Negative post-event processing and decreased self-appraisals of performance following social stress in childhood social anxiety: An experimental study

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ABSTRACT

Cognitive models of social phobia (SP) assume that following social evaluative stress, individuals with SP engage into dysfunctional post-event processing (PEP), a detailed negative review of the past event. While previous research has already shown, that children with high levels of social fears suffer from more frequent negative PEP, it remains unclear how stable PEP is across time in this age group and whether it leads to degraded self-appraisals of performance. Therefore in the present study we exposed a group of high (HSA) and low socially anxious children (LSA; both $n = 20$), aged 10–12 years, to a social evaluative situation and assessed negative and positive PEP as well as self-rated performance at 2.5 h and one week after the task. Our results revealed that HSA children reported more negative PEP than LSA children, independent of levels of depression. Moreover, negative PEP was related to measures of social anxiety and performance ratings within the tasks. Only the performance ratings in HSA children worsened over the course of the following week and were related to more negative PEP. Thus, these results speak for the high clinical relevance dysfunctional PEP may have for the maintenance of social fears already in childhood.

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Introduction

Social phobia (SP) refers to a persistent fear of humiliation by others, leading to the avoidance of social performance and social interaction situations (American Psychiatric Association, 1994). SP is one of the most common mental disorders in children and adolescents with prevalence rates up to 7% (Chavira, Stein, Bailey, & Stein, 2004) and a potential risk to normal social and emotional development when occurring young in age (Ollendick & Hirshfeld-Becker, 2002). SP in childhood often follows a chronic course and is frequently associated with other comorbid disorders such as depression and other anxiety disorders (Beidel, 1998). Despite its high clinical relevance, to date, no empirically validated aetiological model of childhood SP exists (Hodson, McManus, Clark, & Doll, 2008). Cognitive models of adult SP assume that social fears are maintained through a distorted cognitive processing of social information (Clark & Wells, 1995; Rapee & Heimberg, 1997). Beside

exaggerated negative self-beliefs, safety behaviors, and an attentional bias for negative social feedback, these models delineate that, following social situations, individuals with the diagnosis of SP engage into a detailed review ("post-mortem") of the past social situation (Clark & Wells, 1995). During this so called post-event processing (PEP), SPs focus on the negative aspects of the social situation (e.g. "How anxious did I look?"; "What part of my presentation was boring?") and re-experience negative feelings of anxiety. In their model, Clark and Wells (1995) assume a direct relationship between appraisal of one's own performance and subsequent PEP – the more negatively SPs evaluate their performance during a social task, the more frequent their PEP. Importantly, this negative PEP is thought to lead to degraded negative self-appraisals through the reinforcement of negative self-beliefs. Rachman, Grüter-Andrew, and Shafran (2000) argue that PEP is highly intrusive, interferes with the individuals' concentration and can be interpreted as the reoccurrence of self-focused dysfunctional attention as seen during social interactions, with comparable damaging effects on self-evaluation.

Numerous empirical studies have investigated PEP in both clinical and non-clinical samples of adults with high levels of social anxiety (for a detailed review, see Brozovich & Heimberg, 2008), and individuals with high levels of social fears are frequently

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reported to show more negative PEP but not less positive PEP[1] following social situations (Abbott & Rapee, 2004; Edwards, Rapee, & Franklin, 2003; Kocovski & Rector, 2007; Rachman et al., 2000).[1] Further, negative PEP is found to be stable up to four weeks, and seems to be associated with the retrieval of more negative social feedback, more negative autobiographical memories, and decreased self-evaluations over time (Cody & Teachman, 2010; Dannahy & Stopa, 2007; Morgan & Banerjee, 2008).

While there is substantial empirical evidence that cognitive models of SP apply to socially anxious adults (Clark & McManus, 2002), to date, their validity for socially anxious children is mostly unclear (Hodson et al., 2008). Several studies have found cognitive distortions in socially anxious children when compared to non-anxious controls (e.g. Cartwright-Hatton, Tschernitz, & Gomersall, 2005; Spence, Donovan, & Brechman-Toussaint, 1999; Tuschen-Caffier, Kühl, & Bender, 2011), but others have partially failed to do so (e.g. Alfano, Beidel, & Turner, 2006; Beidel, 1991; Bögels & Zigterman, 2000; In-Albon, Dubi, Rapee, & Schneider, 2009). In addition, the question of to which extent negative PEP may play a role in the maintenance of childhood social anxiety has not been fully answered yet.

