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Lydia Fehm a, Jürgen Hoyer b, Gesine Schneider b, Christiane Lindemann b, Uta Klusmann c

a Psychotherapy and Somatopsychology, Humboldt University, Berlin
b Clinical Psychology and Psychotherapy, Technical University of Dresden,
c Max Planck Institute for Human Development, Berlin

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Assessing post-event processing after social situations: a measure based on the cognitive model for social phobia

LYDIA FEHM¹, JÜRGEN HOYER², GESINE SCHNEIDER², CHRISTIANE LINDEMANN², & UTA KLUSMANN³

¹Psychotherapy and Somatopsychology, Humboldt University Berlin; ²Clinical Psychology and Psychotherapy, Technical University of Dresden & ³Max Planck Institute for Human Development, Berlin

Abstract
In their cognitive model of social phobia, Clark and Wells (1995) described a process called post-event processing that is characterized by prolonged ruminative and negative thinking about a past social event. Referring to this concept, Rachman and colleagues (2000) developed a questionnaire that has been used in several studies subsequently (Post-Event Processing Questionnaire (PEPQ)). Our aim was to examine a German version of the PEPQ and, where necessary, modify this measure. In Study 1 (N=130 students), we inspected the psychometric properties of the German version of the PEPQ. According to the item analyses, problematic items were identified and eliminated or reformulated. To map aspects of post-event processing that were missing in the original questionnaire, new items were developed. In Study 2, the psychometric properties of the revised instrument were analyzed in a sample of students (N=268). The revised instrument showed excellent internal consistency and a meaningful pattern of correlations with anxiety, depression, and dysfunctional self-consciousness. With regard to the factorial structure of the construct, our data suggest that a four-factorial model may be more appropriate than the one-dimensional structure proposed by Rachman and colleagues.

Keywords: post-event processing, social phobia, information processing, cognitive model, reliability, validity

Current cognitive models of social phobia regard biased processing of social information as a central mechanism for the maintenance of the disorder (Clark & Wells, 1995; Rapee & Heimberg, 1997). However, a concept which specifically describes the tendency to remain in a prolonged backward-directed self-focus after socially distressing events is unique to the model of Clark and Wells (1995). Post-event processing, as they call it, comprises a detailed review of the event with a focus on negative interoceptive information, anxious feelings, and ambiguous aspects of the social interaction. It is accompanied by a sense of shame and connected with increased self-awareness during the social situation and with biases in encoding and appraisal of threat-related information. Furthermore, there is enhanced recall of other unpleasant experiences in social situations. Consequently, the recollection of actual
events is increasingly negatively biased, which in turn increases the anticipatory anxiety regarding similar future events.

Within the cognitive model of social phobia, post-event processing is an important component by providing a specific explanation for anticipatory anxiety. It may also explain why individuals with social phobia do not habituate to social situations and do often seem not to benefit from apparently successful confrontations. Still, several empirical questions remain: What are the external and internal stimuli that trigger post-event processing? What are its exact features? Is post-event processing specific for social anxiety and/or social situations? For these and other research topics, the reliable and valid assessment of post-event processing is an essential requirement.

Only few studies directly examined post-event processing and its postulated associations with social anxiety and social situations, and authors used different methods to assess the extent of post-event processing. Rachman, Grueter-Andrew, and Shafran (2000) measured post-event processing with a 13-item questionnaire (Post-Event Processing Questionnaire, (PEPQ)) based on semi-structured interviews. Items were scored on a visual analogue scale from 0 to 100. A factor analysis yielded one main factor accounting for 42.8% of the variance, on which 10 out of 13 items loaded. The authors reported high internal consistency (Cronbach’s $\alpha = .85$). The PEPQ score was significantly positively correlated with social anxiety measured by the Social Phobia and Anxiety Inventory (Turner, Beidel, Dancu, & Stanley, 1989; $r = .4$) and with depression measured by the Beck Depression Inventory II (Beck, Steer, & Garbin, 1996; $r = .32$). When the effects of depression were controlled for, the partial correlation with social anxiety was $.32$ ($p < .001$), indicating a specific link between post-event processing and social anxiety. Furthermore, groups of high and low socially anxious individuals differed significantly in their scores on the PEPQ.

