

# Post-event processing in social anxiety

Laura Dannahy\*, Lusia Stopa

*Department of Clinical Psychology, University of Southampton, Highfield, Southampton, SO17 1BJ, UK*

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## Abstract

Clark and Wells' [1995. A cognitive model of social phobia. In: R. Heimberg, M. Liebowitz, D.A. Hope, & F.R. Schneier (Eds.) *Social phobia: Diagnosis, assessment and treatment* (pp. 69–93). New York: Guildford Press.] cognitive model of social phobia proposes that following a social event, individuals with social phobia will engage in post-event processing, during which they conduct a detailed review of the event. This study investigated the relationship between self-appraisals of performance and post-event processing in individuals high and low in social anxiety. Participants appraised their performance immediately after a conversation with an unknown individual and prior to an anticipated second conversation task 1 week later. The frequency and valence of post-event processing during the week following the conversation was also assessed. The study also explored differences in the metacognitive processes of high and low socially anxious participants. The high socially anxious group experienced more anxiety, predicted worse performance, underestimated their actual performance, and engaged in more post-event processing than low socially anxious participants. The degree of negative post-event processing was linked to the extent of social anxiety and negative appraisals of performance, both immediately after the conversation task and 1 week later. Differences were also observed in some metacognitive processes. The results are discussed in relation to current theory and previous research.

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## Introduction

Social phobia is a common and disabling anxiety disorder (Harvey, Clark, Ehlers, & Rapee, 2000), characterised by an intense concern about evoking negative reactions from others during social interactions (Stravynski, Bond, & Amado, 2004). According to recent theoretical models of social phobia, individuals with social phobia attach fundamental importance to being positively appraised by others, yet experience marked insecurity regarding their ability to convey a favourable impression of themselves to others. As a consequence, individuals with social phobia believe that their social behaviour will have disastrous consequences, such as humiliation or rejection (Clark & Wells, 1995; Rapee & Heimberg, 1997).

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\*Corresponding author. Present address: Department of Clinical Psychology, Department of Psychiatry, Royal South Hants Hospital, Southampton, Hampshire, SO14 0YG, UK. Tel./fax: +44 2380 825531.

E-mail address: [laura.dannahy@wht.nhs.uk](mailto:laura.dannahy@wht.nhs.uk) (L. Dannahy).

The Clark and Wells (1995) model of social phobia identifies four processes that contribute to the maintenance of this anxiety: self-schemata, self-focused attention, in-situation safety behaviours, and anticipatory and post-event processing. This study focuses on one part of the fourth maintaining factor, post-event processing. According to the Clark and Wells model, post-event processing refers to the tendency for individuals with social phobia to engage in a detailed review or 'post-mortem' of events following a social interaction. Clark and Wells (1995) argue that the cognitive content and associated affect of post-event processing is guided by the thoughts and feelings that were processed during the event itself. During post-event processing, individuals with social phobia typically become preoccupied with anxious feelings and negative self-perceptions, and ambiguous information is re-interpreted as negative (Stopa & Clark, 2000), leading to greater levels of anxiety and shame (Clark & Wells, 1995). Clark and Wells' (1995) conceptualisation of post-event processing is therefore similar to Rapee and Heimberg's (1997) suggestion that retrospective rumination generates and maintains social anxiety. According to Rapee and Heimberg (1997), retrospective rumination is characterised by information elicited from external and internal cues during the social event itself, together with the recollection of perceived past failures. Similar to Clark and Wells' (1995) model, retrospective rumination is hypothesised to perpetuate maladaptive cognitions and lower anticipation for success in future social interactions.

A number of studies provide support for Clark and Wells' (1995) account of post-event processing in that following a social situation, highly socially anxious individuals engage in significantly more negative post-event processing about their performance compared to individuals low in social anxiety (Edwards, Rapee, & Franklin, 2003; Mellings & Alden, 2000). Research into the characteristics and consequences of post-event processing has shown that following a social situation, the degree of state anxiety experienced during the situation and levels of trait anxiety are strongly correlated with the degree of self-reported post-event rumination (Abbott & Rapee, 2002; Lundh & Sperling, 2002; Rachman, Gruter-Andrew, & Shafran, 2000). Rachman et al. (2000) describe the content of the ruminative thoughts following a social event as recurrent and intrusive, and argue that they interfere with the individual's ability to concentrate, presumably by capturing and maintaining the focus of attention.

The Clark and Wells (1995) model predicts a specific relationship between self-appraisal of performance in social situations and the frequency and valence of subsequent post-event processing. That is, the more negatively one perceives one's performance, the greater the frequency of negative post-event processing. Although empirical research has demonstrated that socially anxious individuals underestimate their performance and overestimate the appearance of negative behaviours relative to individuals with low social anxiety and independent observers (Mellings & Alden, 2000; Rapee & Lim, 1992; Stopa & Clark, 1993), few studies have directly investigated the relationship between subjective appraisals of performance and post-event processing in social anxiety and social phobia. One study that did investigate this relationship asked participants to perform an impromptu speech task (Abbott & Rapee, 2004). Abbott and Rapee (2004) showed that individuals with social phobia engaged in more negative rumination than controls, with the best predictors of post-event rumination being social anxiety symptom severity and self-appraisals of performance. Abbott and Rapee (2004) also demonstrated that individuals with social phobia maintain negative appraisals of performance, contrasting with the non-clinical group who became more positive about their performance over time.