One of the first studies that investigated PEP in a sample of children comes from Hodson et al. (2008). In their study, Hodson and colleagues assessed PEP using the Post-event Processing Questionnaire (PEPQ; Rachman et al., 2000) in a group of 11–14 year old school pupils, classified as either high, medium or low socially anxious. As expected by the authors, high socially anxious children reported more negative PEP following social stress than the two other groups. While these results support the relevance of PEP already in socially anxious children, the study suffers from several methodological shortcomings such as the lack of experimental control of the social situation, and the use of a measure that was developed for the assessment of PEP in adults.

Using a more experimental approach and a child friendly measure for PEP, we recently examined negative and positive PEP as well as self-rated performance 2.5 h after a social evaluative task in a sample of SP and control children, aged 8–12 years (Schmitz, Krämer, Blechert, & Tuschen-Caffier, 2010). As expected, the SP group reported more negative PEP in the aftermath of social stress than controls. Further, negative PEP was related to trait social anxiety and self-rated performance within the tasks, independent of comorbid depression. The latter aspect is important because a ruminative cognitive response style is commonly found in individuals suffering from depression (Thomsen, 2006). Contrary to research with adults, control children in our study reported more positive PEP than children in the SP group. Unexpectedly, performance ratings in SP children remained unaltered over the 2.5 h after the experimental session, presumably as a result of the short interval between social tasks and the follow-up rating.

While these two studies are important in demonstrating that children with social fears already suffer from negative post-event processing immediately after social stress, it is unclear how persistent negative PEP is over time in this age group, since PEP was either assessed on the same day social stress occurred, or the way the study was designed did not include assessment of the exact time frame. Related to this, it remains unexplored whether a longer persistence of negative PEP in anxious children may lead to

a decrease of self-rated performance in the aftermath of social stress, a central claim in the Clark and Wells' (1995) model.

Therefore, the aim of the current study was to replicate and extend the results of previous research by exposing a group of high socially anxious (HSA) and low socially anxious children (LSA; both $n = 20$), aged 10–12 years, to a social performance situation and to assess negative and positive PEP, as well as self-rated performance at 2.5 h and one week after the experimental session. According to current theory and previous research in adults and children with social anxiety, we hypothesized that: (1) Children of the HSA group would report higher levels of negative PEP and lower levels of positive PEP 2.5 h and 1 week after the experimental session, independent of levels of depression (Schmitz et al., 2010); (2) Performance ratings in HSA children would worsen over the course of one week and remain stable in LSA children (Dannahy & Stopa, 2007); (3) More frequent negative PEP would be associated with negative performance ratings obtained immediately after the social tasks, and higher trait social anxiety. More negative performance ratings one week after the experimental session are related to more frequent negative PEP (Abbott & Rapee, 2004; Dannahy & Stopa, 2007; Schmitz et al., 2010).

Method

Participants

A total of 108 families responded to four advertisements in local newspapers and 1200 information flyers in primary and secondary schools as well as psychological and medical treatment facilities offering €35 (US$41) for participation in a study on shy and non-shy children. After having received detailed written information about the aim and procedure of the study, and the Social Anxiety Scale for Children revised (SASC-R; La Greca & Stone, 1993), 73 of these 108 families mailed back the questionnaire and the informed consent form for participation. Out of these 73 families, a total of 40 children were assigned to either the HSA or LSA group ($n = 20$ each). This was done based on the cut-off scores on the SASC-R suggested by La Greca and Stone (1993): HSA: ≥54 for males, ≥50 for females; LSA: ≤40 for males and ≤36 for females (33 children were excluded, because they did not match the SASC-R cut-off scores). Exclusion criteria for all children included medical conditions that might affect the physiological systems investigated (e.g. asthma) or the use of medication that could alter physiological responses (e.g. methylphenidate). Furthermore, to limit other psychopathological influences (e.g. ADHD), children who were reported by their parents to have received a lifetime diagnosis of a mental disorder (e.g. through a medical practitioner) were excluded[2]. Participant characteristics can be found in Table 1. The current study was approved by the local ethics committee.

Psychometric and experimental measures

The child depression inventory (CDI; Kovacs, 1985)

The CDI assesses the cognitive, affective, and behavioral symptoms of depression in childhood. Total scores range from 0 to 52 with a recommended cut-off score at 19. Internal consistency and test-retest reliability estimates are acceptable and the CDI shows good discriminant and convergent validity (Carey, Faulstich, Gresham, Ruggiero, & Enyart, 1987). In the current sample, the CDI showed a good internal consistency ($\alpha = .800$).

