Post-event processing following social and nonsocial evaluative feedback:

The roles of social anxiety and emotion regulation

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Author’s Note

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G.A. developed the study concept under the supervision of H.L.U. Both authors contributed to the study design. Testing and data collection were performed by G.A. G.A. performed the data analysis and interpretation under the supervision of H.L.U. G.A. drafted the paper, and H.L.U. provided critical revisions. Both authors approved the final version of the paper for submission.

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The analysis plan for Study 2 was registered at the Open Science Framework on 12/08/2016, and was made public on 03/03/2017. This registration, which includes more detailed information about methodology, can be viewed at https://osf.io/j5vef. Materials, data files and analysis scripts for both studies can be found at https://osf.io/fquvu.

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Abstract

Post-event processing (PEP) refers to brooding over social events after they occur. We studied two potential causes of PEP. In Study 1 (N = 101), we examined whether giving participants social (vs. nonsocial) performance feedback during an evaluative task would produce higher PEP. Our hypotheses were not supported. In Study 2, we made methodological improvements and increased our sample size (N = 200). Moreover, in response to social (vs. nonsocial) performance feedback, participants either regulated their emotions (REG) or not (CTL). As expected, those who received social (vs. nonsocial) feedback engaged in higher PEP. While REG (vs. CTL) instructions did not impact PEP on their own, those receiving social (vs. nonsocial) feedback engaged in higher PEP in the CTL condition; the opposite was true in the REG condition. It appears that the “social” aspect of evaluative events potentiates PEP and that efforts to regulate emotions may disrupt that potentiation.

*Keywords:* Social anxiety, post-event processing, social evaluation, emotion regulation, repetitive negative thinking
Post-event processing following social and nonsocial evaluative feedback:

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The fifth edition of the Diagnostic and Statistical Manual of Psychiatric Disorders (DSM-5; American Psychiatric Association, 2013) defines social anxiety disorder (SAD) as a “marked fear or anxiety about one or more social situations in which the individual is exposed to possible scrutiny by others” (p. 202). Those with SAD report reduced quality of life (Wittchen, Fuetsch, Sonntag, Müller, & Liebowitz, 2000), are less likely to receive a high school (Stein & Kean, 2000) or college degree, are less productive at work and at home, and miss a greater percentage of work time because of health-related reasons (Katzelnick et al., 2001).

One of the reasons why anxiety is maintained is that people are often able to successfully avoid the source of their anxiety (Saltsers-Pedneault, Tull, & Roemer, 2004). This avoidance often leads to more anxiety; the less the person is exposed to the feared object or context, the more anxious they become about it (Jazaieri, Morrison, Goldin, & Gross, 2014). With more exposure, people often experience decreases in anxiety (e.g. exposure therapy; Deacon & Abramowitz, 2004). Social anxiety (SA) does not seem to fit this mold, however. While it is known that most people with SA try to avoid social situations (Werner, Goldin, Ball, Heimberg, & Gross, 2011), many social encounters (e.g. going to school or work) are difficult to avoid in day-to-day life.

Why is it, then, that people with SA cannot overcome their anxiety despite frequent exposure to social encounters? One of the many explanations proposed by cognitive-behavioral models of SA (Clark & Wells, 1995; Heimberg, Brozovich, & Rapee, 2010; Hofmann, 2007) is that following a social event, socially anxious people later retrieve negative information about even benign social situations, and brood about this negative material after the event has occurred,
also known as post-event processing (PEP). PEP typically focuses on anxious feelings and negative self-perceptions, and may lead the individual to believe that the event was more negative than most others would experience it. As a result, those who do PEP may engage in anticipatory processing dominated by recollections of past perceived failures before entering social events, leading to the emergence and maintenance of SA (Hofmann, 2007).

Considering the crucial role PEP plays in explaining SA, it is important to understand the predictors of PEP so that we can find ways to decrease it, and in turn, decrease SA (Price & Anderson, 2012). Because PEP broadly involves a person thinking about an event, predictors of PEP can either be aspects of the person (e.g. dispositional tendencies) or aspects of the context (e.g. the nature of the event, or context-specific behaviors).

To date, many studies have demonstrated that SA is one important person-based predictor of PEP. People who exhibit higher levels of SA engage in elevated levels of PEP (for reviews, see Brozovich & Heimberg, 2008; Penney & Abbott, 2014; Wong, 2016). This has been shown in correlational studies that examine overall PEP (Rachman, Grüter-Andrew, & Shafran, 2000), as well as in quasi-experimental studies that expose participants to a standardized stressful social event in the lab and measure PEP related to this event (Abbott & Rapee, 2004; Edwards, Rapee, & Franklin, 2003; Kocovski & Rector, 2008; Mellings & Alden, 2000).

Several context-based predictors have also emerged in the literature, such as higher perceived state anxiety (Makkar & Grisham, 2011; Mellings & Alden, 2000), higher perceived costs and consequences of failure (Rapee & Abbott, 2007), worse perceived performance (Abbott & Rapee, 2004; Chen, Rapee, & Abbott, 2013; Zou & Abbott, 2012), higher state fear of negative evaluation (Brozovich & Heimberg, 2011; Fehm, Schneider, & Hoyer, 2007; Zou &
One context-based construct that has not yet been investigated in relation to PEP is emotion regulation (ER). One of the most commonly used models of ER is the process model of ER (Gross, 1998), which outlines five families of strategies a person can use to regulate their emotions – situation selection, situation modification, attentional deployment, cognitive change, and response modulation. Studies demonstrate that people with SAD differ from healthy people in their use of each of the five families of ER strategies (Jazaieri et al., 2014). It is, thus, possible that how a person regulates their emotions during a stressful event might affect how they think about it in the future (i.e. PEP).

The context-based predictors outlined so far focus on what people might think, feel, or do in different contexts and how this relates to PEP. However, it is also important to consider characteristics of events themselves that might facilitate PEP. Because theoretical definitions of PEP posit that it occurs following a social event, the few studies that have examined the characteristics of an event have compared social situations to each other (i.e. performance vs interaction). Findings from these studies have been mixed; some have found that social performance situations predict higher PEP (Kocovski & Rector, 2007; Makkar & Grisham, 2011), while others have found that social interaction situations predict higher PEP (Fehm et al., 2007). Lundh and Sperling (2002) found that, within social events, PEP was only significantly associated with events that had a negative evaluation component. However, few studies have compared social to nonsocial situations. Fehm et al. (2007) found that social events were correlated with more frequent and intense PEP. No experimental studies to our knowledge have compared social and nonsocial events.
In this paper, we present two studies that extend our understanding of context- and person-based predictors of PEP. In Study 1, we conducted an experiment to examine whether evaluative events involving social feedback (SFB) predict higher PEP compared to those involving nonsocial feedback (NSFB), and whether this varies by levels of SA. In Study 2, we extended this work by introducing another context-based predictor to our experiment, ER, while also addressing several of Study 1’s limitations. In both studies, we report how we determined our sample size, and all data exclusions, manipulations, and measures.