There is limited research into the mechanisms underlying post-event processing. Recent accounts propose that metacognitive beliefs and appraisals may play a role in maintaining recurrent negative thinking (Watkins, 2004; Watkins & Baracaia, 2001). Metacognition refers to the psychological structures, knowledge, events and processes that are involved in the control, modification and interpretation of thinking itself (Wells & Cartwright-Hatton, 2004), and is thought to be an important factor in the development and maintenance of psychological disorder (Wells, 2000). More specifically, individuals have positive and negative beliefs about thinking that influences appraisals. Individuals also have implicit procedural metacognitions that form plans or programmes for guiding cognition and action. Research into rumination in depression has demonstrated that individuals who ruminate often believe that it increases insight into the self in order to improve problem solving and reduce the potential for repeating mistakes in the future (Watkins, 2004; Watkins & Baracaia, 2001). These metacognitive processes may be similarly important in post-event processing. Research by both Rachman et al. (2000) and Field and Morgan (2004) reported that individuals with high social anxiety may

find post-event processing helpful, and these results suggest that post-event processing may involve metacognitive beliefs about the need to confront perceived failures in social situations and facilitate reflective problem solving.

The present study is a partial replication and extension of [Abbott and Rapee's \(2004\)](#) study. In contrast to [Abbott and Rapee's \(2004\)](#) use of a speech task, the present study aimed to investigate post-event processing using a 'getting acquainted' conversation with an unknown individual. This task was selected because such situations are necessary first steps in forming friendships, and can be problematic for socially anxious individuals ([Alden & Wallace, 1995](#); [Stravynski & Shahar, 1983](#)). Similar to [Abbott and Rapee \(2004\)](#), one aim of the study was to investigate the relationship between self-appraisals of performance and post-event processing in social anxiety, and to investigate the effects of time on the frequency and valence of post-event processing. The present study also aimed to build upon the research findings of [Abbott and Rapee \(2004\)](#) by investigating the effect of post-event processing on perceived performance in a future social interaction. Participants high and low in social anxiety were informed that they would be required to partake in two conversation tasks, 1 week apart, with an unknown individual. Participants were subsequently asked to rate their performance and complete the post-event processing questionnaire used in the [Abbott and Rapee \(2004\)](#) study both immediately after the first conversation and again prior to the anticipated second conversation. Further to [Abbott and Rapee's \(2004\)](#) study, participants also completed a daily questionnaire designed to investigate the frequency and valence of post-event processing in the week between the first and the anticipated second conversation.

The final aim of the present study was to explore differences in the metacognitive processes of individuals high and low in social anxiety; a factor that has not yet been investigated in studies of post-event processing. Two dimensions of metacognition were investigated, including (1) beliefs about cognitions that occur during post-event-processing and (2) cognitive self-consciousness (i.e. the tendency to be aware and monitor thinking).

Four hypotheses were tested in the current study, based upon [Clark and Wells' \(1995\)](#) model and previous research:

1. High socially anxious participants would predict worse performance, underestimate actual performance, and overestimate the appearance of negative behaviours compared both to individuals low in social anxiety and to their conversation partner.
2. High socially anxious participants would engage in more post-event processing than low socially anxious participants, and the content of this processing would be more negative. High socially anxious participants would also engage in post-event processing for a longer period of time. This hypothesis was derived from [Clark and Wells' \(1995\)](#) suggestion that post-event processing is perpetuated by anticipatory processing prior to a pending social situation.
3. High socially anxious participants would rate their performance more negatively over time. This hypothesis was based upon [Clark and Wells' \(1995\)](#) suggestion that self-appraisals of performance may worsen for individuals who are highly socially anxious as a result of negative post-event processing and the recall of past perceived failures. It was also hypothesised that there would be a significant correlation between social anxiety, negative appraisals of performance and the frequency of negative post-event processing following the conversation.
4. Compared to low socially anxious participants, high socially anxious participants would exhibit higher scores on all dimensions of metacognition regarding social situations. This hypothesis was based upon [Morrison and Wells' \(2003\)](#) suggestion that metacognitions are associated with psychological disturbance, in that they generate and maintain biases in information processing ([Wells & Mathews, 1996](#)).

## Method

### *Participants*

High and low socially anxious groups were selected using a measure of fear of negative evaluation. 132 undergraduate students were screened using the Fear of Negative Evaluation Scale (FNES: [Watson & Friend,](#)

1969). High and low FNE groups were selected using cut offs of 20 or above (High FNE group) or 8 or below (low FNE group), as recommended by Stopa and Clark (2001). 50 participants took part in the study in exchange for either course credit or a small payment: The high FNE group ( $n = 25$ ; 2 males, 23 females) had a mean FNES score of 23.92 ( $SD = 3.00$ ) with a range of 20–30. The low FNE group ( $n = 25$ ; 4 males, 21 females) had a mean FNES score of 4.92 ( $SD = 1.91$ ) with a range of 1–8. As expected, there was a significant difference in FNES scores between groups,  $t(41) = 26.71$ ,  $p < .01$ . There were no significant differences in age between the two groups (High FNE  $M = 20.28$ ,  $SD = 3.36$ ; Low FNE  $M = 21.84$ ,  $SD = 5.72$ ),  $t(39) = 1.18$ ,  $p = .25$ , or in gender composition,  $\chi^2(4, N = 50) = .76$ ,  $p = .38$ .

