAD. Thayer, Friedman, and Borkovec (1996) showed that individuals with GAD exhibited lower cardiac activity across baseline, relaxation, and worry tasks than did nonanxious controls. Further, lower cardiac activity was detected for individuals with GAD in the worry task versus the other two conditions. These findings suggest the presence of less physiological reactivity, thought to approximate a negative affective or anxious response, in individuals with GAD who tend to engage in chronic worry.

It has also been suggested that worry may be a flawed problem solving strategy that is continuous and unsuccessful (Davey, 1994). In this sense, worry involves threat

anticipation and the generation of either coping or avoidant problem-solving strategies geared towards managing negative affect. It is not that chronic worriers are poor problem solvers per se. Research has shown that worry is associated with a perceived lack of control of problems solving and less confidence in problem solving abilities, but not poor problem solving effectiveness (Davey, 1994). This lower confidence for problem solving has also been linked to catastrophizing in individuals with high worry (Davey, Tallis, & Capuzzo, 1996). In this study, individuals with high worry were found to exhibit more catastrophizing steps in problem solving than were their less anxious counterparts. Results of these studies were interpreted to suggest that the process of worry involves monitoring for threat-related information but is problematic because the threat is often uncontrollable (Davey, 1994). Because the problem is uncontrollable, the process continues indefinitely and can thus be considered perseverative. Although there is some theoretical disagreement about the function of worry, common across each conceptualization is the notion that worry is perseverative and is associated with negative affect. That is, worry is theorized to serve as a strategy for managing negative affect. Whereas Borkovec argued that worry serves as an avoidance strategy for dealing with negative affect, Davey views worry as a failed problem solving strategy geared toward managing negative affect. In each case, worry is a coping strategy used to deal with the negative affect associated with perceived future threats.

2.2 Rumination

Perseverative rumination is closely associated with several forms of psychopathology, most notably, depression (e.g. Donaldson, Lam, & Mathews, 2007; Hankin et al., 2009; Pearson, Brewin, Rhodes, & McCarron, 2008). Similar to worry in

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GAD, cognitive rumination is closely associated with depression and is considered perseverative in nature (Donaldson, et al., 2007; Hankin, et al., 2009). According to Response Styles Theory (Nolen-Hoeksema, 1991), rumination is a modality of responding to distress that involves repetitively and passively focusing on the notion of being distressed, symptoms of distress, and on the possible causes and consequences of these symptoms. Rumination is further conceptualized as "the process of thinking perseveratively about one's feelings and problems rather than in terms of the specific content of the thoughts" (Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008, p. 1). That is, individuals with depression appear to have difficulty disengaging from thoughts about their distress and from thinking for a prolonged period of time about the causes and implications of their depression. It is a perseverative thinking style characterized by a failure to disengage attention from negative self-focused thought content about past events (Nolen-Hoeksema, 1991). Research has shown that ruminative thought is associated with the maintenance and exacerbation of depressive symptoms (Nolen-Hoeksema, Morrow, & Fredrickson, 1993). Results of numerous empirical studies indicate that rumination can predict the onset of depressive episodes as well as the intensity of the depressive symptoms (e.g. Just & Alloy, 1997; Nolan, Roberts, & Gotlib, 1998; Roberts, Gilboa, & Gotlib, 1998). Other empirical findings indicate that rumination is a thinking style that mediates the relationship between risk factors associated with depression and depression as an outcome (Spasojević & Alloy, 2001).

In general, ruminative thought is focused on the symptoms and consequences of depression exclusively and is not solution-focused (Craighead, Ritschel, Arnarson, & Gillespie, 2008). In a larger study of coping strategies, Carver, Scheier, and Weintraub

(1989) found supporting the notion that rumination is not solution focused. Results of this study suggested that people who engage in rumination are less likely than non-ruminators to actively solve problems. That is, for depressed individuals, rumination is, in some ways, a passive coping or problem solving strategy. Further, Nolen-Hoeksema (1991) showed that rumination tends to exhaust cognitive resources, thus interfering with active problem solving and decision making abilities.

2.3 Conclusions and limitations

In general, research indicates that perseverative thinking styles are associated with the maintenance of negative affective states such as depression and anxiety (e.g. Borkovec, 1994; Calmes & Roberts, 2007; McLaughlin, et al., 2007; Nolen-Hoeksema, et al., 1993). Two forms of repetitive thought have garnered significant attention in research, worry in GAD and rumination in depression. Worry is related to anxious affect and possible future threat while rumination involves "repetitive thought about past events, current mood states, or failure to achieve goals" (McLaughlin, et al., 2007, p. 26). There is debate in the literature regarding the conceptual margins of these constructs.

Some research has conceptualized worry and rumination as specific forms of the same overarching perseverative thought construct (Segerstrom, Tsao, Alden, & Craske, 2000) while other research suggests that, although the constructs are similar, they retain important distinctions (Hong, 2007). In this study, the researchers found that worry and rumination are differentially related to coping behaviors and clinical symptoms. Results of this study suggest that worry is uniquely linked to anxious and depressive symptoms generally, while rumination is uniquely related to depression. These linkages are, in part, an artifact of their respective influences on coping phenomena. That is, worry is linked

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to low perceived coping effectiveness while rumination is related to problem disengagement. Muris and colleagues (2004) demonstrated that worry and rumination, though significantly correlated, were distinct from one another in factor analysis. Given the conceptual similarities between AP and worry as well as the similarities between PEP and rumination, it seems important to obtain more clarity as to the boundaries of these constructs. Whether worry and rumination are theoretically distinct perseverative thought constructs or whether they are two variants of the same larger perseverative thought construct is an important empirical question. Future research should further clarify the relationship between worry and rumination and how these constructs are concomitantly or differentially related to psychological outcome.

3. Self-focused perseverative thought in social anxiety

As illustrated by the two preeminent cognitive models, self-focused thought is common to social anxiety and may act to maintain psychological distress (Clark & Wells, 1995; Rapee & Heimberg, 1997). Although both models are focused predominantly on in-situation processing, the model proposed by Rapee and Heimberg (1997) includes references to post-event processing, while the model proposed by Clark and Wells (1995) includes anticipatory processing and post-event processing as maintenance factors for social anxiety. These two constructs will be reviewed in the following section. In addition, previous research regarding worry in GAD and rumination in depression suggest a perseverative thinking style associated with psychopathology. Consistent with this research, perseverative thought appears to be associated with social anxiety (Rachman, et al., 2000; Zou, Hudson, & Rapee, 2007). In light of these findings, the constructs of AP and PEP will be conceptualized similarly as perseverative in nature.

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3.1 Anticipatory processing in social anxiety

Clark and Wells (1995) suggested that the socially anxious individual experiences an anxious response prior to entering the feared social event. Socially anxious individuals think about the social situation in advance, anticipate negative outcomes, and predict poor performance and ultimately rejection. This anticipatory thought process is hypothesized to elevate anxiety, encourage avoidance, and prime the person to be negatively self-focused when entering the social situation. Although literature in this area remains quite sparse, there is some empirical support for the presence of AP in social anxiety. Vassilopolous (2004) developed an empirical measure of AP and found via factor analysis of the scale that all items, save two, loaded on one overarching factor that the researchers interpreted as anticipatory processing. Utilizing this measure, it was shown that individuals high in social anxiety engaged in more AP prior to a feared social event than did individuals low in social anxiety. Further, Vassipoulos (2008) conducted a study in which he showed that individuals high in social anxiety engaged in anticipatory mental processes more frequently than did individuals low in social anxiety.

It appears, then, that there exists a relationship between AP and social anxiety; however, the mentioned studies do not indicate what effect AP may have on the socially anxious individual. To this end, Hinrichsen and Clark (2003) utilized an induction technique the anxiety inducing quality of anticipatory processing in social anxiety. In one part of the study, participants high and low in social anxiety to were asked to engage in AP or a distraction task prior to a social-evaluative event. Results indicated that AP was related to increased anxiety prior to the social-evaluative event and to higher levels

of peak anxiety during the event itself. The authors stipulated that, although induction effects were detected for both groups (high and low social anxiety), anticipatory anxiety is a process characteristic of high socially anxious individuals and thus should be afforded consideration as a maintenance factor for pathological social anxiety. Lending further support to this finding, Vassipolous (2005) used an induction technique in which participants were asked to engage in either AP or a distraction task prior to giving a speech. The researchers examined the effects of anticipatory processing by randomly assigning individuals high in social anxiety to an AP condition or a distraction condition. Results showed that AP was associated with higher anxiety symptoms and negative predictions about future performance in a social situation versus the distraction condition.

3.2 Anticipatory processing as perseverative thought

A relationship between AP and social anxiety has been supported by empirical work (Hinrichsen & Clark, 2003; Vassilopoulos, 2004, 2005; Stephanos Ph Vassilopoulos, 2008). However, the characteristics of AP in social anxiety have only begun to receive empirical attention. Whether AP can be considered a perseverative cognitive process has not been discussed specifically. However, there are indications that AP in social anxiety is perseverative thought. AP in social anxiety has been described as a worry-like process specific to feared social events (Hinrichsen & Clark, 2003; Wells, 1997). Previous work has underscored the perseverative nature of worry (Borkovec, 1994; Davey, 1994; McLaughlin, et al., 2007). Given the conceptual similarities between worry and AP and the perseverative nature of worry (e.g. McLaughlin, et al., 2007), AP is posited to be a form of perseverative thought. More specifically, as mentioned previously, AP in social anxiety is future-oriented worry about a social event, is

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associated with increased social anxiety, and encourages avoidance. Although this worry process is centered around a social event, the mentioned characteristics are qualitatively similar to worry in GAD. While empirical findings in this area are lacking, there is some support for the hypothesis that AP is a form of perseverative thinking akin to worry in GAD.

As noted earlier, Vassilopolous (2004) developed an empirical measure of anticipatory processing. In addition to establishing a relationship between AP and social anxiety, Vassilopolous described the nature of AP for individuals high in social anxiety. AP, for these individuals, was characterized by persistent thoughts about the imminent social event that were intrusive, frequent, and interfered with concentration. Individuals high in social anxiety were unable to resist thinking about the upcoming event, tended to make more negative predictions about the outcome or consequences of the event, and were more apt to consider avoiding the event. Individuals high in social anxiety used AP to predict, in great detail, their own future behavior and how others would perceive and respond to their predicted behavior. This persistent and intrusive anticipatory processing, according to Vassipolous, was associated with an increase in emotional distress. In accordance with this conceptualization, Hinrichsen and Clark (2003) provided description of the construct where, in anticipation of a social event, individuals high in social anxiety were more likely than low social anxiety individuals to 1) dwell on avoidance and escape strategies 2) catastrophize about potential social failure and 3) consider negative, distorted images of themselves in the upcoming social event. In another study by Vassilopoulos (2008), an undergraduate sample was used to examine AP as a coping response in social anxiety. Participants were first presented with two vignettes of future

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anxiety-provoking situations and then directed to describe their thoughts relative to the two vignettes. Results suggested that anticipatory processing for individuals high in social anxiety was characterized, in part, by mental preparation for future stressful events. In particular, individuals high in social anxiety tended to think about how to conceal their anxiety or how to avoid the stressful situation.

Findings provided by Lorberbaum and colleagues (2004) lend further credence to the hypothesis that AP is perseverative. Participants were socially phobic and were asked to give a 1-minute impromptu speech on an unknown topic in front of an audience. Using fMRI technology, the researchers found that socially anxious individuals exhibited less activity in cortical regions associated with the ability to shift from one thought process to another, suggesting a perseverative thinking style. The authors concluded that because of this reduced activity in specific cortical regions, socially anxious individuals have trouble disengaging from thought processes. This finding is especially salient given that the fMRI analyses detected this phenomenon during times of increased social anxiety. This implies that the difficulty shifting from one thought process to another is present during heightened social anxiety. As stated previously, perseverative thought is prolonged and repetitive. It reasons, then, that difficulty disengaging from a particular thought process plays a role in the manifestation of perseverative thought. In another study, Vassipolous (2008) presented participants with vignettes regarding the anticipation of a feared social event and asked them to report the details of their thoughts about the scenarios. Responses were categorized based on a coding scheme for AP and results suggested that individuals high in social anxiety were more likely to engage in stagnant

deliberation (dwelling repetitively and negatively on a life stressor) during anticipatory processing compared to individuals low in social anxiety.

3.3 Post-event processing in social anxiety

Similar to AP, post-event processing (PEP) is a self-focused thought process that takes place outside of the social experience itself. It is described as a detailed review or "post-mortem" of events following a social interaction (Rachman, et al., 2000) and may be specific to social anxiety (Fehm, Schneider, & Hoyer, 2007). For socially anxious individuals, it is a type of cognitive rumination involving perceived inadequacies, mistakes, and/or imperfections that increases expectations of failure and related anxiety in future social situations (Dannahy & Stopa, 2007). In order to show empirically this prospective relationship between PEP and social anxiety, Kocovski and Rector (2007) utilized self-report measures to investigate the hypothesis that social anxiety, anxious rumination, and anxiety sensitivity are correlates of post-event processing. Results indicated that both social anxiety and anxious rumination predicted PEP, while anxiety sensitivity was not related to PEP. The authors concluded that social anxiety is maintained, in part, by cognitive processes such as PEP that perpetuate negative perceptions of the self and consequently do not allow for the disconfirmation of beliefs regarding the dangerousness of social situations.

The relationship between social anxiety and PEP has also been shown in observational studies. For example, Abbott and Rapee (2004) asked participants to complete measures of post-event rumination and perceived performance immediately after a socially distressing social task and at 1-week follow-up. Results indicated that socially anxious individuals engaged in more post-event rumination than did controls and

maintained negative self-appraisals at the 1-week follow-up while the non-anxious group

showed increased positivity about their performance. The authors interpret these findings

as evidence of a cyclical process whereby negative PEP is activated following a

perceived failure and, in turn, reinforces negative beliefs about the self thus maintaining

the anxiety over time. In another study, researchers used a social interaction task to

examine the relationship between self-appraisals of performance and PEP in individuals

high and low in social anxiety (Dannahy & Stopa, 2007). Participants were told they

would engage in a conversation with a stranger on two occasions that were one week

apart from one another. The frequency and valence of PEP during this week was

assessed showing that individuals high in social anxiety engaged in more frequent and

more negative PEP than did individuals low in social anxiety.

In addition, at least one study used an experimental manipulation to examine the

relationship between post-event processing and negative affect in social anxiety (Kashdan

& Roberts, 2007). The researchers recruited an undergraduate sample and randomly

assigned participants to one of two 45-minute social interaction conditions: a personal

disclosure condition or a small-talk condition. Participants returned 24 hours later to

complete several self-report instruments including a post-event rumination measure.

Interestingly, results showed that post-event rumination was associated with increased

negative affect for socially anxious individuals in the personal disclosure condition but

was associated with decreased negative affect for socially anxious individuals in the

small-talk condition. This finding was attributed to the tendency for socially anxious

individuals to exhibit greater concerns about social evaluation relative to the amount of

information revealed about the self.

3.4 Post-event processing as perseverative thought

While the presence of PEP in social anxiety is gaining more empirical support, more work is needed to delineate the construct. Specifically, it is important to establish whether PEP is a perseverative thought process similar to rumination in depression. The constructs are similar insofar as both rumination and PEP are past-oriented thought processes that focus on perceived negative events, negative mood states, and are associated with increased symptoms. To examine the nature of PEP in social anxiety, Rachman and colleagues (2000) developed the post-event processing questionnaire (PEPQ). In addition to establishing a link between PEP and social anxiety, the researchers found that PEP was characterized by a recurrent and intrusive quality that causes interference with concentration and is associated with avoidance of social situations. Fehm and colleagues (2008) corroborated this finding by asking participants to recall a social-anxiety evoking event that had occurred during the past six months. Participants were then administered a slightly modified version of the PEPQ. Although not the main focus of the study, factor analysis revealed that PEP in social anxiety is perseverative insofar as it involves frequent thoughts about the social event that are difficult to forget, cause interference with concentration, are undesirable, and persist despite resistance.

Further evidence of the perseverative nature of post-event processing was provided by Lundh and Sperling (2002) who used a diary method to gather more detailed information about the process and content of PEP. Undergraduate students were asked to complete a diary account, of PEP at three times: immediately following a socially distressing event, that evening before bed, and again the following evening. For

individuals high in social anxiety, level of PEP on the day of the socially distressing

event predicted the level of PEP on the following day suggesting a sustained, or

perseverative, process. Building on self-report research, Perini, Abbot, and Rapee (2006)

conducted a study that included a social performance task in which they asked

participants to give an impromptu speech. One week later, each participant completed a

measure of PEP, the Post-Event Rumination Questionnaire. Results indicated that

individuals high in social anxiety engaged in more persistent and repetitive brooding over

the perceived negative aspects of their performance during the one week interval than did

their less anxious counterparts.

3.5 The relationship between AP and PEP in social anxiety

The boundary between anticipatory and post-event processing is not sufficiently

demarcated. In this sense, Dannahy and Stopa (2007) found that negative thoughts about

a past social event (PEP), started to increase as another feared social event was

approaching. This seems to show some overlap between negative rumination about a

past event and anticipatory worry about a future event. In his psychometric study of

anticipatory processing, Vassipolous (2004) acknowledged that AP and PEP involve

"pretty similar cognitive processes, with the difference that anticipatory processing is

future oriented whereas post-event processing is past-oriented" (p. 309). Results of a

recent psychometric study suggest that repetitive (or perseverative) thinking, in general,

may be a transdiagnostic phenomenon (McEvoy, Mahoney, & Moulds, 2010). In this

study, the researchers developed a measure that integrated items from three existing

measures of repetitive thought that were specific to worry in GAD, rumination in

depression, and post-event processing in social anxiety specifically. Factor analysis

yielded two factors of which one, labeled Repetitive Negative Thought, was linked to numerous negative emotional states (e.g., anxiety, depression, anger).