The latter finding could not be replicated by Field and colleagues (2004). Also contradicting expectations, Field et al., (2004) found that within socially anxious individuals higher PEP scores were associated with the recall of less shameful memories after an initial recall of an ambiguous social situation.

Mellings and Alden (2000) analyzed the effects of self-focused attention, anticipatory, and post-event processing after a social interaction. They developed a 5-item questionnaire on the extent of thinking about the event, the quality of the thoughts (positive, negative, or neutral), the extent of self-criticism, thoughts about anxious feelings, and the retrieval of past events. The items were scored on a 7-point Likert-type scale; Cronbach’s $\alpha$ was .70. Socially anxious participants reported significantly more post-event processing measured 1 day after the social interaction than did nonanxious ones.

In a study by Lundh and Sperling (2002), post-event processing was measured by a diary record that included items based on the questionnaire by Rachman et al., (2000). Participants had to write down detailed descriptions of a socially distressing event shortly after it had occurred. On the basis of the descriptions, three categories of distressing events were derived: (1) events with negative evaluation and (2) events with guilt or (3) with anger as the primary emotion. The extent of post-event processing was assessed in the evening of the day on which the event had occurred and in the following evening. Cronbach’s $\alpha$ was .85 for Time 1 and .88 for Time 2. Post-event processing items and social anxiety measured by the Social Phobia Scale (Mattick & Clarke, 1998) were positively correlated only when negative evaluation events and most aversive events were included, but not when all events were analyzed.

Finally, the Thoughts Questionnaire (Edwards, Rapee, & Franklin, 2003) can be assumed to measure aspects of post-event processing. However, this questionnaire (29 items)
addresses positive as well as negative aspects of thought processes and specifically focuses on public speaking situations.

Among all instruments to assess post-event processing, the measure proposed by Rachman et al., (2000) is unique with regard to the large range of situations to which it is applicable and with regard to its good psychometric properties. Furthermore, this measure is most closely related to the theoretical concept of post-event processing, thus enhancing internal validity of studies. Hence, we used the PEPQ as a basis for our studies with the aim of further advancing this measure.

In Study 1, we developed a German version of the PEPQ and closely examined its psychometric properties, which led to a revision of the measure. The aim of Study 2 was to test and validate the revised measure.

Study 1: German version of the PEP Questionnaire

Study 1 intended to examine the descriptive scale characteristics, reliability, and validity of a German version of the PEP Questionnaire (PEPQ; Rachman et al., 2000). In the original instruction of the PEPQ, participants are asked whether they experienced anxiety in a situation during the past few months, but it is not verified whether the recollection in fact referred to a social situation and was characterized by fear of negative evaluation. As negative ruminative processes are highly probable after other events as well (see, e.g., Lundh & Sperling, 2002), we asked participants to write down the situation that they related to in order to provide information whether it had a negative socially evaluative tone or not. Additionally, participants were explicitly instructed to refer to this situation while answering the items of the PEPQ. As a test of the construct validity of this measure, we expected a one-factorial structure of the questionnaire, a significant positive correlation with social anxiety, and meaningful correlations with other measures of anxiety and depression.

Method

Participants

Students in the cafeteria at the campus of the Technical University of Dresden were invited to participate in a survey of the Department of Psychology. The questionnaire was handed out, and the students were asked to answer all items. The participants were invited to contact the investigator again if they had any questions about the items. They were instructed to return the questionnaire to the investigator immediately after completing it. About 95% of all distributed questionnaires were returned, which resulted in a sample of 130 students (63 males, 48.8%) from the Technical University of Dresden. About two-thirds belonged to the faculties of economics (38%) or arts (27%). Their average age was 23.1 years ($SD = 3.52$). Twenty-three participants did not complete the PEP Questionnaire, mostly because they were unable to recall a feared social situation during the past 5 months. Thus, data from 107 participants were included in the statistical analyses.

Measures

PEP Questionnaire (German version): A German translation of the PEP Questionnaire was prepared which was diligently cross-checked by two independent experts and back translated by a bilingual native speaker. For a detailed exploration of all single aspects of
post-event processing, two items of the original PEP Questionnaire were split. Item 10, asking for the type of memory perspective (“If you thought about the event, did you see it from your point of view, or how other people would view it?”; field versus observer perspective), was divided into two items, each asking for one memory perspective. Item 13 was split into two separate items, because it comprised two aspects of avoidance (“As a result of the event, do you now avoid similar events; did this event reinforce a decision to avoid similar situations?”). The German version of the PEP Questionnaire thus contained 15 instead of 13 items. The items were scored from 0 (none, never, not at all) to 100 (very strong, always) on a visual analogue scale.

