Post-event processing and the retrieval of autobiographical memories in socially anxious individuals

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Abstract

Individuals with social anxiety often report considerable ruminative thoughts following ambiguous social events (post-event processing). The purpose of this study was to determine whether post-event processing affects retrieval of autobiographical memories rated as negative, anxious and shameful in a sample of socially anxious individuals and controls. Results indicated that, compared to controls, socially anxious individuals recalled memories that were rated as significantly more negative and shameful regardless of the type of post-event processing engaged in. Unexpectedly, after negative post-event processing socially anxious individuals recalled memories that although anxious and shameful, were rated as significantly more calming than after other types of post-event processing. The results imply that post-event processing may have some adaptive benefit that could explain why it persists in socially anxious individuals.
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Clark and Wells' (1995) model of social phobia suggests that on the basis of early experiences social phobics develop a set of assumptions about themselves and social situations that affect the way in which they interpret future social encounters. Before social encounters, social phobics engage in a pre-mortem, in which they

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review in detail the possible outcomes of a social interaction prior to entering it. This pre-mortem is dominated by recollections of past failures, negative images of the self, and predictions of poor performance and rejection and leads to a negative processing state during the ensuing social situation. This negative processing state encompasses various activities that prevent the person from disconfirming their negative beliefs about the threat of the situation. Socially anxious individuals shift their attentional focus towards detailed monitoring and observation of themselves as a social object—neglecting external information (see Hofmann, 2000; Wells & Papageorgiou, 1998; Woody & Rodriguez, 2000). This tends to make them aware of the somatic and cognitive symptoms triggered by the perception of threat (e.g., blushing, trembling, increased heart rate, mental blanks, lack of concentration, palpitations), which in turn are taken as further evidence of threat and create further anxiety (see Roth, Antony, & Swinson, 2001; Wells & Papageorgiou, 2001). Furthermore, social phobics use in-situation safety behaviors as coping strategies to reduce the risk of negative evaluation by others (see Wells et al., 1995). These behaviors are usually counterproductive (for example, a socially anxious person may appear to be unfriendly because they are avoiding eye contact). Following the social situation, the social phobic engages in a post-mortem during which they review the social event in detail and think about the many ambiguous signs of social acceptance—this is known as post-event processing. Typically they become pre-occupied with anxious feelings and negative self-perceptions and the ambiguous information is re-interpreted as negative (see Stopa & Clark, 2000), leading to greater levels of anxiety and shame (Clark & Wells, 1995).

Although a significant association between post-event processing and social anxiety has been found (Rachman, Gruter-Andrew, & Shafran, 2000), little is known about the function of post-event processing. Despite efforts to resist thinking about past events, socially anxious people have reported difficulty in attempts to forget or suppress information (Fehm & Margraf, 2002) and so rather than viewing post-event processing as a way of working through and resolving uncertainties about how one appears to others during a social interaction, Rachman et al. suggest that post-event processing can worsen these uncertainties, perpetuating social anxiety. However, post-event processing has many similarities to the process of rumination, defined by Martin and Tesser (1996) as conscious thoughts revolving around a common instrumental theme that recur in the absence of immediate environmental demands. The function of rumination might, therefore, provide clues to the function of post-event processing.

Martin and Tesser (1996) believe that rumination serves to reduce discrepancy in goal-attainment. Social phobia is characterized by excessively high standards in social performance; because these standards will invariably not be achieved, discrepancy in goal-attainment and the ensuing rumination is inevitable. However, it may not be a maladaptive process: Martin and Tesser (1989) emphasize that ruminative thought is an attempt to find alternative means of reaching unattained goals or in reconciling oneself for not reaching these goals. However, failure to resolve the ruminative thinking process can be maladaptive: it can increase anxiety

(see Field, 2001; Davey, 1995) and eventually lead to learned helplessness, characterized by a loss of control and feelings of powerlessness (Martin & Tesser, 1989).

The link between ruminative thought and memory recall may offer an explanation as to why rumination increases anxiety. Lyubomirsky, Caldwell, and Nolen-Hoeksema (1998) found that dysphoric patients, instructed to ruminate about negative emotions and negative personal attributes, spontaneously generated more negative autobiographical memories than non-dysphoric controls. Interestingly, recent social phobia research has implicated memories and imagery as a key maintenance factor for the disorder: Hackmann, Clark, and McManus (2000) found that socially anxious individuals repeatedly draw upon negative images and memories of adverse social events in recall of anxiety-provoking social situations. As such, the socially anxious individual's distorted image of his/her social self may fail to update because of repeated activation of these specific memories. Mellings and Alden (2000) have specifically linked post-event processing with biased memory recall by suggesting that post-event processing (1) perpetuates existing biases through the maintenance of memory traces; (2) could increase the salience of negative self-related information, thus maintaining initial biases; and (3) could actually aid socially anxious individuals in resolving their concerns. Mellings and Alden found that selective attention to negative self-related information led to biases in the recollection of a past social interaction and that post-event processing contributed to a bias in recall that favors negative self-related information.