3.6 Conclusions and limitations

Findings suggest that the socially anxious individual is self-focused, not only during the social interaction itself, but also prior to and subsequent to the social event. Anticipatory processing is associated with increased anxiety, predictions of social failure, and likely primes the individual to be anxious upon entering the social event. Post-event processing is another form of self-focused thought that informs negative self-perceptions and increases anxiety in the long-run. The degree to which this self-focused cognition is perseverative has not been addressed explicitly in the literature. The studies reviewed in the previous section provide some general support for the perseverative qualities of both anticipatory processing and post-event processing in social anxiety. Both of these cognitive processes are persistent, resistant to disengagement (i.e., uncontrollable), and are associated with the maintenance and, perhaps, exacerbation of negative affective states. These findings, while persuasive, require more empirical attention. Specifically, the links between AP and social anxiety and PEP and social anxiety should be replicated.

There appears to be some boundary confusion between AP and PEP as evidenced by the findings in which PEP was found to increase in anticipation of a feared event (Dannahy & Stopa, 2007) and was posited to be a process similar to AP (Vassilopoulos, 2004). Qualitatively, they are quite similar insofar as they are recurrent and intrusive, i.e. perseverative. The primary distinction appears to be the temporal focus of AP and PEP. Future research should clarify the parameters of these two constructs so as to provide a more well-defined boundary, if one exists. The implications of McEvoy's psychometric

study (2010) can be applied, theoretically, within diagnoses as well as across them. It is possible that the overarching construct of repetitive/perseverative thought in social anxiety contains both anticipatory and post-event processing. It is also possible that the constructs are independent or part of a larger perseverative thought phenomenon but retain their distinctiveness. That is, the relationship between AP and PEP may be similar to findings in the GAD and depression literature suggesting that worry and rumination, while associated with one another, are differentially related to coping behaviors and clinical symptoms (Hong, 2007). Although findings require replication, the relationships between the perseverative thought processes of AP and PEP and social anxiety have garnered empirical support. In light of these relationships, it is important to further develop our understanding of the factors that may aid in the maintenance of perseverative thought in social anxiety. Metacognitive processes have gained increasing attention in the literature as underlying maintenance factors for perseverative thought in various forms of psychopathology. Given the conceptual similarities between worry and AP as well as rumination and PEP, a review of literature regarding the role of metacognition in the maintenance of worry and rumination provides a basis for further exploration of metacognition in social anxiety.

4. Metacognition and psychopathology

Research suggests that perseverative thought is associated with certain forms of psychopathology. As mentioned, worry, rumination, and AP/PEP have been linked to GAD, depression, and social anxiety respectively. What remains unclear, however, is what process, or processes, may explain the presence of this perseverative thinking style. In this vein, the construct of metacognition has garnered support in the literature as a

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maintenance factor for perseverative thought. Metacognition is generally understood to be a top-down information processing construct that involves the experiences and knowledge we possess about our own cognitive process as well as the regulation of the same cognitive processes (Efklides, 2008; Vukman, 2005). Correspondingly, Wells proposed a metacognitive model of psychological disorder in which disturbances in psychological function are largely a product of "biases in the selection and execution of control processes for appraising and coping with thoughts, threats, and emotions" (Fisher & Wells, 2009, p. 7). Given the apparent relationship between perseverative thought and social anxiety, it is important to examine factors that may provide for the maintenance of this thinking style. As mentioned, metacognitive processes help to sustain perseverative thought in various forms of psychopathology, notably GAD and depression. It is reasonable to suppose that metacognition plays a role in the maintenance of perseverative thought in social anxiety. The following is a review of the three major components of metacognition and their relevance to worry in GAD and rumination in depression to serve as a framework for an examination of metacognition as it relates to AP and PEP in social anxiety. Preliminary findings regarding these metacognitive processes in social anxiety will also be discussed.

4.1 Metacognitive knowledge/beliefs

Metacognitive knowledge is conceptualized as declarative knowledge (and beliefs) about our own cognitive processes and refers to knowledge we use to ascertain which strategies will help to facilitate goal attainment and the conditions for their use (Larkin, 2010). In terms of psychopathology, metacognitive knowledge has been explored as the beliefs one holds about the functionality of perseverative thought. That

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is, models have been proposed in which one chooses (and sustains) perseverative thought as a cognitive strategy to address negative thoughts and emotions largely on the basis of positive and negative beliefs about the strategy itself (Fisher & Wells, 2009; Wells, 2007). In light of the mentioned similarities between AP in social anxiety and worry in GAD, literature pertaining to metacognitive beliefs in GAD and depression will be reviewed in this section as will findings regarding the possible role of metacognitive beliefs in social anxiety.

4.1.1 Metacognitive beliefs and generalized anxiety disorder

Wells (1995) advanced a metacognitive model of GAD in which the disorder results from the presence of dysfunctional metacognitive beliefs about the functionality of worry. Positive metacognitive beliefs about worry such as "worry allows me to be prepared" or "worry helps me anticipate and avoid future problems" perpetuate the volitional use of worry as a coping strategy. Negative metacognitive beliefs about worry such as "my worries are uncontrollable" or "my worry makes me crazy" sustain the process of worry by contributing to the perception of diminished cognitive control and experience of worry as potentially harmful.

Cartwright-Hatton and Wells (1997) developed a measure, the Meta-Cognitions Questionnaire to examine beliefs about worry. Factor analysis showed five distinct dimensions of metacognition in this regard including positive and negative beliefs about worry. Results suggested that both positive beliefs about the benefits of worry and negative beliefs about the controllability and harmfulness of thoughts independently predicted the experience of worry. Wells and Papageorgiou (1998a) extended these findings by differentiating between worry and obsessive-compulsive symptoms as they

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relate to metacognitive processes. Results indicated that, beyond the contribution of obsessive-compulsive symptoms, positive and negative metacognitive beliefs about worry were associated with worry proneness.

Other researchers have also studied the relationship between metacognitive beliefs and excessive worry. Francis and Dugas (2004) devised a structured interview to assess positive beliefs about worry. Positive beliefs about worry were shown to predict worry and that this relationship was unique beyond the contributions of anxiety and depressive symptoms. Via factor analysis, Davey and colleagues (1996) identified five coherent factors of which three comprised positive consequences and two comprised negative consequences of worry. Both positive and negative beliefs about worry were independently related to poor psychological outcomes including excessive worry. Moreover, individuals who held both positive and negative beliefs about worry scored higher on measures of psychopathology than did individuals who endorsed only negative beliefs about worry.

4.1.2 Metacognitive beliefs and anticipatory processing

The body of literature regarding anticipatory anxiety remains small and, at present, there are no known studies examining the relationship between metacognitive beliefs and anticipatory anxiety in social anxiety specifically. However, given the conceptual similarities between worry in GAD and worry-like anticipatory processing common to social anxiety, it seems reasonable to hypothesize that, like worry, AP is perseverative and maintained by positive and negative metacognitive beliefs. Although speculative at this point, there is some preliminary support for the relationship between metacognitive beliefs and AP.

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Although the explicit purpose of the previously referenced Vassilopoulos studies on AP in social anxiety (2004, 2005; 2008) was not to examine metacognitive beliefs about the functionality of AP, it is reasonable to deduce that metacognitive beliefs influence the use of AP in socially anxious individuals based on their results. The use of AP as a method of prediction and preparation for socially distressing situations is analogous to findings suggesting that worry in GAD is a failed attempt to predict and solve future problems (Davey, 1994). Employing AP as a way to predict one's own future behavior, others' responses to this behavior, and to develop strategies to address problems in the future social event implies the presence of a positive metacognitive belief about the functionality of AP. That is, high socially anxious individuals appear to hold the positive metacognitive belief that AP allows for the prediction of and preparation for future problems in a social situation. Taken a step further, the belief that AP allows one to predict and prepare in this way implies that doing so will reduce the likelihood and consequences of a negative outcome, otherwise it is a fruitless enterprise. This is consistent with findings in the GAD literature regarding positive metacognitive beliefs and worry (Freeston, Rhaume, Letarte, & Dugas, 1994; Wells, 2005).

Research regarding the relationship between AP and negative metacognitive beliefs is even more lacking. Findings from the GAD literature indicate that negative metacognitive beliefs about worry largely involve a sense that worry is uncontrollable and harmful (Wells, 1995, 2005). Acknowledging its similarity to worry in GAD, this conceptualization is extended to AP in social anxiety with social distress as the specific worry referent. Although no empirical research has been conducted to firmly establish

this connection, there are some preliminary indications that negative metacognitive beliefs are associated with AP.

At least one recent study investigated the relationship between negative metacognitive beliefs and anticipatory anxiety in social anxiety. McEvoy and Perini (2009) conducted a group treatment study in which they used attention training as proposed by Wells (1990) to compliment cognitive behavioral group therapy and, hopefully, reduce dysfunctional metacognitive beliefs, self-focused attention, and perseverative thinking in socially anxious individuals. Exploratory analyses conducted as one component of the study indicated that reductions in AP were related to overall symptom relief as well as changes in metacognitive beliefs as measured by the Meta-Cognitions Questionnaire (Cartwright-Hatton & Wells, 1997). Specifically, decreases in anticipatory anxiety were associated with reductions in metacognitive beliefs regarding the uncontrollability, danger, and need to control thoughts.

4.1.3 Metacognitive beliefs and depression

As mentioned above, rumination is associated with depression (Donaldson, et al., 2007; Hankin, et al., 2009; Nolen-Hoeksema, et al., 2008). Metacognition has been implicated in the maintenance of ruminative thought in depression (Thomsen, 2006; Wells, 2008). A metacognitive model of depression has been proposed in which rumination is a maladaptive response to sadness or negative thoughts and is linked to positive and negative metacognitive beliefs about rumination (Papageorgiou & Wells, 2001). According to this conceptualization, positive beliefs about the advantages of depressive rumination, such as "rumination helps me understand my mistakes" may encourage the selection of ruminative thought as a strategy. Further, negative

metacognitive beliefs about rumination (e.g., "I cannot control my thoughts; my thoughts mean I'm crazy") may lead to the persistence of ruminative thinking by stimulating negative affect.

Subsequent empirical work has generally supported the construction of this model. Papageorgiou and Wells (2003) used structural equation modeling to test the statistical fit of their model in a clinically depressed sample. Results suggested that positive beliefs about rumination are directly related to the experience of rumination while negative beliefs about rumination mediate the relationship between rumination and depressive symptoms. Watkins and Baracaia (2001) provided further evidence of the link between metacognition and rumination. The researchers found that people high in rumination were more likely to endorse perceived benefits of rumination than people low in rumination with the most frequently reported benefits being: understanding of depression, problem-solving, and preventing future mistakes. In another study, negative metacognitive beliefs about rumination were predictive of depression when controlling for the effects of rumination while rumination was not predictive of depression when controlling for negative metacognitive beliefs about rumination (Papageorgiou & Wells, 2009).

4.1.4 Metacognitive beliefs and post-event processing

PEP in social anxiety is gaining increased attention, however there is a void in the literature with respect to metacognitive beliefs as a possible maintenance factor for PEP. As mentioned, depression literature suggests that positive metacognitive beliefs about rumination activate perseverative thought and increase the likelihood of its selection as a strategy whereas negative metacognitive beliefs about the uncontrollability

and harm of rumination serve to maintain it (Papageorgiou & Wells, 2001; Thomsen, 2006). Given the conceptual similarity between rumination and PEP, it is reasonable to speculate that positive metacognitive beliefs about PEP serve a similar function in social anxiety.

As part of a larger study, Dannahy and Stopa (2007) explored differences in positive metacognitive beliefs about PEP between individuals high and low in social anxiety. An undergraduate sample was utilized and data collection took place on two occasions spaced one week apart. In session 1, participants were asked to engage in an impromptu conversation with a stranger while being video recorded. At session 2, participants were given instructions identical to those given at session 1. Self-report data regarding anxiety, PEP, and metacognition were collected at both sessions. Contrary to researcher expectations, no differences were found between high and low socially anxious individuals in terms of positive metacognitive beliefs about PEP following a socially distressing event. The authors suggest this finding may be an artifact of methodology because the measure of metacognition used was not designed to measure metacognition in social anxiety specifically.

McEvoy and colleagues (2009) conducted a treatment study in which they examined changes in post-event processing and metacognition during cognitive behavioral group therapy for social anxiety. Participants were individuals with clinically diagnosed social phobia who completed a 7-week group therapy intervention program that involved widely-used CBT techniques such as cognitive restructuring and exposure. Data on symptoms of social anxiety, PEP, and metacognition were gathered both pre- and post-treatment. Results showed no differences in positive metacognitive beliefs about

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PEP from pre- to post-treatment. The authors surmised that the stability of positive metacognitive beliefs about PEP may be a function of the treatment design. Metacognitive beliefs were not directly confronted during the group treatment intervention which may explain why the positive metacognitive beliefs about PEP persisted. In addition, the use of the MCQ (Cartwright-Hatton & Wells, 1997) was acknowledged as problematic. This instrument was not designed for use with social anxiety and is considered to be more sensitive to worry-based cognitive processes than rumination.

Although research in this area is sparse at best, PEP appears to be related to negative metacognitive beliefs. For example, results of a previous study suggested that high socially anxious individuals were more likely to endorse the belief that their thoughts are uncontrollable than their less anxious counterparts (Dannahy & Stopa, 2007). In a previously mentioned study, McEvoy and Perini (2009) affirmed this hypothesis finding that high levels of social anxiety were associated with negative metacognitive beliefs about the uncontrollability and danger of PEP as well as the need to control thoughts and that these beliefs were reduced from pre- to post-treatment.

4.1.5 Conclusions and Limitations

Metacognitive processes have been linked to psychopathology, notably depression and generalized anxiety disorder (Watkins & Baracaia, 2001; Wells, 1995). Models have been proposed implicating metacognitive beliefs as a maintenance factor for psychopathology via perseverative thought processes such as rumination and worry (Davey, et al., 1996; Papageorgiou & Wells, 2001). In general, metacognitive beliefs are thought to contribute to psychopathology by increasing the likelihood of perseverative

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thought activation via positive metacognitive beliefs and perpetuating the experience of perseverative thought via negative metacognitive beliefs. Whether or not metacognitive beliefs are related to the maintenance of perseverative thought in social anxiety remains an unsettled issue. However, drawing from findings in the depression and GAD literature regarding the relationship between metacognitive beliefs and perseverative thought, there is a theoretical basis to posit this relationship given that anticipatory processing and post-event processing are conceptually similar to worry and rumination respectively.

Findings from several studies indicate that AP is used as a method of prediction, preparation, and problem-solving for future challenges suggesting the presence of positive metacognitive beliefs about AP. Only one known study investigated negative metacognitive beliefs about AP in social anxiety, characterizing such beliefs as involving uncontrollability, danger, and need to control thoughts. The relationship between positive metacognitive beliefs and PEP in social anxiety has not been established. Only two studies to date have dealt with this issue, neither of which found an effect of positive metacognitive beliefs on PEP in social anxiety. On the other hand, the association between negative metacognitive beliefs and PEP in high, subclinical social anxiety and SAD has garnered some preliminary support as at least three studies have shown a link between these two constructs in social anxiety.

Findings here are promising; however, there are several limitations. First, the data are limited to date. There are relatively few empirical studies regarding the role of metacognition in psychopathology. Available findings should be replicated and extended to build on this promising work. Second, although these theoretical models acknowledge the role of metacognitive constructs other than knowledge/beliefs, they do not appear as a

major component of the conceptualizations. Future research would likely benefit from the inclusion of other metacognitive processes such as monitoring and control. Further, there is very little research regarding the nature of perseverative thought in social anxiety and even less that involves metacognition as a possible maintenance factor perseverative thought. Although there is some work examining the relationship between metacognitive beliefs in social anxiety, it is limited at this point. As such, existing findings should be replicated and extended so as to provide more empirical support for this work.

4.2 Metacognitive monitoring

The second component of metacognition to be discussed, metacognitive monitoring, involves the capacity to acknowledge the presence of cognitive processes related to task performance and to heuristically evaluate global task progress (Efklides, 2001; Kahneman, 2003; Nelson & Narens, 1994). This component of metacognition involves the feelings and appraisals about the current state of cognition when presented with a task (Efklides, 2008; Wells, 2000). Given the use of perseverative thought as a problem-solving strategy aimed at reducing negative affect, it is necessary to examine the metacognitive monitoring of this strategy. Metacognitive monitoring processes related to anxiety as a general concept and depression will be reviewed in the following section, followed by an examination of literature regarding possible metacognitive monitoring in social anxiety.

4.2.1 Metacognitive monitoring in anxiety and depression

In two related psychometric studies, instruments were developed and/or further tested to capture the qualities of metacognition in psychological disorder (MCQ, Cartwright-Hatton & Wells, 1997; MCQ-30, Wells & Cartwright-Hatton, 2004). An

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examination of the factor structure of the related instruments revealed the presence of an empirically distinct metacognitive category described as "Cognitive Self-Consciousness." This category was suggested to reflect the degree to which an individual focuses on his/her cognitive processes, i.e., metacognitive monitoring. The degree to which this factor is predictive of emotional distress (anxiety and depression) was investigated in a follow-up study of the MCQ-30 (Spada, Mohiyeddini, & Wells, 2008). Results of structural equation modeling suggested that Cognitive Self-Consciousness was shown to account for a significant amount of variance in depression, but not anxiety scores. Interestingly, it was found that cognitive self-consciousness inversely predicted depression. It was concluded that depressed individuals may lack an awareness of their ruminative thinking styles and thus do not modify them which leads to increased negative affect.

This conclusion was supported by an examination of dysfunctional thinking in depression (Sheppard & Teasdale, 2000). Of interest, was whether or not depression can be characterized by the presence of stable cognitive schemas as measured by the endorsement of dysfunctional attitude statements. The researchers examined patterns of responding on a computer task where participants were asked to either agree or disagree with attitude statements (neutral and dysfunctional) by striking one of two computer keys. It was hypothesized that a mismatch between an individual's schema content and a particular attitude statement would result in a longer response time because the individual must engage in metacognitive monitoring to "double check" the potential response before acting. Results suggested that, compared to non-depressed controls, depressed participants showed no slowing of agreements with dysfunctional statements. Further,

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depressed participants showed a virtually identical pattern of responding affirmatively to dysfunctional and neutral statements suggesting that depressed individuals treated these very different attitudes in a similar fashion. The researchers concluded that this indicated an absence of metacognitive monitoring for thoughts that were consistent with dysfunctional schemas in depressed individuals. It was further concluded that this lack of metacognitive monitoring exacerbates depression as these dysfunctional schemas are never reality tested and are accepted as factual self-statements.