The participants could choose between six given socially phobic situations (e.g., public speaking, being criticized) or indicate one of their own choices. While 86.9% of the sample selected one of the six given situations, 13.1% of the sample wrote down other situations, e.g., asking a question in a seminar or experiencing stage fright during a musical performance. All of them could be verified as being mainly characterized by the fear of negative evaluation. The participants were instructed to refer to their chosen situation while answering the questionnaire.

Social evaluation anxiety was assessed with the Fear of Negative Evaluation Scale (FNE; Watson & Friend, 1969; German: Vormbrock & Neuser, 1983). It comprises 20 items, which are scored on a Likert-type scale (1–4). General anxiety and depression were measured with the Hospital Anxiety and Depression Scale (HADS; Zigmond & Snaith, 1983; German: Herrmann, Buss, & Snaith, 1995), a screening measure consisting of seven items for the subscales anxiety and depression, respectively. The item-specific answer format provides four response options, which are described by verbal anchors. The HADS is highly economic, and it has a high acceptability in non-clinical samples. The German version possesses good to acceptable psychometric properties (Herrmann et al., 1995).

Finally, the participants were asked to complete the Questionnaire of Dysfunctional and Functional Self-Consciousness (DFS; Hoyer, 2000), a self-report scale assessing maladaptive (14 items) and self-regulative aspects (8 items) of self-consciousness. All items are to be answered on a 5-point Likert-type scale. Good psychometric properties have been demonstrated in clinical as well as non-clinical samples (Hoyer, 2000).

Results

Descriptive scale characteristics

The mean score on the PEP Questionnaire was 35.3 (SD = 13.4; range: 12.7–73.3). The distribution of the mean scores diverged significantly from normal distribution (p < .05), a visual inspection indicated positive skewness.

Scale structure

We conducted a factor analysis to replicate the single-factor structure through the extraction of one factor in a principal components analysis. Only 27.9% of the variance could be explained in contrast to 42.8% in the study of Rachman et al., (2000). The course of Eigenvalues showed a decline after the first factor (4.19, 1.91, 1.63, 1.17, 1.0, 0.91, etc.). Similar to the study by Rachman and colleagues, for four items the factor loadings were below 0.4: the degree to which the memory was welcome (Item 5, r = −.16), whether the feelings about the event improved with increased processing (Item 9, r = −.25) and the point of view from which the people thought about the event (Item 10, r = .11; Item 11,
$r = .35$) were not explained by the factor. In contrast to the study by Rachman et al., (2000), for the German version, the reported extent of anxiety that was experienced during the situation did not load on the factor (Item 1, $r = .20$). Furthermore, some items had low indices of discriminatory power ($< .30$; items 1, 5, 9, 10, and 11). Internal consistency (coefficient $\alpha$) was substantially lower than for the original version of the PEP Questionnaire ($\alpha = .72$ vs. .85), and homogeneity (average item intercorrelation) was also low ($r = .15$).

In an explorative analysis, we eliminated all items with low discriminatory power; for this version, the explained variance was $38.7\%$; factor loadings exceeded 0.4 for all items, and internal consistency also increased ($\alpha = .81$).

Correlations

Significant positive correlations with post-event processing were found for social anxiety ($r = .26$, $p < .01$), general anxiety ($r = .31$, $p < .01$), and dysfunctional self-awareness ($r = .41$, $p < .001$). Moreover, there was a significant negative correlation between PEP and functional self-awareness ($r = -.24$, $p < .05$). Contrary to our expectations, the correlation between PEP and depression was not significant ($r = .17$, $p > .05$). Partial correlations revealed a significant association between PEP and dysfunctional self-awareness when social and general anxiety were used as covariates ($r = .25$, $p < .01$). In contrast, the relations between PEP and social anxiety as well as between PEP and general anxiety were no longer significant when dysfunctional self-awareness was entered as a covariate. Similar to the study by Rachman et al., (2000), the partial correlation between PEP and social anxiety was significant with depression as a covariate ($r = .23$, $p < .05$).