This study aims to further explore the relationship between post-event processing and memory recall in social anxiety. In contrast to Mellings and Alden's study, which focused on frequency of ruminative thoughts as a predictor of encoding negative self-related information, the present study attempts to show how ruminative responses may lead to a bias in memory recall. It is predicted that socially anxious individuals will generate autobiographical memories rated as more negative, shameful, and anxious after negative post-event processing, compared to non-anxious controls.

1. Method

1.1. Participants

Participants recruited from a higher education college and the University of Sussex were initially screened using Turner, Beidel, and Dancu's (1996) Social Phobia and Anxiety Inventory (SPAI—see Section 1.2). One hundred and thirty-two questionnaires were completed and 66 participants were selected from the upper and lower quartiles, 18 males and 48 females with a mean age of 28 years (S.D. = 10 years). Participants with SPAI scores of 72 or above were selected for the socially anxious group ($n = 33$) and participants with SPAI scores of 44 or below were selected as non-anxious controls ($n = 33$). The mean score on SPAI for the socially anxious group was 87.03 (S.D. = 14.29), which is substantially higher than a sample of college students rigorously diagnosed by Beidel, Turner,

Stanley, and Dacu (1989) as having social phobia ($M = 73.4$). The mean score of the socially anxious group also compared to a sample of 121 social phobics ($M = 95$, S.D. $= 32.8$) reported by Turner et al. (1996). The mean score on the SPAI for the non-anxious group was 29.03 (S.D. $= 13.00$), which compares to the group of college students that Beidel et al. (1989) diagnosed as being non-socially anxious ($M = 31.3$). A *t*-test confirmed that the socially anxious and non-anxious groups scored significantly differently on the SPAI ($t(64) = -17.24$, $P < .001$). All participants were run individually in a laboratory and were debriefed afterwards.

1.2. Materials

1.2.1. Social Phobia and Anxiety Inventory (Turner et al., 1996)

The SPAI is a 45-item self-report questionnaire containing a 7-point Likert response scale, ranging from 0 (never) to 6 (always). Peters (2000) found that, compared to other social phobia assessment scales, the SPAI is a better measure for discriminating between socially anxious and non-socially anxious participants, and is a significant predictor of membership to the social phobia group.

1.2.2. Mood questionnaires

The mood questionnaire was used to assess changes in mood during the experiment. Each questionnaire asked participants to rate their present state on levels of positivity, anxiety and shame. For each of these moods there were two visual analogue scales that assessed levels of opposite sides of the emotion on a scale ranging from 0 (not at all) to 100 (very). So, for positivity the first scale assessed levels of happiness and the second levels of sadness, for anxiety the first scale assessed levels of anxiety and the second calmness, for shame the first scale assessed shame and the second pride.

1.2.3. Memory rating questionnaire

Participants rated each memory generated in a free recall task using a questionnaire similar to that used by Lyubomirsky et al. (1998). Participants rated each memory along six dimensions of whether it was a positive, negative, anxious, calm, shameful or proud experience by endorsing statements with a 5-point Likert scale ranging from 1 (strongly agree) to 5 (strongly disagree).

1.2.4. Post-event processing questionnaire (Rachman et al., 2000)

The post-event processing questionnaire (PEPQ) is a 13-item questionnaire constructed to measure the extent to which participants engage in a detailed review of a socially anxious event. Participants were asked to think of a recent social situation in which anxiety was experienced before completing the PEPQ using this situation as the example. Respondents answered using a visual analogue scale ranging from 0 (never) to 100 (frequently). Rachman et al. (2000) report that scores on this questionnaire significantly correlate with social anxiety, although their study did not include data from a sub-sample of social phobics.

1.3. Design

This study was a 2 (social anxiety: socially anxious vs. non-anxious) × 3 (post-event processing: negative, positive, or distraction task) independent measures design. Dependent variables were the self-reported positivity, anxiety and shame of the memories recalled after the experiment. Changes in mood and post-event processing scores were included as predictors in each analysis.