4.2.2 Metacognitive monitoring in social anxiety

Research suggests a link between anxiety and depression, and the process of metacognitive monitoring. It is possible to extend this theoretical link to social anxiety specifically. That is, cognitive models of social anxiety indicate that socially anxious individuals are hyper-aware of internal processes, including cognition (Clark & Wells, 1995; Rapee & Heimberg, 1997). This implies an awareness of thought processes that can be described as metacognitive monitoring. However, only two studies to date have examined the relationship between metacognitive monitoring and social anxiety specifically. As part of a larger investigation of PEP in social anxiety, Dannahy and Stopa (2007) found that individuals high in social anxiety scored higher on measures of cognitive self-consciousness (i.e., metacognitive monitoring) than did their less anxious counterparts. Affirming this finding, McEvoy and colleagues (2009) conducted a cognitive behavioral group treatment study in which they found that levels of cognitive self-consciousness were significantly reduced from pre- to post-treatment in socially anxious individuals. Participants were individuals with SAD who completed a 7-week course of CBGT that included psychoeducation, exposure and response prevention,

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cognitive restructuring, and a focus on attention shifting. These interventions were utilized to address symptoms of social anxiety, including a specific focus on AP and PEP. The researchers detected reductions in PEP following treatment and found that metacognitions were less strongly endorsed upon conclusion of the CBGT program.

4.2.3 Conclusions and limitations

At present, research regarding metacognitive monitoring in anxiety and depression is limited. Acknowledging this, at least one study has shown that depression and depressive rumination are associated with decreased metacognitive monitoring. Researchers concluded that this decreased metacognitive monitoring impairs the ability to modify problematic thinking adaptively. Other research also identified deficits in metacognitive monitoring for depressed individuals that were specific to negative attitude statements about the self. Thus, it was concluded that these metacognitive monitoring deficits were reflective of existing negative self-schemas that rendered the "double-checking," or monitoring, of negative self-statements unnecessary. There is virtually no research regarding the presence and influence of metacognitive monitoring processes in social anxiety. At present, only two studies have examined metacognitive monitoring specifically in social anxiety, both concluding that social anxiety is associated with high levels of metacognitive monitoring. Assessing metacognitive monitoring in social anxiety was not the primary objective of either study; however, these findings can be reasonably interpreted as preliminary evidence of the relationship between metacognitive monitoring and social anxiety.

Future research should aim to further deconstruct the nature of dysfunctional metacognitive monitoring as it relates to depression and rumination. The finding that

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metacognitive monitoring is not related to anxiety, as measured by a subscale of the MCQ-30, is puzzling. Given the body of research implicating self-focused attention to cognition in GAD, this finding is counterintuitive. Future research should attempt to replicate this finding and more targeted measures of metacognitive monitoring in anxiety should be developed to ensure enhanced specificity. In addition, no definitive conclusions can be made about the role of metacognitive monitoring in social anxiety given the lack of empirical work in this area. It is necessary to identify whether unique patterns of metacognitive monitoring are present in social anxiety specifically. The preliminary findings mentioned above must be extended such that metacognitive monitoring of perseverative thought in social anxiety is a primary goal of the research endeavor.

4.3 Metacognitive control

Research suggests that metacognitive beliefs and metacognitive monitoring contribute to the link between perseverative thought and psychopathology. In this sense, the third component of metacognition, metacognitive control, is also of interest. According to Efklides (2008), metacognitive control is the volitional use of strategies to control ones cognitive processes. In the context of psychological disorder, metacognitive control strategies are described as attempts to control cognitive processes as a means of regulating negative affect (Wells, 2000). Selective attention (SA) is thought to be a component of metacognitive control and refers to a top-down control process that is effortful and is suggested to rely on the inhibition of non-preferred or extraneous stimuli (Umiltà & Stablum, 1998). Thus, inhibitory control (IC) is a central feature of selective attention and is an important metacognitive control function which allows an individual

to effortfully disengage from task-irrelevant mental operations that serve to interfere with efficient cognitive processing (Larkin, 2010). Given limited research regarding metacognitive control and social anxiety specifically, the following section will begin with a review of metacognitive control processes associated with perseverative thought in GAD and depression, namely selective attention/inhibitory control. This review will be followed by an examination of preliminary findings regarding metacognitive control processes in social anxiety.

4.3.1 Metacognitive control and worry

Selective attention and inhibitory control (IC) are interrelated processes that have been associated with activity in the prefrontal cortex (Miller & Cohen, 2001). Further, research has found that elevated activity in the prefrontal cortex (PFC) is associated with generalized anxiety disorder (Hoehn-Saric, Schlund, & Wong, 2004). In addition, Hoehn-Saric and colleagues (2005) used a worry induction technique to observe the effects of worry on cerebral blood flow to the prefrontal cortex in a non-anxious sample. Results indicated that worry was associated with increased activity in the PFC and decreased activity in the amygdala. The researchers interpreted this finding as corroboration for the avoidance hypothesis of worry as it appears the increased PFC activity is associated with cognitive function while activity in the amygdala is affect-related. In another recent study, Price and Mohlman (2007) examined the relationship between inhibitory control and worry in a GAD sample. Participants were administered a Stroop task in which they were presented with color names printed in an incongruent color of ink and were asked to report the color of the ink thus requiring them to inhibit reporting the written color name. The researchers found that Stroop task performance

was positively correlated with measures of worry for individuals with GAD. This is not consistent with previous work suggesting a deficit of IC, however, the current study did not utilize emotionally-laden stimuli suggesting that performances on emotional Stroop tasks do not generalize to non-emotional tasks. The authors interpreted these findings as evidence that, within the context of GAD, increased inhibitory control is associated with more severe symptomatology. That is, GAD is not characterized by a deficit in inhibitory control, but rather is associated with a failure to utilize IC in adaptive ways.

4.3.2 Metacognitive control and depression

As with GAD, depression appears to be associated with differential functioning of attention. It has been shown that depression is associated with attentional biases (Craighead, Ritschel, et al., 2008). These attentional biases have been examined as related to dysfunctions in IC processes. Joorman (2004) used a negative affective priming task to investigate the inhibitory control functioning during processing of emotional material in a depressed sample. Results suggested that depressed individuals failed to show a negative priming effect in the processing of negative stimuli. That is, depressed individuals did not appear to exert IC for irrelevant negative stimuli, even when primed to do so. This may point to a tendency for depressed individuals to have difficulty disengaging their attention from negative stimuli (Gotlib, Krasnoperova, Yue, & Joormann, 2004). Lending support to this hypothesis, one study used an affective shifting task to examine neuropsychological differences in depressed versus non-depressed individuals (Murphy et al., 1999). More specifically, one component of the study was designed to observe inhibitory control processes in depression and whether mood-congruent attentional biases were present during the affective shifting task.

Results suggested that depressed individuals showed an impaired ability to shift the focus of attention away from negative affective (i.e., mood-congruent) material. This may account for the apparent inability of individuals with depression to disengage from mood-congruent cognitive rumination.

4.3.3 Metacognitive control and social anxiety

As described earlier, social anxiety is associated with the self-focused thought processes of post-event processing and anticipatory anxiety. Similar to rumination and worry, these thought processes appear to be perseverative in nature. It is important, then, to examine attentional control processes such as selective attention/inhibitory control that have been linked to other forms of perseverative thought (i.e., worry and depression) and may be associated with this perseverative thinking style in social anxiety. In this vein Amir and colleagues (2003) conducted a study in which they examined whether attention disengagement difficulties, i.e. inhibitory control, were associated with social anxiety. The researchers used a modified cued target paradigm developed to study covert shifts in attention. In particular, participants were presented with emotionally valenced (positive and social threat) and neutral stimuli as cues during "valid" and "invalid" trials and response times were measured. Socially anxious individuals garnered longer response latencies when identifying invalidly cued targets following social threat words. These results support the hypothesis that socially anxious individuals have difficulty disengaging (or inhibiting) attention from social threat words. In another study, Buckner, Maner, and Schmidt (2010) used an eye tracking paradigm to investigate attentional processes in social anxiety. Similar to the Amir study, the researchers were interested in selective attention in social anxiety regarding socially threatening stimuli, in this case

facial photos (happy, disgust, neutral). Individuals high in social anxiety were found to exhibit slower disengagement from negative social cues (disgust faces) relative to individuals low in social anxiety. According to the authors, the ability to effortfully disengage attention from social threat information may serve as protection against social anxiety, while difficulty with disengagement likely serves to maintain and/or exacerbate the anxious experience.

At least one study has examined the neural bases of social anxiety (P. Goldin, Manber, Hakimi, Canli, & Gross, 2009). fMRI technology was used to examine neural responses to social threat in socially anxious individuals. In particular, the researchers were interested in examining the regulatory functioning of socially anxious individuals when presented with socially threatening stimuli. Participants were asked to implement cognitive-linguistic regulation of their emotional response when presented with social-threat (harsh faces) physical-threat (violent scenes), and neutral stimuli. Compared to controls, socially anxious individuals showed reduced coordination of cognitive control circuitry during regulation of attention during social threat. Socially anxious individuals showed a differential pattern of activity in response to social threat in which medial PFC activity was enhanced while dorsolateral PFC activity was attenuated. This reciprocal relationship is thought to be reflective of emotion-cognitive interactions. These findings suggest an impaired ability for socially anxious individuals to implement cognitive/attention regulation strategies during (perceived) social threat conditions.

Schmidt and colleagues (2009) conducted a study in which they examined the effects of attention training on symptoms of social anxiety. Participants were social phobics who were randomly assigned to either an attention training condition or a control

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condition. The training component was a dot-probe task that was designed to promote the disengagement of attention from social threat (disgusted faces). Symptoms of social anxiety were assessed on three occasions: pre-treatment, post-treatment, and 4-month follow-up. Results showed that, self-reported symptoms of social anxiety were significantly reduced at post-treatment and follow-up. Further, 72% of the social phobics in the attention training condition no longer met DSM-IV criteria for SAD at post-treatment and, and at follow-up 64% remained sub-threshold. Goldin, Ramel, and Gross (2009) examined the effects of mindfulness-based stress reduction on the neural correlates of self-referential processing in social phobics. Participants were asked to engage in a self-referential processing task designed to facilitate self-endorsement of trait descriptions (positive and negative) both pre- and post-treatment. fMRI analyses showed decreased medial prefrontal cortex (PFC) activity and increased activity in regions associated with attention regulation (i.e., left inferior parietal lobule, medial precuneus) which corroborates the hypothesis that treatment may have facilitated enhanced attentional control.

4.3.4 Conclusions and limitations

According to Borkovec's (1994) avoidance model of worry, the avoidance of threatening emotional content is, in part, a product of preferentially (and effortfully) allocating attentional resources away from threatening material and toward verbal-linguistic material, i.e. worry. The studies referenced above appear to support this claim by 1) Providing evidence of increased activity in the prefrontal cortex associated with inhibitory control for individuals with GAD and 2) Using a modified Stroop task to demonstrate that individuals with GAD may deploy inhibitory control in maladaptive

ways. In addition, there is an apparent relationship between inhibitory control dysfunction and depression. For depressed individuals, there is evidence of an impaired ability to disengage attention from negative affectively-laden material that is congruent with the predominant negative mood state. Further, research has shown that social anxiety is associated with an impaired ability to disengage attention from negative stimuli. Studies examining the neural bases of social anxiety have also supported this hypothesis as unique activity in brain regions associated with attention regulation has been found in socially anxious individuals. In addition, treatments that include attention training and/or attention re-focusing have resulted in the improvement of attentional control. Given that perseverative thought is characterized by a failure to disengage attention from a repetitive cognitive process, these findings may have implications for the maintenance of AP and PEP in social anxiety.

Although these findings are convincing, more research is needed to further delineate these relationships. Results showing that increased activity in the PFC is associated with worry are compelling; however, it is unclear what mechanisms are responsible for this activity. For example, it is possible that the process of worry might account for the increased activity irrespective of inhibitory control. Future research should clarify the relationship between worry, activity in the PFC, and inhibitory control. In addition, there is no current agreement in the literature about the nature of the relationship between metacognitive control and worry (Price & Mohlman, 2007). For example, Mathews and McLeod (1985) suggest an alternative explanation in that the attentional bias associated with worry is involuntary and thus unrelated to control processes. A limitation of attentional control research for both GAD and depressed

populations in this regard is the reliance on reaction times for attention tasks like the

Stroop. There are certainly other explanations for why an individual may register a

delayed reaction time on a task like this. For example, it is reasonable to suppose that

depressed individual may simply be engaging in perseverative thought during the task

regardless of the affectively laden stimuli. One limitation of the findings regarding social

anxiety specifically is that it is not clear whether the stimuli used to approximate social

threat (e.g., disgusted faces) in some of this work adequately represents the construct for

which it serves as a proxy. Future research should utilize observations of actual social

situations to determine whether these results generalize to the "real world." In addition,

given that attentional biases are common across pathologies (e.g. Mogg & Bradley,

2005), future research should determine whether there is a pattern of attentional control

processes unique to social anxiety.

5. A proposed metacognitive model of social anxiety

There is broad empirical support for the cognitive nature of social anxiety.

However, existing models of social anxiety concentrate on the content of cognition rather

than the overall style of thinking. In addition, factors that maintain this maladaptive style

of thinking in social anxiety remain unclear. Given the relative lack of research in these

areas specific to social anxiety, research on worry in GAD and rumination in depression

provide the best available empirical basis for this examination. Although literature

regarding perseverative thought in mental disorder is garnering more attention in the

literature, as is the role of metacognition, these areas of research remain in development.

Work specific to social anxiety is even less mature. As such, the proposed model does

not presume etiology, rather, it is an examination of variables that may aid in the

maintenance of social anxiety and, perhaps, help to characterize it. Because research in this area is sparse, several components of the model are somewhat speculative. Still, the conceptual similarities between cognitive processes associated with GAD and depression, and cognitive processes linked to social anxiety lend credence to this speculation. Further, the lack of research in this area, in and of itself, necessitates such speculation and, indeed, provides the very basis for such an investigation.

In general, the proposed theoretical model hypothesizes that socially anxious individuals engage in perseverative thinking both pre and post social event to cope with negative thought content and emotions related to the social experience, and that various metacognitive processes maintain this maladaptive style of thinking (See Figure 1). Prior to a feared social event, the socially anxious individual engages in AP (Hinrichsen & Clark, 2003; Vassilopoulos, 2004). In the current model, AP is conceptualized as a domain-specific worry process and is thus considered perseverative. Following the feared social event, the socially anxious individual engages in PEP, a "post-mortem" review of his/her performance during a social experience that focuses on perceived failures (Rachman, et al., 2000). Though specific to social experiences, PEP is a thinking style similar to rumination in depression and, as such, is presumed to be perseverative. These constructs are assumed, in the current model, to be conceptually similar and highly interrelated. That is, AP and PEP are conceptualized as two distinct components of a larger perseverative thought construct. Research has shown that worry and rumination are primarily distinguished by temporal focus (McEvoy, et al., 2010). Because AP and PEP are conceptually similar to worry and rumination, it is reasonable to speculate that, like worry and rumination, AP and PEP are distinguished, in part, by temporal focus.

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However, given the qualitative differences between worry and rumination and research suggesting that the two constructs maintain relative independence, the current model assumes that AP and PEP are similarly distinguished from one another. That is, AP is future-oriented worry about a social event in which possible social challenges are considered and anxiety is stimulated.

Figure 1: Conceptual Metacognitive Model of Social Anxiety

```
  Metacognitive        Metacognitive        Metacognitive
    Beliefs              Monitoring            Control
       |                     |                    |
       v                     v                    v

         Anticipatory            Post-Event
          Processing             Processing
              |                       |
              v                       v

                      Social
                      Anxiety
```
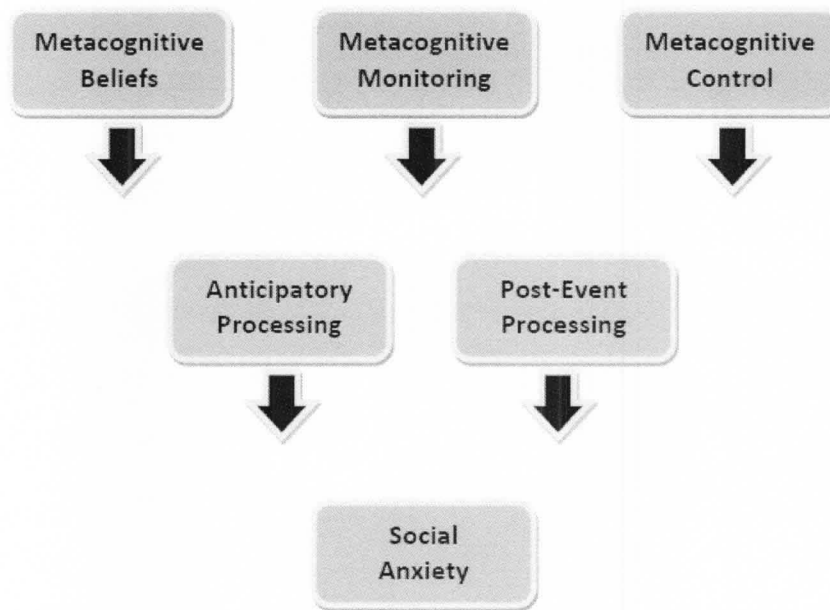
As articulated by Clark and Wells (1995), the socially anxious individual becomes anxious as she starts to think about the social event because she begins producing negative images of herself in the future situation and tends to predict negative performance and, ultimately, rejection. PEP, on the other hand, is past-oriented rumination about a perceived social failure which entails prolonged thought specific to these perceived failures and is associated with the stimulation of anxiety. More specifically, the socially anxious individual broods over the social event and focuses on cognitive content that is guided by negative thoughts and anxious feelings that occurred

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during the social experience (Dannahy & Stopa, 2007). In addition, PEP involves the biased retrieval of perceived negative information about themselves from the social experience (Coles & Heimberg, 2002). Further, this selective retrieval is theorized to lead to the reshaping or distortion of memories such that the recollection of the event is eventually reconstructed to fit the socially anxious individual's negative self-view (Brozovich & Heimberg, 2008). PEP, then, is related to perseverative thought about what *did* happen in a past social experience versus AP which is centered around what *might* happen in a future social experience. So while it is temporal focus, in some ways, that distinguishes the constructs, there are additional qualitative differences between AP and PEP.

