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Focus Article

Changes in post-event processing during cognitive behavioural therapy for social anxiety disorder: A longitudinal analysis using post-session measurement and experience sampling methodology

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ABSTRACT

Purpose: Post-event processing (PEP) is posited to be an important factor in the maintenance of social anxiety symptoms. Previous research has demonstrated that general PEP tendencies are sensitive to treatment. However, it remains unclear how momentary PEP following social interactions changes over the course of treatment for social anxiety disorder. The purpose of the present study was to examine how both momentary and general PEP change over the course of treatment, and how such changes predict treatment outcome.

Method: Participants (N = 60) with social anxiety disorder were enrolled in group cognitive behavioural therapy. All participants completed measures of PEP and social anxiety symptom severity at five time points over treatment. A subset (N = 33) also completed repeated experience sampling measurements of PEP following social interactions across the course of treatment.

Results: Both general and momentary PEP decreased over the course of treatment. Decreases in both types of PEP predicted lower social anxiety symptom severity following treatment.

Conclusion: The results of the study demonstrate that momentary experiences of PEP can be influenced by treatment, and can in turn impact treatment outcome. The findings have significant clinical and theoretical implications.

1. Introduction

1.1. Social anxiety disorder and post event processing

Cognitive models of social anxiety disorder (SAD) identify post-event processing (PEP) as a maintenance factor of SAD (Clark & Wells, 1995). Based on the DSM-5, the symptoms of SAD involve cognitive content (fears that one is being negatively evaluated by others), emotions (intense anxiety in social situations), and behaviours (avoidance of social situations) (American Psychiatric Association, 2013). PEP is a repetitive cognitive process that is distinct from the definable symptoms of SAD but is hypothesized to be a key cognitive factor in the maintenance of this symptom constellation. PEP is defined as a form of rumination with content pertaining to negative automatic thoughts, cognitive biases, and dysfunctional beliefs related to self- and other appraisals. PEP has been shown to maintain social anxiety. During PEP, individuals retrospectively analyze their performance in social situations (Clark & Wells, 1995; Rapee & Heimberg, 1997). Cognitive models propose that individuals with social anxiety hold maladaptive beliefs about themselves and social performances (Clark & Wells, 1995; Clark, 2001). These beliefs lead to an increased self-consciousness during the social interaction and a negative information processing bias for signs of social rejection or failure (Clark & Wells, 1995; Rapee & Heimberg, 1997). Following social interactions, individuals with SAD are then likely to engage in PEP, during which they continue to focus on perceived negative aspects of the social interaction (Heimberg, Brozovich, & Rapee, 2014). Over time, this negative bias may distort memories of the social event and thereby confirm the negative view individuals have of themselves in social situations (Brozovich & Heimberg, 2008), potentially resulting in the perpetuation of social anxiety cycles.

PEP has been associated cross-sectionally with social anxiety in both clinical (e.g., Abbott & Rapee, 2004; Kocovski & Rector, 2008; Perini, Abbott, & Rapee, 2006) and nonclinical samples (e.g., Dannahy &

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Stopa, 2007; Hodson, McManus, Clark, & Doll, 2008; Kocovski & Rector, 2007; Rachman, Grüter-Andrew, & Shafran, 2000; see Brozovich & Heimberg, 2008; Wong, 2016 for review). However, there is a paucity of prospective or longitudinal studies examining the relationship between PEP and social anxiety. In one prospective study in a nonclinical sample, lower levels of rumination regarding past social events was associated with a later decrease in negative social beliefs about the self, but only in situations when social anxiety and social stressors were also high (Wong, McEvoy, & Rapee, 2016). However, the same study found that high rumination in the same circumstance also tended to predict a decrease in strength of maladaptive beliefs. Moreover, state social anxiety and anxious coping-focused rumination uniquely predicted PEP over and above pre-treatment levels of social anxiety. Similarly, in a clinical sample of individuals with social anxiety, Brozovich et al. (2015) found that higher baseline rumination levels predicted higher social anxiety symptoms throughout treatment, though the type of rumination measured at baseline was not restricted to post-event processing. Social anxiety has also been found to predict later PEP levels. For example, Laposa and Rector (2011) found that pre-treatment levels of state social anxiety were positively associated with PEP following videotaped exposures that occurred later in the cognitive behavioral therapy (CBT) treatment process.