1.4. Procedure

1.4.1. Pre-experiment

All participants completed the SPAI pre-experimental assessment 2 weeks prior to participating in the study and were divided into two groups: socially anxious individuals and non-anxious controls. Each of these two groups randomly divided into three subgroups for the post-event processing (PEP) conditions (negative, positive and distraction task).

1.4.2. Pre-PEP stage

Participants were asked to read and sign a consent form that described the experiment as an investigation into the processes of visual imagery and day-dreaming. This cover story was given to minimize possible demand characteristics. During this pre-PEP stage all participants completed the first mood questionnaire.

1.4.3. PEP stage

Participants were asked to describe a recent ambiguous social event or interaction. Participants in the negative PEP condition were then asked to focus their attention on negative aspects of the event and why it was a bad experience. Participants in the positive PEP condition were instructed to focus their attention on positive aspects of the social event and why it was a good experience. Participants in the distraction task condition were asked to read an extract of text deemed to have little or no emotional content by a small sample of students. The text chosen was Chapter 3 of Chalmers (1982). Each group spent 3 min engaged in the task to which they were assigned. Participants completed the second mood questionnaire directly after PEP.

1.4.4. Post-PEP stage

Participants were given a timed free recall task based on the memory task used by Lyubomirsky et al. (1998). Participants were given 3 min to recall and list several specific events or experiences from memory. No limit was placed on the number of memories recalled. Participants were instructed that the memories could include recent events or events that had occurred in the past but should not include the event described in the response manipulation task. After the free recall task, participants rated each of the retrieved memories using the memory rating questionnaire described above. Finally, participants completed the PEPQ to

measure the extent to which they generally negatively ruminate about anxious social events.

2. Results

2.1. Scoring data

2.1.1. Mood questionnaires

The six mood scales were reduced to three scores representing the three moods that were being assessed. For each mood, the VAS rating on the positive aspect of the mood (happy, calm, or proud) was subtracted from the VAS rating for the negative aspect of the mood (sad, anxious, or ashamed) resulting in a single score ranging from $+100$ (very anxious, sad, or shameful) to -100 (very calm, happy, or proud). These scores were calculated both before and after the response manipulation task and the difference between the two was used as a measure of the change in mood across the experimental manipulation. So, for example, a positive score for anxiety represented an increase in anxiety over the experiment.

2.1.2. Memory ratings

For each memory, indexes of positivity, anxiety, and shame were created by subtracting the rating on the negative aspect of the emotion (negativity, anxious, or shame) from the rating for the positive aspect of the emotion (positive, calming, or proud). This produced a single score ranging from $+4$ (very positive, calming, or proud) to -4 (very negative, anxious, or shameful). A score of 0, therefore, represented a neutral rating in the memory data.

2.1.3. Mood ratings

To check that results were not due to mood differences between the socially anxious and non-anxious groups prior to the experiment, MANOVA was conducted using the six self-report mood scales taken at the beginning of the experiment (happy, sad, calm, anxious, ashamed, proud) as the dependent variables. This revealed no significant difference between groups ($V = .093$, $F(6, 59) = 1.01$, ns) indicating that self-reported mood between the groups was statistically equivalent before post-event processing. Similar results were found when three mood scores (described above) were used instead of six.

2.2. Analyses

Data were analyzed using multilevel modeling (see Wright, 1998). Justification for using this technique is probably appropriate given that it is still rarely used in psychology. In autobiographical memory research, memories are sampled from some larger population of memories that a person has. As such, memories that the researcher asks a person to recall are nested within the individual.

These memories could be treated, statistically, as independent units (for example, by taking the average rating of several memories as Lyubomirsky et al., 1998, did); however, the probability of a given memory being recalled depends on what other memories are available, and the recall of one memory may have knock on effects for what other memories are recalled. Therefore, memories are not independent units. By treating participants as the unit of investigation (rather than memories) the power of the analysis is decreased because by aggregating the data important information is ignored (readers unfamiliar with multilevel modeling on memory data will find Wright, 1998 a useful primer, and Goldstein, 1995; Kreft & de Leeuw, 1998).