**Study 1**

The purpose of Study 1 was to understand whether social evaluative events lead people to engage in PEP more than nonsocial evaluative events. We exposed participants to an evaluative performance-based situation in the lab, manipulating whether the feedback they received was explicitly social or not. Because all participants were evaluated on their performance, we expected everyone to respond with anxiety, therefore we collected self-reported and physiological measures of arousal during the task. Our goal was to determine whether participants would differentially engage in PEP about this task as a function of the nature of the feedback 24 hours and 1 week later.

We hypothesized that those receiving SFB would engage in more PEP at both time points, and that PEP would decrease over time for both events, but that this decline would be less pronounced for those receiving SFB. In addition, we expected that those who were higher in SA would demonstrate higher PEP, especially after receiving SFB, and that this higher level of PEP would be more consistent over time, compared to those who were lower in SA.

**Method**

**Participants**
We sought to have \( N = 50 \) participants in each feedback type group to achieve reasonable statistical power while also maintaining feasibility to collect in the time we had available (one academic year). We recruited 102 participants for the study. A set of post-hoc sensitivity analyses conducted using GPower 3.0.5 software (Faul, Erdfelder, Lang, & Buchner, 2007) suggested that, when conducting analyses comparing the SFB and NSFB groups, we had adequate power to detect medium (\( f = .25, 1-\beta = .70 \)) and large (\( f = .40, 1-\beta = .98 \)) effects. When breaking down analyses by SA, we had adequate power to detect large effects (\( f = .40, 1-\beta = .87 \)). Of the 102 participants, 66 participated for course credit, and 36 participated for pay.

One hundred and one participants were included in our final sample because one participant declined to complete the main laboratory performance task. Out of the final sample, 66.3% of our participants were female and the age range was 18-65 years (\( M = 25.23, SD = 13.20 \)). Our sample was 13.1% Hispanic or Latino, 72.2% White, 21.8% Asian, 9.9% Black, and 2.0% Hawaiian or other Pacific Islander; 5.9% declined to provide racial/ethnic information. All study procedures were approved by the Social, Behavioral, and Educational Research Institutional Review Board (SBER IRB) at Tufts University and the United States Army Human Research Protections Office.

**Performance task**

To induce anxiety, we used a modified version of the Trier Social Stress Test (TSST; Kirschbaum, Pirke, & Hellhammer, 1993). This version of the TSST involved doing difficult serial subtractions, though participants were told that the task is easy. Participants were not given positive feedback for correct responses, however when they provided an incorrect response, they were told they were wrong and instructed to start over. Participants were alone in a room and heard the verbal feedback through headphones. Participants completed two rounds of the task in
counterbalanced order. In one round, they were asked to count backwards from 2,223 by 17 for 5 minutes, and in the other, from 2,104 by 13 for 5 minutes.

Participants completed this task by entering their responses using the keyboard; they received veridical verbal and visual feedback about their performance. Participants were randomly assigned to one of two feedback conditions: SFB or NSFB. In the SFB condition, the experimenter provided verbal feedback on their task performance. In the NSFB condition, the computer provided this verbal feedback. All experimenters were women; therefore, we used a female voice for the computerized version as well, though it was clearly distinguishable from a human voice. The computerized feedback was generated using Microsoft Narrator and recorded using Audacity 2.1.1 (Audacity Team, 2015). Participant responses were recorded by E-Prime 2.0 (Psychology Software Tools, Pittsburgh, PA).

**Ratings of state anxiety**

We measured state anxiety using the State Trait Inventory for Cognitive and Somatic Anxiety (STICSA; Ree, MacLeod, French, & Locke, 2000), which consisted of 21 items that are rated on a 4-point Likert scale ranging from 1 (*not at all*) to 4 (*very much*). Eleven of the items were about somatic symptoms of anxiety; the remaining 10 were about cognitive symptoms of anxiety. Items were summed to create a final score.

**Peripheral physiology**

We also indexed objective changes in anxiety using peripheral physiological data during the baseline and performance tasks. These data were collected using an MP150 system (Biopac, Goleta, CA) and processed using ANSLAB (Wilhelm & Peyk, 2005). See Urry (2010) for details related to acquisition and processing of electrocardiographic and electrodermal activity. Heart
rate (HR) and skin conductance level (SCL) values were averaged across all time points for the baseline and performance tasks for each participant.

**Social anxiety symptoms**

Trait SA was measured after the completion of the performance task using the Social Interaction Anxiety Scale (SIAS; Mattick & Clarke, 1998). Participants responded to 20 items using a five-point scale ranging from 0 (*not at all characteristic or true of me*) to 4 (*extremely characteristic or true of me*). Three items were reverse scored, and all items were summed.

**Follow-up questionnaires**

Participants received links to the online questionnaires via e-mail, the first one 24 hours and the other 7 days following the lab session, completed using Qualtrics Online Survey Software (Provo, UT). The rate of completion for both surveys was 96%. Overall, most participants completed the surveys around the time they received them both for the 24-hour (\(M_{\text{hours}} = 30.04, SD = 13.38\)) and the seven-day follow-up (\(M_{\text{days}} = 6.58, SD = 0.70\)).

**Post-event processing.** PEP was measured using a modified version of the Thoughts Questionnaire (TQ; Edwards et al., 2003). The TQ is a 29-item questionnaire with positive and negative subscales that measures PEP following a speech task. In this study, we reworded each item so that it was specific to our performance task (e.g. “My speech was good” became “My math performance was good”), and removed two items that did not apply to our task (“I should have chosen a different topic,” and “That I chose an interesting topic”), resulting in a 27-item questionnaire (10 positive, 15 negative, 2 general items). Participants rated how often they had thoughts about aspects of the task using a five-point Likert scale ranging from 0 (*never*) to 4 (*very often*). Because the central hypotheses of this study focused on negative PEP, only the

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1 We also used the Post-Event Processing Questionnaire, Revised (PEPQ-R; McEvoy & Kingsep, 2006); analyses conducted with this measure can be found in the Online Supplemental Materials (Table S1).
negative subscale of the TQ, which was created by summing all relevant items, will be used in our analyses here. Further analyses using the positive subscale can be found in the Online Supplemental Materials (Table S1).

**Additional materials**

Several lab session and follow-up questionnaire measures were also collected\(^2\). These measures were not relevant to the central hypotheses, and their analyses will not be reported.

**Procedure**

Overall, the study involved a lab session and two online follow-up surveys. During the lab session, participants provided written informed consent and then completed a baseline task during which they looked at a fixation cross for 2 minutes. They then completed the performance task to which they were randomly assigned with either SFB or NSFB for 10 minutes. HR and SCL data were collected during both tasks. Participants also reported their levels of anxiety before and after the performance task. At the end of the lab session, participants completed a questionnaire including a measure of SA. Finally, 24 hours and 7 days after the lab session, participants reported on their PEP online, as well as debriefed and compensated online.

**Results**

**Data retention**

Missing observations were due to participants not responding to some of the questionnaires. For our preliminary analyses, we retained between 94 and 98 participants.