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[1] Positive PEP in most studies is conceptualized as positive thoughts about the past social situation (e.g. "My speech was good"; "I was at my best" cf. Edwards et al., 2003). Please note that in some studies PEP is labeled "Post-event rumination". However both expressions refer to the same process, assessed through the same measures (e.g. Abbott & Rapee, 2004; Dannahy & Stopa, 2007).

[2] From the 108 families that responded to flyers and advertisements, 35 children were excluded due to the intake of medication, severe medical conditions or the report of a mental disorder.

Table 1
Participant characteristics.

	HSA $n = 20$	LSA $n = 20$	Statistics
Age	11.0 (.76)	11.1 (.83)	$t(38) = .39$, n.s.
% Female	60	45	$\chi^2(1) = .91$, n.s.
% Elementary school	15	15	$\chi^2(1) = .00$, n.s.
SASC-R	61.4 (7.64)	30.6 (8.75)	$t(38) = 11.84^{***}$
CDI	15.1 (8.92)	10.3 (12.4)	$t(38) = .69$, n.s.
CBCL	41.0 (20.2)	14.6 (8.56)	$t(38) = 5.39^{***}$
Externalizing	10.2 (8.39)	7.2 (5.96)	$t(38) = 1.28$, n.s.
Internalizing	18.1 (9.15)	4.1 (3.61)	$t(38) = 6.36^{***}$

CBCL = Child behavior checklist; CDI = Child depression inventory; HSA = High social anxiety group; LSA = Low social anxiety group; SASC-R = Social anxiety scale for children − revised.
*** $p < .01$.

The child behavior checklist (CBCL; Achenbach, 1991)

The CBCL is a parent-report measure for emotional and behavioral problems in children and adolescents. It includes various DSM-oriented syndromes and competence scales grouped into internalizing or externalizing scales. The CBCL has shown good levels of internal consistency, test-retest reliability and an acceptable convergent validity (e.g. Achenbach, 1991). Since we did not include a structured diagnostic interview for the assessment of mental disorders in children, the CBCL was used to measure levels of psychopathology within the sample. Both internalizing and externalizing scales showed excellent internal consistency ($\alpha = .922$, and $\alpha = .888$, respectively).

The social anxiety scale for children − revised (SASC-R; La Greca & Stone, 1993)

The SASC-R is a self-report measure, which assesses trait social anxiety symptoms in children (e.g. "I only talk to kids that I know really well") with total scores ranging from 18 to 90. The SASC-R has satisfactory test-retest reliability and internal consistency (La Greca, Kraslow Dandes, Wick, Shaw, & Stone, 1988). Children respond to each item using a 5-point Likert-type scale ranging from 1 (not at all) to 5 (all the time). The scale is moderately correlated with general measures of anxiety, self-perceptions of social confidence, teacher ratings of anxiety withdrawal, and peer nominations of popularity (Ginsburg, La Greca, & Silverman, 1998). Internal consistency in our sample was excellent ($\alpha = .928$).

The thoughts questionnaire for children (TQ-C; Schmitz et al., 2010)

The TQ-C is a child-appropriate measure of positive and negative PEP in the aftermath of a social performance situation ("After the end of the social situation, how often did you think…"). It consists of 16 items, 8 positive and 8 negative cognitions, referring to performance aspects (e.g. "I did well on the tasks"), cognitions regarding observers (e.g. "The observers didn't like me"), and cognitions referring to feelings experienced (e.g. "I felt anxious"). Children respond to all items on a 6-point Likert-scale ranging from "never" to "very often". The two subscales for negative and positive PEP have a maximum score of 48 each. Some minor changes were made to the original TQ-C to match with the content of the social performance tasks in this study. In the current sample Cronbach's alpha indicated excellent internal consistency for both the negative and the positive PEP scale ($\alpha = .922–.931$), and there was no significant correlation between the subscales (T1: $r = .010$; $p = .952$; T2: $r = −.033$; $p = .842$).

Performance questionnaire (PQ; Spence et al., 1999)

The PQ is a performance measure, on which children rate their own performance within a social situation. It contains four items (e.g. "Compared to other kids your age, how well did you recount the stories?") that are rated on a 5-point scale ranging from 1 (lowest) to 5 (highest). Some items were slightly changed from the original scale to match with the content of the social tasks in our study (e.g. "read aloud" was replaced by "recount the stories"). The PQ has a maximum score of 20 and showed excellent internal consistency in the larger sample ($\alpha = .901–.907$).

