Post-event processing in social anxiety disorder: Examining the mediating roles of positive metacognitive beliefs and perceptions of performance

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ABSTRACT

Background: Post-event processing (PEP) is defined as repetitive negative thinking following anxiety provoking social events. PEP is thought to maintain anxiety symptoms in Social Anxiety Disorder (SAD) but little is known about the specific factors that contribute to the maintenance of PEP.
Aims: The current study investigated how perceptions of performance and positive metacognitive beliefs might contribute to the persistence of PEP.
Method: Participants with SAD ($n = 24$) as well as anxious ($n = 24$) and healthy ($n = 25$) control participants completed a standardized social performance task in the lab. Their engagement in PEP and perceptions of performance were assessed in the week that followed.
Results: Immediately following the social task, individuals with SAD rated their performance more negatively and endorsed a greater number of positive metacognitive beliefs about PEP than did participants in both control groups. Importantly, both metacognitive beliefs and initial negative self-ratings of performance mediated the relationship between group status and PEP in the days following the event.
Conclusions: These results are consistent with cognitive and metacognitive models of SAD and enhance our understanding of the cognitive processes which may function to initiate and maintain negative thinking patterns in SAD.

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Cognitive models of Social Anxiety Disorder (SAD) emphasize biased cognitive processing of social events after they occur, a phenomenon known as post-event processing (PEP), as a key contributing factor in the maintenance of anxiety symptoms (Clark & Wells, 1995; Hofmann, 2007). It is proposed that during PEP, the socially anxious individual is likely to focus on anxious feelings and negative self-perceptions, since these were processed in detail during the social event. This process is problematic because the individual is prone to recalling the event as being more negative than it objectively was. Empirical studies have demonstrated that socially anxious individuals are more likely to engage in PEP than anxious controls following a therapy session (Perera, Rowa, and McCabe, 2016) and non-anxious controls following a social

encounter (see Brozovich & Heimberg, 2008 for review) and that PEP is associated with a number of negative emotional and cognitive consequences (Kocovski, Endler, Rector, & Flett, 2005; Makkar & Grisham, 2011; Rachman, Grüter-Andrew, & Shafran, 2000; Rowa, Antony, Swinson, & McCabe, 2014; Rowa, Gavric, Stead, LeMoult, & McCabe, 2016).

1. Relationship between post-event processing and perceptions of performance

Although the phenomenon of PEP in social anxiety has been well established, the precise nature of the relationship between social anxiety, PEP, and perceptions of performance is not yet clearly understood. Several empirical studies have demonstrated that socially anxious individuals have negatively biased perceptions of their own social performance (e.g., Moscovitch & Hofmann, 2007; Rapee & Lim, 1992), and that these negative perceptions are associated with increased engagement in PEP following socially

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threatening events (e.g., Abbott & Rapee, 2004; Perini, Abbott, & Rapee, 2006). One premise of the Clark and Wells (1995) model of social anxiety is that engagement in PEP may maintain or even exacerbate initial negative self-perceptions so that they become more negatively distorted over time. Some studies examining this phenomenon have indeed found support for worsening perceptions of performance over time and that such changes in perceptions are associated with PEP. Using a student sample, Dannahy and Stopa (2007) showed that relative to a low social anxiety group, individuals high in social anxiety rated their performance more negatively one week following a social interaction than immediately afterwards. Similarly, Brozovich and Heimberg (2011) demonstrated that high social anxiety undergraduate students who exhibited a high trait tendency to engage in PEP rated their performance of a social interaction more negatively one week after the interaction compared to immediately afterwards (this was not the case for the low social anxiety group).

Although such studies lend support to the hypothesized deteriorating perceptions of performance over time amongst socially anxious individuals, other research has yielded somewhat different results. An experimental study by Abbott and Rapee (2004) showed that perceptions of performance for socially anxious individuals remained unchanged in the week following a speech task. Cody and Teachman (2010) provided individuals high and low in social anxiety with standardized positive and negative feedback following a speech task. Participants' recall and recognition memory for the feedback was evaluated immediately after the task and again two days later, at which time engagement in PEP was also assessed. The authors did not find any memory recall biases. Surprisingly however, their results demonstrated that all participants showed a positive recognition bias and remembered their overall feedback as more positive than it actually was; furthermore, all participants' memories for this feedback actually became more positive over time. However, when positive items were examined separately, the results indicated that the high social anxiety group recalled their positive feedback more negatively at follow-up suggesting that they had a tendency to diminish positive feedback over time. The low social anxiety group did not show this pattern. Importantly, these authors also found that engagement in PEP mediated the relationship between trait social anxiety symptoms and negatively biased memory.