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\(^2\) These measures were the Social Phobia Scale (SPS; Mattick & Clarke, 1998), the Brief Fear of Negative Evaluation Scale (BFNE; Leary, 1983), the Ruminative Response Scale (RRS; Treynor, Gonzalez, & Nolen-Hoeksema, 2003), the Beck Depression Inventory (BDI-II; Beck, Steer, & Brown, 1996), the Multi-Family ER Questionnaire (MFERQ; under development in our lab), an emotion regulation strategy questionnaire (developed in our lab), a perceptions of performance task scale (developed in our lab), the Perceived Performance Questionnaire (PPQ; Whittaker, 2002), a perceptions of the experimenter scale (developed in our lab).
Retention was lower for analyses for hypothesis testing; these retained between 88 and 97 participants. Materials, data files, and analysis scripts can be found at https://osf.io/fquvu.

Preliminary analyses

**Did the performance task elicit the expected anxiety response?** Repeated-measures general linear models (GLM), indicated that participants had significantly higher HR during the performance task ($M = 81.92$, $SD = 12.17$) compared to baseline ($M = 76.46$, $SD = 11.85$), $F(1,97) = 96.64$, $p < .001$, $\eta^2_p = .50$. Participants also had significantly higher SCL during the performance task ($M = 11.22$, $SD = 5.19$) compared to baseline ($M = 8.17$, $SD = 4.71$), $F(1,97) = 245.97$, $p < .001$, $\eta^2_p = .72$. Participants also reported feeling more anxious after ($M = 32.97$, $SD = 12.03$) compared to before the performance task ($M = 30.03$, $SD = 10.51$), $F(1,93) = 19.89$, $p < .001$, $\eta^2_p = .18$. The feedback type by time interaction was not significant for HR, $F(1,97) = 0.01$, $p = .91$, $\eta^2_p < .001$, SCL, $F(1,97) = 0.21$, $p = .65$, $\eta^2_p = .002$, or self-reported anxiety, $F(1,93) = 0.93$, $p = .34$, $\eta^2_p = .01$, suggesting that participants experienced similar increases in anxiety in both groups.

Hypothesis Testing

**Did PEP vary by levels of SA and feedback type at either time point?** Univariate GLMs indicated that SA, $F(2, 95) = 1.98$, $p = .14$, $\eta^2_p = .04$, feedback type, $F(1, 95) = 0.19$, $p = .66$, $\eta^2_p = .002$, and their interaction, $F(2, 95) = .64$, $p = .53$, $\eta^2_p = .01$, had no effect on PEP at the 24-hour follow-up. This was also the case for the 7-day follow-up for SA, $F(2, 93) = 0.79$, $p = .46$, $\eta^2_p = .02$, feedback type, $F(1, 93) = .57$, $p = .45$, $\eta^2_p = .01$, and their interaction, $F(2, 93) = 0.31$, $p = .74$, $\eta^2_p = .01$. In sum, contrary to the hypothesis, PEP did not vary by levels of SA, feedback type, or their interaction at either time point (see Table 1).
Did PEP decrease over time, and if so, did this depend on feedback type? A repeated measures GLM revealed a significant main effect of time, where PEP decreased over time, $F(1, 93) = 40.96, p < .001, \eta_p^2 = .31$. However the hypothesized effects of feedback type, $F(1, 93) = .08, p = .77, \eta_p^2 = .001$, and the time by feedback type interaction, $F(1, 93) = 3.05, p = .08, \eta_p^2 = .03$, were not significant.

Did PEP decrease over time depending on levels of SA and feedback type? We created low, medium, and high SA groups based on clinical cutoff recommendations (Heimberg, Mueller, Holt, Hope, & Liebowitz, 1992; replicated in Brown et al., 1997). Specifically, those who scored $\geq 34$ on the SIAS were in the high SA group ($n = 39$), those who scored $< 34$ and $> 20$ on the SIAS were in the medium SA group ($n = 22$), and those who scored $\leq 20$ were in the low SA group ($n = 38$). We then conducted a repeated measures GLM with time as a within-subjects factor and feedback type and SA as between-subjects factors. The predicted time by feedback type by SA interaction was not significant, $F(2, 87) = 2.53, p = .09, \eta_p^2 = .06$.

Notably, the pattern of results depicted in Figure 1, though not significant, suggested differences in the degree to which PEP declined over time as a function of feedback type for people high in SA (see Table 1 for descriptives and effect sizes, Lakens, 2013). Those high in SA experienced a decrease in PEP over time in the NSFB condition, $p < .001$, Hedges’ $g_{av} = 0.91$, but not in the SFB condition, $p = .24$, $g_{av} = 0.23$. By contrast, those low in SA experienced a small decrease in PEP over time, but this was not significant in either the SFB condition, $p = .05$, $g_{av} = 0.35$, or NSFB conditions, $p = .12$, $g_{av} = 0.39$. Those medium in SA experienced a significant decrease in PEP over time in both the SFB condition, $p = .004$, $g_{av} = 0.90$, and in the NSFB condition, $p = .005$, $g_{av} = 0.78$. Therefore, although our hypothesis was not supported by a
significant three-way interaction, the direction of these pairwise comparisons was in line with expectations.

**Discussion**

Implicit in the definition of PEP is the notion that the “social” aspect of social evaluative events is what prompts subsequent self-focused brooding (Clark & Wells, 1995; Heimberg et al., 2010; Hofmann, 2007). This idea had correlational support (Fehm et al. 2007) but, to our knowledge, experimental support that promote causal inferences was lacking. To rectify this gap in the literature, we exposed participants to an evaluative situation in which participants received performance feedback that was explicitly social (i.e., delivered by a person) or nonsocial (i.e., delivered by a computerized voice) in nature. We tested the hypothesis that receiving SFB would lead to more PEP than receiving NSFB 24 hours and 7 days later, and that this association would be stronger in people reporting higher levels of SA.

Contrary to the notion that the “social” aspect of social evaluative events is what prompts PEP, our results suggest that participants in the social and nonsocial feedback conditions engaged in similar levels of PEP at both time points; this was true regardless of level of SA. However, although we did not observe statistically significant support for the hypotheses, we did observe a nonsignificant pattern hinting that, while most participants experienced decreases in PEP over time, those who were high in SA and received SFB on their performance engaged in more consistent PEP over the course of the week. This pattern is intriguing, but it was not statistically robust so it bears replication in the context of methodological improvements that a) extend it in important ways (e.g., to consider the role of emotion regulation), and b) address the following three limitations:
First, it is possible that our social versus nonsocial feedback manipulation was ineffective; participants may not have experienced our SFB condition to be more social in nature than our NSFB condition, but we had no way to assess this possibility. One way to establish the construct validity of this manipulation would be to measure public self-consciousness; if our manipulation was successful, we would expect the SFB group to be more self-conscious than the NSFB group (Matheson & Zanna, 1988).

Second, our follow-up surveys measured two retrospective time periods that were unequal in length. This choice of timing may have led to potential retrospective memory problems. Retrospective reporting is known to be prone to biases and distortions (Stone et al., 1998); our 24-hour and 7-day follow-ups were differentially susceptible to these problems.

Third, our study was adequately powered to detect medium effects when comparing the feedback groups to each other, and large effects when looking at their interaction with SA. If there is a true effect and it is smaller than that, it would have been undetectable in this sample.