Multilevel modeling is a technique for analyzing hierarchical data structures. Simplistically, it can be likened to a multiple regression in which the hierarchical structure of the data is accounted for within the analysis. In this case we are interested in both the variation among individuals and the variation among memories nested within those individuals. Therefore, ratings of each memory are treated as random variables within this hierarchy. In its simplest form, the multilevel model is:

$$\text{Memory rating}_{ij} = \beta_{ij} + u_j + e_{ij}$$

in which β_{ij} is the intercept (like in normal regression), u_j is the variation among participants, and e_{ij} is the variation among memories within individuals. The subscript j is for people and i is for memories. Terms can then be added to this basic model to establish which variables predict the memory ratings. In all of the models described in this paper, the same predictors were used. First, the type of PEP engaged in was coded using two dummy variables (see Field, 2000, Chapter 7). The distracter task was used as a baseline category and so the first dummy variable (*positive PEP*) was coded 1 for participants who engaged in positive PEP and zero for all other individuals and, therefore, represents the difference between positive PEP and distracter task groups. The second dummy variable (*negative PEP*) was coded 1 for participants who engaged in negative PEP and zero for all other individuals and, therefore, represents the difference between the negative PEP and distracter task groups. Whether an individual was socially anxious or not was included as a single dummy variable with non-anxious coded as zero and socially anxious coded as 1 (*social anxiety*). Post-event processing questionnaire scores were also included as a predictor (*PEP*). Interaction terms derived, as in regression, from multiplying terms (see Jaccard, Turrisi, & Wan, 1990) were included between whether an individual was socially anxious and the type of PEP they engaged in (in terms of the two dummy variables). The final variable entered was the change in mood resulting from the task engaged in (be that PEP or distraction). In general terms, the model is described as follows:

$$\begin{aligned}
\text{Memory rating}_{ij} = {} & \beta_0 + \beta_1 \text{positive PEP}_j + \beta_2 \text{negative PEP}_j \\
& + \beta_3 \text{social anxiety}_j + \beta_4 \text{PEP}_{ij} + \beta_5 \text{mood change}_j \\
& + \beta_6 \text{positive PEP} \times \text{social anxiety}_j + \beta_7 \text{negative PEP} \\
& \times \text{social anxiety}_j + u_j + e_{ij}
\end{aligned}$$

The model was estimated three different times (once to see which variables predicted the positivity ratings of memories and then to look at anxiety and shame ratings, respectively). The change in mood used was the mood congruent with the type of memory rating (so anxious mood was used for anxiety ratings and shameful mood for the shame ratings, etc.). Estimates were calculated with the program MLwiN (Rasbash, Healy, Browne, Cameron, & Charlton, 1999) using restrictive iterative generalized least squares, RIGLS (see Goldstein, 1989 for technical details).

2.3. Positivity of memories

Fig. 1 shows the mean positivity of recalled memories after negative or positive PEP or a distraction task in socially anxious and non-anxious individuals. Non-anxious individuals recalled more positive memories (as shown by higher scores) regardless of the type of post-event processing in which participants engaged. The profile of memories recalled across the three different tasks was fairly similar in the socially anxious and non-anxious groups.[1]

Table 1 shows the results of the multilevel model for predicting the positivity of a given memory. This analysis revealed that social anxiety significantly predicted the positivity of the memories. Socially anxious participants produced memories rated as significantly less positive. The other main predictor was participants' scores on the PEP questionnaire: as PEP scores increased, the positivity of memories significantly decreased. In summary, the multilevel model revealed that socially anxious individuals produced significantly less positive memories than non-anxious individuals regardless of the task engaged in after generating an ambiguous social event.

2.4. Anxious memories

Fig. 1 also shows mean anxiety ratings of recalled memories after negative or positive PEP or a distraction task in socially anxious and non-anxious individuals. A high score represents a calm memory, and a low score an anxious memory. Socially anxious participants appear to generate more anxious memories than controls after positive PEP and the distraction task. Oddly though after negative rumination their memories were rated as relatively calming.

Table 1 shows results of the multilevel model for predicting the anxiety of a given memory. As with the positivity of memories, social anxiety significantly predicted the anxiety of the memories: socially anxious individuals produced memories rated as significantly less calming. Again, the other main predictor of the anxiety of memories was the scores on the PEP questionnaires: as PEP scores