### Measures

#### *Fear of negative evaluation scale (FNES; Watson & Friend, 1969)*

The FNES is a 30-item true-false questionnaire which measures trait social-evaluative anxiety. The FNES has high internal consistency ( $\alpha = .94$ ), good test–retest reliability ( $r = .78$ ), and good discriminant validity ( $p < .01$ ) when compared with a measure of social desirability (Crowne-Marlowe Scale; Crowne & Marlowe, 1964) on a sample of undergraduates (Watson & Friend, 1969). High and low FNES groups produce results that are similar to comparisons between individuals with social phobia and controls (Stopa & Clark, 2001).

#### *State anxiety and prediction of performance scales*

Anxiety and prediction of performance ratings were completed using 0 (*no anxiety/I will not perform well at all*) to 100 (*extreme anxiety/I will perform extremely well*) visual analogue scales to indicate how participants felt about the conversation task.

#### *Social performance rating scale (SPRS)*

A modified version of the SPRS (Fydrich, Chambless, Perry, Buergener, & Beazley, 1998) was used to measure the quality of social performance in the conversation. Behaviour is rated on a 5-point scale, with higher scores indicating more skilled social interaction. The SPRS has been validated as a reliable tool, with acceptable internal consistency ( $\alpha = .72$ ), excellent inter-rater reliability ( $r = 1.00$ ), and good convergent validity ( $p < .001$ ) when compared to measures of social anxiety and shyness (Fydrich et al., 1998). Two versions of this questionnaire were used in the study: self-rating of performance (SPRS) and confederate rating of participant's performance (SPRS-Confederate).

#### *Thoughts questionnaire*

The Thoughts Questionnaire, modified from Edwards et al. (2003), was used to measure post-event processing immediately after/during the week following the conversation task. Participants responded to items using a 5-point scale ranging from 0 (*Never*) to 4 (*Very Often*). The questionnaire contains 11 positive rumination items, 16 negative rumination items, and 2 general items. Higher scores indicate more frequent post-event processing. Cronbach's alpha for the negative, positive and total subscales has indicated acceptable to excellent internal consistency (Edwards et al., 2003). In the present study, this scale was used to measure the degree of post-event processing related to a specific social-evaluative task, and not levels of post-event processing in general.

#### *Daily thoughts questionnaire (DTQ)*

The DTQ is a daily rating scale that was designed to measure the degree to which the participant ruminated on the conversation during the day. The DTQ comprises 3 positively valenced items, 5 negative items and 2 general items. Items are scored on a 5-point scale ranging from 0 (*never*) to 4 (*very often*); higher scores indicate more post-event rumination.

#### *Metacognitions questionnaire*

A metacognitions questionnaire, adapted from Cartwright-Hatton and Wells (1997) Metacognitions questionnaire, was used to measure beliefs about cognitions that occur during post-event processing. The questionnaire assessed two dimensions of metacognition, using a 5-point scale ranging from 0 (*do not agree*) to

5 (*totally agree*). The two dimensions comprised (1) beliefs regarding the degree to which thinking helps problem-solving and negative beliefs about the controllability of thoughts, and (2) cognitive self-consciousness. A measure of imagery was also included. Higher scores indicate greater conviction in the metacognitive component.

### *Depression measures*

Two well-established measures were used. The Ruminative Responses subscale of the Response to Depression Questionnaire (RDQ, Nolen-Hoeksema & Morrow, 1991) was used to examine ruminative style. The Beck Depression Inventory (BDI-II, Beck, Steer, & Garbin, 1996) was used to measure the severity of depression. Dysphoric mood has been linked to anxiety (Nolen-Hoeksema, 2000) and may influence post-event processing (Abbott & Rapee, 2002). The BDI was included to examine whether any effects observed in the present study were due to dysphoria rather than social anxiety.<sup>1</sup>

### *Confederates*

Two research students, blind to the hypotheses of the study, served as experimental confederates. They were trained to engage in consistent behaviour across participants in line with Veljaca and Rapee's (1998) suggestions. The aim was to portray neither overtly positive nor negative behaviours. The confederates were instructed not to give any feedback to participants regarding their performance. The confederates were also given training in the SPRS rating system in order to maximise consistency between raters.

### *Materials and procedure*

The study took place over two sessions, 7 days apart. At the first session, participants were presented with the instructions:

I would like you to take part in a conversation with a person who is waiting for you in the room next door. Your task is to try to acquaint yourself with this person, similar to what you may do when meeting someone for the first time. The conversation will last for at least 5 min, and you will be recorded using a video tape. Following the conversation, you will be rated by the other person on your performance.

Following the instructions, participants completed the state anxiety and prediction of performance visual analogue scales. The participant was then taken into an adjacent room and sat opposite the stooge, who was seated approximately 1 m away. A video camera was positioned to the right of the confederate, so that it was visible to the participant. At the end of the conversation, participants were asked to complete the anxiety and prediction of performance analogue scales, the SPRS and the Thoughts Questionnaire. The confederate also rated the participant's performance using the SPRS-Confederate. Finally, the participant was asked to complete the Daily Thoughts questionnaire during the following week.