1.2. Treatment and dispositional PEP tendencies

Group format CBT (CBGT) for SAD is an effective treatment for decreasing SAD symptoms (Barkowski et al., 2016; Powers, Sigmarsson, & Emmelkamp, 2008). The group format allows participants to practice exposure to social situations in a therapeutic environment. Although rumination and PEP are not specifically addressed by traditional CBGT, the structure and products of the ruminative thoughts in the PEP cycle, such as negative automatic thoughts and cognitive distortions, are directly targeted by traditional CBT skills. CBT encourages clients to increase their immediate awareness of unhelpful thoughts, distance themselves from those thoughts, and respond with reframing techniques in order to change their anxiety levels. Indeed, group CBT for SAD has been found to increase client "decentering," or distancing from internal experiences (Hayes-Skelton & Lee, 2018). Therefore, while clients may not be provided with tools to directly stop their PEP thought cycles following social interaction, they may decrease the initiation, severity, and duration of PEP by "decentering" from the cognitive content that comprise the PEP process or by creating new interpretations following social interactions that then could decrease the urge to engage in PEP.

Several studies have demonstrated the efficacy of CBT in reducing general PEP levels among individuals with SAD, including CBGT (Abbott & Rapee, 2004; McEvoy, Mahoney, Perini, & Kingsep, 2009; Modini, Rapee, Costa, & Abbott, 2018), internet-based CBT (Spence, Donovan, March, Kenardy, & Hearn, 2017), and CBT incorporating virtual reality exposures (Price & Anderson, 2011). As PEP is posited to be a maintenance factor of SAD symptoms, one would expect that changes in dispositional PEP over treatment would then lead to symptom reduction. Dispositional PEP is defined as the amount of PEP that participants generally engage in. Several studies have measured dispositional PEP at pre- and post-treatment, and have found that change in PEP was positively associated with change in anxiety symptom severity or mediated the effects of treatment (Hedman, Andersson, Lekander, & Ljótsson, 2015; McEvoy & Perini, 2009; McEvoy et al., 2009; Spence et al., 2017).

1.3. Momentary PEP

Though general PEP tendencies have been shown to reduce from pre- to post-treatment, less information is available on how CBT influences clients' abilities to "decenter" immediately following social interactions, reframe their unhelpful thinking, and engage in less momentary PEP. In other words, additional information is required regarding how CBT influences the occurrence and severity of individual PEP cognitive cycles following instances of social interaction. Currently, much of the information on the effects of therapeutic techniques on momentary PEP stems from laboratory-based studies. Shikatani, Antony, Kuo, and Cassin (2014), for example, demonstrated that a single training session in cognitive restructuring or mindfulness reduced PEP about a speech task among patients with SAD compared to a control condition, although there were no differences in PEP reduction between the two experimental groups. Cassin and Rector (2011) also showed that brief training in mindfulness reduced distress associated with PEP over the post-event period compared to no training among patients with social phobia.

To our knowledge, the majority of PEP studies in SAD have been limited to studies that examine general changes in PEP tendencies from pre- to post-treatment, or laboratory-based studies that examine the immediate effects of therapeutic skills on reducing momentary PEP following social interactions. As of yet, no study has examined how the development of CBT skills over the course of therapy might impact PEP cycles following real-life social interactions. The study of momentary changes in PEP over the course of treatment requires a methodology distinct from the use of post-session or post-treatment questionnaires; an experience sampling methodology (ESM; Csikszentmihalyi & Larson, 1987; Hektner, Schmidt, & Csikszentmihalyi, 2007) would be more ideal. During ESM, participants complete multiple questionnaires that ask about their present experiences as they go about their daily lives. Compared to laboratory-based studies or questionnaires that use retrospective recall, ESM can provide a more ecologically valid and temporally sensitive measurement of behaviour (Csikszentmihalyi & Larson, 1987; Hektner et al., 2007).

To our knowledge, two studies have used ESM to examine factors associated with PEP. Helbig-Lang, von Auer, Neubauer, Murray, and Gerlach (2016) used ESM in a clinical sample with SAD to explore predictors of higher PEP levels, including individual differences, state cognitive and emotional variables, and situational context. Participants were asked to complete questionnaires on a personal digital assistant (PDA) device following social situations that they found distressing. Multiple predictors of higher PEP were identified, including self-attention, negative affect, social performance situations, and the use of safety behaviours. Of note, the ESM measurement did not take place in the context of treatment.