Comparison of high and low socially anxious individuals

Similar to Rachman et al., (2000), the cut-offs for high and low social anxiety were set to one standard deviation above and below the average. Consistent with the results found by Rachman et al., (2000), we found significant differences in post-event processing between high ($n = 17$, $M = 42.5$, $SD = 12.0$) and low socially anxious participants ($n = 19$, $M = 33.9$, $SD = 15.2$; $t(34) = 1.89$, $p < .05$, $d = .63$).

Discussion

In Study 1, the psychometric properties of the German version of the PEP Questionnaire were analyzed using a nonclinical sample. We found some remarkable differences compared with the original version of the questionnaire.

Principal component analysis revealed only 26.7% explained variance for the first factor; five items did not load on that factor. In the study by Rachman et al., (2000), one factor explained 42.8% of the variance, but remarkably, the same items as in our study (except Item 1) did not load on this factor. Internal consistency (Cronbach’s $\alpha$) for the German version was lower than for the original PEPQ ($\alpha = .72$ vs. .85).

Significant positive correlations were found between the scores of the PEP Questionnaire and measures of social anxiety, general anxiety, and dysfunctional self-consciousness. Other than in the Rachman et al., study, no positive correlation was found between PEP and depression. The association with social and general anxiety disappeared when controlling
for dysfunctional self-consciousness. Groups of high and low socially anxious participants could be differentiated by their means on the PEP Questionnaire.

Taken together, the psychometric properties of the German version of the PEP Questionnaire were not fully convincing. Although the discriminative validity was good and the pattern of correlations with other variables mostly followed expectations, the factor loadings of some items were problematic. One explanation could be the translation process, but the problematic items were also unsatisfactory in the original version. In addition, problems with Item 1 may result from the fact that it does not inquire about processing after but during the situation. Furthermore, some important aspects of post-event processing as described by Clark and Wells (1995) were not included in the original version of the PEP Questionnaire (e.g., the retrieval of other instances of past failure).

Given these shortcomings of the German PEPQ, a careful refinement of the questionnaire in accordance with its theoretical underpinnings seemed obvious. Study 2 describes the refinement process and a further validation study.

**Study 2: Extended version of the PEP Questionnaire**

In order to improve the German version of the PEP Questionnaire, the following modifications were made:

1. Three items were eliminated. Item 1 (extent of anxiety during situation) was excluded because it does not provide information about processing after the event. Items 5 (degree to which the memory was welcome) and 9 (improvement of feelings with increased processing) were excluded because of their low factor loadings and discriminatory power.

2. Assuming that items 10 and 11 (asking for the memory perspective) were difficult to comprehend, we altered the wording according to Wells et al., (Wells, Clark, & Ahmad, 1998). Additionally, we changed the presentation of the item by placing the text on both sides of the scale. An advantage of this format is that the participants have to decide which memory perspective fits with his/her recollection rather than to rate the two perspectives independently.

3. On the basis of the Clark and Wells’ model (1995), we formulated eight new items for the PEP Questionnaire to reflect all aspects of post-event processing. Newly included aspects were the feeling of shame, thoughts about anxious feelings, remembering past failures, self-criticism, thinking about the event more than wanted, thoughts about bodily sensations, positive/negative self-view, and a predominantly positive or negative recollection of the event. For two of the new items, we applied the same answer format as we did for the memory perspective item. Thus, 19 items (ten original, one modified and eight new items) were used to measure post-event processing in Study 2 (see Table I for an overview of original and new items; the exact wording of the final measure is printed in the Appendix).

Our criteria to be tested included good psychometric properties of all items as well as a factor solution explaining an acceptable amount of the total variance. The correlation of PEP with social anxiety was expected to be significantly positive, independent of the level of depression.
Method

Participants

A total of 289 individuals were approached in a cafeteria of the Technical University of Dresden, of whom 281 (response rate 97.2%) agreed to take part in the study. Most of them were students belonging to different faculties (e.g., law school: \( n = 56 \); economics: \( n = 44 \); faculty of arts: \( n = 36 \)); three were postdoc students and six attended their last year of high school. The participants’ average age was 23 years (\( SD = 3.1 \), range: 17–38), 130 of them were male (46%). Since 13 participants could not recall a feared social situation during the past 6 months, they did not answer the PEP Questionnaire. Consequently, the final sample consisted of 268 participants.