At the second session, participants were given identical instructions to those used in the first session. Participants were then asked to complete state anxiety and prediction of performance scales, equivalent versions of the SPRS and Thoughts questionnaire (modified to ask participants how they felt they had performed during their conversation task 1 week ago/how much they had thought about that conversation task over the course of the week respectively), the depression measures, and the Metacognitions Questionnaire. Following completion of these questionnaires, participants were told that they would not have to take part in a second conversation, and were debriefed.

### *Data analysis*

SPSS version 12.0 was used for the analysis. The dependent variables were analysed using mixed ANOVA's. Any interactions were followed up with post hoc *t*-tests using an alpha of  $p < .05$  (except for the

<sup>1</sup>There were no significant differences between groups on BDI-II and RDQ scores,  $t(48) = 0.49, p = .63$ , and  $t(48) = 1.29, p = .21$ , respectively. As there were no differences, no further analyses were undertaken with these two scales.



Metacognitions Questionnaire where a more stringent value of  $p < .01$  was used as this measure has not been validated). Where  $t$ -tests were used, the test value reported was one that did not assume equal variances if Levene's test for the equality of variance was significant. Data that were not normally distributed were log transformed (with the exception of the Daily Thoughts Questionnaire where transformation failed to normalise the data and thus non-transformed data is used).

## Results

### Anxiety

Means and standard deviations for anxiety ratings immediately before the conversation, after the conversation and before the anticipated second conversation are shown in Table 1. A 2 (Group)  $\times$  3 (Time) mixed design ANOVA was used to compare anxiety immediately before the first conversation task, immediately after the first conversation task, and immediately before the second conversation task. There was a main effect of group,  $F(1, 48) = 24.00$ ,  $p < .001$ . The high FNE group were more anxious overall than the low FNE group (High  $M = 48.64$ , Low  $M = 26.60$ ). There was also a main effect of time,  $F(2, 48) = 6.55$ ,  $p < .01$ . Both high and low FNE groups were more anxious before the first conversation compared to after the first conversation (Anxiety1  $M = 43.22$ , Anxiety2  $M = 34.60$ ),  $t(49) = 3.94$ ,  $p < .001$ , and before the first conversation compared to before the anticipated second conversation (Anxiety1  $M = 43.22$ , Anxiety3  $M = 35.04$ ),  $t(49) = 3.01$ ,  $p < .01$ . However, there was no time by group interaction,  $F(2, 48) = .13$ ,  $p = .88$ .

### Performance

#### Prediction of performance

Means and standard deviations for prediction of performance ratings immediately before the conversation, after the conversation and before the anticipated second conversation are shown in Table 1.

Table 1

Variable	High FNE		Low FNE	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
<i>Anxiety</i>				
Anxiety <sup>a</sup>	54.64	18.93	31.80	18.25
Anxiety <sup>b</sup>	46.00	21.17	23.20	16.43
Anxiety <sup>c</sup>	45.28	22.21	24.80	18.31
<i>Performance</i>				
Prediction <sup>a</sup>	36.68	14.32	56.44	16.10
Prediction <sup>b</sup>	48.24	18.94	66.60	15.54
Prediction <sup>c</sup>	44.12	18.40	61.60	17.28
<i>SPRS ratings</i>				
SPRS self-rating <sup>b</sup>	18.80	3.38	21.80	2.20
SPRS self-rating <sup>c</sup>	17.56	3.54	21.68	2.41
SPRS confed. rating	21.04	3.89	20.64	3.87
<i>Metacognition</i>				
Problem solving	16.84	3.50	15.32	3.12
Cognitive self-consciousness	14.80	2.27	9.80	3.08
Controllability	22.76	5.17	14.12	4.46
Imagery	3.28	1.14	2.48	1.45

<sup>a</sup>Immediately before first conversation.

<sup>b</sup>After first conversation.

<sup>c</sup>Before anticipated second conversation.

A 2 (Group)  $\times$  3 (Time) mixed design ANOVA was used to compare prediction of performance before the first conversation task, after the first conversation task, and before the second conversation task. There was a main effect of group,  $F(1, 48) = 20.87, p < .001$ . The high FNE group predicted a worse performance overall than the low FNE group (High  $M = 43.01$ ,  $SD = 14.98$ , Low  $M = 61.55$ ,  $SD = 13.67$ ). There was also a main effect of time,  $F(2, 48) = 12.73, p < .001$ , but no time by group interaction,  $F(2, 48) = .14, p < .87$ . Both groups predicted a more negative performance before the first conversation compared to their performance ratings after the first conversation (Prediction1  $M = 46.56$ ,  $SD = 18.08$ , Prediction2  $M = 57.42$ ,  $SD = 19.49$ ),  $t(49) = 5.01, p < .001$ , and a more negative performance before the first conversation compared to before the anticipated second conversation (Prediction1  $M = 46.56$ ,  $SD = 18.08$ , Prediction3  $M = 52.86$ ,  $SD = 19.75$ ),  $t(49) = 2.97, p < .005$ . Similarly, both groups also predicted a more positive performance following the first conversation compared to before the anticipated second conversation (Prediction2  $M = 57.42$ , Prediction3  $M = 52.86$ ),  $t(49) = 2.13, p < .05$ .