A second ESM study by Badra et al. (2017) examined PEP in a nonclinical, undergraduate sample that scored high or low on a social anxiety measure. Participants were prompted five times a day for four days to indicate the degree to which they engaged in PEP since the last prompt. Participants scoring high in symptoms of social anxiety were not found to significantly differ on momentary PEP from those scoring low in symptoms. The authors concede that these results could have been affected by the simplicity of the item that measured PEP. Equally, as PEP was measured without any additional measurement of social interaction occurrence, it is also possible that participants scoring high in social anxiety symptoms engaged in fewer challenging social interactions, which would in turn affect their average PEP levels.

Though some studies have examined momentary PEP, no study has explored changes in momentary PEP over the course of CBT treatment for individuals with SAD. Knowledge of how PEP changes following every day social interactions could provide information on the effectiveness of CBT-based skills, including exposure exercises and cognitive reframing, on disrupting individual instances of the PEP cognitive cycle.

The present study had two objectives: 1) to examine the effects of treatment on PEP using two different methods of PEP measurement: traditional PEP questionnaires that rely on retrospective recall following therapy sessions, and ESM analysis in which participants rate their PEP following social interactions during their daily lives, and 2) to examine the relationship between PEP change over treatment and post-

treatment symptom severity outcome. Our hypotheses were as follows: 1) PEP, as measured using both traditional and ESM methods, would decrease over the course of treatment, and 2) greater PEP reduction over treatment would predict better treatment outcome as measured by social anxiety symptom severity.

2. Method

2.1. Participants

Participants were 66 treatment seeking adults at a large, university-affiliated outpatient clinic for mood and anxiety disorders. Of the 66 initial participants, six did not complete any questionnaires, resulting in 60 participants in total (40% female; $age_M = 34.62$, SD = 12.98) included in the analysis. A smaller subset of participants (N = 33; 42.4% female; $age_M = 34.00$, SD = 14.80) agreed to take part in the experience sampling study. Independent t-tests and Chi-Square tests indicated that those who participated in the ESM study and those who chose not to participate did not significantly differ in terms of age, gender, ethnicity, marital status, education, pre-treatment SAD symptom severity, and pre-treatment PEP scores, all p's > 0.05. Inclusion criteria were as follows: (1) primary diagnosis of SAD based on the Structured Clinical Interview for DSM-IV-TR, Research-Version (First, Spitzer, Gibbon, & Williams, 1996), (2) ability to provide informed consent, (3) completion of the Post Event Processing Questionnaire (PEPQ) at least once during treatment. Exclusion criteria included the following: (1) active psychosis or bipolar disorder, (2) substance dependence based on DSM-IV-TR criteria, (3) participation in concurrent or recent adequate course of CBT for SAD, (4) recent suicide attempt or active suicidality/self-harm. This study was performed in compliance with the standards established by the Research Ethics Board (REB) where the research was conducted. Participation was voluntary and all participants provided informed consent.

Of the larger participant sample, 70.0% reported being single, 25.0% reported being married or in a co-habiting relationship, and 5.0% reported being divorced. In terms of ethnicity, 88.3% were white, 3.3% were Asian, 1.7% were Hispanic, and 6.7% identified as an ethnicity other than those previously mentioned. In terms of education, 93.3% reported completing high school, 48.3% reported completing a college or university undergraduate program, and 16.7% reported completing a graduate or professional school program.

2.2. Measures

2.2.1. Post-session measures

2.2.1.1. Post-event processing questionnaire. (PEPQ; Rachman et al., 2000). The PEPQ is a self-report measure of the extent to which individuals engaged in PEP following social events. Individuals use an analogue scale to indicate the extent to which they experienced different PEP processes. Though initially comprised of 13 items, the present study utilized only nine items. Early psychometric studies suggested that three of the PEPQ items did not load on the same factor as the other ten (Rachman et al., 2000). These three items were not used in the present study. Furthermore, an additional PEPQ item measures anxiety severity rather than PEP; this item was also dropped from the PEPQ, consistent with previous research (Kocovski, MacKenzie, & Rector, 2011). In the present study, the PEPQ demonstrated strong internal consistency at pre-treatment, Cronbach's α = 0.86.