Measures

Post-event processing was measured with the extended version of the German PEPQ containing 19 items. Again, the instruction was related to one specific social situation, which had to be written down at the beginning of the questionnaire. To enhance validity and objectivity, we presented 17 different social situations and instructed the participants to choose one. The selection of situations was geared to the list of situations presented in

<table>
<thead>
<tr>
<th>No.</th>
<th>Original items</th>
<th>M</th>
<th>SD</th>
<th>fact. load.</th>
<th>discrim. pow.</th>
<th>corr with FNE score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Thinking about event</td>
<td>53.8</td>
<td>30.1</td>
<td>.70</td>
<td>.61</td>
<td>.21**</td>
</tr>
<tr>
<td>2</td>
<td>Undesirability of thoughts</td>
<td>37.3</td>
<td>33.9</td>
<td>.78</td>
<td>.69</td>
<td>.21**</td>
</tr>
<tr>
<td>3</td>
<td>Interference with concentration</td>
<td>30.6</td>
<td>33.0</td>
<td>.75</td>
<td>.66</td>
<td>.26**</td>
</tr>
<tr>
<td>4</td>
<td>Difficulty to forget about event</td>
<td>38.0</td>
<td>33.6</td>
<td>.79</td>
<td>.70</td>
<td>.19*</td>
</tr>
<tr>
<td>5</td>
<td>Effort to resist thinking about event</td>
<td>27.1</td>
<td>32.8</td>
<td>.72</td>
<td>.63</td>
<td>.25**</td>
</tr>
<tr>
<td>6</td>
<td>Aggravation of event-related feelings</td>
<td>24.2</td>
<td>26.9</td>
<td>.62</td>
<td>.55</td>
<td>.25**</td>
</tr>
<tr>
<td>7a, ex</td>
<td>Memory perspective</td>
<td>58.0</td>
<td>27.2</td>
<td>.14</td>
<td>.12</td>
<td>.11</td>
</tr>
<tr>
<td>8</td>
<td>Thoughts about prevention of behavior/feelings</td>
<td>49.2</td>
<td>34.8</td>
<td>.51</td>
<td>.46</td>
<td>.19*</td>
</tr>
<tr>
<td>9</td>
<td>Wish to turn back the clock</td>
<td>49.4</td>
<td>37.9</td>
<td>.60</td>
<td>.52</td>
<td>.19*</td>
</tr>
<tr>
<td>10</td>
<td>Future avoidance of similar events</td>
<td>28.6</td>
<td>31.4</td>
<td>.44</td>
<td>.39</td>
<td>.15*</td>
</tr>
<tr>
<td>11</td>
<td>Aggravation of existing avoidance</td>
<td>27.7</td>
<td>30.6</td>
<td>.51</td>
<td>.46</td>
<td>.24**</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No.</th>
<th>Newly formulated items</th>
<th>M</th>
<th>SD</th>
<th>fact. load.</th>
<th>discrim. pow.</th>
<th>corr with FNE score</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>Emotion of shame</td>
<td>30.2</td>
<td>30.4</td>
<td>.63</td>
<td>.60</td>
<td>.32**</td>
</tr>
<tr>
<td>13</td>
<td>Thoughts about anxious feelings</td>
<td>39.6</td>
<td>30.8</td>
<td>.59</td>
<td>.54</td>
<td>.26**</td>
</tr>
<tr>
<td>14</td>
<td>Remembering past failures</td>
<td>52.0</td>
<td>31.4</td>
<td>.44</td>
<td>0.4</td>
<td>.30**</td>
</tr>
<tr>
<td>15</td>
<td>Self-criticism</td>
<td>52.5</td>
<td>34.3</td>
<td>.63</td>
<td>.59</td>
<td>.27**</td>
</tr>
<tr>
<td>16</td>
<td>Thinking about the event more than wanted</td>
<td>43.3</td>
<td>34.0</td>
<td>.78</td>
<td>.71</td>
<td>.28**</td>
</tr>
<tr>
<td>17</td>
<td>Thoughts about bodily sensations</td>
<td>33.4</td>
<td>33.3</td>
<td>.45</td>
<td>0.4</td>
<td>.20**</td>
</tr>
<tr>
<td>18</td>
<td>View of oneself positive/negative</td>
<td>35.9</td>
<td>30.8</td>
<td>.49</td>
<td>.45</td>
<td>.19**</td>
</tr>
<tr>
<td>19ex</td>
<td>Remembering predominantly positive/negative aspects</td>
<td>57.6</td>
<td>28.8</td>
<td>.38</td>
<td>.34</td>
<td>.19**</td>
</tr>
</tbody>
</table>