In response to a trigger (e.g., a negative thought or emotion), the socially anxious individual activates positive metacognitive beliefs about AP. For example "worrying about the upcoming social event allows me to predict and prepare for potential problems" is a positive metacognitive belief about the functionality of AP. Further, the belief that allows for the prediction of and preparation for potential social "threats" may encourage a behavioral response, such as avoidance. Avoiding the social "threat," then, reinforces the positive metacognitive belief that AP decreases social threat probability. These types of beliefs encourage the use of AP as a coping strategy which, in turn, maintains the perseverative thinking style and consequently the negative affect. In addition to positive metacognitive beliefs, negative metacognitive beliefs serve to maintain anticipatory processing. The current model suggests that, similar to worry in GAD, negative metacognitive beliefs about AP maintain the AP because it is viewed as uncontrollable and harmful which stimulates an anxious response and, in turn, more AP.

A socially anxious individual who views AP as uncontrollable may experience increased negative affect due to this lack of perceived control. Moreover, the metacognitive belief that AP is harmful likely stimulates anxiety and maintains perseverative thought.

Following the social event, and in response to an ambiguous trigger, post-event processing is initiated due positive metacognitive beliefs held about PEP. For example, the negative thought "I embarrassed myself" may trigger the metacognitive belief that PEP promotes an understanding of why the perceived failure occurred. This, in turn, stimulates the use of PEP as a coping strategy. Similar to rumination in depression, negative metacognitive beliefs about PEP concern the uncontrollability, harm, and meaning of PEP. These negative metacognitive beliefs allow PEP to persist because there is a perceived lack of control and a sense of harm which increases negative affect and precipitates more PEP.

In addition to metacognitive beliefs about AP and PEP, the proposed model asserts that perseverative thought in social anxiety exists as a function of poor metacognitive monitoring and control processes. As stated above, metacognitive monitoring involves feelings and appraisals about cognition and the heuristic evaluation of progress toward a goal (Efklides, 2001; Kahneman, 2003; Wells, 2000). Because the goals of the socially anxious individual (i.e., control/prevention of negative thoughts and emotion) are never attained, the current model proposes that socially anxious individuals suffer from impaired metacognitive monitoring abilities. Data regarding metacognitive monitoring in psychopathology are limited and of mixed results. In light of the shortage of research in this area, the current model only supposes disruptions in metacognitive monitoring processes for socially anxious individuals, but does not assume the nature of

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these disruptions. It is possible that social anxiety is, like depression, inversely related to metacognitive monitoring. Alternatively, social anxiety may be associated with excessive monitoring and awareness of thoughts, leading to increased negative affect. It is dysfunction in metacognitive monitoring, generally, that the current model assumes to be linked with social anxiety.

In addition, metacognitive control processes are also implicated in the maintenance of perseverative thought and related social anxiety. Previous work indicates that metacognitive control involves the deliberate use of strategies to control cognition (Efklides, 2008; Perfect & Schwartz, 2002). In particular, selective attention/inhibitory control is proposed as a metacognitive control mechanism that perpetuates perseverative thinking when impaired. The current model suggests that the maintenance of perseverative thought in social anxiety is, in part, a function of an impaired ability to appropriately disengage attention from maladaptive thought processes. Both GAD and depression studies implicate problems with metacognitive control in the maintenance of perseverative thought and, by extension, negative affect.

The current study

The relationship between perseverative thought and various forms of psychopathology is well-established in the literature (Borkovec, 1994; Nolen-Hoeksema, 1991). Further, metacognitive processes have been implicated in the maintenance of this perseverative thinking style in psychopathology (Wells, 1995; Wells & Matthews, 1994). The proposed model considers the role of perseverative thought in social anxiety specifically, both pre and post social event. As with psychopathology more generally, the proposed model implicates metacognitive processes in the perpetuation of maladaptive

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perseverative thinking. The current study is an attempt to establish, empirically, the hypothesized relationships presented in the proposed model.

The first aim of the current study was to establish relationships among the variables of interest. First, it is important to replicate the previously cited findings that social anxiety is associated with perseverative thought (Rachman, et al., 2000; Vassilopoulos, 2004). Correspondingly, the relationship between anticipatory processing and social anxiety was tested, and it was expected that AP will show a significant and positive correlation with social anxiety. Post-event processing was expected to share a significant positive correlation with social anxiety. Because there appears to be some conceptual confusion about the boundary between these two constructs, it was important to assess the degree to which these two constructs are independent or, alternatively, interrelated. To this end, we hypothesized that AP and PEP would be significantly related to one another, but would constitute separate distinct constructs. As a rule of thumb, correlations above a value of 0.8 signal a possible problem with multicollinearity (Kline, 2005). The correlation between AP and PEP was expected to be strong and positive; however, it was not expected to exceed this value. Beyond this rule of thumb, it is important to examine the shared variance between AP and PEP as they relate to social anxiety so as to provide more statistical clarity. The links between the three metacognitive processes (beliefs, monitoring, control) and AP were tested as well. Significant positive correlations were expected to exist between metacognitive beliefs and AP as well as metacognitive control and AP. The correlation between metacognitive monitoring and AP was expected to be significant. Although findings are mixed in the literature regarding metacognitive monitoring and perseverative thought, the valence of

this correlation was expected to be positive given the self-focused nature of cognition in

social anxiety. The potential link between the three metacognitive processes and PEP

was tested. Metacognitive beliefs, metacognitive monitoring, and metacognitive control

were expected to share significant positive correlations with PEP. Finally, all three

components of metacognition were expected to be associated with social anxiety and

were tested. Specifically, metacognitive beliefs, control, and monitoring were expected

to show a significant and positive correlation with social anxiety.

A hypothesized model was presented in Figure 1 to provide conceptual context

for the testable model provided in Figure 2. That is, the model presented in Figure 2 is a

testable proxy of the more broadly defined conceptual model presented in Figure 1.

Figure 2: Hypothesized Path Model
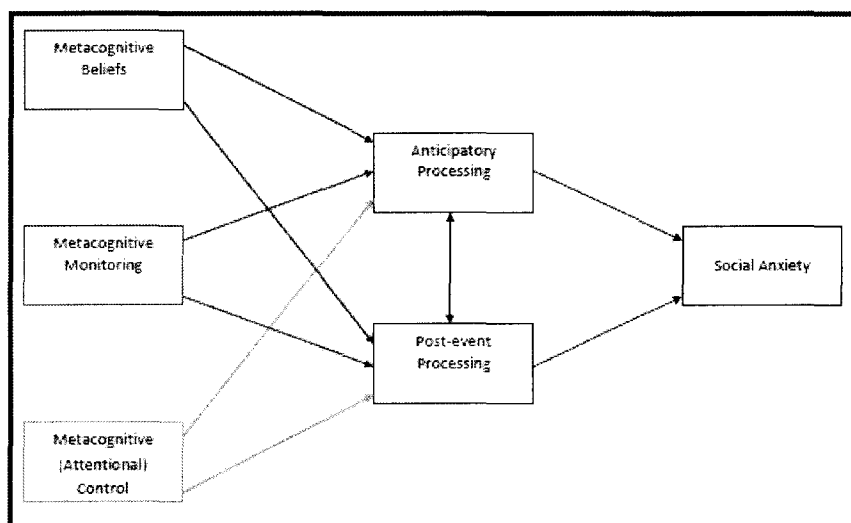
The second aim of this study was to examine the relationship among metacognitive

processes, perseverative thought, and social anxiety. Whereas the analyses mentioned

above establish and/or affirm relationships among the variables of interest, this analysis

tested the statistical cogency of the hypothesized model overall, as well as the hypothesized causal pathways within the overall model. The direct relationships mentioned above were tested within the context of the path model and were expected to be significant. In terms of indirect relationships, the first path we tested was the relationship between metacognitive beliefs and social anxiety, via anticipatory processing. Based on research regarding the relationship between anticipatory processing and social anxiety (Vassilopoulos, 2004) and findings implicating metacognitive beliefs in the maintenance of worry in GAD (Wells, 2005), this path was hypothesized to be significant. Second, given the apparent relationship between social anxiety and PEP (Rachman, et al., 2000) and research implicating metacognitive beliefs in the maintenance of rumination in depression (Papageorgiou & Wells, 2003), an indirect relationship was hypothesized between metacognitive beliefs and social anxiety through the intermediate variable of post-event processing. Further, research points toward a link between metacognitive monitoring and perseverative thought in psychopathology generally (Cartwright-Hatton et al., 2004; Cartwright-Hatton & Wells, 1997). Preliminary findings suggest a similar relationship between metacognitive monitoring and perseverative thought in social anxiety (Dannahy & Stopa, 2007; McEvoy, et al., 2009). As such, it was hypothesized that metacognitive monitoring will share an indirect relationship with social anxiety, via AP and PEP. Next, based on research indicating a relationship between the attentional control and perseverative thought (e.g. Joormann, 2004; Price & Mohlman, 2007) and preliminary findings linking attentional control problems to social anxiety (Amir, et al., 2003; P. Goldin, et al., 2009), an indirect relationship was hypothesized between metacognitive (attentional) control and social

anxiety through the intermediate variables of AP and PEP.   Each path and the overall fit were tested for significance using path analysis.

METHODS

Recruitment and process

The sample was comprised of undergraduate students from a large Midwestern university. Participants were recruited from the undergraduate psychology subject pool using the computer-based research participation system, Sona Systems. Incentive, in the form of research participation credit for the psychology course was provided for participation in the study for eligible participants. IRB approved flyers advertising the study were posted on billboards in various locations on campus. In addition, researchers provided information about the study to students in introductory psychology classes via a brief talk. Participants were tested in groups in classroom settings. Prior to testing, each participant reviewed and completed an informed consent form. Following the consent process, each participant completed a series of self-report measures (the specifics of these self-report measures can be found in the Measures section). In total, this process took approximately one to one and a half hours to complete.

Sample Size

There exists no strict formula for arriving at an ideal sample size using a path analysis approach. Consequently, to determine an appropriate sample size, previous path analysis literature was reviewed. Some literature suggests a minimum of 100 subjects to in order to obtain a sound model estimate (Anderson & Gerbing, 1984). However, other literature advocates a more model specific approach stipulating that for every free

parameter and every observed variable, 5 to 10 subjects are necessary to ensure an accurate model estimation (Benter, 1993). In light of the mentioned standards and because there are 12 free parameters and 6 observed variables, between 100 and 180 participants is indicated. The current sample comprised 154 participants.

Measures

Anticipatory Processing Questionnaire (Vassilopoulos, 2004). The APQ is a self-report measure of anticipatory processing as it relates to the experience of social anxiety. It is an 18-item questionnaire that was developed in line with Clark and Wells' model of social phobia (Clark & Wells, 1995). Respondents are presented with an introductory paragraph that states "According to research findings, most people experience anxiety before entering a social event-activity (such as a party or interaction with unknown people). Have you experienced anxiety before a social event in the past few months? If yes, then please answer the questions below." A visual analogue scale is used and all items are scored from 0 (not at all) to 100 (extremely) with the exception of item 17 (yes/no). The measure yields a composite score for anticipatory processing which has been shown to be associated with measures of social anxiety (Vassilopoulos, 2004). According to Vassipolous (2004), the APQ shows good internal consistency (Cronbach's α = .91).

Attentional Control Scale (Derryberry & Reed, 2002). The ACQ is a self-report measure of attentional control. It comprises 20 items, tapping individual differences in attentional control. Items are rated by respondents on a 4-point Likert-type scale (1=almost never; 2=sometimes; 3=often; 4=always). Item scores are summed to yield a total score of attentional control. Of particular note, high scores reflect *good* attentional

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control. In terms of psychometrics, the ACQ shows good internal consistency

(Cronbach's α = .86) and is positively related to indices of positive emotionality and

inversely related to indices of negative emotionality, such as trait anxiety (Claes,

Vertommen, Smits, & Bijttebier, 2009).

Beck Depression Inventory-II (Beck, Steer, Ball, & Ranieri, 1996). The BDI-II is

a 21-item self-report measure that assesses the severity of somatic, affective, and

cognitive symptoms of depression in an adult population. Clinical interpretation of

scores is as follows: 0-13 indicates minimal depression, 14-19 indicates mild depression,

20-28 indicates moderate depression, 29-63 indicates severe depression. The BDI-II has

excellent internal consistency as it yields alphas ranging from 0.92 to 0.93.

Meta-Cognitions Questionnaire (Cartwright-Hatton & Wells, 1997). The MCQ is

a 65-item self-report measure design to assess beliefs about worry and intrusive thoughts.

It is based on Well's self-regulatory model of vulnerability to psychological disorder

(Wells & Matthews, 1994). The scale consists of five subscales: positive beliefs about

worry, beliefs about controllability and danger, beliefs about cognitive competence,

general negative beliefs, and cognitive self-consciousness. Respondents are asked how

much they agree with each item on a four-point Likert-type scale. The subscales of the

MCQ demonstrated adequate to good internal consistency with alphas ranging from .72

to .89, adequate to very good test-retest reliability, and good convergent validity

(Cartwright-Hatton & Wells, 1997) .

Post-event Processing Questionnaire (Rachman, et al., 2000). The PEP is a self-

report measure developed to index post-event rumination in social anxiety. This measure

consists of 13 items designed to gauge how much and how often respondents engage in

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post-event processing following an anxiety-provoking social event in the last few months. The PEP uses a 100-point visual analogue scale with 0 indicating low levels of PEP and 100 indicating severe levels of PEP which yields a total score based on all 13 items. The PEP is correlated with measures of social anxiety and an investigation of the psychometric properties of the instrument revealed good internal consistency, with a Cronbach's alpha of .85 (Rachman, et al., 2000).

Social Phobia and Anxiety Inventory (Turner, Beidel, Dancu, & Stanley, 1989). The SPAI is a 45-item self-report questionnaire that was empirically developed to measure social anxiety. It measures cognitive, somatic, and behavioral aspects of social anxiety across situations and settings. Each item is rated for frequency on a seven-point scale ranging from 0 (never) for to 6 (always). The SPAI contains two subscales: social phobia and agoraphobia. Subscale scores are calculated by summing the items that constitute each subscale. Normative information is available for both clinical and student samples. The SPAI shows good internal consistency with alphas ranging from .94 to .96 for the social phobia subscale and .85 to .86 for the agoraphobia subscale. The SPAI also shows good test-retest reliability, good convergent validity, and adequate discriminant validity (Beidel, Turner, Stanley, & Dancu, 1989; Turner, Stanley, Beidel, & Bond, 1989).

Internal Consistency for the Current Sample

In order to assess the degree to which each scale or subscale used in the study measures a unitary construct in the current sample, Cronbach's alpha coefficient values were evaluated. In this sample, the SPAI evidenced excellent internal consistency (Chronbach's alpha = 0.98). The Anticipatory Processing Questionnaire produced a

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Cronbach's alpha value of 0.92 which indicates excellent reliability. The Post Event Processing Questionnaire demonstrated good internal consistency with a Cronbach's alpha value of 0.89. The Attentional Control Scale showed good internal consistency (Cronbach's alpha = 0.85). The metacognitive beliefs composite produced by the Meta-Cognitions Questionnaire subscales measuring *positive beliefs about worry* and *beliefs about controllability and danger* demonstrated excellent reliability (Cronbach's alpha = 0.92). Finally, the Meta-Cognitions Questionnaire subscale measuring *cognitive self-consciousness* evidenced acceptable internal consistency (Cronbach's alpha = 0.79). The Beck Depression Inventory-II showed excellent reliability (Cronbach's alpha = 0.90)

Statistical Analyses

Preliminary analyses were conducted to evaluate the utility of data obtained from the sample. It is important to ascertain whether any of the demographic variables hold strong relationships with the constructs included in study analyses. Correlational analyses were run to test these potentially problematic relationships. In addition, the extent to which each measurement instrument or subscale included in this study measures a unitary construct (i.e., internal consistency) was evaluated via Chronbach's alpha coefficients.

In order to replicate previous findings that established direct relationships among the variables of interest included in the model, Pearson Product Moment Correlations were run for each expected relationship. In addition, although not the primary purpose of the current study, replicating previous findings of these direct relationships provides statistical justification for testing a more comprehensive model including potential indirect relationships within such a model.

Path analysis was chosen to test the proposed theoretical model and the AMOS version 20.0 Structural Equation Modeling (SEM) software package was used to conduct the analysis (IBM SPSS, 2012). This analytic strategy was chosen because offers multiple distinct advantages relative to other statistical analysis procedures. For example, path analysis (as a variant of SEM) allows for the evaluation of the entire system of variables. More specifically, if it is a good fit for the data, the hypothesized model "argues for the plausibility of postulated relations among variables" (Byrne, 2001, p. 1). This method involves the examination of multiple relationships, including direct and indirect pathways, at the same time (Mezo & Francis, 2012). Moreover, this technique offers the ability to account for shared variance among variables included in the model. Path analysis allows for testing these relationships in a unitary model, rather than in multiple separate analyses as is the case with other methods, such as multiple regression (Adelson, 2012). This is advantageous relative to the validity of the specified construct, as well as the reliability of measurement. It also reduces the impact of error related to conducting multiple, separate analyses. In this context, path analysis includes measurement error variables for the variables within the model (Kline, 2005). In the current model, level of social anxiety symptoms was the dependent variable. Metacognitive beliefs, metacognitive monitoring, and metacognitive (attentional) control served as the initial predictor variables. The perseverative thought constructs of AP and PEP were the hypothesized intermediate variables. The extent to which the hypothesized model is a good fit for the data was evaluated with the use of various fit indexes. In addition, direct relationships were tested within the context of the path model. Of particular importance, indirect relationships between predictor variables (metacognition)

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and the dependent variable (social anxiety symptoms) via intermediate variables (perseverative thought constructs) were tested within the path model. The significance of these relationships was evaluated using the Sobel Test (Baron & Kenny, 1986). In addition, comparison models were run to evaluate the performance of the hypothesized model relative to other models. Specifically, given the high comorbidity between social anxiety and depressive symptoms, comparison models were run that included depression as an additional variable.