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[1] Bear in mind that, because Fig. 1 displays aggregate data they are fairly crude representations of what the multilevel models show, the beta-values in the model are better indicators of the correct interpretation of the effects.
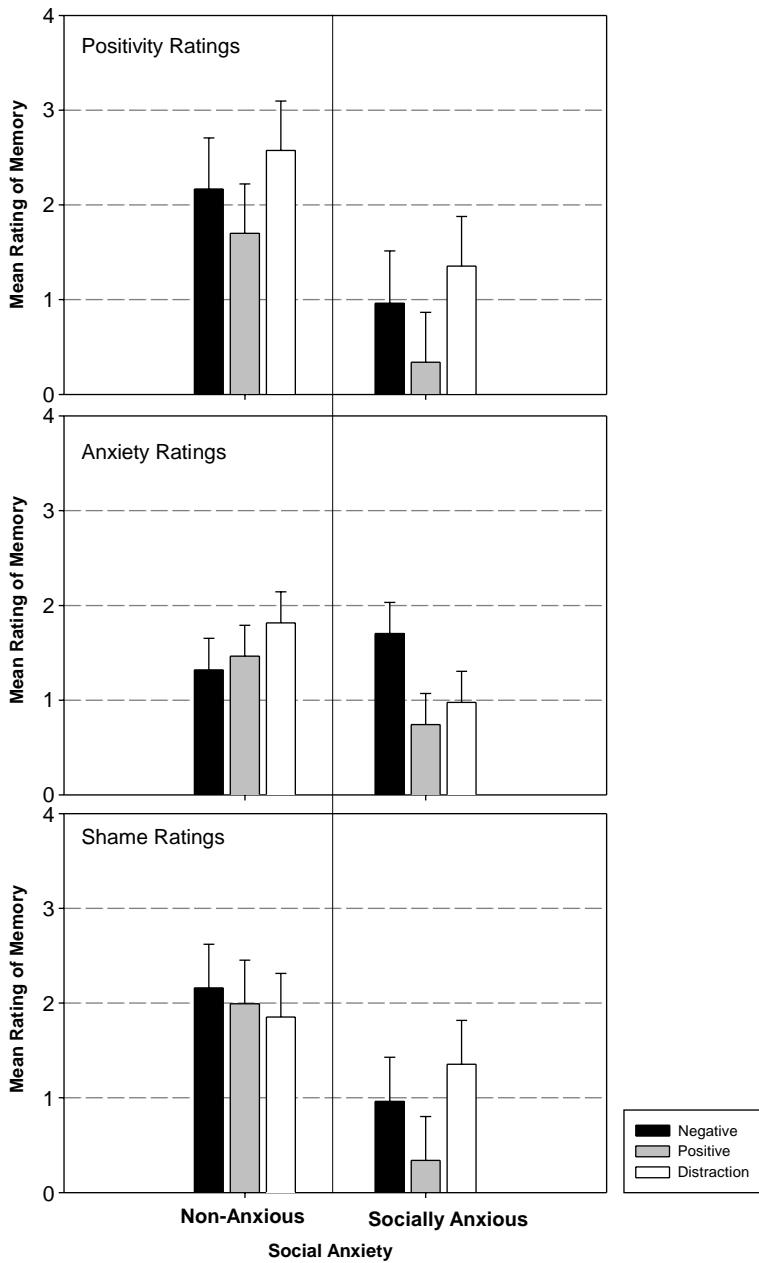
Fig. 1. Graph to show the mean positivity, anxiety and shame ratings of memories generated after positive or negative post-event processing, or a distraction task in low and high socially anxious participants (low score = more negative, more anxious, or more shameful rating, respectively).

Table 1
Coefficients with their associated standard errors for the three multilevel models conducted on positivity, calmness, and shame ratings of recalled memories

Effect	Negative–positive			Anxious–calm			Shame–pride		
	β	S.E.	P	β	S.E.	P	β	S.E.	P
β_0	3.691	0.635		3.264	0.425		1.837	0.669	
Social anxiety	−1.331	0.637	.018	−0.928	0.425	.014	1.934	1.035	.031
Negative PEP	−0.477	0.651	.232	−0.564	0.431	.095	0.274	0.543	.307
Positive PEP	−0.961	0.660	.073	−0.400	0.445	.184	−0.013	0.555	.491
PEP	−0.024	0.011	.015	−0.031	0.007	.000	0.003	0.013	.409
Mood change	0.007	0.006	.122	0.003	0.003	.159	0.005	0.005	.159
Social anxiety × negative PEP	0.239	0.909	.396	1.325	0.611	.015	−0.200	0.772	.398
Social anxiety × positive PEP	0.094	0.949	.461	0.244	0.623	.348	−0.626	0.785	.213
Social anxiety × PEP							−0.050	0.019	.004

increased, the calmness ratings of memories significantly decreased. Most interesting was the significant social anxiety × negative PEP interaction term. This indicated that compared to the distraction task, memories were significantly more calming after negative PEP in socially anxious individuals compared to non-anxious individuals. In fact, non-anxious individuals produced more calming memories after the distraction task than after negative PEP. To sum up, the multilevel model revealed that socially anxious individuals generally produced significantly less calming memories than non-anxious individuals. However, after negative PEP socially anxious individuals seem to produce calming memories (compared to after the distraction task) and in non-anxious individuals the reverse trend was observed.