Note. fact.load.: factor loading; discrim. pow: discriminatory power; FNE: Fear of Negative Evaluation Scale; \(*p < .05; **p < .01.\)

*aanswer format modified.

*ex excluded in the final revised version.
the Social Phobia Diagnostic Questionnaire (Newman, Kachin, Zuellig, Constantino, & Cashman, 2003) and the social phobia section of the German Anxiety Disorders Interview Schedule (Margraf, Schneider, & Ehlers, 1991).

As in Study 1 (see above), the cognitive aspect of social anxiety was assessed by the FNE (Watson & Friend, 1969; German: Vormbrock & Neuser, 1983). General anxiety and depression were measured using the HADS (Zigmond & Snaith, 1983; German: Herrmann et al., 1995), and dysfunctional self-consciousness using the DFS (Hoyer, 2000). In Study 2, only the subscale Dysfunctional Self-Consciousness was used.

Results

In a first step, all items were analyzed with regard to item and scale statistics (see Table I).

Item means ranged between 27.1 and 58.0. The mean total score was 39.7 (SD = 20.2, range: 2.9–88.7). The distribution of mean scores did not significantly diverge from normal distribution. All items correlated significantly with social anxiety (FNE scores; see Table I, last column). Factor loadings ranged between .79 and .14, but only two items (Items 7 and 19) failed to pass the criterion of a factor loading > 0.4. Item 7 was also problematic with regard to its discriminatory power (.12). For all other items, the discriminatory power was acceptable and ranged between .34 (Item 19) and .70 (Item 4). Due to their problematic item statistics, Items 7 and 19 were dropped from the scale. For the remaining 17 items, all factor loadings exceeded 0.4 and their discriminatory power was above 0.4. Internal consistency (Cronbach’s $\alpha$) was .90; homogeneity (average item intercorrelation) reached .34.

Correlations

Post-event processing was found to be significantly positively correlated with social anxiety ($r = .37$, $p < .01$), general anxiety ($r = .34$, $p < .01$), depression ($r = .25$, $p < .01$), and dysfunctional self-consciousness ($r = .34$, $p < .01$). Partial correlations revealed a significant association between PEP and social anxiety ($r = .25$, $p < .01$) as well as between PEP and dysfunctional self-consciousness ($r = .13$, $p < .05$) when we entered all other variables as covariates. The relations between PEP and general anxiety as well as those between PEP and depression were not significant in partial correlations with all other variables as covariates ($p > .05$).

Comparison of means

A one-way analysis of variance was used to compare groups of different levels of social anxiety. High social anxiety was operationalized as lying at least one standard deviation above the mean on the FNE (PEPQ score: $n = 47$; $M = 52.5$, $SD = 18.1$) and low socially anxious as lying at least one standard deviation below the mean on the FNE ($n = 39$; PEPQ: $M = 27.7$, $SD = 20.4$). The remaining group was categorized as moderately socially anxious ($n = 182$; PEPQ: $M = 38.9$, $SD = 18.8$). An analysis of variance revealed significant differences between groups ($F(2, 265) = 18.7$, $p < .001$). Scheffé post hoc tests revealed that all pairwise comparisons of the group means were significant ($p < .05$; high vs. moderate anxiety: $d = .72$, moderate vs. low anxiety: $d = .57$).
Scale structure

A principal component analysis for the 17-item version revealed that 39.6% of the variance was explained by a one-factor solution. The Eigenvalues for the first five factors were as follows: 6.41, 1.86, 1.42, 1.11, and 0.72. Ten items had factor loadings above .60.