### Performance

Means and standard deviations for self and partner ratings of performance using the Social Performance Rating Scale (SPRS) are shown in Table 1. Higher ratings indicate better performance. Confederate and participant ratings were compared using a 2 (Group)  $\times$  2 (Rater) mixed design ANOVA. There was a significant interaction between rater and group,  $F(1, 48) = 11.41, p < .01$ . The high FNE group rated their performance worse than both the low FNE group,  $t(41) = 3.72, p < .001$  and the confederate,  $t(24) = 3.48, p < .005$ . There were no differences in performance ratings between the low FNE group and the confederate,  $t(24) = 1.50, p = .15$ .

Self-ratings of performance over time were analysed using a 2 (Group)  $\times$  2 (Time) mixed design ANOVA. There was a main effect of group,  $F(1, 48) = 19.78, p < .001$ , and a main effect of time,  $F(1, 48) = 9.16, p < .005$ . These effects were mediated by a significant group  $\times$  time interaction,  $F(1, 48) = 6.21, p < .05$ . The high FNE group rated their performance significantly more positively after the first conversation compared to before the second conversation,  $t(24) = 3.3, p < .005$ . In contrast, there was no significant difference in the ratings made by the low FNE group after the first and before the anticipated second conversation tasks,  $t(24) = .486, p = .63$ .

### Post-event processing

#### Frequency of post-event processing

*Thoughts questionnaire.* A 2 (Group)  $\times$  2 (Time) mixed design ANOVA was conducted on total scores obtained on the Thoughts Questionnaires. There was a main effect of group,  $F(1, 48) = 11.75, p < .001$ . The high FNE group engaged in more post-event processing overall than the low FNE group (High  $M = 40.20$ ,  $SD = 13.45$ , Low  $M = 27.74$ ,  $SD = 12.23$ ). There was also a main effect of time,  $F(1, 48) = 53.97, p < .001$ : both high and low FNE groups engaged in more post-event processing immediately after the first conversation task compared to over the following week (TQ1  $M = 43.68$ ,  $SD = 16.33$ , TQ2  $M = 24.26$ ,  $SD = 17.57$ ). However, there was no group by time interaction,  $F(1, 48) = .32, p = .57$ .

*Daily thoughts questionnaire.* A 2 (Group)  $\times$  5 (Time) mixed design ANOVA was conducted on total scores obtained on the Thoughts Questionnaires. Only days 1–5 of the Daily Thoughts Questionnaire were analysed as there were so much missing data on days 6 and 7.<sup>2</sup> There was a main effect of group,  $F(1, 39) = 4.84, p < .05$ . The High FNE group engaged in more post-event processing overall than the low FNE group (High  $M = 7.78$ ,  $SD = 6.67$ , Low  $M = 4.06$ ,  $SD = 3.99$ ). There was also a main effect of time,  $F(4, 39) = 30.75, p < .001$ , but no group by time interaction,  $F(4, 39) = .41, p = .81$ . Both groups engaged in more post-event processing the day after the conversation task compared to days two (Day1  $M = 10.64$ ,  $SD = 7.58$ , Day2  $M = 5.76$ ,  $SD = 6.84$ ),  $t(49) = 5.78, p < .001$ ; three (Day3  $M = 4.54$ ,  $SD = 5.99$ ),  $t(49) = 6.45, p < .001$ ; four (Day4  $M = 4.06$ ,  $SD = 5.63$ )  $t(49) = 6.93, p < .001$ ; and five (Day5  $M = 4.59$ ,  $SD = 6.20$ ),  $t(40) = 6.18, p < .001$ , respectively. Similarly, both groups engaged in more post-event processing on day two compared to

<sup>2</sup>This was because participant completion of the DTQ in both high and low FNE groups declined on days 6 and 7.

days three,  $t(49) = 2.97$ ,  $p < .005$ , and four,  $t(49) = 3.0$ ,  $p < .005$ . No significant differences were found in the amount of post-event processing engaged in between days three, four and five ( $t$ 's(40)  $< .77$ ,  $p$ 's  $> .05$ ).

#### *Valence of post-event processing*

Negative and positive rumination scores were calculated on the basis of the valence of items in the Thoughts Questionnaires and Daily Thoughts Questionnaires.<sup>3</sup> Higher ratings indicate more post-event processing. The question of interest is whether post-event processing in the high FNE group is more negative and less positive than in the low FNE group, and whether this changes over time.