2.5. Shameful memories

Fig. 1 shows the mean shame ratings of recalled memories after negative or positive PEP or a distraction task in socially anxious and non-anxious individuals. A high score represents a proud memory, and a low score a shameful memory. Socially anxious participants appear to generate more shameful memories than controls regardless of the type of post-event processing in which they engaged. Table 1 shows results of the multilevel model for predicting the shame associated with a given memory. This model differed from the others in that the interaction between social anxiety and PEP score was included as an additional predictor.[2] As with the positivity and anxiety of memories, social anxiety significantly predicted the shame associated with the memories: socially anxious

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[2] This additional term was included because exploratory analysis revealed that for shame ratings only, this term improved the overall fit of the model.
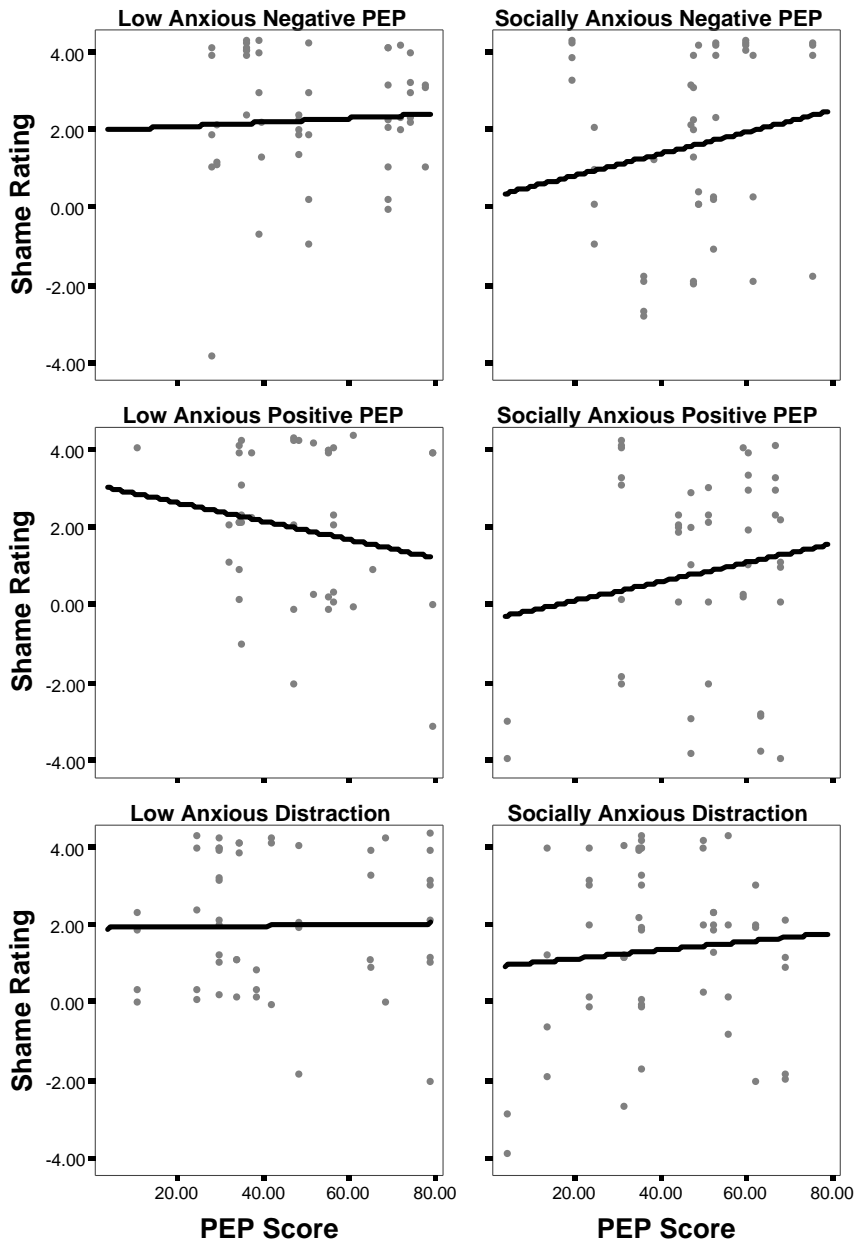
Fig. 2. Distribution of memories across PEP scores in socially anxious and non-anxious individuals (a random jitter was applied to the shame ratings so that all points could be seen, the jitter is just the shame score with a uniformly distributed random number between ±0.25 added). A low score represents a more shameful memory.