As the total amount of explained variance was still not very large, we explored further factor structures that might provide a better fit of the model. The course of Eigenvalues could also be interpreted in favor of a four-factor solution. To test whether this structure would be more appropriate, we randomly divided the total sample in a group of 100 and a group of 168 participants. The smaller group served a basis for an exploratory factor analysis with four factors as a preset. The factors were assumed to be not independent from each other, thus oblique rotation of the factors was allowed. The results showed clear factors loadings of all items on either one of the four factors. The factors could be named as “cognitive impairment” (factor 1, 7 items); “negative self” (factor 2, 4 items); “thoughts about past and future” (factor 3, 4 items); and “avoidance” (factor 4, 2 items).

Beyond this exploratory analysis, confirmatory factor analyses were performed to compare the two models within the bigger subsample \( (n = 168) \) using Mplus 3.12 (Muthén & Muthén, 1998-2000). Because of the sensitivity of the Chi-square test to sample size and the assumptions underlying the test, additional measures of model fit have been proposed in the literature (Hu & Bentler, 1999). Related to the Chi-square test, it has been suggested to adjust for the sample size by dividing the Chi-square to the degrees of freedom. A ratio smaller than 2 would indicate a good model fit (Tabachnik & Fidell, 2001, p. 748). Additionally, we used the Comparative-Fit-Index (CFI), the Tucker–Lewis-Index (TLI), and the Root-Mean-Squared-Error-of-Approximation (RMSEA). The CFI and the TLI compare the increment in the model fit compared with a null model that represents no associations among variables. Values higher than .95 indicate an adequate model fit. The RMSEA estimates the lack of fit in a model compared to a saturated model. An acceptable fit demands values smaller than 0.08; values of less than 0.05 indicate a good model fit (Hu & Bentler, 1999). Table II reports the fit indices for the compared factor models.

While the fit indices for the one-factor models were not satisfying, the fit indices for the four-factor models were all in the recommended range indicating a good fit of the model to the empirical data. Also the Chi-square difference test indicated a significant improvement from the one-factor models to the four-factor models \( (\Delta \chi^2 = 323.845, df = 6, p < .01) \). The standardized factor loadings for the one- and the four-factor models and the latent factor correlations are shown in Table III.

The four factors seem to reflect delimitable aspects of post-event processing. But it should be noted that there are substantial factor correlations, which suggest a super-ordinated general factor or construct.

For a summary of both studies, Table IV sums up statistical descriptors for the original version by Rachman and colleagues, the German version, and the extended German version.

| Table II. Fit indices for the one- and four-factor models. |
|-----------------|----------------|-----------------|
| \( \chi^2 \) | \( df \) | \( \chi^2/df \) | \( \Delta \chi^2 \) | CFI | TLI | RMSEA |
| one-factor model | 478.835** | 119 | 4.02 | 0.704 | 0.662 | 0.137 |
| four-factor model | 154.499** | 113 | 1.37 | 323.845 | 0.966 | 0.959 | 0.048 |

Note. CFI: Comparative-Fit-Index; TLI: Tucker–Lewis-Index, RMSEA: Root-Mean-Squared-Error-of-Approximation.
Discussion

In Study 2, we modified the German version of the PEPQ (Rachman et al., 2000) following methodological as well as theoretical considerations. Finally, this resulted in a 17-item version of the questionnaire. Internal consistency (coefficient $\alpha$) was high ($r_{\alpha} = .90$). Scores on the PEP Questionnaire correlated significantly with social anxiety, depression, dysfunctional self-awareness, and general anxiety, and PEP scores remained significantly related to social anxiety and dysfunctional self-awareness when controlling for general anxiety and depression. Individuals with high scores in social anxiety differed significantly from medium and low socially anxious participants in their mean scores of post-event processing. The single-factor structure as proposed by Rachman and colleagues does not optimally fit the data as indicated by a comparison of a one- and a four-factor solution. The four-factor solution provides four interpretable factors. However, given the high inter-correlations between factors, the use and interpretation of single factors seem not to be supported by our results.
In this article, we presented a refined measure for post-event processing after social situations based on the questionnaire proposed by Rachman et al., (2000). Our modified version comprised 17 items and had high internal consistency (Cronbach’s α .90). Evidence for construct validity was shown; namely, the refined PEPQ was significantly related to social anxiety also when we controlled for the effects of depression, general anxiety, and dysfunctional self-consciousness. Furthermore, PEP Questionnaire scores differentiated between high, medium, and low socially anxious individuals. When a one-factor model was applied, we received an amount of explained variance that was comparable to the original version by Rachman and colleagues but the actual portion of explained variance is rather low (about 40%). A four-factor model seems to fit much better and should be tested in further studies using bigger samples.