In sum, we found that putting the social in social evaluation did not prompt greater PEP, regardless of levels of social anxiety. However, there were hints that such effects were present but obscured by the limitations described above. Moreover, in this study, we did not tackle an important contextual question: If one attempts to down-regulate negative emotions during evaluative events, might this alter patterns of PEP? We designed Study 2 with these ideas in mind.

**Study 2**

Similar to Study 1, we exposed participants to an evaluative performance-based situation in the lab. This time, we manipulated two aspects of the context of the same performance task: first, whether they received SFB or NSFB, and second, whether they were prompted to use ER
strategies to change how they feel or not. This ER manipulation allowed us to test whether prompting those who are high in SA to use ER during socially evaluative tasks might help them decrease their PEP.

In addition to this conceptual extension, we introduced several methodological changes to address some of Study 1’s limitations. First, we improved our participant instructions to make the distinction between the two feedback conditions more salient. We also included measures of self-consciousness and negative affect to assess whether the manipulation had the intended effect. Moreover, we addressed the problem of having measured two time periods of unequal length with our follow-up surveys by sending our participants daily surveys for seven days. We also improved our ability to detect smaller effects by increasing our sample size, and by recruiting only those who were high in SA. Finally, we used a new analytical approach (Latent Growth Curve Modeling; LGCM) for the hypothesis test, which allowed us to examine effects of the two manipulations on the intercept (day 1 PEP scores) and slope (change in PEP scores) and to use full information maximum likelihood (FIML) estimation to take advantage of all available data.

With these significant improvements, we tested the following confirmatory hypotheses:

H1. Compared to NSFB, those receiving SFB condition would:

   H1a. engage in higher levels of PEP on Day 1 (intercept).³

   H1b. exhibit a flatter decrease in PEP over the course of seven days (slope). We estimated both linear and quadratic slopes because participants might experience a steeper decrease in PEP earlier in the week.

³ In Study 1, we did not find differences in how much participants engaged in PEP on the first day following the performance task. However, due to the changes we made to our design and the literature reviewed earlier, we retained this as a confirmatory hypothesis in Study 2.
H2. Compared to those who were instructed to experience their emotions without changing them (Control [CTL]), those who were instructed to use ER strategies during the performance task (REG) would:

H2a. engage in lower levels of PEP on Day 1 (intercept).

H2b. exhibit a steeper decrease in PEP over the course of seven days (slope). As in H1, we estimated both linear and quadratic slopes.

The data collected in this study also afforded the opportunity to assess whether feedback type and ER conditions have an interactive effect on the intercept and slope of PEP.

**Method**

**Participants**

We sought to have $N = 100$ participants in each feedback type (SFB, NSFB) and emotion regulation (REG, CTL) group to achieve reasonable statistical power for main effects of each of these factors. We, thus, recruited 200 participants for the study. This gave us adequate power ($1 - \beta = .80$) to detect effects of $d = .40$ for main effects, and of $d = .57$ for two-way interactions. Of the 200, 67 participated for course credit, and 133 participated for pay. Prior to participation, participants completed a brief eligibility survey that included the SIAS (embedded among other measures); only those who scored $\geq 34$ and were, thus, high in SA were recruited. All study procedures, which remained identical to Study 1 except where noted below, were approved by the SBER IRB at Tufts University and the United States Army Human Research Protections Office.

We stopped recruitment as soon as we obtained usable data from 200 participants. Unfortunately, some participants enrolled in the study had completed very similar studies in our lab before. These participants, as well as participants who completed fewer than 3 follow-up
surveys (limiting our ability to conduct analyses of nonlinear changes in PEP) were excluded from our analyses. We collected data from 226 participants to compensate for these losses.

Out of the final sample, 63.8% of our participants were female and the age range was 18-55 years ($M = 21.06, SD = 5.23$). Our sample was 5.0% Hispanic or Latino, 69.0% White, 26.5% Asian, 8.5% Black, 0.5% Hawaiian or other Pacific Islander, and 0.5% American Indian or Alaska native; 2.5% declined to provide racial/ethnic information.

**Performance task**

To induce an anxious state, we used the performance task described in Study 1. To ensure that participants experienced the feedback as social or nonsocial as intended, those receiving SFB heard the experimenter say: “Importantly, I will monitor your performance during this math task. I will see your responses. Should you miscalculate, I will point out your mistake and instruct you to start over again.” Those receiving NSFB heard the computer say: “Importantly, the computer will monitor your performance during this math task. The experimenter will not see your responses. Should you miscalculate, the computer will point out your mistake and instruct you to start over again.”

Participants were also randomly assigned to one of two ER conditions: the regulation (REG) condition, where they were asked to manage their negative emotions, and the control (CTL) condition, where they were told to experience their emotions naturally as they occur. To ensure that this manipulation was salient, we included a brief training before the task. All participants were asked to imagine a scenario where they would need to perform mental arithmetic. Then, for two minutes, participants in the REG condition typed in ER strategies to help them decrease negative emotions during this imaginary task, while those in the CTL condition typed in mathematical strategies.
Before the task began, all participants were told: “It is possible that you will experience some unpleasant emotions while you complete this math task.” Participants who were in the REG group additionally received the following instructions: “If you do, please try your best to regulate these emotions in such a way that you feel less negative. While you do so, feel free to use some of the strategies you outlined earlier.” Those who were in the CTL group instead received the following instructions: “If you do, please simply let these emotions occur without trying to change them.” All participants then completed the math task. Similar to Study 1, we collected HR and SCL data during the baseline and performance tasks.

**Lab session questionnaire measures**

The lab session questionnaire measures were identical to the ones used in Study 1 except where noted below.

**Ratings of mood.** Participants completed an in-house measure of mood that we adapted from previous work (Tamir, John, Srivastava, & Gross, 2007). Participants rated how they were currently feeling across 11 items, rating each one on a continuous Likert scale (0 = not very much, 6 = very much). Sample items include: “judged, scrutinized, evaluated” and “embarrassed, humiliated, ashamed”. Based on a principal components analysis with a varimax rotation, we computed two sum scores, positive (4 items) and negative (7 items).

**Ratings of self-consciousness.** Participants completed the Situational Self-Awareness Scale (Govern & Marsch, 2001). This measure consists of 9 items measuring public self-awareness (3 items), private self-awareness (3 items), and awareness of immediate surroundings (3 items). We expected our manipulation to affect only the public subscale because that is the one that reflects awareness of how one is perceived by others (e.g. “I am self-conscious about the way I look”), therefore we discuss only this subscale, which was a sum of the three relevant
items, in the remainder of this paper. Participants rated items on a 7-point scale (1 = *strongly disagree*, 7 = *strongly agree*), indicating to what extent they felt that way “right now, at this instant”.

**Emotion regulation.** Participants first reported on the ER strategies they used during the performance task in an open-ended fashion immediately following the performance task. They then completed two additional closed-ended measures of ER.