RESULTS

<u>Descriptives</u>

The final sample was comprised of 154 undergraduate participants who ranged in age from 18 to 30 years old. The mean age for the sample was 20.83 (SD=3.24). The modal age for the sample was 20 years. Of the 154 participants, 33 (21.4%) were male and 121 (78.6%) were female. The sample included (33.1%) freshmen, 37 (24.0%) sophomores, 33 (21.4%) juniors, 32 (20.8%) seniors, and 1 (0.6%) 5th year senior. In terms of ethnic composition, the sample was comprised of 105 (68.2%) European Americans, 30 (19.5%) African Americans, 9 (5.8%) Asian Americans, 1 (0.6%) Latino American, 8 (5.2%) self-identified multiethnic individuals, and one (0.6%) participant who declined to specify his/her ethnicity.

<u>Preliminary Analyses</u>

Demographic Variables

Each demographic variable (age, ethnicity, academic year, sex) was included in a correlation matrix to determine whether there were any problematic relationships among demographic variables and variables of interest in the model. No significant relationships were detected between any of the variables included in the model and any of the mentioned demographic variables. There was, however, a noticeable imbalance in sex distribution with a substantially higher number of females in the sample (78.6%). Although sex as a variable was not statistically associated with other variables of interest

in the model, the imbalance is substantial and worthy of attention nevertheless. As such, a comparison model was run to investigate whether sex exerts a significant amount of influence on the data.

Table 1: Correlations Between Demographic Variables and Path Model Variables

	Metacognitive Monitoring	Metacognitive Control	Anticipatory Processing	Post-Event Processing	Social Anxiety
Age	0.04	0.14	-0.06	0.06	0.13
Sex	-0.03	-0.06	0.07	-0.06	0.01
Academic Year	0.07	0.15	-0.02	0.04	0.07
Ethnicity	0.04	0.001	-0.06	0.05	-0.15

** $p < 0.05$; * $p < 0.01$

Analyses: Aim 1

Correlational analyses were conducted so as to statistically justify exploration of the data with path analysis. Anticipatory processing was positively related to social anxiety ($r=0.42$, $p<0.001$). This is consistent with findings by Vassilopoulos (2004, 2005; 2008) linking anticipatory processing to social anxiety. Post-event processing was related positively to social anxiety ($r=0.26$, $p=0.001$). This result was expected and is a replication of Rachman's (2000) work that established a relationship between PEP and social anxiety. As expected, anticipatory processing and post-event processing were positively correlated ($r=0.67$, $p<0.001$) but did not exceed 0.8, the value which signals possible problems with multicollinearity. Although this threshold was not crossed, the relationship is substantial, thus AP and PEP were covaried in the final model.

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Table 2: Correlations Between Variables Included in the Path Model[1]

	Metacognitive Monitoring	Metacognitive Control	Anticipatory Processing	Post-Event Processing	Social Anxiety
Metacognitive Beliefs	0.43**	-0.27**	0.55**	0.57**	0.28**
Metacognitive Monitoring	—	-0.06	0.33**	0.31**	0.10
Metacognitive Control	—	—	-0.18*	-0.18*	-0.23**
Anticipatory Processing	—	—	—	0.67**	0.42**
Post-Event Processing	—	—	—	—	0.26**

** p < 0.05; * p < 0.01

Of the three metacognitive constructs, two were significantly correlated with social anxiety: Metacognitive beliefs (r=0.28, p<0.001) and metacognitive/attentional control (r= -0.23, p =0.004). These results were expected and comport with previous findings (e.g., Dannahy & Stopa, 2007). Consistent with previous research (e.g., McEvoy et al, 2009), all three metacognitive constructs were significantly correlated with anticipatory processing: metacognitive beliefs (r=0.55, p<0.001), metacognitive awareness/monitoring (r=0.33, p<0.001), and metacognitive/attentional control (r= -0.18, p=0.028). Lastly, each metacognitive construct was significantly related to post-event processing: metacognitive beliefs (r=0.57, p<0.001), metacognitive awareness/monitoring (r=0.31, p<0.001), and metacognitive/attentional control

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[1] Variables described reflect scores on continuous measures of each construct and are not intended to be viewed as diagnostic representations.

(r= -0.18,p=0.022). In general, these results constitute replications of findings from previous research (e.g., Dannahy & Stopa, 2007).

Table 3: Descriptive Information for Variables Included in the Path Model

	Metacognitive Monitoring	Metacognitive Control	Metacognitive Beliefs	Anticipatory Processing	Post-Event Processing	Social Anxiety
Mean	19.38	49.14	71.24	554.31	351.03	49.09
Range	38.00	46.00	74.00	1470.00	920.00	135.00
Minimum	0.00	28.00	38.00	10.00	20.00	2.00
Maximum	38.00	74.00	112.00	1480.00	940.00	137.00

Analyses: Aim 2

Model Fit

The principal question of interest for this study is whether or not the model presented in Figure 2 was a good fit for the data. In addition, significant pathways were explored to ascertain the extent to which metacognitive processes affected levels of social anxiety by way of perseverative thought constructs (i.e., anticipatory and post-event processing). A visual depiction of the path model is presented in Figure 3. The CMIN/DF is the relative chi-square, i.e. an index of how much the fit of data to model has been reduced by dropping paths and should be non-significant (Byrne, 2001). More specifically, this fit index relies on the premise that relationships among the variables included in the model are implied. The relative chi-square measures the degree to which

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the tested relationships in the researcher's model comport with the implied relationships in the "null" model (Adelson).

In short, a failure to reject the "null" model indicates a good model fit. The relative chi-square is non-significant (CMIN/DF=1.97, p = 0.12) indicating a good fit for the data. The Normed Fit Index (NFI) indicates the proportion in the improvement of the overall fit of the model being tested as compared to the null or independent model. In this case, significant relationships are *not* assumed among variables in the null model and thus a good model fit is detected when the researcher's model is statistically different from the null. It is recommended that the NFI have a value greater than 0.9 (Bentler, 1990). The model produced a NFI = 0.98 which is consistent with a good model fit for the data. The Comparative Fit Index (CFI) serves a similar function and is used to further interpret the goodness of fit for the tested model (Byrne, 2001). For the current model, CFI = 0.99 suggesting that it is a good fit for the data. The Root Mean Square Error of Approximation (RMSEA) is used to estimate lack of fit compared to the saturated model and should have a value less than 0.1 (Loehlin, 2004).

Figure 3: Final Tested Path Model

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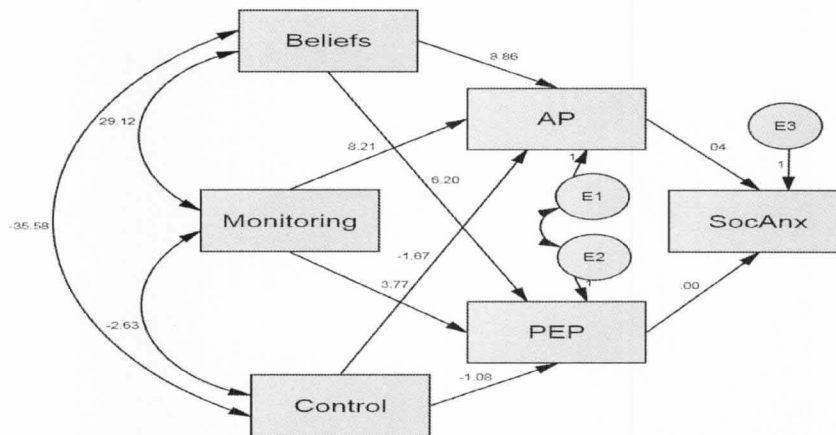
Adelson (2012) noted "whereas (other fit indexes) may be considered a goodness-of-fit indexes, RMSEA may be considered a badness-of-fit index with greater values indicating a worse fit " (p. 52). RMSEA = 0.08 indicating that the model is not a bad fit for the data.

Comparison Models

Social anxiety and depression are highly comorbid (e.g., Kashdan & Roberts, 2011). Moreover, perseverative thought processes are common in individuals with depression (e.g., Harrington & Blankenship, 2002). In particular, post-event rumination has been linked to the maintenance of depressive symptoms (e.g., Nolen-Hoeksema, 2000). Given these factors, a comparison model was constructed to ascertain whether the relationships among the tested variables and the significance of the model overall could be explained by phenomena associated with depression (See Figure 4).

Figure 4: Path Model with Depression included as a Variable
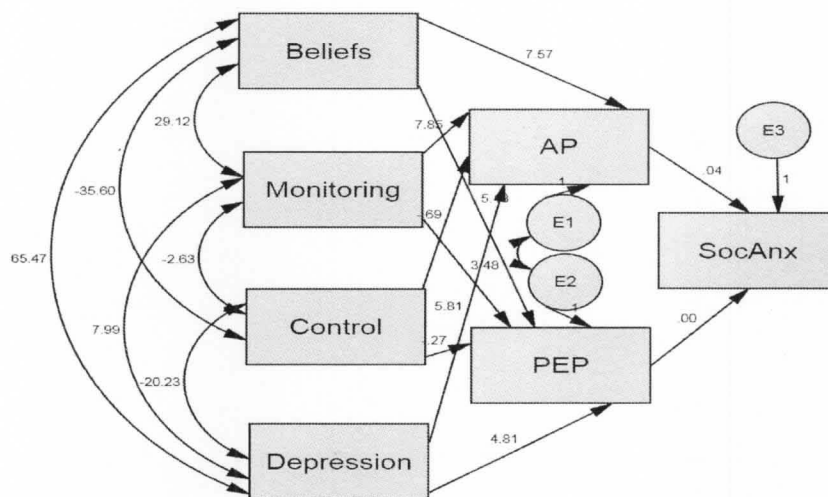
With path analysis, it is possible to evaluate the comparative fit of different models to the

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data by comparing their relative chi-square statistics. When including depression as a variable in the model, the model was a good fit for the data overall. However, including depression in the model did not improve the "goodness" of the overall model fit. That is, a comparison of relative chi-square statistics between the two models revealed a non-significant statistical difference (χ^2 (1) = 0.99, p = 0.32). As an exploratory enterprise, the social anxiety variable was replaced with depression as the dependent variable to determine whether depression might provide for a better model fit. This model was a poor fit for the data (CMIN/DF=5.91, p<0.001; NFI = 0.76; CFI = 0.75; RMSEA = 0.18). In both cases, results suggest that the impact of depressive symptoms is not significant for the model. Therefore, and in the interest of model parsimony, depression was not included in the final model.

Social anxiety is more prevalent in women, than in men (Magee, Eaton, Wittchen, McGonagle, & Kessler, 1996). Sex differences have also been detected in terms of

Figure 5: Path Model with Sex Included as a Variable

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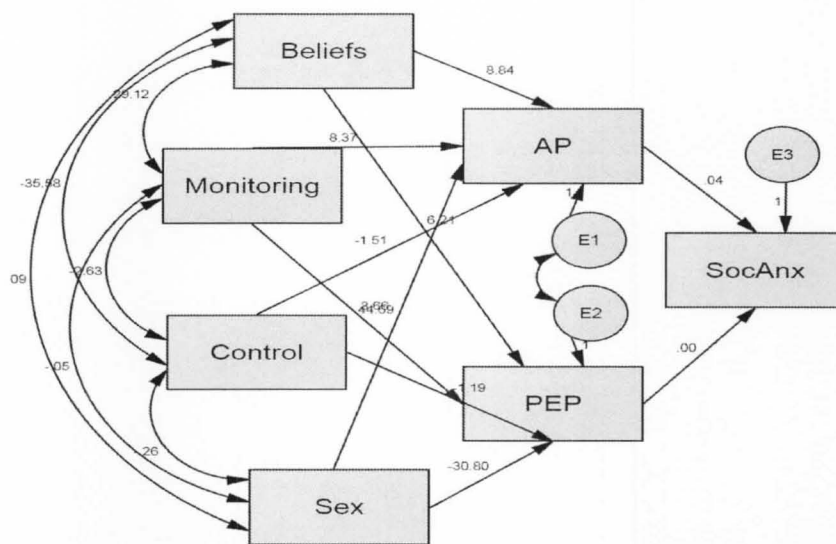
perseverative thought with women reporting experiencing more worry and rumination than men report (e.g., Yoder & Lawrence, 2011). In light of these findings and in response to the disproportionate number of female participants in the current study, a comparison model was run that included sex as a variable (See Figure 5). This comparison model was a good fit for the data; however, it did not improve the fit of the model overall. A comparison of the two models produced a non-significant statistical difference (χ^2 (1) = 0.19, p = 0.66). Moreover, sex was not a component of a statistically significant pathway within the model. Therefore, sex was not included in the final model.

Table 4: Fit Indexes for Path Models

	CMIN/DF (p)	NFI	CFI	RMSEA
Final Model	1.97 (0.12)	0.98	0.99	0.08
Model Including Depression	1.65 (0.16)	0.92	0.96	0.07
Model Including Sex	1.44 (0.22)	0.93	0.97	0.06

Direct effects

Given the strength of the path model, it is possible to examine relationships between variables in the model. That is, it is important to ascertain whether established relationships (i.e., correlations) between variables of interest hold within the context of the path model. The relationship between metacognitive beliefs and anticipatory

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processing was significant, r=6.64, p <.001. The relationship between metacognitive

beliefs and post-event processing was significant, r=4.71, p<.001. The relationship

between metacognitive monitoring and anticipatory processing was significant, r=12.63,

p=0.04. Contrary to results from preliminary analyses, the relationship between

Table 5: Direct Relationships Between Variables in the Final Path Model

Variable	r	p
Metacognitive Beliefs		
Anticipatory Processing	6.64	<0.001
Post-Event Processing	4.71	<0.001
Metacognitive Monitoring		
Anticipatory Processing	12.63	0.04
Post-Event Processing	6.01	0.13
Metacognitive Control		
Anticipatory Processing	-1.14	0.70
Post-Event Processing	-0.72	0.70
Anticipatory Processing		
Social Anxiety	0.03	<0.001
Post-Event Processing		
Social Anxiety	-0.004	0.74

metacognitive monitoring and post-event processing was non-significant, r=6.01, p=0.13

as was the relationship between metacognitive control and anticipatory processing, r=-

1.14, p=0.70. Similarly, the relationship between metacognitive control and post-event

processing was non-significant, r=-0.72, p=0.70 which contrasts with preliminary

analyses. The relationship between anticipatory processing and social anxiety was

significant, r=0.026, p<.001. Although there was a correlation between post-event

processing and social anxiety in preliminary analyses, this relationship was non-

significant, r=-0.004, p = 0.74 in the path model. Given the substantial correlation

between anticipatory processing and post-event processing, the error terms of these two

variables were covaried in the model and the relationship was significant (p<.001).

Indirect Effects

    As stated, the influence of metacognitive processes on social anxiety within the

hypothesized model were expected to be indirect. That is, metacognitive processes were

hypothesized to affect levels of social anxiety by way of perseverative thought constructs

(i.e., AP and PEP). Hypothesized indirect effects were measured by the Sobel Test

Table 6: Indirect Relationships in the Path Model

Indirect Relationship	Sobel's Statistic	p
Metacognitive Beliefs → AP → Social Anxiety	3.90	<0.001
Metacognitive Beliefs → PEP → Social Anxiety	0.31	0.76
Metacognitive Monitoring → AP → Social Anxiety	1.54	0.12
Metacognitive Monitoring → PEP → Social Anxiety	-0.03	0.77
Metacognitive Control → AP → Social Anxiety	-0.55	0.58
Metacognitive Control → PEP → Social Anxiety	0.27	0.79

(Sobel, 1986) which is a method for detecting whether the effect of an independent

variable on a dependent variable via a mediator variable is significant. This method

indicated that the indirect path between metacognitive beliefs and social anxiety via the

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intermediate variable of anticipatory processing was significant: Sobel Test statistic = 3.90, p<0.001. Contrary to expectations, the indirect path between metacognitive beliefs and social anxiety via post event processing was non-significant: Sobel test statistic = -0.31, p =0.76. The indirect path between metacognitive monitoring and social anxiety through the intermediate variable of anticipatory processing was non-significant: Sobel test statistic = 1.54, p = 0.12. The indirect path between metacognitive monitoring and social anxiety through the intermediate variable of post-event processing was non-significant: Sobel Test statistic = -0.03, p = .77. The indirect path between metacognitive control and social anxiety via the intermediate variable of anticipatory processing was non-significant: sobel's test statistic = -0.55, p = 0.58. The indirect path metween metacognitive control and social anxiety via the intermediate variable of post-event processing was non-significant: Sobel Test statistic = 0.27, p = 0.79.

DISCUSSION

Social anxiety is prevalent and debilitating (Kessler, et al., 2005; Rosenberg,

Ledley, & Heimberg, 2010). Contemporary models emphasize unique cognitive

phenomena associated with social anxiety (Clark & Wells, 1995; Hinrichsen & Clark,

2003; Hudson & Rapee, 2000; Rapee & Heimberg, 1997). These models tend to be

concerned with how the socially anxious individual thinks and feels when they are

immersed in a social context. However recent research has begun to investigate the

experience of the socially anxious individual before and after the social event.

Researchers have posited that socially anxious individuals preemptively ponder the social

experience, anticipating social failure. Vassilopolous (2004) linked what he termed

Anticipatory Processing, empirically, to symptoms of social anxiety. Rachman (2000)

argued that, following the social event, the socially anxious individual engages in Post-

Event Processing wherein the social experience is reviewed such that perceived social

failures are emphasized. In turn, symptoms of social anxiety are maintained. These

thought processes are perseverative in quality insofar as they are self-focused, repetitive,

and associated with the prolonging of psychological distress. Metacognitive processes

have been linked to the maintenance of perseverative thought in other forms of

psychopathology (Papageorgiou & Wells, 2001, 2003; Watkins & Moulds, 2005; Wells,

1995, 2000, 2005, 2007; Wells & Papageorgiou, 1998a). The current study was designed

to investigate whether metacognitive processes are associated with social anxiety symptoms via perseverative thought processes, namely AP and PEP.