*Thoughts questionnaire.* A 2 (Group)  $\times$  2 (Time)  $\times$  2 (Valence) mixed design ANOVA indicated main effects of group,  $F(1, 48) = 8.36$ ,  $p < .0$ , time,  $F(1, 48) = 53.17$ ,  $p < .001$ , and valence,  $F(1, 48) = 5.39$ ,  $p < .02$ . These main effects were mediated by significant time  $\times$  valence,  $F(1, 48) = 11.41$ ,  $p < .01$ , and time  $\times$  valence  $\times$  group interactions,  $F(1, 48) = 24.27$ ,  $p < .001$ . The high FNE group reported more negative post-event processing than the low FNE group (High  $M = 1.49$ ,  $SD = .66$ , Low  $M = .62$ ,  $SD = .53$ ),  $t(48) = 5.18$ ,  $p < .01$ , but the groups did not differ in the frequency of positive post-event processing (High  $M = 1.21$ ,  $SD = .52$ , Low  $M = 1.38$ ,  $SD = .57$ ),  $t(48) = 1.06$ ,  $p = .29$ . The low FNE group engaged in more positive than negative post-event processing overall (Pos  $M = 1.38$ ,  $SD = .57$ , Neg  $M = .62$ ,  $SD = .53$ ),  $t(24) = 5.31$ ,  $p < .01$ . In contrast, the high FNE group demonstrated a trend towards engaging in more negative than positive post-event processing (Pos  $M = 1.21$ ,  $SD = .52$ , Neg  $M = 1.49$ ,  $SD = .66$ ),  $t(24) = 1.78$ ,  $p = .09$ .

Investigation of the time  $\times$  valence interaction showed that both the high and low FNE groups engaged in more positive and negative rumination immediately after the first conversation task compared to during the following week (TQ1Pos  $M = 1.73$ ,  $SD = .76$ , TQ2Pos  $M = .86$ ,  $SD = .66$ ; TQ1Neg  $M = 1.31$ ,  $SD = .80$ , TQ2Neg  $M = .79$ ,  $SD = .79$ ),  $t(49) = 6.83$ ,  $p < .01$ ;  $t(49) = 5.96$ ,  $p < .001$ . Both groups reported more positive than negative rumination immediately after the first conversation task,  $t(49) = 2.70$ ,  $p < .01$ , but these differences disappeared a week later,  $t(49) = 1.39$ ,  $p = .17$ .

*Daily thoughts questionnaire.* A 2 (Group)  $\times$  5 (Time)  $\times$  2 (Valence) mixed design ANOVA indicated a main effect of group,  $F(1, 39) = 5.39$ ,  $p < .001$ : the high FNE group engaged in more positive and negative post-event processing overall compared to the low FNE group (High  $M = .80$ ,  $SD = .72$ ; Low  $M = .38$ ,  $SD = .44$ ). There was also a main effect of time,  $F(4, 36) = 32.3$ ,  $p < .001$ , and a time  $\times$  valence interaction,  $F(4, 36) = 4.0$ ,  $p < .005$ , but no time  $\times$  valence  $\times$  group interaction,  $F(4, 36) = 1.27$ ,  $p = .28$ . Both groups engaged in more positive and negative rumination on day one compared to days two to five ( $t$ 's ranged from 4.53 to 6.8  $p$ 's all  $> .001$ ). Both groups engaged in more positive and negative rumination on day two compared to days three and four ( $t$ 's ranged from 2.43 to 2.89  $p$ 's range from .05 to .01), but there was no difference between days three and five ( $p = .2$  negative, .15 positive). There were no differences between days three and four for either positive or negative rumination ( $p = .53$  negative, .15 positive). There was no difference between days four and five for positive rumination ( $p = .26$ ); however, there was a trend indicating an increase in negative rumination between days four and five ( $t(40) = -1.8$ ,  $p = .079$ ).

#### *Relationships between social anxiety, appraisal of performance, and post-event processing*

Table 2 presents the correlations between FNE group, SPRS scores after the conversation task and 1 week later, and the Thoughts Questionnaires scores (including positive and negative post-event processing scores for immediately after the conversation task and one week later). There were significant correlations between FNE and performance questionnaire scores, and between FNE and frequency of post-event processing both immediately after the conversation task and one week later. More severe FNE scores were associated with poorer appraisals of performance and the tendency to engage in more frequent rumination. A significant correlation also was observed between FNE and tendency to engage in negative post-event processing over time, with high FNE associated with a greater tendency to engage in negative post-event processing.

<sup>3</sup>Table of results available from the author.



Table 2

Correlations between FNES, social performance ratings and post-event processing questionnaire scores

	FNES	SPR1	SPR2	TQ1tot	TQ1pos	TQ1neg	TQ2tot	TQ2pos	TQ2neg
FNES	—								
SPR1	-.50**	—							
SPR2	-.57**	.89**	—						
TQ1tot	.385**	-.26	-.40**	—					
TQ1pos	-.222	.36*	.24	.55**	—				
TQ1neg	.62	-.57**	-.65	-.82**	.02	—			
TQ2tot	.45**	-.30*	-.39**	.40**	-.03	.50**	—		
TQ2pos	-.01	.19	.15	.06	.19	-.06	.71**	—	
TQ2neg	.61**	-.52**	-.61**	.50**	-.16	.71**	.91**	.36*	—

\* $p < .05$ .\*\* $p < .01$ .

There were also significant negative correlations between SPR1 scores and frequency of negative post-event processing, both immediately after the conversation task and one week later. This finding indicates that more negative self-appraisals of speech task performance immediately after the conversation were associated with more negative post-event processing. Similarly, there were significant negative correlations between SPR2 scores and both the total amount and frequency of negatively valenced post-event processing and in the week following the conversation task. Results therefore indicated that more negative self-appraisals of performance were associated with (1) more post-event processing, and (2) more negatively valenced post-event processing, 1 week after the conversation task.