For the open-ended measure of ER, participants described the ER strategies they used during the math task. They had the option of selecting “I did not try to change my emotions during this task.” Three trained research assistants coded the typed entries using a modified version of the coding scheme described in Opitz, Cavanagh, & Urry (2015). This scheme identifies cognitive reappraisal (i.e. acceptance, self-focused, situation-focused, reality challenge), attentional deployment (i.e. visual, distancing, distraction, clearing), and response modulation. It has additional categories for “concentration/immersion/maintain”, “general emotional control”, “react normally”, “focus on the task”, “unclear”, and “other”. Randolph's free-marginal multirater kappas (Randolph, 2005) suggested acceptable reliability (kappa = .73). If all three coders agreed on a category, we retained this as the participant’s response. If only two coders agreed on a category, we retained the majority as the participant’s response. In cases where all three coders provided a different code, the first author determined which of these three codes was best. We computed a total ER strategy score for each participant that indicated how many different categories of ER strategies they reported using.

Participants then completed two closed-ended measures of ER. The first was a modified version of an 11-item measure developed by Sarah Cavanagh. The original measure asks participants to rate to what extent they engaged in one of 11 specific ER categories while
viewing an image. In our study, we changed mentions of images to mentions of the math task (e.g. “notice your own emotional response to the image” became “…to the math task”). Participants rated each item on a 7-point scale (0 = not at all, 6 = extremely). Based on a principal components analysis with a varimax rotation, we computed 5 sum scores as follows: task-focus (4 items), distraction (2 items), response modulation (2 items), non-emotional focus (1 item) and acceptance (1 item).

The second was a modified version of an 11-item measure developed by Iris Mauss. The original measure asks participants to rate to what extent they engaged in 4 ER strategies (acceptance [2 items], reappraisal (increase positive) [2 items], reappraisal (decrease negative) [3 items], suppression [2 items]), and whether they tried (1 item) and succeeded (1 item) in adopting the “mindset” instructed while viewing a film clip. In our study, we changed mentions of the film clip to mentions of the math task (e.g. “During the film clip, I accepted whatever feelings I had as a natural response” became “During the math task…”). Participants provided ratings using the same 7-point rating scale as the first closed-ended ER measure. Items were summed to create subscale scores.4

**Procedure**

Overall, the study involved a lab session as well as seven daily online follow-up surveys. As in Study 1, after providing written informed consent, participants completed a baseline task during which they looked at a fixation cross on the screen for 2 minutes. They then completed the performance task for 10 minutes, during which they received either SFB or NSFB about their performance. Some received instructions to regulate their emotions during this task, and some

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4 We also collected measures of concurrent mood and anxiety as part of each follow-up survey using the Anxiety Depression Distress Inventory-27 (ADDI-27; Osman et al., 2011), and the State Social Anxiety scale (Kashdan & Steger, 2006), however these measures were not central to our hypotheses and are thus not discussed here.
were asked to simply experience their emotions as they occur. HR and SCL were collected during both the baseline and the performance tasks. Participants reported on their levels of anxiety, mood, and self-consciousness before and after the performance task. At the end of the lab session, participants completed a questionnaire including a measure of SA. Finally, starting 24 hours after their lab session, participants reported their PEP for the past 24 hours every day for the seven days following the lab session. Upon completion of the last follow-up survey, participants were debriefed and compensated.

Results

The analysis plan for this study was registered at the Open Science Framework website (https://osf.io/j5vef) prior to data analysis. Below, we present all confirmatory analyses outlined in this registration, as well as additional exploratory analyses. Materials, data files and analysis scripts can be found at https://osf.io/fquvu.

Data retention

As noted above, we retained participants who completed at least part of the performance task and at least three follow-up surveys. For t-test and GLM analyses, there was listwise deletion of cases where participants did not provide a response, and we retained between 190 and 200 participants. Because we used FIML for confirmatory hypothesis testing, all available data were retained.

Manipulation checks

Did the performance task elicit the expected anxiety and mood response? Increased anxiety and mood would be indexed by higher HR, SCL, and self-reported anxiety and negative mood scores.
Repeated measures GLMs indicated that, as expected, participants experienced higher HR during the performance task ($M = 79.13, SD = 12.73$) compared to baseline ($M = 74.15, SD = 11.40$), $F(1, 195) = 130.06, p < .001, \eta_p^2 = .40$. There was also a time by feedback type interaction, $F(1, 195) = 14.11, p < .001, \eta_p^2 = .07$, such that those receiving SFB experienced a larger increase in HR compared to those receiving NSFB. Contrary to our expectations, there was no time by ER condition interaction, $F(1, 195) = 3.59, p = .06, \eta_p^2 = .02$, and no time by feedback type by ER condition interaction, $F(1, 195) = 0.10, p = .75, \eta_p^2 < .001$.

All participants also experienced higher SCL during the performance task ($M = 15.10, SD = 6.59$), compared to baseline ($M = 11.87, SD = 6.74$), $F(1, 195) = 257.69, p < .001, \eta_p^2 = .57$. This increase did not vary by feedback type, $F(1, 195) = 0.83, p = .36, \eta_p^2 = .004$, ER condition, $F(1, 195) = 0.01, p = .92, \eta_p^2 < .001$, or their interaction, $F(1, 195) = 0.42, p = .52, \eta_p^2 = .002$.

Participants also reported increased anxiety after the performance task ($M = 34.74, SD = 10.48$), compared to before ($M = 31.32, SD = 8.45$), $F(1, 195) = 37.69, p < .001, \eta_p^2 = .16$. However, this did not vary by feedback type, $F(1, 195) = 1.05, p = .31, \eta_p^2 = .01$, ER condition, $F(1, 195) = 0.06, p = .82, \eta_p^2 < .001$, or their interaction, $F(1, 195) = 0.01, p = .94, \eta_p^2 < .001$.

With respect to mood, participants reported increased negative mood after the performance task ($M = 13.97, SD = 8.46$), compared to before ($M = 6.97, SD = 5.70$), $F(1, 195) = 180.98, p < .001, \eta_p^2 = .48$. There was also a time by feedback type interaction, $F(1, 195) = 5.02, p = .03, \eta_p^2 = .03$; those receiving SFB experienced a larger increase in negative mood compared to those receiving NSFB. There was no significant interaction between time and ER condition, $F(1, 195) = 0.80, p = .37, \eta_p^2 = .004$, or time and feedback type and ER condition, $F(1, 195) = 0.46, p = .50, \eta_p^2 = .002$. 

In sum, participants experienced increases in HR, SCL, self-reported anxiety, and negative mood. Those receiving SFB experienced a higher increase in HR and negative mood compared to those receiving NSFB. Contrary to our expectations, ER condition did not have a significant effect on any of these measures.

Did participants in different conditions differ in their self-consciousness? A repeated measures GLM revealed that participants did not report a significant increase in public self-consciousness as a main effect over time, $F(1, 195) = 2.75, p = .10, \eta^2_p = .01$. However, as expected, there was a significant interaction between time and feedback type, $F(1, 195) = 14.12, p < .001, \eta^2_p = .07$, such that those receiving SFB reported a significant increase in public self-consciousness, $p < .001$, whereas those receiving NSFB did not, $p = .14$. There were no significant interactions between time and ER condition, $F(1, 195) = 0.76, p = .39, \eta^2_p = .004$, or between time, feedback type, and ER condition, $F(1, 195) = 0.30, p = .59, \eta^2_p = .002$. In sum, our expectation that those in the SFB condition would experience a higher increase in public self-consciousness than those in the NSFB condition was supported.