A number of authors have also investigated how intentionally engaging in PEP relative to distraction impacts socially anxious individual's perceptions of performance on social tasks. Kocovski, MacKenzie, and Rector (2011) examined the differential impact of PEP and distraction periods on positive and negative thoughts about a speech task in an unselected sample of undergraduate students. They found that compared to PEP, distraction resulted in more positive thoughts but only for individuals with elevated social anxiety (no differences were found amongst the low social anxiety participants). Interestingly, no differences were observed in negative thoughts about the speech task. A similar study by Makkar and Grisham (2012) found a different pattern of results. These authors investigated the impact of deliberately engaging in PEP or distraction on perceptions of speech performance in high and low socially anxious individuals. Contrary to predictions, these authors found that both high and low socially anxious participants who engaged in PEP rated their overall speech performance more positively than those who engaged in a distraction task.

Taken together, the literature on whether and how self-perception changes over time as a result of PEP in social anxiety has yielded mixed results. While some studies do find that perceptions worsen over time for socially anxious individuals, other studies find no changes or even improvements in perceived performance with time, suggesting that additional research is needed to clarify the nature of these processes. Most studies have been conducted on analogue samples of socially anxious individuals and none have used both a healthy and an anxious control comparison in order to identify the unique contribution of social anxiety on performance appraisals or PEP.

2. Metacognitive beliefs

It has been proposed that individuals engage in repetitive negative thinking patterns, such as PEP, as an attempt to regulate their negative emotions (Aldao, Nolen-Hoeksema, & Schweizer, 2010; Kivity & Huppert, 2016). However, as the emotion regulation literature consistently demonstrates, repeatedly focusing on the causes and consequences of past events is likely to lead to increased distress and to hinder problem solving and decision-making processes (Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008; Ward, Lyubomirsky, Sousa, & Nolen-Hoeksema, 2003). The Self-Regulatory Executive Function (S-REF) model (Matthews & Wells, 2004; Wells & Matthews, 1994, 1996) seeks to explain why this regulation strategy might persist despite the seemingly negative consequences for the individual. More specifically, the S-REF model proposes that repetitive negative thinking patterns are initiated and maintained by metacognitive processes. This model suggests that positive metacognitive beliefs about the advantages of engaging in repetitive thought (e.g., "thinking about past events will allow me to gain insights into myself") play an important role in initiating this maladaptive coping style. However, engaging in such thinking leads, in turn, to the development of negative metacognitive beliefs about the disadvantages and uncontrollability of such thought processes. To date, a significant body of research has found support for the S-REF model and the role of metacognition in emotional disorders such as Generalized Anxiety Disorder (GAD); however, metacognitive processes have received relatively little attention in relation to PEP in social anxiety.

In an initial study, Wong and Moulds (2010) examined the relationship between social anxiety and positive metacognitive beliefs in two unselected undergraduate student samples. In both samples, the researchers found that individuals with elevated social anxiety reported stronger endorsement of positive beliefs about PEP, even when gender, depression, and level of trait post-event processing were controlled for statistically. Using an author-developed measure of positive metacognitive beliefs (*Positive Beliefs about Post-Event Processing Questionnaire*; PB-PEPQ), Fisak and Hammond (2013) similarly reported a significant relationship between positive metacognitive beliefs, PEP, and social anxiety. Although these studies provide useful and important preliminary data, they employed correlational designs in unselected student samples; thus, further investigation of the nature of positive metacognitive beliefs in social anxiety is warranted.

Given the mixed and methodologically limited research literature outlined above, it is clear that additional research is needed to improve our understanding of PEP in social anxiety within the context of rigorously designed studies on clinical samples of participants with SAD in comparison to both anxious and healthy control groups.

3. The current study and hypotheses

In the current study, we examined how perceptions of performance on a standardized speech task and positive metacognitive beliefs contributed to PEP in individuals with SAD relative to both individuals without a history of psychological difficulties (i.e., healthy controls) and individuals who received a principal anxiety disorder diagnosis other than SAD and denied any current symptoms of social anxiety (i.e., anxious controls). Individuals with a