### Metacognition

Means and standard deviations for the four subscales of the Metacognitions Questionnaire are shown in Table 1. Data for the imagery subscale were transformed, yet failed to normalise the data for the high socially anxious group. Table 1 shows the untransformed mean for ease of interpretation. The high FNE group scored higher than the low FNE group on cognitive self-consciousness,  $t(48) = 6.53$ ,  $p < .01$ , and controllability of thoughts,  $t(48) = 6.33$ ,  $p < .01$ . Scores on the imagery subscale showed a non-significant trend in the same direction,  $t(43) = 2.46$ ,  $p = .017$ . However, the two groups did not differ on the problem solving subscale,  $t(48) = 1.62$ ,  $p = .11$ .

### Discussion

The aim of this study was to empirically examine post-event processing in participants who were high and low in social anxiety. Consistent with previous research, the results showed that high socially anxious individuals experienced more anxiety, predicted worse performance, and underestimated their actual performance compared to low socially anxious individuals. More importantly in terms of the main aim of the study, high socially anxious participants engaged in more post-event processing following the conversation than their low anxious counterparts. High socially anxious participants reported more negative post-event processing than low socially anxious individuals, but there were no differences between the groups in positive post-event processing. Finally, there were differences between the two groups in some metacognitive processes, namely cognitive self-consciousness and controllability of thoughts. These findings will now be discussed in relation to previous research and current theory.

The current study replicated previous research, which demonstrates that high socially anxious individuals have a negatively distorted perception of their own social performance (e.g. Abbott & Rapee, 2004; Mellings & Alden, 2000; Rapee & Lim, 1992; Stopa & Clark, 1993). While there is a debate over whether socially anxious individuals actually perform worse than low anxious individuals, this study did not find a difference in social performance as judged by the confederate (consistent with Rapee & Lim, 1992). Models of social phobia conceptualise the tendency to underestimate performance as a reflection of information processing biases in

which individuals with high social anxiety selectively attend to negative information about social events, thus contributing to negative perceptions or 'mental representations' of performance (Clark & Wells, 1995; Rapee & Heimberg, 1997). In this study, high socially anxious participants rated their performance significantly more negatively over time, whereas low anxious participants' ratings did not change. It is possible that in the high socially anxious group, mental representations of performance may be rehearsed in post-event processing, and may get progressively more negative over time.

The data provide some indirect support for this suggestion. There were differences between high and low socially anxious individuals in the frequency and valence of post-event processing following the social interaction. High socially anxious individuals engaged in more frequent post-event processing than low socially anxious individuals, and given that there were no differences in the confederate's ratings of the two groups, this 'post-mortem' (Clark & Wells, 1995) appears to be negatively biased. The degree of negative post-event processing about the conversation was linked to participants' ratings of social anxiety and to their negative appraisals of performance, both immediately after the conversation task and over time. The frequency of post-event processing (particularly negative post-event processing) was associated with appraisals of performance worsening over time. Although high socially anxious participants reported more negative post-event processing, the groups did not differ in the amount of positive post-event processing that they reported. These results are consistent with and extend previous empirical findings (e.g. Abbott & Rapee, 2002, 2004; Edwards et al., 2003; Mellings & Alden, 2000; Rachman et al., 2000) and provide support for theoretical models of social anxiety and social phobia (Clark & Wells, 1995; Rapee & Heimberg, 1997).

One surprising finding in this study was that high and low socially anxious individuals did not differ in the amount of positive processing that they performed after the conversation. There is evidence that demonstrates that high socially anxious individuals lack a positive inferential bias that might have protective effects in terms of preventing the development of social anxiety (e.g. Hirsch & Mathews, 2000). However, in this study, the high and low socially anxious groups differ in the extent to which they negatively process the social interaction, but not in their positive appraisals. This raises an interesting question about the function of positive post-event processing and why, in this case, positive processing does not inhibit or block negative processing. One possibility is that negative interpretation biases outweigh or invalidate positive inferences about performance in high socially anxious individuals. Negative information may be more salient or more believable than positive information to this group. This is consistent with Hackmann, Clark, and McManus's (2000) observation that early unpleasant experiences may lead to the development of excessively negative images that fail to update even in light of favourable experiences. Positive post-event processing may therefore have had little impact on perception of performance in the current study because, as Hackmann et al. (2000) suggest, positive information is insufficient to update distorted perceptions of the public self.

Examination of the effects of time on post-event processing suggest that although the high socially anxious group engaged in more negative and positive post-event processing overall than the low socially anxious group, both groups engaged in more post-event processing immediately after the conversation task compared to during the following week. The Daily Thoughts Questionnaire provided a number of interesting trends regarding the duration of post-event processing. Both groups (1) engaged in more post-event processing in the first two days after the conversation task, and (2) consistently rated their thoughts until day five, after which there was a significant decline in ratings. This may provide an indication of the natural duration of post-event processing: after the fifth day, participants may have 'stopped' post-event processing. Interestingly, there was also a trend indicating that negative thoughts about the conversation had started to increase between days four and five, and this might have been linked to anticipatory anxiety about the forthcoming conversation (participants were due to return for part two of the study). If this is the case, then it raises interesting questions about the relationships between post-event processing and anticipatory processing that warrant further investigation.