Did participants in the regulation condition use ER strategies more so than those in the control condition? A univariate GLM revealed that those in the REG condition ($M = 2.07, SD = 1.28$) reported using significantly more ER strategies than those in the CTL condition ($M = 1.22, SD = 1.20$), $F(1, 196) = 23.36, p < .001, \omega^2_p = .10$. There was no effect of feedback type, $F(1, 196) = 0.93, p = .34, \omega^2_p = -.003$, nor a feedback type by ER condition interaction, $F(1, 196) = 0.73, p = .40, \omega^2_p = -.001$.

We also conducted an exploratory MANOVA predicting each open-ended ER strategy. Based on the coded responses, those in the REG condition reported using self-focused reappraisal more ($M = .23, SD = .42$) than those in the CTL condition ($M = .08, SD = .27$), $F(1,
Those in the REG condition also reported using response modulation more ($M = .56, SD = .50$) than those in the CTL condition ($M = .29, SD = .46$), $F(1, 196) = 16.47, p < .001, \omega_p^2 = .07$. Finally, those in the REG condition reported using task focus more ($M = .41, SD = .49$) than those in the CTL condition ($M = .24, SD = .43$), $F(1, 196) = 6.72, p = .01, \omega_p^2 = .03$. There were no significant differences in the use of any other strategies, $ps$ ranging from .053 to .70.

Next, we conducted a MANOVA predicting each subscale of the ER measure provided by Sarah Cavanagh. Those in the REG condition ($M = 2.56, SD = 1.62$) scored lower in the acceptance subscale compared to those in the CTL condition ($M = 3.54, SD = 1.53$), $F(1, 193) = 18.71, p < .001, \omega_p^2 = .08$. On the other hand, they scored higher in the response modulation subscale, ($M = 4.85, SD = 3.04$) compared to those in the REG condition ($M = 3.88, SD = 3.00$), $F(1, 193) = 5.12, p = .03, \omega_p^2 = .02$. There were no significant differences in the other subscales, $ps$ ranging from .21 to .32.

Finally, we conducted a MANOVA predicting each of the four subscales of the ER measure provided by Iris Mauss. Those in the REG condition scored lower in the acceptance subscale ($M = 6.02, SD = 2.86$) compared to those in the CTL condition ($M = 8.00, SD = 2.70$), $F(1, 191) = 25.03, p < .001, \omega_p^2 = .11$. There were no significant differences in any of the other subscales, $ps$ ranging from .13 to .90.

In sum, as expected, looking at the open-ended responses, those in the REG condition reported strategies that were coded as reflecting self-focused reappraisal, response modulation, and task focus more than those in the CTL condition. Similarly, looking at the closed-ended responses, those in the REG condition were more likely to report using response modulation. Unexpectedly, however, those in the CTL condition reported using acceptance more.
Preliminary analysis

**Were participants still experiencing high SA?** To be eligible for this study, participants needed to report an SIAS score $\geq 34$ in the eligibility survey. However, scores on this measure from the laboratory session ranged from 7 to 71. There were 27 participants who scored $< 34$ ($M = 24.89, SD = 6.60$) on the SIAS, and 4 participants who did not complete the SIAS during the lab session. We therefore conducted our confirmatory analyses with and without these participants.

**Confirmatory analyses**

To test our confirmatory hypotheses, we used latent growth curve modeling (LGCM) to estimate latent (unobserved) scores based on repeated observations of seven daily PEP scores. The intercept (the group mean for the first follow up) and slope (the mean change with each additional day) were estimated for negative TQ$^5$, and then treated as criterion variables in analyses in which we assessed the impact of feedback type (effect-coded as 1 = social and -1 = nonsocial), ER condition (effect-coded as 1 = REG and -1 = CTL), and their interaction. In sum, this analysis enabled us to determine whether negative TQ on the first day and/or its trajectory over the week varied by feedback type and ER condition. We estimated parameters using FIML with robust standard errors.

Results are presented in the first column of Table 2. These analyses suggested that our confirmatory hypotheses were not supported. However, the model fit statistics indicated that the estimated models fit the data poorly, likely because the distributions were non-normal with a strong positive skew; therefore, we do not discuss these findings further. Instead, we shift to reporting exploratory LGCM analyses in which we assumed a zero-inflated Poisson distribution,

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$^5$ Analyses predicting positive TQ can be found in the Online Supplemental Materials (Table S2).
a better fit for the data (see Table 2). Of note, the zero-inflated Poisson models including the quadratic slope failed to converge. We therefore removed the quadratic slope from these analyses. As promised in the preregistered analysis plan, we are presenting our findings first with the whole sample, then with the reduced sample, where we removed participants who no longer met our eligibility criteria of being high in SA at the time of the lab session.

**Exploratory analyses: Whole sample**

Overall, results in the whole sample indicated that participants reported negative PEP levels that were significantly higher than zero on day 1, \( p < .001 \), and that the odds of having a score of zero increased over time, \( p < .001 \).

**H1. Did feedback type predict the intercept and slope of PEP?** We found partial support for H1a; those receiving SFB engaged in higher PEP on day 1, compared to those who received NSFB, \( p = .003 \), but the odds of reporting zero PEP did not differ between the two conditions, \( p = .48 \). Looking at linear slope, we also found partial support for H1b. There were no significant differences in the slope of the amount of PEP participants reported based on feedback type, \( p = .42 \). However, while the odds of reporting zero PEP increased over time for everyone, this effect was magnified for those receiving NSFB, \( p = .04 \).

**H2. Did ER condition predict the intercept and slope of PEP?** We found no support for H2a; participants in the REG condition engaged in similar levels of PEP, \( p = .08 \), and were similarly likely to report zero PEP, \( p = .45 \), as those in the CTL condition on day 1. We also found no support for H2b. There were no significant differences in the slope of the amount of PEP participants reported, \( p = .70 \). While the odds of reporting zero PEP increased over time for everyone, this effect was magnified for those in the CTL condition, \( p = .003 \), which was in the opposite direction of what we would have expected.
Did the interaction of feedback type and ER condition predict the intercept and slope of PEP? While we had no preregistered hypotheses about the interaction of our two manipulations, we found a significant feedback type and ER condition effect on the amount of Day 1 PEP, $p = .001$. Follow-up tests indicated that, in the CTL condition, those receiving SFB engaged in higher PEP than those receiving NSFB, $B = 0.16, S.E. = 0.05, p = .001$. However, in the REG condition, we found the opposite effect; those receiving NSFB engaged in higher PEP than those receiving SFB, $B = -0.40, S.E. = 0.07, p < .001$.

**Exploratory analyses: Reduced sample**

When conducting parallel analyses with only those participants who scored above our SIAS cutoff ($n = 169$), our results stayed consistent in some ways, but not in others (see Table 2). Like before, overall, results indicated that participants reported negative PEP levels that were significantly higher than zero on day 1, $p < .001$, and that the odds of having a score of zero increased over time, $p = .02$.