Aim 1: Replicating previously established direct relationships

Aim 1 of the current study was to replicate previously established direct relationships in order to provide an adequate statistical foundation for more complex analyses. As expected, correlational analyses run for the present study yielded results that are consistent with previous research (Amir, et al., 2003; Cartwright-Hatton & Wells, 1997; Dannahy & Stopa, 2007; Fisher & Wells, 2009; McEvoy, et al., 2009; Rachman, et al., 2000; Vassilopoulos, 2004). Each tested relationship was statistically significant, except for the relationship between metacognitive monitoring and social anxiety symptoms. Although this finding was unexpected, research is limited in this area as there are only two known studies that have examined this potential link (Dannahy & Stopa, 2007; McEvoy, et al., 2009) and metacognitive monitoring was not a primary focus of either study. In addition, findings are mixed regarding the relationship between metacognitive monitoring and symptoms of psychopathology. For example, research conducted by Irak and colleagues (2008) revealed a relationship between OCD symptoms and increased metacognitive monitoring. In contrast, other researchers have linked depression to a deficit of metacognitive monitoring (Sheppard & Teasdale, 2000). Results of this study showed that depressed individuals did not discriminate between attitudinal statements presented to them that were either congruent with, or in opposition to, schemas associated with depression. The researchers extrapolated that this was due to an impairment of metacognitive monitoring, i.e., the depressed individuals failed to

observe their own cognitive schemas when presented with comparative information. Regardless, although not correlated with symptoms of social anxiety, metacognitive monitoring was related to both perseverative constructs, and thus was retained for the path model.

<u>Aim 2: Evaluating the statistical cogency of the hypothesized model and pathways</u>

Model Fit

These direct relationships have largely been established in previous studies (e.g., Dannahy & Stopa, 2007; Rachman, et al., 2000; Vassilopoulos, 2004). Aim 2 of the present study was to examine the associations among variables within a unitary model. Of importance is whether these previously established relationships hold within the context of a larger relational context. Advances in computation software have allowed for a more complex, inclusive, and broader view of relationships among variables. In the present study, path analysis revealed that the hypothesized model was a good fit for the data. The model was strong, overall, as measured by each of the reported fit indexes. Moreover, multiple comparison models were run to ascertain the potential advantage of including additional variables in the path model. Because of the high proportion of female participants in this study, it was necessary to explore the influence sex might have on the model. Consistent with preliminary analyses that showed no relationship between sex and any of the model variables, including sex as a variable in the path model was of no statistical benefit. In addition, given the high rate of comorbidity between social anxiety and depression, a comparison model was run with depression as a predictor variable. Inclusion of this variable provided no advantage and was thus excluded from

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the final model. An exploratory model was run to determine whether the integrity of the model would hold with depression as the dependent variable. This model was a poor fit for the data and was therefore discarded. Taken together these results suggest that the model provides a statistically adequate context for describing the associations among variables within it. It was possible, then, to interpret the pathways contained in the path model.

Direct Relationships

An examination of direct relationships in the model revealed that a number of previously established relationships were maintained when evaluated within the path model. The hypothesis that anticipatory processing and symptoms of social anxiety would be significantly related was supported. These results mirror findings from work conducted by Vassilopolous (2004) which showed that social anxiety is associated with recurrent, intrusive, and interfering anticipatory worry about the social event. Results of the present study provided support for the link between metacognitive beliefs and AP. Although there is a relative dearth of literature in this area, these findings provide affirmation of preliminary results suggesting that beliefs about anticipatory worry (related to the social event) aid in the maintenance of this maladaptive thought process. For example, the belief that worry is preparatory may help to maintain the process of AP prior to a feared social event for the socially anxious individual. Findings of the present study also linked metacognitive beliefs to PEP. This is in line with research conducted by McEvoy and colleagues (2009) that found an association between negative metacognitive beliefs about uncontrollability and harm, and the persistence of PEP.

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Previous research has suggested that these types of beliefs tend to stimulate negative affect which, in turn, maintains the ruminative thought process (Papageorgiou & Wells, 2001). The relationship between metacognitive monitoring and AP was significant, which is consistent with study hypotheses. Although there is preliminary research suggesting a link between metacognitive monitoring and social anxiety symptoms generally, the link between metacognitive monitoring and AP is novel. This finding suggests that individuals who engage in AP, tend to be hyperaware of their thoughts which is be problematic as these perseverative thought processes are associated with negative affect (Papageorgiou & Wells, 2003).

Although some of the direct relationships were maintained, others did not hold within the context of the path model. While PEP was correlated with social anxiety symptoms in preliminary analyses, this association was non-significant in path analysis. This finding stands in contrast with a body of research that suggests PEP is a construct that aids in the maintenance of social anxiety (Abbott & Rapee, 2004; Dannahy & Stopa, 2007; Fehm, et al., 2008; Fehm, et al., 2007; Field, Psychol, & Morgan, 2004; Kashdan & Roberts, 2007; Kocovski, Endler, Rector, & Flett, 2005; McEvoy, et al., 2009; Rachman, et al., 2000). However, the present study is the first known attempt to observe the relationship between PEP and social anxiety in a broader relational context. It is possible that the relationship between social anxiety and PEP was mitigated by the significant association between AP and social anxiety symptoms. As noted, these constructs are highly related such that researchers have speculated about conceptual overlap (Vassilopoulos, 2004). However, to account for this, AP and PEP were covaried in the path model. Despite this technique, the relationship between PEP and social anxiety was

not significant. It may be that AP is more meaningfully related to social anxiety insofar as worrying about the social situation leading up to it exacerbates symptoms more so than does reflecting on the event once it has already occurred. The experience of anxiety tends to reflect excessive concern about an uncertain, often amorphous threat. By implication, this suggests that the identified "threat" has not occurred. For example, worry in GAD is often characterized by "what if" statements regarding future-oriented concerns (Craighead, Miklowitz, & Craighead, 2008). This so-called "fortune telling" tends to stimulate anxiety symptoms proximally, while also aiding in the maintenance of an anxious disposition in the long-term. Results from the current study comport with these concepts insofar as socially-based worry (i.e., anticipatory processing) about future social events appears to disproportionately influence social anxiety symptoms as compared to post-event processing. In contrast with preliminary correlation analyses, metacognitive monitoring was not significantly related to PEP in the path model. Metacognitive monitoring has been linked to social anxiety symptoms generally; however, to date no empirical relationship has been established between metacognitive monitoring and PEP per se. It is possible that the relationship between metacognitive monitoring and social anxiety is not influenced by PEP. Metacognitive (attentional) control was not significantly related to AP or PEP in the path model. This is surprising given previous research conducted by Amir and colleagues (2003) as well as Buckner and colleagues (2010) suggesting that socially anxious individuals experience difficulty disengaging attention from social threat. This may be explained, in part, by metacognitive beliefs. That is, the metacognitive beliefs variable included beliefs about the uncontrollability of perseverative thought. It is possible that individuals might not

exercise much control over perseverative thought processes if they believe their thoughts are uncontrollable. Of note, the covarying relationship between metacognitive beliefs and metacognitive control is significant (p=0.02).

Indirect Relationships

Regarding indirect relationships, results supported a significant pathway from metacognitive beliefs to social anxiety symptoms by way of anticipatory processing which is consistent with study hypotheses. This finding is highly consistent with Wells' theory of psychological disorder which posits that emotional distress is maintained by a maladaptive coping process in which individuals engage in perseverative thought. This maladaptive coping process is perpetuated by beliefs about the functionality of perseverative thought. In turn, psychological distress is maintained and this cyclical process continues (Wells, 2000). In this case, beliefs (positive and negative) about the utility of perseverative thought may aid in the maintenance of anticipatory processing. For example, the socially anxious individual may believe that engaging in worry prior to the social experience may allow her to anticipate potential social embarrassment and, thus, be prepared for this possibility. This is similar to Davey and colleagues (1996) findings that worry associated with GAD is perceived by the worrier as preparatory or as a problem solving strategy. However, previous research suggests that this type of perseverative thought initiates and/or exacerbates the experience of anxiety (Borkovec, 1994; Davey, et al., 1996; de Jong-Meyer, Beck, & Riede, 2009; Wells, 2005). It reasons, then, that the socially anxious individual engages in AP so as to anticipate and

prepare for potential social embarrassment; however, this strategy is self-defeating as it serves to prolong the distressing social anxiety symptoms.

Contrary to expectations, the indirect relationship between metacognitive beliefs and social anxiety via PEP was not significant. Although this was an unexpected result, it is consistent with the idea that anticipatory processing is a more meaningful construct as it relates to social anxiety symptoms. As mentioned, the previously established direct relationship between PEP and social anxiety symptoms did not hold in the current model. To date, the current study is the first to evaluate the relative influence of AP and PEP within a larger statistical model. It may be that PEP is simply not a meaningful construct as it relates to social anxiety symptoms. This notion is in line with the large body of research linking anticipatory worry, rather than post-hoc rumination, to pathological anxiety (e.g., Borkovec, 1994; Borkovec, et al., 1983; Cartwright-Hatton & Wells, 1997; Covin, Ouimet, Seeds, & Dozois, 2008; Davey, et al., 1996; Dugas, Gagnon, Ladouceur, & Freeston, 1998; Francis & Dugas, 2004; Freeston, et al., 1994; Hong, 2007; Wells, 1995). It is also possible that post-hoc rumination in social anxiety tends to carry over into a worry process. That is, PEP information may be used by the socially anxious individual as worry material for future social concerns. In the face of a potentially distressing social situation, the socially anxious individual draws from previous "failures" and uses this information as a part of the foundation for anticipatory processing.

The indirect relationship between metacognitive monitoring and social anxiety through the intermediate variable of AP was not significant. The pathway between metacognitive monitoring and social anxiety via PEP was also non-significant. These

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results were somewhat surprising as previous research has linked dysfunctional metacognitive monitoring to psychopathology (Sheppard & Teasdale, 2000; Spada, et al., 2008). Moreover, some findings have delineated a relationship between metacognitive monitoring social anxiety generally (McEvoy, et al., 2009). However, findings are limited in this regard as there are few studies addressing this concept specifically. Moreover, the findings linking metacognitive monitoring to psychopathology generally are mixed in terms of relationship directionality (i.e., is there more or less metacognitive monitoring in psychopathology). In addition, in these studies metacognitive monitoring was evaluated independently, and was not observed in relation to other metacognitive constructs. Therefore, the contribution of metacognitive monitoring to social anxiety symptoms may be accounted for by the impact of other, more meaningful metacognitive constructs.

The indirect pathways that included metacognitive control were non-significant. That is, contrary to expectations, the indirect relationships between metacognitive control and social anxiety symptoms via AP and PEP were not statistically meaningful. This finding may be an artifact of measurement techniques insofar as actual control was not assessed. Rather, an individual's perception of control was observed via self-report. It may be that there is a distinction between a person's perceived control and the metacognitive control that he or she actually exerts regarding perseverative thought processes. In addition, the Attentional Control Scale does not focus on one's ability to attend (or not attend) to one's own cognitions. Rather, it contains items that are indirectly, but not specifically, related to an individual's capacity in this regard. It is

possible that this instrument did not capture the relationship between social anxiety and the perceived ability to focus attention on, or away from, internal cognitive information.

Treatment Implications

Results of the present study underscore the significance of metacognitive processes as they relate to the maintenance of perseverative thought and, in turn, social anxiety. These are useful findings as they advance our conceptual understanding of constructs that perpetuate the social anxiety experience. In addition to these empirical implications, these findings are significant in terms of treatment for symptoms of social anxiety. Cognitive-behavioral therapy (CBT) posits that it is not events themselves that produce distress; rather it is the way we perceive these events that affects our experience (Heimberg, 2005). Cognitive restructuring involves the hypothesis testing of our thoughts and beliefs, evaluating the extent to which they are rational or irrational. Irrational thoughts and beliefs are challenged so as to engender a new and less distressing relationship with the world. This process typically involves challenging mental constructs about our experience. Rosenberg and colleagues (2010) suggest that, in the case of social anxiety, dysfunctional beliefs (e.g., "I will get too anxious to finish the speech") are to be tested and challenged with more adaptive beliefs (e.g., "I can continue the speech even if I am anxious"). That is, the focus of intervention is the belief about the external situation. Results of the present study suggest; however, that beliefs about internal processes may be just as viable an intervention target. Just as maladaptive beliefs about the social situation itself perpetuate social anxiety, dysfunctional beliefs about perseverative thought (e.g., "AP helps me anticipate and prepare for social failure")

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may sustain symptoms of social anxiety by perpetuating a problematic thought process. Consistent with the CBT model, evaluating the veracity of these beliefs about perseverative thought may provide an avenue for disrupting this maladaptive thought process.

In fact, therapeutic techniques described by Fisher and Wells (2009) suggest that it is possible to decrease distress by targeting the process of perseverative thought specifically. In what they call Metacognitive Therapy (MCT) Fisher and Wells delineate their theory that psychological distress is centered on the relationship we maintain with our thought processes. According to this model, it is the perseverative quality of thought that is problematic, more so than the content. Despite their arguments to the contrary, the strategies they offer are consistent with a CBT framework. That is, the mechanism of change is an alteration of maladaptive beliefs, albeit beliefs about the perseverative thought process. Although the authors do not reference social anxiety specifically, they discuss the process of worry in general as a target for intervention. This method, it seems, could be naturally applied to the process of AP in social anxiety.

In addition, the results of the present study suggest that the socially anxious individual maintains a problematic relationship with her cognitive processes. AP is maintained, in part, due to metacognitive beliefs that sustain it. This constitutes, in effect, a unique way that the socially anxious person relates to the very thing that maintains her anxiety. The beliefs that she holds appear to render her "stuck" in the maladaptive process of AP. Mindfulness-based psychotherapy approaches involve, among other things, the way we relate to our internal experiences including cognition.

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Whereas the psychologically distressed person tends to become entangled with her cognitive processes, mindfulness suggests that a gentle "detachment" from these processes provides psychological distance and promotes a shift in perspective about their nature and impact (Shapiro, Carlson, Astin, & Freedman, 2006). This detachment process involves the manner by which our attention is deployed and held, particularly as this relates to internal experiences. This has obvious applications to the process of AP in social anxiety. That is, interventions designed to redefine the relationship held by the socially anxious individual with AP may, ultimately, lessen her distress. At least one study has provided preliminary support for this. Schmidt and colleagues (2009) detected a reduction in social anxiety symptoms following an attention training intervention. Though not a mindfulness-based intervention per se, this method involved a shaping of attentional processes which is also emphasized in mindfulness-based approaches.

Limitations and Future Directions

Although the findings of this study are novel and provide a contribution to the literature regarding the cognitive and metacognitive architecture of social anxiety, there are limitations that are important to consider when interpreting these findings. Data were gathered via self-report instruments. Although the psychometrics of each of these instruments are quite good, this method of data collection presents some interpretive challenges. Self-report instruments, by definition, measure the individual's impression of a given psychological construct. This is not a direct measurement approach and thus it is possible that additional variance (and error) is introduced into the measurement process. However, it can be argued that an individual's impression of a psychological construct

may be what we are interested in anyway. For example, when considering a diagnosis of Social Anxiety Disorder, we are interested in the level of distress and impairment an individual is reporting based on her subjective experience of symptoms. Thus it is not the social anxiety symptom that constitutes pathology per se; rather it is the individual's perception of, or distress regarding that symptom with which we are concerned. Nevertheless, future research in this area should consider using diagnostic interviews to obtain more robust information regarding social anxiety pathology. In addition, there are no known techniques for directly measuring the cognitive and metacognitive variables included in this study. However, there have been some interesting methods used to observe perseverative thought, including Stroop techniques (e.g., Sheppard & Teasdale, 2000) and fMRI technology (e.g., P. Goldin, et al., 2009) that have advanced our understanding of these processes. Although they do not provide a direct measurement of perseverative thought and maintain interpretive limitations as well, these methods are intriguing and may provide for a more detailed depiction of perseverative thought in social anxiety. It is likely a worthwhile endeavor to incorporate such experimental techniques into research in this area.

The composition of this sample is a limitation of the current study. The sample was recruited from the student body of a large university. Although the benefits of this are multiple (e.g., providing for a large enough sample size), there are limitations to using a college sample. The sample is not a clinical sample. Therefore, it is inappropriate to describe the findings as indicative of psychpatholgical phenomena per se. Rather, these findings reflect relationships among variables as they occur within the context of a college population. In addition, the age range of the current sample is restricted to

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between 18 and 30, with most of the participants falling between the ages of 18 and 22. It is plausible that the results of this study will not generalize to other age ranges. In addition, the sample was relatively homogonous in terms of ethnicity. That is, the sample was predominantly European American (68%). Although the demographic composition of the sample mimics the demographics of the U.S., further ethnic diversity would likely provide for a more complete depiction of phenomena included in the current study.

In addition, the sample was predominantly female. In order to account for this, a comparison model was run but did not provide any statistical advantage relative to the primary model. Despite this, the disproportionate number of female participants is not representative of the population at large. Of note, some research suggests that social anxiety symptomotology tends to be more prevalent in women than men (Kessler, et al., 2005). Other researchers posit that this sex distinction can be explained by differences between men and women in the respective rates of reported psychiatric symptoms (e.g., Egloff & Schmukle, 2004). In either case, there is an apparent difference across sexes in terms of symptom report and, by extension, what is available to measurement. Given this issue, it is possible that the findings of this study were unduly influenced by the sex imbalance in the sample. Future research should attempt to utilize a sample with a more balanced sex distribution.

The present study was neither sequential nor longitudinal and thus it is not possible to comment empirically on temporal relationships among these variables. These temporal relationships are potentially important in terms of early intervention and, ideally, preventive measures. It is possible that people develop a metacognitive style

based, in part, on early learning experiences. For example, metacognitive learning processes are emphasized in some educational formats. For example, there are programs that teach metacognitive strategies that emphasize, among other things, learning how to select effective problem-solving strategies by learning to discern which mental process would be most helpful for a given problem (e.g., Kramarski, 2004). The development of (or lack thereof) of such strategies may lay the groundwork for the presence or absence of maladaptive perseverative thought and, ultimately, social anxiety symptoms. If so, emphasizing metacognitive development in an individual's early experience may serve as a protective factor against the emergence of psychological distress. Alternatively, it may be that the development of social anxiety precedes that of metacognitive beliefs about perseverative thought. It seems reasonable to suspect that when social anxiety symptoms emerge, a person tends to engage in anticipatory worry about the distressing social event. In turn, this person might develop a post hoc rationale for why she engages in this process. In any case, it is critical that the sequential and longitudinal characteristics of these processes be delineated.