individuals produced memories rated as significantly more shameful.[3] There were no other predictors of shame ratings except for the interaction between social anxiety and PEP. To further explore this relationship another multilevel model was estimated that looked only at the interaction between social anxiety, PEP and the type of PEP engaged in. This model took the form:

$$\text{Shame rating}_{ij} = \beta_{0ij} + \beta_1 \text{social anxiety} \times \text{negative PEP} \times \text{PEP}_j$$
$$+ \beta_{21} \text{social anxiety} \times \text{positive PEP} \times \text{PEP}_j + u_j + e_{ij}$$

When this model was run, the interaction of social anxiety, positive PEP, and PEP scores was significant ($\beta = -0.024$, S.E. $= 0.009$, $P = .004$) as was the interaction of social anxiety, negative PEP and PEP scores ($\beta = -0.017$, S.E. $= 0.008$, $P = .017$). Fig. 2 shows the distribution of memories against PEP scores for socially anxious and non-anxious individuals in the three experimental conditions. This figure shows that for non-anxious individuals there is no relationship between PEP scores and shame ratings, except after positive PEP where more shameful memories were generated in people scoring high on PEP. Socially anxious individuals, as PEP scores increase pride ratings increase—regardless of the type of task engaged in. In other words, more shameful memories are associated with low PEP scores. To sum up, the multilevel models revealed that socially anxious individuals generally produced significantly more shameful memories than non-anxious individuals. However, PEP seemed to have some influence in socially anxious individuals in that low levels of PEP were associated with more shameful memories.

3. Discussion

This study has four important findings: (1) socially anxious individuals produce significantly more negative memories than non-anxious individuals regardless of the type of post-event processing in which subjects engaged; (2) socially anxious individuals produce significantly more anxious memories than non-anxious individuals, except after negative post-event processing, after which they produce relatively calming memories; (3) socially anxious individuals produce significantly more shameful memories than non-anxious individuals regardless of the type of post-event processing engaged in; and (4) an individual's natural tendency to

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[3] The β value in Table 1 is positive, which implies that socially anxious individuals actually produced memories that were rated as less shameful. However, in the full model, the direction of this effect is moderated by the lower order interaction term of social anxiety × PEP. The true main effect of social anxiety can be obtained from a model in which the interaction terms are not included. Such a model would take the form of

$$\text{Shame rating}_{ij} = \beta_0 + \beta_1 \text{social anxiety}_j + u_j + e_{ij}$$

When this model was run, the effect of social anxiety was highly significant ($\beta = -0.839$, S.E. $= 0.352$, $P = .009$) and the true direction of the main effect can be seen in the β coefficient: as social anxiety increases, ratings decrease (remember, low scores = more shame).

post-event process seemed to be associated with more negative and anxious memories in both anxious and non-anxious groups but was associated with less shameful memories in socially-anxious individuals.

Current findings are consistent with the relationship between post-event processing and memory recall bias suggested by Mellings and Alden (2000) who found that frequency of post-event processing predicts recall of negative self-related information in social phobia. However, whereas Mellings and Alden suggest that this relationship reflects a bias in encoding information about a social event, results of the present study suggest there is also a bias in the retrieval of past information: post-event processing may lead socially anxious individuals to generate negative memories about past events and experiences. However, because similar results have been found in dysphoric individuals (Lyubomirsky et al., 1998) one possibility is that the socially anxious participants in the current study were more depressed and, therefore, the results reflect effects of depression and not social anxiety. However, although trait levels of depression were not measured, pre-experiment mood ratings were equivalent in socially anxious and non-anxious individuals and the change in mood across post-event processing did not predict differences in memory ratings in any analysis; therefore, the observed differences in memories recalled are likely to be due to social anxiety and not negative or depressed mood.

The fact that socially anxious individuals did recall more negative and shameful memories than non-anxious individuals fits nicely with Clark and Wells' conception of social phobia. However, one puzzling aspect of this study is that, in terms of positivity and shamefulness of memories, the type of PEP engaged in had no effect: regardless of whether post-event processing was positive or negative, socially anxious individuals drew upon both negative and shameful self-related autobiographical memories. One possibility is that positive rumination has no positive effect on the memories recalled. This is consistent with Hackmann et al.'s (2000) observation that early unpleasant experiences may lead to the development of excessively negative images which fail to update even in light of favorable experiences, or positive feedback in a social setting. Positive post-event processing may have had no effect in the current study because, as Hackmann et al. suggest, positive information is insufficient to update socially anxious individuals' distorted images of their public self. A second explanation is that socially anxious individuals were intrinsically incapable of *not* engaging in negative PEP, even when given a distracter task, or asked to engage in dwell on the positive aspects of the ambiguous event. Although future work needs to employ thought listing techniques to verify post-event processing manipulations, this explanation can probably be ruled out by the finding that post-event processing did have differential effects on the anxiety ratings of memories. In fact, negative post-event processing led to the recall of relatively calmer memories than positive post-event processing or a distracter task. This result is a curious one. One explanation is rebound effects, in which efforts to avoid a specific thought lead to later pre-occupation with that same thought (Wegner & Pennebaker, 1992).