2.2.1.2. Social phobia scale. (SPS; Mattick & Clarke, 1998). The SPS is a 20-item self-report measure that assesses fears related to social scrutiny. Items on the SPS are rated on a five-point Likert scale ranging from 0 (*not at all characteristic or true of me*) to 4 (*extremely characteristic or true of me*). Previous research has provided support for the validity and reliability of the SPS (Mattick & Clarke, 1998). The SPS demonstrated excellent internal validity in the present study at pre-treatment, Cronbach's α = 0.92.

2.2.2. Experience sampling measures

2.2.2.1. Post-event processing. To measure momentary PEP, participants rated on a 7-point Likert scale the extent to which they had been thinking about their last recorded social interaction. The item was one of several as part of a larger ESM study. Participants were asked to complete the rating following all social interactions during the data collection period.

2.3. Procedure

Participants were enrolled in a CBGT for SAD intervention. Treatment consisted of 12 weekly sessions and was based on established CBT protocols and models (e.g., Clark & Wells, 1995; Hope, Heimberg, & Turk, 2006). Treatment focus included in-session and at home exposure exercises to overcome avoidance and safety behaviours, behavioural experiments, and cognitive restructuring to target negative appraisals and dysfunctional beliefs. All participants completed the PEPQ at pre- and post-treatment as well as after the second, fifth, and ninth sessions for five total waves of data.

The subsample of participants who completed the ESM study attended an introductory session prior to the start of treatment. During the session, they were shown how to use a PDA device in order to complete questionnaires following social interactions. Social interactions were defined as any situation in which two or more people are involved, and are reacting or responding to one another for a minimum of five minutes. Interactions were allowed to be either in person or by phone. Other forms of communication, such as email or texting, that do not involve face-to-face or voice-to-voice interacting were not defined as social interactions. Questionnaire completion was event-contingent: participants were asked to log into the PDA device and complete questionnaires as soon as possible following any social interaction. Included in the questionnaires was the item measuring PEP. Participants were asked to use the PDAs during three time periods. The first time period began one week before the first CBGT session and ended one week after the first session, for a total of 14 possible days of recording. The second time period occurred between the fourth and fifth session of CBGT, for a total of seven possible days of recording. The final period occurred between the eleventh and twelfth session of CBGT, for a total of seven possible days of recording.

3. Results

3.1. Descriptive statistics and symptom reduction

See Table 1 for descriptive statistics. A paired-samples t-test indicated a significant difference between pre-treatment SPS scores (M = 31.04, SD = 15.26) and post-treatment SPS scores (M = 22.74, SD = 15.4), t(43) = 4.05, $p < 0.001$, 95% CI (3.42, 10.21), an outcome consistent with meta-analyses (Hofmann & Smits, 2008). An independent samples t-test failed to indicate a significant difference

Table 1
Descriptive statistics.

	N	M	SD
Pre-treatment SPS	60	31.03	15.26
Post-treatment SPS	43	22.74	15.40
Pre-treatment PEPQ	60	533.23	215.60
Session 2 PEPQ	50	304.72	190.06
Session 5 PEPQ	46	390.72	209.76
Session 9 PEPQ	44	349.72	218.86
Post-treatment PEPQ	43	400.51	226.78

Note. SPS = Social Phobia Scale; PEPQ = Post-Event Processing Questionnaire.

between mean baseline SPS or PEP between those who participated in the ESM study and those who did not (SPS: t(58) = −1.04, p = 0.30, 95% CI [−12.02, 3.82]; PEP: t(58) = 1.43, p = 0.16, 95% CI [−31.85, 190.19].

3.2. Sessional analysis

Longitudinal mixed effects analysis was conducted using R (R Core Team, 2017). Post-session PEPQ scores were regressed on a "time" variable. The "time" variable represented the number of treatment sessions that had elapsed. Restricted maximum likelihood estimation was used to fit all regression models. The model began as a random intercept model with fixed intercept effects and an unstructured G matrix. Linear and quadratic effects of time were then added to the model. A Wald test indicated that time significantly added to the model, $F(2, 181) = 14.71$, $p < 0.001$. A random effect for linear and quadratic time was then added to the model. A likelihood ratio test indicated that the random effects of time did not add significantly to the model, $\chi^2(5) = 4.47$, $p = 0.48$. The random intercepts model was therefore used as the final model.