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Appendix A: Anticipatory Processing Questionnaire

Anticipatory Processing Questionnaire (APQ)
Developed by Stephanos Vassilopoulos

According to recent research findings, most people experience anxiety before entering a social event-activity (such as a party, dating, acquaintance with unknown people). Did you happen to experience anxiety before a social event during the past few months? If yes, then please rate your responses next to each question below using the following scale:

0------10------20------30------40------50------60------70------80------90------100
"Not at all"
"Extremely"

---

1) How much anxiety did you believe you experienced? ____

2) Did you find yourself thinking about the event a lot? ____

3) Did the thoughts and ideas about the event keep coming into your head even when you did not wish to think about it again? ____

4) Did you find the thoughts ever interfering with your concentration? ____

5) How negative were your thoughts/ideas about the event? ____

6) Did you find it difficult to forget about the event? ____

7) Did you try to stop thinking about the event? ____

8) If you did think about the event, over and over again, did you find your anxiety increasing more and more? ____

9) If you did think about the event, over and over again, did you find your anxiety decreasing more and more? ____

10) Did you try to form some predictions and/or estimates about the event (the course and outcome of the event, consequences, etc.)? ____

11) How negative were these predictions/estimates? ____

12) Did you try to predict in every detail your behavior and other people's reactions, as if you were watching a movie in which you were the protagonist (main character)? ____

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13) How much did you try to think of ways that you might deal with/avoid particular problems during the social interaction? ____

14) Did you recall any past similar social situations (e.g. prior parties or dates)? ____

15) How negative were these recollections? ____

16) How positive were these recollections? ____

17) Did you, finally, avoid the social event completely? **For this question, circle yes or no below**

Yes/No

18) If no, did you ever wish that you could avoid the event? ____

Appendix B: Attentional Control Scale

Attentional Control Scale (ACQ)
Developed by Douglas Derryberry and Marjorie A. Reed

Below is a list of statements about attention that may or may not apply to you. Based upon your own personal experiences, please indicate how frequently each statement applies to you. Please rate each statement using the following scale:

1 - almost never; *2 - sometimes*; *3 -often*; *4 - always*

1) It's very hard for me to concentrate on a difficult task when there are noises around.
2) When I need to concentrate and solve a problem, I have trouble focusing my attention.
3) When I am working hard on something, I still get distracted by events around me.
4) My concentration is good even if there is music in the room around me.
5) When concentrating, I can focus my attention so that I become unaware of what's going on in the room around me.
6) When I am reading or studying, I am easily distracted if there are people talking in the same room.
7) When trying to focus my attention on something, I have difficulty blocking out distracting thoughts.
8) I have a hard time concentrating when I'm excited about something.
9) When concentrating I ignore feelings of hunger or thirst.
10) I can quickly switch from one task to another.
11) It takes me a while to get really involved in a new task.
12) It is difficult for me to coordinate my attention between the listening and writing required when taking notes during lectures.
13) I can become interested in a new topic very quickly when I need to.
14) It is easy for me to read or write while I'm also talking on the phone.
15) I have trouble carrying on two conversations at once.
16) I have a hard time coming up with new ideas quickly.

17) After being interrupted or distracted, I can easily shift my attention back to what I was doing before.

18) When a distracting thought comes to mind, it is easy for me to shift my attention away from it.

19) It is easy for me to alternate between two different tasks.

20) It is hard for me to break from one way of thinking about something and look at it from another point of view.

Appendix C: Beck Depression Inventory-II

BDI-II
Developed by Beck, A.T., Steer ,R.A., Ball, R., & Ranieri, W.

Instructions: This questionnaire consists of 21 groups of statements. Please read each group of statements carefully, and then pick out the **one statement** in each group that best describes the way you have been feeling during the **past two weeks, including today**. Circle the number beside the statement you have picked. If several statements in the group seem to apply equally well, circle the highest number for that group. Be sure that you do not choose more than one statement for any group, including Item 16 (Changes in Sleeping Pattern) or Item 18 (Changes in Appetite).

1. Sadness
- 0   I do not feel sad
- 1   I feel sad much of the time
- 2   I am sad all the time
- 3   I am so sad or unhappy that I can't stand it

2. Pessimism
- 0   I am not discouraged about my future
- 1   I feel more discouraged about my future than I used to be.
- 2   I do not expect things to work out for me.
- 3   I feel my future is hopeless and will only get worse.

3. Past Failure
- 0   I do not feel like a failure
- 1   I have failed more than I should have.
- 2   As I look back, I see a lot of failures.
- 3   I feel I am a total failure as a person.

4. Loss of Pleasure
- 0   I get as much pleasure as I ever did from the things I enjoy.
- 1   I don't enjoy things as much as I used to.
- 2   I get very little pleasure from the things I used to enjoy.
- 3   I can't get any pleasure from the things I used to enjoy.

5. Guilty Feelings
- 0   I don't feel particularly guilty.
- 1   I feel guilty over many things I have done or should have done.
- 2   I feel quite guilty most of the time.
- 3   I feel guilty all of the time.

6. Punishment Feelings
0   I don't feel I am being punished.
1   I feel I may be punished.
2   I expect to be punished.
3   I feel I am being punished.

7. Self-Dislike
0   I feel the same about myself as ever.
1   I have lost confidence in myself.
2   I am disappointed in myself.
3   I dislike myself.

8. Self-Criticalness
0   I don't criticize or blame myself more than usual.
1   I am more critical of myself than I used to be.
2   I criticize myself for all of my faults.
3   I blame myself for everything bad that happens.

9. Suicidal Thoughts or Wishes
0   I don't have any thoughts of killing myself.
1   I have thoughts of killing myself but I would not carry them out.
2   I would like to kill myself.
3   I feel my future is hopeless and will only get worse.

10.   Crying
0   I don't cry any more than I used to.
1   I cry more than I used to.
2   I cry over every little thing.
3   I feel like crying but I can't.

11.   Agitation
0   I am no more restless or wound up than usual.
1   I feel more restless or wound up than usual.
2   I am so restless or agitated that it's hard to stay still.
3   I am so restless or agitated that I have to keep moving or doing something.

12.   Loss of Interest
0   I have not lost interest in other people or activities.
1   I am less interested in other people or things than before.
2   I have lost most of my interest in other people or things.
3   It's hard to get interested in anything.

13. Indecisiveness

0   I make decisions about as well as ever.
1   I find it more difficult to make decisions than usual.
2   I have much greater difficulty in making decisions than I used to.
3   I have trouble making any decisions.

14. Worthlessness

0   I do not feel I am worthless.
1   I don't consider myself as worthwhile and useful as I used to.
2   I feel more worthless as compared to other people.
3   I feel utterly worthless.

15. Loss of Energy

0   I have as much energy as ever.
1   I have less energy than I used to have.
2   I don't have enough energy to do very much.
3   I don't have enough energy to do anything.

16. Changes in Sleeping Pattern

0   I have not experienced any change in my sleeping pattern.

1a.	I sleep somewhat more than usual.
1b.	I sleep somewhat less than usual.

2a.	I sleep a lot more than usual.
2b.	I sleep a lot less than usual.

3a.	I sleep most of the day.
3b.	I wake up 1—2 hours early and can't get back to sleep.

17. Irritability

0   I am no more irritable than usual.
1   I am more irritable than usual.
2   I am much more irritable than usual.
3   I am irritable all the time.

18. Changes in Appetite

0   I have not experienced any change in my appetite.

1a.	My appetite is somewhat less than usual.
1b.	My appetite is somewhat greater than usual.

2a.	My appetite is much less than before.
2b.	My appetite is much greater than usual.

3a.   I have no appetite at all.
3b.   I crave food all the time.

19.   Concentration Difficulty
0   I can concentrate as well as ever.
1   I can't concentrate as well as usual.
2   It's hard to keep my mind on anything for very long.
3   I find I can't concentrate on anything.

20.   Tiredness or Fatigue
0   I am no more tired or fatigued than usual.
1   I get more tired or fatigued more easily than usual.
2   I am too tired or fatigued to do a lot of the things I used to do.
3   I am too tired or fatigued to do most of the things I used to do.

21.   Loss of Interest in Sex
0   I have not noticed any recent change in my interest in sex.
1   I am less interested in sex than I used to be.
2   I am much less interest in sex now.
3   I have lost interest in sex completely.

Appendix D: Metacognitions Questionnaire

Meta-Cognitions Questionnaire (Roy-Byrne et al.)
Developed by Cartwright-Hatton, S., & Wells, A.

This questionnaire is concerned with beliefs people have about their thinking. Listed below are a number of beliefs that people have expressed. Please read each item and say how much you generally agree with it by circling the appropriate number. Please respond to all the items. There are no right or wrong answers.

	Do not agree	Agree slightly	Agree moderately	Agree very much
1. Worry helps me to avoid problems in the future.	1	2	3	4
2. My worrying is dangerous for me	1	2	3	4
3. I have difficulty knowing if I have actually done something, or just imagined it.	1	2	3	4
4. I think a lot about my thoughts.	1	2	3	4
5. I could make myself sick with worrying.	1	2	3	4
6. I am aware of the way my mind works when I am thinking through a problem.	1	2	3	4
7. If I did not control a worrying thought, and then it happened, it would be my fault.	1	2	3	4
8. If I let my worrying thoughts get out of control, they will end up controlling me.	1	2	3	4
9. I need to worry in order to remain organized.	1	2	3	4
10. I have little confidence in my memory for words and names.	1	2	3	4
11. My worrying thoughts persist, no matter how I try to stop them.	1	2	3	4
12. Worrying helps me to get things sorted out in my mind.	1	2	3	4
13. I cannot ignore my worrying thoughts.	1	2	3	4
14. I monitor my thoughts.	1	2	3	4
15. I should be in control of my thoughts all of the time.	1	2	3	4
16. My memory can mislead me at times.	1	2	3	4
17. I could be punished for not having certain thoughts.	1	2	3	4
18. My worrying could make me go mad.	1	2	3	4
19. If I do not stop my worrying thoughts, they could come true.	1	2	3	4
20. I rarely question my thoughts.	1	2	3	4
21. Worrying puts my body under a lot of stress.	1	2	3	4
22. Worrying helps me to avoid disastrous situations.	1	2	3	4
23. I am constantly aware of my thinking.	1	2	3	4
24. I have a poor memory.	1	2	3	4
25. I pay close attention to the way my mind works.	1	2	3	4
26. People who do not worry have no depth.	1	2	3	4
27. Worrying helps me cope.	1	2	3	4
28. I imagine having not done things and then doubt my memory for doing them.	1	2	3	4
29. Not being able to control my thoughts is a sign of weakness.	1	2	3	4
30. If I did not worry, I would make more mistakes.	1	2	3	4
31. I find it difficult to control my thoughts.	1	2	3	4
32. Worrying is a sign of a good person.	1	2	3	4
33. Worrying thoughts enter my head against my will.	1	2	3	4
34. If I could not control my thoughts I would go crazy.	1	2	3	4
35. I will lose out in life if I do not worry.	1	2	3	4
36. When I start worrying, I cannot stop.	1	2	3	4

37. Some thoughts will always need to be controlled.	1	2	3	4
38. I need to worry in order to get things done.	1	2	3	4
39. I will be punished for not controlling certain thoughts.	1	2	3	4
40. My thoughts interfere with my concentration.	1	2	3	4
41. It is alright to let my thoughts roam free.	1	2	3	4
42. I worry about my thoughts.	1	2	3	4
43. I am easily distracted.	1	2	3	4
44. My worrying thoughts are not productive.	1	2	3	4
45. Worry can stop me from seeing a situation clearly.	1	2	3	4
46. Worrying helps me to solve problems.	1	2	3	4
47. I have little confidence in my memory for places.	1	2	3	4
48. My worrying thoughts are uncontrollable.	1	2	3	4
49. It is bad to think certain thoughts.	1	2	3	4
50. If I do not control my thoughts, I may end up embarrassing myself.	1	2	3	4
51. I do not trust my memory.	1	2	3	4
52. I do my clearest thinking when I am worrying.	1	2	3	4
53. My worrying thoughts appear automatically.	1	2	3	4
54. I would be selfish if I never worried.	1	2	3	4
55. If I could not control my thoughts, I would not be able to function.	1	2	3	4
56. I need to worry, in order to work well.	1	2	3	4
57. I have little confidence in my memory for actions.	1	2	3	4
58. I have difficulty keeping my mind focused on one thing for a long time.	1	2	3	4
59. If a bad thing happens which I have not worried about I feel responsible.	1	2	3	4
60. It would not be normal if I did not worry.	1	2	3	4
61. I constantly examine my thoughts.	1	2	3	4
62. If I stopped worrying, I would become glib, arrogant, and offensive.	1	2	3	4
63. Worrying helps me plan the future more effectively.	1	2	3	4
64. I would be a stronger person if I could worry less.	1	2	3	4
65. I would be stupid and complacent not to worry.	1	2	3	4

Post-Event Processing Questionnaire (PEPQ)
Developed by S. Rachman, J. Gruter-Andrew, and R. Shafran

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According to research, many people experience anxiety in social situations. During the past few months, have you experienced anxiety/nervousness in a social situation (such as at a party, public speaking, dating, etc.)? If yes, than please answer the questions below. Please rate your responses next to each question below using the following scale:

0------10------20------30------40------50------60------70------80------90------100
"Not at all"
"Extremely"

1) How much anxiety did you experience? ____

2) After the event was over, did you find yourself thinking about it a lot? ____

3) Did your memories and thoughts about the event keep coming into your head even when you did not wish to think about it again? ____

4) Did the thoughts about the event ever interfere with your concentration? ____

5) Were the thoughts/memories about the event ever welcome to you? ____

6) Did you find it difficult to forget about the event? ____

7) Did you try to resist thinking about the event? ____

8) If you did think about the event, over and over again, did your feelings about the event get worse and worse? ____

9) If you did think about the event, over and over again, did your feelings about the event get better and better? ____

10) If you thought about the event, did you see it from your point of view, or how other people would view it?

    For this question circle above, either "from your point of view" or "how other people would view it"

11) Did you ever wonder about whether you could have avoided or prevented your behavior/feelings during the event? ____

12) Did you ever wish that you could turn the clock back and re-do it Ð do it again, but do it better?

    ____

13) As a result of the event, do you now avoid similar events; did this event this reinforce a decision to avoid similar situations? ____

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Social Phobia and Anxiety Inventory (SPAI)
Developed by S.M. Turner, C.V. Dancu, and D.C. Beidel

Below is a list of behaviors that may or may not be relevant for you. Based on your personal experience, please indicate how frequently you experience these feelings and thoughts in social situations. A social situation is defined as a gathering of two or more people. For example: A meeting; a lecture, a party, bar or restaurant, conversint with one another person or group of people, etc. FEELING ANXIOUS IS A MEASURE OF HOW TENSE NERVOUS OR UNCOMFORTABLE YOU ARE DURING SOCIA ENCOUNTERS. Please use the scale listed below and circle the number which best reflects how frequently you experience these responses.

Never	Very Infrequent	Infrequent	Sometimes	Very Frequent	Very	Always
1	2	3	4	5	6	7

1) I feel anxious when entering social situations where there is a small group.................... 1 2 3 4
    5 6 7

2) I feel anxious when entering social situations where there is a large group..................... 1 2 3 4
5 6 7

3) I feel anxious when I am in a social situation and I become the center of attention............ 1 2 3 4
5 6 7

4) I feel anxious when I am in a social situation and I am expected to engage in some activity. 1 2 3 4
5 6 7

5) I feel anxious when making a speech in front of an audience....................................... 1 2 3 4
5 6 7

6) I feel anxious when speaking in a small informal meeting... 1 2 3 4
5 6 7

7) I feel so anxious about attending social gatherings that I avoid these situations.................. 1 2 3 4
5 6 7

8) I feel so anxious in social situations that I leave the social gathering.............................. 1 2 3 4
5 6 7

9) I feel anxious when in a small gathering with:

   Strangers.. 1 2 3 4
5 6 7

   Authority figures... 1 2 3 4
5 6 7

   Opposite sex.. 1 2 3 4
5 6 7

People in general...1 2 3 4
5 6 7

10) I feel anxious when in a large gathering with:

Strangers..1 2 3 4
5 6 7

Authority figures...1 2 3 4
5 6 7

Opposite sex..1 2 3 4
5 6 7

People in general...1 2 3 4
5 6 7

11) I feel anxious when in a bar or restaurant with:

Strangers...1 2 3 4
5 6 7

Authority figures..1 2 3 4
5 6 7

Opposite sex...1 2 3 4
5 6 7

People in general..1 2 3 4
5 6 7

12) I feel anxious and I do not know what to do when in a new situation with:

Strangers..1 2 3 4
5 6 7

Authority figures...1 2 3 4
5 6 7

Opposite sex..1 2 3 4
5 6 7

People in general...1 2 3 4
5 6 7

13) I feel anxious and I do not know what to do when in a situation involving confrontation with:

Strangers..1 2 3 4
5 6 7

Authority figures..1 2 3 4
5 6 7

Opposite sex...1 2 3 4
5 6 7

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People in general...1 2 3 4
5 6 7

14) I feel anxious and I do not know what to do when in an embarrassing situation with:

Strangers...1 2 3 4
5 6 7

Authority figures..1 2 3 4
5 6 7

Opposite sex..1 2 3 4
5 6 7

People in general..1 2 3 4
5 6 7

15) I feel anxious when discussing intimate feelings with:

Strangers..1 2 3 4
5 6 7

Authority figures...1 2 3 4
5 6 7

Opposite sex...1 2 3 4
5 6 7

People in general..1 2 3 4
5 6 7

16) I feel anxious when stating an opinion to:

Strangers...1 2 3 4
5 6 7

Authority figures...1 2 3 4
5 6 7

Opposite sex..1 2 3 4
5 6 7

People in general..1 2 3 4
5 6 7

17) I feel anxious when talking about business with:

Strangers..1 2 3 4
5 6 7

Authority figures...1 2 3 4
5 6 7

Opposite sex...1 2 3 4
5 6 7

People in general...1 2 3 4

5 6 7

18) I feel anxious when approaching and/or initiating a conversation with:

Strangers..1 2 3 4

5 6 7

Authority figures...1 2 3 4

5 6 7

Opposite sex...1 2 3 4

5 6 7

People in general...1 2 3 4

5 6 7

19) I feel anxious when having to interact for longer than a few minutes with:

Strangers..1 2 3 4

5 6 7

Authority figures...1 2 3 4

5 6 7

Opposite sex...1 2 3 4

5 6 7

People in general...1 2 3 4

5 6 7

20) I feel anxious when (drinking any type of beverage) and/or eating in front of:

Strangers..1 2 3 4

5 6 7

Authority figures...1 2 3 4

5 6 7

Opposite sex...1 2 3 4

5 6 7

People in general...1 2 3 4

5 6 7

21) I feel anxious when writing or typing in front of:

Strangers..1 2 3 4

5 6 7

Authority figures...1 2 3 4

5 6 7

Opposite sex...1 2 3 4

5 6 7

People in general...1 2 3 4
5 6 7

22) I feel anxious when speaking in front of:

Strangers...1 2 3 4
5 6 7

Authority figures..1 2 3 4
5 6 7

Opposite sex..1 2 3 4
5 6 7

People in general..1 2 3 4
5 6 7

23) I feel anxious when being criticized or rejected by:

Strangers...1 2 3 4
5 6 7

Authority figures..1 2 3 4
5 6 7

Opposite sex..1 2 3 4
5 6 7

People in general..1 2 3 4
5 6 7

24) I attempt to avoid social situations where there are:

Strangers...1 2 3 4
5 6 7

Authority figures..1 2 3 4
5 6 7

Opposite sex..1 2 3 4
5 6 7

People in general..1 2 3 4
5 6 7

25) I leave social situations where there are:

Strangers...1 2 3 4
5 6 7

Authority figures..1 2 3 4
5 6 7

Opposite sex..1 2 3 4
5 6 7

People in general...1 2 3 4
5 6 7

26) Before entering a social situation I think about all the things that can go wrong. The types of thoughts
I experience are:

Will I be dressed properly?...1 2 3 4
5 6 7

I will probably make a mistake and look foolish...................................1 2 3 4
5 6 7

What will I do if no one speaks to me?..1 2 3 4
5 6 7

If there is a lag in the conversation what can I talk about?.....................1 2 3 4
5 6 7

People will notice how anxious I am..1 2 3 4
5 6 7

27) I feel anxious before entering a social situation...............................1 2 3 4
5 6 7

28) My voice leaves me or changes when I am talking in a social situation.........1 2 3 4
5 6 7

29) I am not likely to speak to people until they speak to me........................1 2 3 4
5 6 7

30) I experience troublesome thoughts when I am in a social setting. For example:

I wish I could leave and avoid the whole situation................................1 2 3 4
5 6 7

If I mess up again I will really lose my confidence...............................1 2 3 4
5 6 7

What kind of impression am I making?...1 2 3 4
5 6 7

Whatever I say it will probably sound stupid..1 2 3 4
5 6 7

31) I experience the following prior to entering a social situation:

Sweating..1 2 3 4
5 6 7

Frequent urge to urinate...1 2 3 4
5 6 7

Heart palpitations..1 2 3 4
5 6 7

32) I experience the following in a social situation:

Sweating..1 2 3 4

   5 6 7

Blushing...1 2 3 4

5 6 7

Shaking..1 2 3 4

5 6 7

Frequent urge to urinate..1 2 3 4

5 6 7

Heart palpitations...1 2 3 4

5 6 7

33) I feel anxious when I am home alone..1 2 3 4

   5 6 7

34) I feel anxious when I am in a strange place...1 2 3 4

   5 6 7

35) I feel anxious when I am on any form of public transportation (e.g., bus, train, airplane)....... 1 2 3 4

   5 6 7

36) I feel anxious when crossing streets...1 2 3 4

   5 6 7

37) I feel anxious when I am in crowded public places (e.g., Stores, church, movies, etc.)......... 1 2 3 4

   5 6 7

38) Being in large open spaces makes me feel anxious..1 2 3 4

   5 6 7

39) I feel anxious when I am in enclosed places (e.g. elevators, tunnels, etc.)...................... 1 2 3 4

   5 6 7

40) Being in high places makes me feel anxious (e.g., tall buildings)............................... 1 2 3 4

   5 6 7

41) I feel anxious when waiting in a long line..1 2 3 4

   5 6 7

42) There are times when I feel like I have to hold on to things because I am afraid I will fall.... 1 2 3 4

   5 6 7

43) When I leave home and go to various public places, I go with a family member or friend.....1 2 3 4

   5 6 7

44) I feel anxious when riding in a car..1 2 3 4

   5 6 7

45) There are certain places I do not go to because I may feel trapped...............................1   2   3   4   5   6   7

Appendix G: Brief Demographic Form

Demographic Information

Name:_____

Age:_____

Sex:_____

Class (e.g. freshman, sophomore, etc.)_____

Ethnicity:_____

Course to which research credit applies (if any):_____

CURRICULUM VITAE

Ryan P. Hosey, M.A.

Clinical Psychology Intern
VA Pittsburgh Healthcare System
Phone: 843-475-1774 (cell)
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Ryan.Hosey11@gmail.com

Academic History

2006-present University of Louisville, Louisville, Kentucky
Mentor: Janet Woodruff-Borden, Ph.D.
Dissertation Title: Metacognitive Processes in Social anxiety: A Path
  Analysis
Expected Degree: Ph.D., Clinical Psychology: December 2012

2002-2004 College of Charleston, Charleston, South Carolina
Major: Psychology
Minor: Political Science
Degree: Bachelor of Science
Graduation: May, 2004, Magna cum laude

2000-2002 Trident Technical and Community College
Degree: Associate in Science

Postdoctoral Fellowship (Beginning August 2012)

Center for Treatment of Addictive Disorders
VA Pittsburgh Healthcare System
Postdoctoral Fellow
Supervisor: To be determined

Primary responsibilities: Conduct substance abuse initial evaluations. Provide individual
psychotherapy emphasizing empirically based treatment interventions

with a particular emphasis on motivational interviewing. Independently lead inpatient and outpatient treatment groups. Conduct psychological testing. Case management responsibilities. Consult across disciplines to provide comprehensive patient care. Provide clinical supervision to interns and practicum students. Conduct program development projects.

Clinical Internship Experience

Rotation 1	**Center for Treatment of Addictive Disorders**
And	VA Pittsburgh Healthcare System
Externship	Clinical Psychology Intern
	Supervisor: Anya Moon, Ph.D.

Primary responsibilities: Conduct substance abuse initial evaluations so as to help individuals seeking outpatient treatment for addictive disorders develop a treatment plan. Provide individual and group psychotherapy for individuals with substance use disorders utilizing empirically based treatment interventions. Conduct diagnostic testing to provide diagnostic clarification when necessary. Maintain case management responsibilities for residential patients including treatment planning, aftercare planning, resource location, and treatment coordination. Participate in interdisciplinary treatment team meetings in the service of integrated patient care

Rotation 2	**Geriatric Research and Education Clinical Center (GRECC)**
	VA Pittsburgh Healthcare System
	Clinical Psychology Intern
	Supervisors: Jody Tomko, Ph.D. and Natali Edmonds, Psy.D.

Primary responsibilities: Providing psychological treatment to older adults emphasizing assessment and home based primary care. Administering neuropsychological/cognitive assessments, interpreting results, presenting results to the interdisciplinary treatment team and providing feedback to veteran and veteran's family. Conducting testing to assess a veteran's ability to drive safely. Providing home based primary care services to older veterans including individual psychotherapy, caregiver stress intervention, and cognitive screening assessments. Participate in interdisciplinary team meetings.

Rotation 3   **Behavioral Medicine Clinic**
VA Pittsburgh Healthcare System
Clinical Psychology Intern
Supervisor: Cynthia Kirsch, Ph.D.

Primary responsibilities: Working with veterans to improve their health behaviors as well
as their ability to cope with existing medical health conditions.
Conducting interviews, psychological assessments, and report writing.
Providing cognitive-behavioral treatment to reduce problematic behaviors
associated with poorer health experiences and outcomes. Group, and
some individual therapy focused on smoking cessation, chronic pain
management, insomnia treatment, weight control (MOVE), and
biofeedback training. Conducting psychological interviews with
individuals under consideration for organ transplant and presenting
feedback to the transplant team

General Clinical Experience

2007-2011   **Noble H. Kelley Psychological Services Center**
University of Louisville
Assessment Practicum
Supervisors: Bernadette Walter, Ph.D. & David Winsch, Ph.D.

Primary responsibilities: Conducting assessments including full diagnostic, cognitive
functioning, adaptive functioning, personality functioning, attention
deficit-hyperactivity disorder, learning disability, clinical symptom,
malingering, gifted and talented assessments for children, among others.
Assessment responsibilities included test administration, scoring,
interpretation, and the preparation of integrated reports. In-person
feedback sessions were provided to each client to explain the report
material and results of testing.

08/10-06/11   **Noble H. Kelley Psychological Services Center**
University of Louisville
Mindfulness Based Behavior Therapy Team
Supervisor: Paul Salmon, Ph.D.

Primary responsibilities: Several hours per week providing individualized mindfulness-
based behavioral treatment for symptoms of general emotional and
psychological distress. Other responsibilities include observing

colleague's therapy sessions and providing peer supervision, constructing client reports, and attending weekly supervision meetings

08/07-08/10 **Noble H. Kelley Psychological Services Center**
University of Louisville
Cognitive-Behavioral Therapy for Anxiety Disorders Clinical Team
Supervisor: Janet Woodruff-Borden, Ph.D.

Primary responsibilities: Several hours per week providing individualized cognitive-behavioral treatment largely for individuals with anxiety disorders and depression. Other responsibilities include conducting psychological assessments relevant to the treatment of anxiety and depression, observing colleague's therapy sessions and providing peer supervision, constructing client reports, and attending weekly supervision meetings

06/09-06/10 **Central State Hospital**
Supervised Practicum
Supervisor: J. Wayne Putnam, Psy.D.

Primary responsibilities: 20 hours per week of psychiatric inpatient clinical work including--conducting individual psychotherapy, assessment work (e.g. personality, cognitive, intelligence, suicide risk, symptom inventories, malingering). Constructing integrated reports and providing feedback to patients. Daily meetings with multidisciplinary treatment team and consulting with the treatment team including psychiatrists, social workers, mental health counselors/nurses

06/09-06/10 **Noble H. Kelley Psychological Services Center**
University of Louisville
Clinical Graduate Teaching Assistant
Supervisor: Bernadette Walter, Ph.D.

Primary responsibilities: 20 hours per week conducting clinic intake interviews, crisis management, constructing integrated intake reports, tracking student therapy and assessment hours, presenting intake information to clinic supervisor and clinical team supervisors, brief phone intake interviews for prospective therapy and assessment clients, providing referral information to callers, evaluation of and grading material for clinical interviewing course, grading and evaluating 1st year clinical students training on assessment instruments, conducting lab instruction for 1st year clinical students on clinic protocol, attending weekly clinic assistant

meetings

06/09-06/10   **Outpatient Psychiatry**
University of Louisville
Supervised Clinical Practicum
Supervisor: Tracy Eells, Ph.D.

Primary responsibilities: 4 to 5 hours per week conducting psychological assessments,
both outpatient and inpatient. Assessments include cognitive functioning,
adaptive functioning, personality functioning, dementia, intellectual
functioning, clinical symptom among others. Administering assessments,
scoring, interpretation, writing clinical notes, and report construction.
Case conceptualization, assessment planning, report construction, and
treatment recommendations.

Research Experience

Present   **Health Parents-Healthy Kids Research Lab**
University of Louisville
Dissertation Research
Project Title: Metacognitive Processes in Social Anxiety: A Path
Analysis
Chair: Janet Woodruff-Borden, Ph.D.

07/07-06/11   **Healthy Parents-Healthy Kids Research Lab**
Graduate Research Assistant
Director: Janet Woodruff-Borden, Ph.D.
University of Louisville

Project Titles: Family interactions and Stress Responses in Anxious Parents and their
Children
Worry in Mothers and Their Children
Group Therapy for Generalized Anxiety Disorder
Physiological and Cognitive Responses in Anxious Families
Worry and Autonomic Inflexibility in Children
Metacognitive Processes in Social Anxiety: A Path Analysis

Primary responsibilities: Project design, literature reviews, administration of diagnostic
interviews and self-report measures, explanation of informed consent
documents, behavioral interaction coding, transcript analysis, data entry

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and analysis, recruitment, integrative report writing, participant feedback sessions, and manuscript preparation.

Manuscripts in Press

Hosey, R.P., & Woodruff-Borden, J. (In press). An examination of the relationship between parent language and child anxiety. *Child and Family Behavior Therapy.*

Poster Presentations

Hosey, R.P., Schrock, M., Williams, S., & Woodruff-Borden, J. (2011). *The role of child and parent factors in parent behavioral negativity: A path analysis.* Poster to be presented at the Annual Association of Behavior and Cognitive Therapies Convention, November 10-13, Toronto, Canada.

Schrock, M., **Hosey, R.P.**, Williams, S. & Woodruff-Borden, J. (2011*)*. Child Internalizing Symptoms: *The Role of Child Temperament, Maternal Anxiety, and Family Environment.* Poster to be presented at the Annual Association of Behavior and Cognitive Therapies Convention, November 10-13, Toronto, Canada.

Bortoleto, E. G., Williams, S. R., Kertz, S. J., Schrock, M., Hosey, R. & Woodruff-Borden, J. (2011). *Examining the autonomic responsiveness of children with high and low worry to threat and nonthreat pictures.* Poster submitted for presentation at the Annual Association for Behavior and Cognitive Therapies Convention, November 10-13, Toronto, Canada.

Hosey, R.P., Kertz, S. J., Schrock, M., Williams, S., & Woodruff-Borden, J. (2010). *Maternal anxiety moderates the relationship between child emotion word use and maternal sensitivity.* Poster to be presented at the Annual Association of Behavior and Cognitive Therapies Convention, November 18-21, San Francisco, CA.

Kertz, S. J., **Hosey, R.P.**, Schrock, M, Williams, S. R., & Woodruff-Borden, J. (2010*)*. *Child Coping Style Moderates the Relationship Between Trait Anxiety and Anxiety Symptoms.* Poster to be presented at the Annual Association of Behavior and Cognitive Therapies Convention, November 18-21, San Francisco, CA

Schrock, M., Williams, S. Kertz, S. J., **Hosey, R.P.**, & Woodruff-Borden, J. (2010*)*. *The Moderating Effect of Stressful Life Events on Anxious and Non-anxious Parents' Conditional Responses to Child Behavior.* Poster to be presented at the Annual Association of Behavior and Cognitive Therapies Convention, November 18-21, San Francisco, CA.

Williams, S. R., Kertz, S. J., **Hosey, R.P.**, Schrock, M., & Woodruff-Borden, J. (2010*)*. *The Role of Anxiety on Parent Coaching and Dismissing Behaviors and Their*

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Relationship to Child Anxiety. Poster to be presented at the Annual Association of Behavior and Cognitive Therapies Convention, November 18-21, San Francisco, CA.

Hosey, R.P., Kertz, S.J., Schrock, M., Williams, S., Briggs, N., & Woodruff-Borden, J. (2009). *Language use as a characteristic of anxiety in parent-child interactions.* Poster to be presented at the Annual Association of Behavior and Cognitive Therapies Convention, November 19-22, New York, NY.

Hosey, R.P., Schrock, M., Kertz, S. J., Williams, S., Chapman, L. K., & Woodruff-Borden, J. (2008). *Anxiety as a function of crime risk in a primary care sample.* Poster to be presented at the Annual Association of Behavior and Cognitive Therapies Convention, November 13-16, Orlando, FL.

Kertz, S. J., **Hosey, R.P.,** Schrock, M, Williams, S. R., & Woodruff-Borden, J. (2008*). A path analysis of parent and child behaviors: Differences in children with GAD and other anxiety disorders.* Poster to be presented at the Annual Association of Behavior and Cognitive Therapies Convention, November 13-16, Orlando, FL.

Schrock, M, Kertz, S. J., **Hosey, R.P.,** Williams, S., & Woodruff-Borden, J. (2008*). Impact of parental anxiety on parent's perceptions of child behavior.* Poster to be presented at the Annual Association of Behavior and Cognitive Therapies Convention, November 13-16, Orlando, FL.

Teaching Experience

Spring 2011   Introduction to Psychology (Undergraduate)
Graduate Teaching Assistant
Professor: Melissa Rowe, Ph.D.
University of Louisville

Primary responsibilities: Grading exams, managing online grading system, preparing material for review lectures, conducting review lectures, maintaining office hours, providing academic support, proctoring exams.

Spring 2011   Social Psychology (Undergraduate)
Graduate Teaching Assistant
Barbara Stetson, Ph.D.
University of Louisville

Primary responsibilities: Grading exams, managing online grading system, preparing material for lectures (e.g., power point presentations), reviewing and grading papers, maintaining office hours, providing academic support, proctoring exams.

2009-2010   Intellectual and Cognitive Assessment (Graduate)
University of Louisville
Supervisor: Bernadette Walter, Ph.D.

Primary Responsibilities: Teaching administration, scoring, and interpretation of WAIS-IV and WISC-IV to first year graduate students, observing and providing feedback for training administrations of the instruments, reviewing and providing feedback for training assessment reports.

2009-2010   Interviewing Skills Practicum (Graduate)
University of Louisville
Supervisor: Bernadette Walter, Ph.D.

Primary responsibilities: Observing first year graduate students conducting clinical (training) interviews and providing feedback on interviewing skills. Reviewing and grading written material for each training module.

Professional Memberships

American Psychological Association

Association for Behavioral and Cognitive Therapies

References

Dr. Anya Moon
Psychologist/Team Leader
Center for Treatment of Addictive Disorders
VA Pittsburgh Healthcare System
7180 Highland Drive
Pittsburgh, PA, 15206
Email: anya.moon@va.gov

Dr. Janet Woodruff-Borden
Professor
Director of Clinical Training
Department of Psychological and Brain Sciences
University of Louisville
Louisville, Kentucky 40292
(502) 852-6070
Email: j.woodruff-borden@louisville.edu

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Louisville, Kentucky 40292
(502) 852-6782
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