Perhaps negative PEP led to memories rated as calmer because of a rebound effect of suppressing positive thoughts about an event. However, if this were the case then similar rebound effects should be observed in terms of the positivity and shame ratings of memories. The ratings might also represent mood-congruence and contrast effects (e.g., Burke & Mathews, 1992). However, given that mood change did not predict memory ratings in any of the analyses, this explanation can probably be ruled out too. Perhaps, then, this result tells us something about the adaptive properties of post-event processing. It seems that socially anxious individuals will generally recall more negative and shameful memories than non-anxious individuals, but that after negative post-event processing only, they generate relatively calming memories. Maybe generating calmer memories, even though these memories are rated as negative and shameful, is a maintaining factor for post-event processing.

This explanation appears to be consistent with Rachman et al. (2000), who pointed out that some of their anxious participants reported that post-event processing actually improved matters. Also, these ideas are consistent with the finding that reliving and re-appraising traumatic memories is a successful strategy in treatments of disorders such as Post-Traumatic Stress Disorder (Ehlers & Clark, 2000). Within these treatments patients are encouraged to repeatedly re-visit their memories and gradually re-appraise them over successive retrievals. This strategy may work because, as Mellings and Alden (2000) have emphasized, prolonged processing of an anxiety-provoking social event can help individuals to resolve their concerns (and these ideas gel with Martin & Tesser's, 1989, beliefs about the adaptive function of ruminative though in general). Therefore, post-event processing may serve a rather similar function to the re-appraisal strategies used in treatments of PTSD: it is used as a calming, coping strategy in which anxious memories are revisited and re-appraised. Why are the memories calming though? It could be because they represent situations that the individual sees as negative and shameful, but that they have subsequently 'come to terms with' and so now is relatively calming because it is a bad situation that they have made good. For example, one participant in the present study reported "I remember being teased at school for the color of my hair," subsequent rating of this memory indicated that this participant was drawing on a negative experience but had learnt to deal with this experience and, as a result, the memory was rated as calm. As such, the current data tentatively suggest that post-event processing could be used as a compensatory coping strategy for confronting perceived failures in social situations. This could be a small step towards understanding the function of post-event processing and explaining why socially anxious individuals engage in this kind of thinking after a social interaction.

The final mystery is the role of trait post-event processing: that is, the degree to which individuals naturally engage in post-event processing. Although Rachman et al. (2000) have found that scores on their PEPQ correlate highly with social anxiety, the current study showed that PEPQ scores had an equivalent range in both anxious and non-anxious groups. What is more, although levels of natural

post-event processing generally predicted the recall of more anxious and negative memories (which was predicted), in socially anxious individuals levels of natural post-event processing predicted the recall of less shameful memories. So, although socially anxious individuals generated more shameful memories than non-anxious individuals, those that were more prone to post-event processing actually recalled memories about which they felt less shame. This finding again tentatively supports an adaptive function of post-event processing: the fact that socially anxious people who engage in lots of post-event processing are more likely to produce less shameful memories suggests that the function of post-event processing may in fact be to make socially anxious individuals aware of past failures about which they have come to terms, and to promote less shameful past memories. This is not to say that Clark and Wells are incorrect in their beliefs that post-event processing may enhance anxiety about the present situation, the current study merely suggests that it promotes recall of specific kinds of memories, and that these may be calming, and when the person is prone to post-event processing, less shameful too. As such, the current results, like those of Rachman et al. (2000), suggest that the focus of the nature and consequences of post-event processing in Clark and Wells' model could perhaps be expanded to incorporate the adaptive role that post-event processing may play.

Of course, one limitation of the preliminary work is that post-event processing may not necessarily lead to memory recall in natural situations. The next stage is to determine whether participants do naturally recall memories after post-event processing. Even if this is not the case, the present study suggests that prompting memory recall after post-event processing may have some benefit to socially anxious people in that the types of memories they will generate could provide them with cues to situations that were negative and shameful, but have a calming property.

Acknowledgments

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