Based on a reliable and valid measurement of post-event processing, an ensuing step of research would be to delineate post-event processing from related constructs and processes. There are several possible target constructs, for example, dysfunctional self-consciousness, heightened self-awareness, rumination, worry, and action versus state orientation.

For example, in both our studies, post-event processing was significantly related to dysfunctional self-consciousness, independent of the influence of social anxiety. Based on a broad overview of the literature, Ingram (1990) proposes that heightened self-awareness plays a ubiquitous and non-specific role in psychopathology. Therefore, an important aspect of future research is to clarify the specificity of post-event processing within social phobia and anxiety after social situations.

Furthermore it remains open to what degree post-event processing as a specific cognitive process is predictable by distant personality variables such as, for example, state orientation (see, e.g., Hartung, 1995; Kuhl, 1992, 1994). State orientation may be related to post-event processing as they both describe states of continued rumination. Yet both constructs differ with respect to the time perspective implied, while state orientation includes pondering over alternative actions to be taken in the future, post-event processing is directed to past situations. State orientation has also been shown to be highly correlated with dysfunctional self-consciousness (Hoyer, 2000) and must therefore be expected to be an important predictor of post-event processing. Examining of the correlation and functional associations...
between both constructs (state orientation and post-event processing) seems to be an obvious recommendation for further research. Similarly, other authors (Field et al., 2004) have discussed the similarities and differences of post-event processing and rumination (Martin & Tesser, 1989, 1996). Again, it remains open if post-event processing has to be regarded as a specific variant of ruminative thinking or if it represents a distinguishable construct.

In sum, the revised PEPQ demonstrated improved psychometric properties which make its use in research recommendable. Further explorations and testings of the construct seem promising, not only with regard to an increasingly differentiated picture of the construct of post-event processing, but also with regard to the clinical applications within the model of social phobia and the treatment of social phobia.

References


**Appendix: Extended version of the PEPQ**

We would like you to remember one specific social situation, which has led to unreasonably strong or unrealistic anxiety or discomfort or in which you had a strong feeling of shame. Please let yourself be guided by the situations listed below. The situation should have been of personal relevance to you, and it should have happened during the past six months. If you remember more than one situation, please choose the one that was most relevant for you.

Examples:

- Talking in front of a group; O being at a party; O talking to authorities; O participating in group activities; O using public restrooms; O returning goods to a store; O beginning/maintaining a conversation; O expressing disapproval; O talking on the phone; O initiating a romantic relationship; O dating someone; O oral exams; O eating/drinking/writing in public; O talking on the phone with others listening; O giving a party; O formal and informal meetings; O being criticized

Please mark the situation you have chosen and remember to refer to this situation while answering the following questions.

1. After the event was over, did you think about it a lot?
2. Did your memories and thoughts about the event keep coming into your head even when you did not wish to think about it again?
3. Did the thoughts about the event interfere with your concentration?
4. Did you find it difficult to forget about the event?
5. Did you try to resist thinking about the event?
6. If you repeatedly thought about the event, did your feelings about the event worsen?
7. Have you ever wondered about whether you could have avoided or prevented your behavior/feelings during the event?
8. Have you ever wished that you could turn the clock back and do it again but better this time?
9. As a result of the event, are you now avoiding similar situations?
10. Did this event reinforce your pre-existing avoidance of similar situations?
11. Did you experience a sense of shame while remembering your behavior during the situation?
12. Did you think about anxious feelings that you had experienced during the event?
13. When remembering the situation did other instances of past failure that you had experienced in the same way come into your mind?
14. Did you criticize yourself for your behavior in the situation?
15. Did you think about the event more than you wanted to?
16. Did you think about bodily sensations you had experienced in the situation?
17. In my memories about the event, I saw myself (my behavior, my attributes) in a positive way—In my memories about the event, I saw myself (my behavior, my attributes) in a negative way.
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