**H1. Did feedback type predict the intercept and slope of PEP?** When looking at hypothesis H1a, our results were consistent with those including our whole sample; those receiving SFB engaged in higher PEP on day 1, compared to those receiving NSFB, $p = .001$, and the odds of reporting zero PEP did not differ between the two conditions, $p = .32$. Looking at linear slope, however, we no longer found partial support for H1b.

**H2. Did ER condition predict the intercept and slope of PEP?** Similar to the whole sample, we found no support for H2a; participants in the REG condition engaged in similar levels of PEP, $p = .16$, and were similarly likely to report zero PEP, $p = .32$, as those in the CTL condition on day 1. We also found no support for H2b, and the unexpected effect indicating that
those in the CTL condition experienced a larger increase in their odds of reporting zero PEP was no longer significant, \( p = .64 \).

**Did the interaction of feedback type and ER condition predict the intercept and slope of PEP?** While we had no preregistered hypotheses about the interaction of our two manipulations, we found a significant feedback type and ER condition effect on the amount of Day 1 PEP, \( p = .02 \). This result paralleled that from the analysis including the whole sample. Those receiving SFB engaged in higher PEP compared to those receiving NSFB if they were in the CTL condition, \( B = 0.50, S.E. = 0.05, p < .001 \). However, we found the opposite effect for those who were in the REG condition; those receiving NSFB engaged in higher PEP than those receiving SFB, \( B = -0.36, S.E. = 0.07, p < .001 \). We also found a significant interaction effect on the linear slope of PEP, \( p = .02 \), which only emerged in this reduced sample. In the REG condition, those receiving SFB experienced a larger decrease in their PEP over time compared to those receiving NSFB, \( p < .001 \). In the CTL condition, we found the opposite effect; those receiving SFB experienced a smaller decrease in their PEP over time compared to those receiving NSFB.

In sum, we found that those receiving SFB engaged in higher PEP on day 1 compared to those receiving NSFB. This was the case when we included everyone in our sample, and when we limited our sample to those who were still high in SA during the lab session. While we found no main effects of ER condition on the intercept or slope of PEP, there was an unexpected significant interaction in both the whole and partial samples. More specifically, we found that participants only engaged in higher PEP following SFB if they were in the CTL condition. If they were in the REG condition, they reported higher PEP following NSFB.
Discussion

In this study, we examined two predictors of PEP: the type of feedback that people receive in a stressful evaluative situation, and whether they engage in ER during the situation or not. Specifically, we expected that compared to those receiving NSFB, those receiving SFB would engage in higher PEP on day 1, and would exhibit a flatter decrease in PEP over the course of the week. Neither of these hypotheses was supported using traditional analyses. Follow-up exploratory analyses using models that assumed a zero-inflated Poisson distribution showed that those who received SFB engaged in higher PEP on day 1 for both the entire sample and the reduced sample. While we also found a slope effect indicating that the odds of reporting zero PEP over time increased more for those receiving NSFB compared to SFB, this was only the case for the whole sample and not the reduced sample.

In addition, we expected that compared to those in the CTL condition, those who were in the REG condition would engage in lower PEP on day 1, and exhibit a steeper decrease in PEP over the course of the week. These hypotheses were not supported using traditional or zero-inflated Poisson LGCMs. In fact, when conducting analyses with the entire sample, we found the opposite slope effect than what we expected; while the odds of reporting zero PEP increased over time for everyone, this effect was magnified for those in the CTL condition. Of note, however, this effect was no longer significant in the reduced sample.

Finally, while we had no preregistered hypotheses about the interaction of our feedback type and ER condition manipulations, in both our whole and reduced samples, we found that those receiving SFB engaged in higher PEP on the day after the performance task than those receiving NSFB if they were in the CTL condition. However, we found the opposite effect for those who were asked to regulate their emotions. Because this was an unexpected exploratory
finding, further empirical studies are needed to replicate and fully explore it. Nevertheless, it highlights the potential importance of considering contextual factors when exploring PEP following social and nonsocial events, as seemingly identical events in our study led to differing outcomes based on how participants were managing their emotions during the event.

It is worth noting that our ER manipulation operated differently than expected. As expected, participants in the REG condition reported using self-focused reappraisal, response modulation, and task focus more than those in the CTL condition. However, contrary to our expectations, participants in the CTL condition reported using acceptance more. Due to the way our CTL instructions were worded (“let these emotions occur without changing them”), it is possible that we inadvertently induced ER use in the form of acceptance in this condition. This may explain why participants in the REG condition did not experience a reduction in anxiety compared to those in the CTL condition.

**General Discussion**

Together, these two studies provided a novel way of testing how different types of feedback (i.e. social vs non-social) influence the way in which people with high SA respond to stressful evaluative events, and how this relationship changes depending on how they regulate their emotions during the event. In Study 1, we exposed participants to an evaluative task, and examined whether a version of this task involving SFB would predict higher PEP than a version involving NSFB, and found no evidence of this main effect. In Study 2, in addition to the SFB vs. NSFB manipulation, we also tested whether prompting participants to use ER during the task might have an effect on PEP. We found partial support for our hypotheses; those receiving SFB engaged in higher PEP on day 1 than those receiving NSFB. In addition, there was a significant interaction between feedback type and ER condition when predicting PEP on day 1, such that
those receiving SFB engaged in higher PEP than those receiving NSFB only if they were in the CTL condition. This effect was flipped for those who were asked to regulate their emotions, indicating that the effects of the feedback type manipulation were context-dependent.

**Broader Implications**

PEP is defined as a social phenomenon in which one engages in a repetitive and detailed review of one’s performance following social events. Because this definition pinpoints performance in social events as the target of subsequent review, the goal of these two studies was to examine whether events involving SFB potentiate higher PEP than those involving NSFB. In Study 1, consistent with the way PEP is defined, we fully expected to demonstrate that receiving SFB would prompt more PEP, however we found no evidence for this. In Study 2, perhaps due to improvements we made to the study design as well as higher power to detect differences, zero-inflated Poisson LGCM analyses indicated that participants who received SFB engaged in higher PEP on day 1, supporting the theoretical literature. However, an unpredicted interaction between feedback type and ER condition indicated that this effect may be dependent upon whether participants were asked to regulate their emotions. More specifically, SFB led to higher PEP compared to NSFB only if participants were in the CTL condition.

This work also underscores the conceptual overlap between PEP and related concepts such as rumination (Nolen-Hoeksema, 1991) and worry (Papageorgiou & Wells, 1999), which share many similarities: they are repetitive, passive, uncontrollable, and focused on negative content. Some have suggested that they may all represent slightly different forms of the transdiagnostic construct of repetitive negative thinking (RNT; Ehring & Watkins, 2008; Klemanski, Curtiss, McLaughlin, & Nolen-Hoeksema, 2016; McEvoy, Mahoney, & Moulds, 2010). Whether our findings for PEP in this study would extend to other forms of RNT remains
to be determined. Meanwhile, recent evidence suggests that RNT and PEP have differential predictive validity and thus are not redundant constructs (Wong, McEvoy, & Rapee, 2015).