There were a number of limitations in measuring the effects of time using the Daily Thoughts Questionnaire. Given that only a few participants completed the DTQ after day five, there might have been a problem with compliance. To counter this, the researcher could have sent a daily e-mail or text message to remind participants to complete the DTQ. However, providing participants with daily recording instructions could in itself have been problematic because it might have cued people to think about the conversation task

when they would otherwise have forgotten about it, and this could have inflated the scores. Furthermore, demand characteristics may have been particularly pertinent in the high socially anxious group, who might be more likely to respond because of a fear of being negatively evaluated by the experimenter, and this might explain why more people in this group continued to complete the DTQ on days 5–7.

It was surprising that there were no significant relationships between frequency of post-event processing and changes in state anxiety over time. [Clark and Wells \(1995\)](#) suggest that post-event processing maintains anxiety about social situations because the individual repeatedly rehearses negatively biased information about the self and about performance. This information is also fed into anticipatory processing, so those future encounters are perceived as threatening. If this is the case, then we would expect a relationship between negatively valenced post-event processing following a social situation and state anxiety prior to a pending social situation. The failure to find this expected relationship is puzzling but could be due to methodological weaknesses in the ‘getting acquainted’ paradigm. The paradigm was chosen because it has high ecological validity, but in an experimental situation (where the success of the encounter has no repercussions beyond the experiment) it might have failed to elicit high levels of anxiety, even in high socially anxious participants used.

A unique contribution of the current study was the examination of differences in metacognition in high and low socially anxious individuals. High socially anxious participants scored significantly higher than low socially anxious participants on measures of cognitive self-consciousness (i.e. the tendency to be aware of and monitor thinking) and controllability of thoughts (i.e. the belief that one’s thoughts are uncontrollable). These results are consistent with the hypothesis that metacognitions are more generally associated with psychological disturbance ([Morrison & Wells, 2003](#)). According to [Wells and Mathews’ \(1996\)](#) Self-Regulatory Executive Function model ([Wells & Mathews, 1996](#)), these metacognitive processes may increase vulnerability to psychological dysfunction because they generate and maintain biases in information-processing. These biases are characterised by heightened self-focused attention, threat monitoring, ruminative processing, activation of dysfunctional beliefs, and self-regulation strategies that fail to modify maladaptive beliefs.

High socially anxious individuals also demonstrated a trend towards experiencing more imagery during post-event processing (it is of note that this finding would have been significant if the more stringent  $p$ -value of  $p < .01$  had not been used). This finding is consistent with the current research base into mental imagery in social phobia (see [Stravynski et al. \(2004\)](#) for a review). Limitations in measurement, however, meant that the present study was unable to delineate whether images reflect the actual social interaction or memories of previous social encounters, and it would be interesting for future studies to include an examination of image content.

The absence of a difference between the groups on problem-solving (i.e. positive beliefs about the usefulness of thinking about social performance after a social event) is puzzling. [Clark and Wells’ \(1995\)](#) model conceptualises post-event processing as maladaptive because it elevates anxiety, and this could imply an impairment of problem-solving processes (i.e. focus on ruminative processing rather than more adaptive problem-solving strategies). However, some recent research suggests that post-event processing can sometimes serve an adaptive function and be used as a strategy for confronting perceived failures in social situations (e.g. [Field & Morgan, 2004](#); [Mellings & Alden, 2000](#); [Rachman et al., 2000](#)). One methodological problem with the present finding is that the Metacognitions Questionnaire used here was not validated as a reliable tool for measuring metacognitive processes in social phobia and social anxiety, and therefore further research into metacognitive processes requires proper validation of the instrument to ensure that the observed differences in this study are reliable.

There are a number of other potential limitations to note. First, a non-clinical analogue sample selected on the basis of fear of negative evaluation was used. Although fear of negative evaluation is closely related to social anxiety ([Stopa & Clark, 2001](#)), it is not synonymous with it and future studies would do well to include measures of social anxiety as well as fear of negative evaluation. Second, the study used a predominantly female sample and [Glasgow and Arkowitz \(1975\)](#) suggest that relationships between social anxiety and social performance are sometimes found in female but not male samples. In view of this possibility, it is difficult to generalise the findings of the present study to both socially anxious males and females. Replication of the study using both males and females and the use of a clinical sample would greatly strengthen the current evidence base.

## Conclusion

According to Clark and Wells' (1995) model of social phobia, post-event processing involves a review of events following a social interaction, whereby the individual focuses on anxious feelings and negative cognitions that focus on the social self. The findings from this experiment are consistent with this proposal. In line with previous research, this study showed that high socially anxious participants experience higher subjective anxiety, predict worse performance, and underestimate actual performance in a social situation compared to low socially anxious individuals. High socially anxious individuals also engage in more negative post-event processing than low socially anxious participants, with the best predictors of post-event processing being social anxiety symptom severity and self-appraisals of performance. This study also provides preliminary evidence to show that high socially anxious participants exhibit higher levels of some dysfunctional metacognitive processes than low socially anxious participants.

A final question that may be posed by the findings of the current study is how post-event processing is specifically linked to the other processes proposed by Clark and Wells (1995) in the maintenance of social phobia. Future research is therefore required to elucidate the relationships between these processes, which in turn will enable the development of empirically based therapeutic interventions that effectively treat social phobia.

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