Controlling for quadratic effects of time, the linear effects of time significantly added to the model, B = -18.98, $p = 0.01$, such that PEP scores decreased as sessions progressed. Controlling for linear effects of time, the quadratic time variable significantly added to the model such that the slope of PEP change became less negative and more positive over time, B = 29.42, $p < 0.001$.[1]

3.3. Experience sampling analysis

All event-contingent responses for each participant were included in the analysis. A "time" variable was created in which time was measured between the first survey each participant completed and all subsequent surveys.

Restricted maximum likelihood estimation was used to fit all regression models. Initially, the model used an unstructured error covariance structure. The model began as a random intercept model with fixed intercept effects. Fixed effects for the linear and quadratic effects of time were then added to the model. A Wald test indicated that time significantly added to the model, $F(2, 1304) = 12.53$, $p < 0.001$. A random effect of linear and quadratic time was then added. Likelihood ratio tests indicated a significant difference between the models, $\chi^2(5) = 64.38$, $p < 0.001$. The Akaike Information Criterion indicated that the model including a random effect of time was a better fit for the data. Finally, a first order continuous autoregressive (CAR1) error covariance structure was compared to an unstructured covariance structure. Likelihood ratio tests indicated that the model including the CAR1 covariance structure was not better for the data, $\chi^2(1) = 7.85$, $p < 0.001$, therefore the final model retained the unstructured covariance structure.

Using the final model, a Wald test indicated a significant effect of time, $F(2, 1304) = 4.41$, $p = 0.01$. Controlling for the quadratic effects of time, the linear effects of time significantly added to the model, B = -0.01, $p = 0.02$, such that PEP regarding the most recent interaction decreased over the course of treatment. Controlling for the linear effects of time, the quadratic effects of time also significantly added to the model, $p < 0.01$, though the rate by which PEP decrease slowed was close to zero, B < 0.001.

3.4. Prediction of treatment outcome

3.4.1. Sessional analysis

Hierarchical linear regression was used to determine the effect of PEPQ change on treatment outcome. Residualized change scores for the PEPQ were created using pre- and post-treatment PEPQ measures. A linear regression model was created with post-treatment SPS as the dependent variable. In the first block for each model, post-treatment SPS was regressed on pre-treatment SPS. Pre-treatment SPS added significantly to the model, B = 0.76, $p < 0.001$, 95% CI (0.54, 0.98), $R^2 = 0.54$. PEPQ residualized change scores were then added to the model. The residualized change scores accounted for an additional 10% of the variance and added significantly to the model, B = 5.15, $p < 0.01$, 95% CI (2.07, 8.23). Therefore, change in PEPQ over the course of treatment significantly predicted symptom outcome as measured by the SPS.

3.4.2. Experience sampling analysis

In order to determine whether change in momentary PEP over the course of therapy predicted post-treatment SPS when controlling for pre-treatment SPS, momentary PEP scores for each participant were aggregated based on whether they were collected in the first two weeks of treatment or the final week of treatment (those from the mid-therapy period were not included in this analysis). Each participant therefore had two mean PEP scores: early treatment and late treatment. These scores were then used to arrive at residualized change scores for momentary PEP. A hierarchical linear regression model was then used to analyse the data. In the first block, post-treatment SPS was regressed on pre-treatment SPS. Pre-treatment SPS added significantly to the model, B = 0.79, $p < 0.001$, 95% CI (0.47, 1.10), $R^2 = 0.53$. The residualized change scores were then added to the model. The residualized change score of momentary PEP accounted for an additional 10% of the model variance and added significantly to the model, B = 5.44, $p = 0.02$, 95% CI (0.98, 9.90).

4. Discussion

PEP has long been considered an important component in the maintenance of SAD. Though research has demonstrated that broad PEP tendencies decrease during CBT treatment (Abbott & Rapee, 2004; McEvoy et al., 2009), and laboratory-based research has demonstrated the effect of treatment strategies on momentary PEP (Cassin & Rector, 2011; Shikatani et al., 2014), no naturalistic studies had examined the effect of treatment on momentary PEP levels following social interactions. The present study was the first to use ESM as well as traditional retrospective measurement of PEP in order to determine how these variables change over the course of CBT treatment for SAD. It was hypothesized that PEP would decrease over treatment according to both types of measurement. Furthermore, it was hypothesized that change in PEP would predict treatment outcome in terms of social anxiety symptom severity.