The results also have clinical applications. Studies suggest that higher PEP may interfere with positive responses to treatment for SAD (Price & Anderson, 2011). In both studies, we found that PEP was highest earlier in the week. Perhaps therapy should focus on identifying and targeting PEP immediately following evaluative events. One way in which this could be done is through the use of mindfulness, which has previously been shown to decrease rumination in those with SA (Goldin & Gross, 2010; Goldin, Ramel, & Gross, 2009). In addition, Cassin and Rector (2011) demonstrated that applying mindfulness strategies immediately following a PEP induction led to significant decreases in distress. In Study 2, we also found that the effects of SFB were flipped when participants were asked to regulate their emotions, suggesting that ER may affect the relationship between feedback type and PEP. ER training could perhaps be used in the therapy setting to decrease PEP following social events. That being said, the ER manipulation in our studies was too broad in nature to inform therapeutic approaches. Future studies testing the effects of specific ER strategies on PEP are warranted before clinical recommendations can be made.

Limitations and Future Directions

Despite the many strengths of this set of studies, some limitations remain. First, like with most well-controlled studies, external validity was a concern. While the feedback type manipulation enabled us to keep the two events the same except for the social/nonsocial manipulation, being asked to count backwards is not a typical everyday stressor. Relatedly, the SFB version of our task might not have been sufficiently personally relevant given that participants were unlikely to encounter their experimenter again. These aspects of our
experiment may have led to lower PEP scores compared to other studies using the same measure. In future studies, participants could report on their thinking about real-life social events (rather than one manufactured in the laboratory).

Second, in both studies, participants reported PEP at the end of each day; they may, thus, have overlooked some instances of PEP in their reporting. In future studies, participants could report on their thinking about social events either as those thoughts occur, or soon after, using experience sampling methodology (Helbig-Lang, von Auer, Neubaumer, Murray, & Gerlach, 2016; Larson & Csikszentmihalyi, 1983). Such measurements would give researchers a more accurate account of changes in PEP over time.

**Concluding comment**

The overall goal of these studies was to expand our understanding of context-based and person-based predictors of PEP. Together, these studies examined the role of feedback type (social vs nonsocial), levels of SA, and the use of ER in predicting PEP. While the findings from Study 1 were inconclusive, with its improved methodology and increased sample size, Study 2 showed that SFB may indeed lead to higher PEP compared to NSFB shortly after the event, but that this effect might depend on whether participants were asked to regulate their emotions or not. Our findings have theoretical implications in that they provide evidence to suggest that the “social” in social evaluative events alters levels of PEP. Our findings also have tentative clinical implications for how we can prompt people to use beneficial ER strategies during evaluative events to decrease their PEP, although further studies are needed for exploring the effects of specific ER strategies.
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Table 1

Mean (and standard deviation) comparisons and effect sizes for the mean comparisons, comparing the SFB and NSFB groups in their PEP scores within each time point and over time in Study 1.

<table>
<thead>
<tr>
<th></th>
<th>SFB</th>
<th>NSFB</th>
<th>Effect size (d)</th>
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</thead>
<tbody>
<tr>
<td><strong>24-hour follow-up</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Low social anxiety</td>
<td>12.18 (10.96)</td>
<td>11.00 (10.31)</td>
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<td>14.09 (9.16 )</td>
<td>14.09 (9.22 )</td>
<td>&lt;.001</td>
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<td>High social anxiety</td>
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<td>All levels of social anxiety</td>
<td>13.33 (9.91 )</td>
<td>14.48 (10.72 )</td>
<td>0.11</td>
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<tr>
<td><strong>1-week follow-up</strong></td>
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<td></td>
<td></td>
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<tr>
<td>Low social anxiety</td>
<td>8.16 (10.95 )</td>
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<td>6.36 (9.12 )</td>
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<tr>
<td>High social anxiety</td>
<td>11.67 (12.43)</td>
<td>7.63 (11.50 )</td>
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<tr>
<td>All levels of social anxiety</td>
<td>8.94 (10.74 )</td>
<td>6.89 (10.20 )</td>
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<tr>
<td><strong>Change over the week (1-week minus 24-hour follow-up)</strong></td>
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<tr>
<td>Low social anxiety</td>
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<tr>
<td>High social anxiety*</td>
<td>-2.52 (12.29)</td>
<td>-10.74 (8.89)</td>
<td>0.79</td>
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<tr>
<td>All levels of social anxiety</td>
<td>-4.37 (9.99 )</td>
<td>-7.65 (8.12 )</td>
<td>0.36</td>
</tr>
</tbody>
</table>

*Note. *p < .05.
Table 2

Results of the LGCM analyses predicting intercepts, linear slopes, and quadratic slopes of negative TQ in Study 2

<table>
<thead>
<tr>
<th></th>
<th>Negative TQ</th>
<th>Negative TQ (Zero-inflated Poisson, whole sample)</th>
<th>Negative TQ (Zero-inflated Poisson, only SIAS ≥ 34)</th>
</tr>
</thead>
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<tr>
<td></td>
<td>Count</td>
<td>Zero-inflated</td>
<td>Count</td>
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<tr>
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<td>Estimate</td>
<td>S.E.</td>
<td>Estimate</td>
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<tr>
<td>Intercepts</td>
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<tr>
<td>Intercept</td>
<td>10.21***</td>
<td>0.97</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Linear slope</td>
<td>-3.49***</td>
<td>0.40</td>
<td>2.27***</td>
</tr>
<tr>
<td>Quadratic slope</td>
<td>0.36***</td>
<td>0.05</td>
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<tr>
<td>Intercept on Feedback type</td>
<td>1.31</td>
<td>0.82</td>
<td>0.12**</td>
</tr>
<tr>
<td>ER condition</td>
<td>-0.84</td>
<td>0.86</td>
<td>0.03</td>
</tr>
<tr>
<td>Feedback X ER</td>
<td>-0.64</td>
<td>0.82</td>
<td>-0.13**</td>
</tr>
<tr>
<td>Linear slope on Feedback type</td>
<td>-0.37</td>
<td>0.31</td>
<td>-0.01</td>
</tr>
<tr>
<td>ER condition</td>
<td>0.34</td>
<td>0.33</td>
<td>0.01</td>
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<tr>
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<td>0.32</td>
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<td>Quadratic slope on Feedback type</td>
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<tr>
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<td>Model fit</td>
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<tr>
<td>Chi-square (df, value)</td>
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<tr>
<td>RMSEA (value, [90% CI])</td>
<td>0.11, (0.09-0.13)</td>
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<td>CFI</td>
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<tr>
<td>AIC</td>
<td>7677.9</td>
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<td>Free parameters, N</td>
<td>25, 200</td>
<td>26, 200</td>
<td>26, 169</td>
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*Note.* Estimates for models using the Poisson distribution were on a logarithmic scale. Chi-square, RMSEA, and CFI values are not returned by Mplus for models using the Poisson distribution. *p < .05, **p < .01, ***p < .001.
Figure 1. Effects of time, feedback type, and social anxiety on negative post-event processing in Study 1. Error bars represent ±1 SEM.
Figure 2. Observed means of negative TQ scores over time in Study 2, split by condition. There was listwise deletion of cases for missing values. Top panel (1A and 1B) represent the whole sample, while the bottom panel (2A and 2B) represent the sample after those who were no longer high in social anxiety were removed. Error bars represent ±1 SEM.