The hypotheses were largely supported. Momentary PEP, as measured by the ESM analysis, significantly decreased over the course of treatment, as did PEP tendencies measured by the post-session questionnaires. Therefore, treatment appears to have strengthened participants' ability to refrain from engaging in PEP patterns of thinking following daily social interactions. However, the rate of PEP change was not uniform across data collection, particularly in the sessional data analysis. Instead, there was a significant quadratic effect of time, such that the rate of PEP decrease slowed as treatment progressed. A quadratic modeling of change over treatment is not unheard of in the CBT research literature (e.g., Sunderland, Wong, Hilvert-Bruce, & Andrews, 2012), and in this case suggests that the beginning stages of treatment are a particularly important period in terms of their impact on PEP. The

[1] These analyses were duplicated using only the subset of participants who participated in the ESM study. Using this subset, a Wald test indicated that time significantly added to the model, $F(2, 113) = 5.89$, $p < 0.01$. Controlling for quadratic time, there was a trend of the linear time variable significantly adding to the model, B = -18.32, $p = 0.09$. Controlling for linear time, quadratic time significantly added to the model, B = 25.66, $p < 0.01$. Therefore, there was a nonsignificant trend of PEPQ decreasing over time, though the rate of change significantly slowed over time.

decrease in rate of PEP reduction could also have been due to the nature of the CBT protocol. Initial sessions focused largely on exposure exercises, while later sessions gradually incorporated more cognitive restructuring. The introduction of additional focus on and engagement with cognitions may have paradoxically increased participants' awareness of their PEP, leading to higher self-report ratings although this particular explanation is beyond the limits of testing in the current study and will require future examination. Alternately, it is also possible that participants engaged in more difficult exposure exercises as treatment progressed, leading to a greater likelihood of their engaging in PEP.

While treatment led to a significant decrease in PEP, change in PEP in turn significantly predicted post-treatment social anxiety symptom severity when controlling for pre-treatment symptom severity. These findings support CBT models of social anxiety (Clark & Wells, 1995), in which PEP is posited to be one of several factors that help maintain the symptom cycle, and are in keeping with previous research that identified PEP as a significant mediator of symptom change in CBGT for SAD (Hedman et al., 2013). There are also clear clinical implications from these findings. Though PEP was frequently measured, the treatment approach used in the present study did not include techniques that directly targeted PEP, but rather traditional CBT techniques such as in-session and at-home exposure exercises, cognitive restructuring, and interpersonal effectiveness skills. The opportunity to decrease anxious avoidance and subsequently receive information that disconfirms previously held social beliefs, as well as the ability to reframe interpretations of social performance may lead to a decrease in the frequency and severity of PEP. However, given the relationship between PEP change and treatment outcome, it may be additionally beneficial to introduce techniques that directly target PEP or that have been developed to challenge other types of ruminative thought patterns (e.g., Watkins, 2016).

There are several limitations to the present study. Though PEP was measured at multiple points over the course of treatment, there was no control group. We therefore cannot exclude the possibility that a confounding variable led to the decrease in PEP. A previous, non-treatment based ESM study on PEP in an SAD sample was unable to determine whether time was a significant predictor of PEP, though they did find that number of ESM questionnaires completed did not significantly predict PEP (Helbig-Lang et al., 2016); at this stage, additional research is needed as to the effects of time and/or ESM measurements on PEP. Future research can use ESM to compare changes in PEP in treatment versus control groups. Equally, only one item was used to measure PEP in the ESM analysis. While the use of only one item decreased participant burden in what was otherwise a long and involved study, it is possible that important nuances of PEP were lost in the simplification. As well, in keeping with previous ESM-based PEP studies (Helbig-Lang et al., 2016), the current study measured PEP closely following an interaction, but did not measure duration of PEP or whether PEP may follow at a lag from when the interaction ended. Future research can use signal-contingent sampling in order to determine duration and potential later-onset of PEP. Finally, the present study examined a particular subset of social interactions, namely those that involve vocal communication. However, PEP may also be initiated by types of social interactions that do not involve vocal interactions, such as texting, tweeting, or other types of social network exchanges. Future research is therefore necessary to examine whether decreases in PEP over treatment generalize beyond vocal interactions.

Despite these limitations, the present study has multiple strengths. It is the first study to our knowledge that examined changes in both momentary PEP and PEP tendencies over the course of treatment in an SAD sample, as well as one of the few studies to examine the relationship between PEP change and social anxiety symptom change over treatment. As such, it provides novel and rich information on how CBT treatment might impact clients' daily cognitive experiences.

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