Procedure

After arriving at the laboratory, children were guided to the experimental room, seated in a comfortable armchair and were equipped with electrodes for psychophysiological assessment, the results of which will be presented elsewhere. In the upcoming two social performance tasks, children were instructed to recount two short stories (written by David H. Wilson and shortened by us: "Tim's birthday party", and "Monkeys and Lions") for 3 min in front of two unknown adult judges, sitting in the same room. Female and male undergraduate students in psychology served as judges. To increase the evaluative character of the task, the experimenter instructed children to perform better than other children at their age and advised them that other children would rate their performance based on a video of their performance (cf. Spence et al., 1999). Following each task, children rated their maximum level of anxiety (0 − *no anxiety* to 10 − *extreme anxiety*) in the last 3 min and evaluated their performance on the PQ (T0)[3]. Two and a half hours after the end of the experimental session (T1), the experimenter called the child's parent and asked that the child fill out the TQ-C, which assesses positive and negative PEP in the aftermath of a social situation, and the PQ. After one week (T2), children and their parents returned to the laboratory, again filled out the TQ-C and the PQ, and were then debriefed.

Statistical analyses

For all analyses PASW 18.0 statistics software was used. For testing Hypothesis 1, a 2 (Group: HSA, LSA) × 2 (Valence: Positive PEP, Negative PEP) × 2 (Time: T1, T2) ANOVA with repeated measures on the Time factor evaluated whether HSA and LSA children differed in their amount of negative and positive PEP 2.5 h and one week after the experimental session. To evaluate whether possible group differences in PEP were due to sub-threshold group differences in levels of depression, CDI scores were entered as a covariate. Further, since previous research suggests that negative PEP may be independently related to both social anxiety and depression (e.g. Schmitz et al., 2010), partial correlation analyses were used to evaluate the relationships between SASC-R scores, CDI scores and the amount of negative PEP. To test Hypothesis 2, a 2 (Group) × 3 (Time: T0, T1, T2) ANOVA with repeated measures on the Time factor (Greenhouse−Geisser adjustment) was used to assess the course of the PQ performance self-ratings over the following week in both groups. Therefore, the two PQ scores obtained after recounting the two stories (T0) were integrated into a mean score ($\alpha = .901$ among both measures). Finally, for Hypothesis 3 a correlation analysis evaluated the relationships between negative PEP, social anxiety, self-appraisals of performance (PQ scores), and age. Cohens' d is reported as effect size for significant t-tests, η^2 for significant ANOVAs. Level of significance for all analyses was set at alpha = .05.

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[3] During the two social performance tasks, a faked heart rate feedback was made audible to either the children alone or to the children and judges. In addition, we assessed subjective ratings of perceived bodily arousal and worry about the visibility of anxiety symptoms − results are presented in Schmitz, Blechert, Krämer, Asbrand, and Tuschen-Caffier, in press. Anxiety and performance ratings reported here were not influenced by the feedback manipulation ($ps > .361$).

Results

Demographics

HSA and LSA children were successfully matched on all demographic variables (Table 1). HSA children showed higher scores on the CBCL, and on the internalizing scale of the CBCL. There were no significant group differences between HSA and LSA children in CDI-depression scores or on the externalizing scale of the CBCL.

Manipulation check

Subjective anxiety ratings at baseline and during social stress (mean anxiety score for both tasks) were compared between HSA and LSA children using independent sample t-tests. There were no significant group differences on subjective anxiety during baseline (HSA: $M = 1.20$; $SD = 1.36$; LSA: $M = .70$; $SD = 1.03$), $t(38) = 1.32$, $p = .20$, but children of the HSA group experienced more anxiety during social stress when compared to LSA children (HSA: $M = 5.57$; $SD = 2.49$; LSA: $M = 2.85$; $SD = 2.53$), $t(38) = 3.42$, $p = .001$, $d = 1.08$.

Hypothesis 1. Children of the HSA group report higher levels of negative PEP and lower levels of positive PEP 2.5 h and 1 week after the social evaluative tasks, independent of levels of depression.

Fig. 1 shows negative and positive PEP for both groups 2.5 h and one week after the social tasks. The 2 (Group) $\times$ 2 (Valence) $\times$ 2 (Time) ANOVA with repeated measures on the Time factor showed a trend toward a significant main effect of Group, $F(1,38) = 3.62$, $p = .06$, $\eta^2 = .87$, but no significant main effects of Time or Valence, $ps > .14$. Further, there was a significant Group $\times$ Valence interaction, $F(1,38) = 12.7$, $p = .001$, $\eta^2 = .25$. All other interactions remained non-significant, $ps > .27$. To evaluate whether ANOVA effects were due to levels of depression within the sample, CDI scores were entered as a covariate, which, however, did not reach significance, $F(1,37) = 1.80$, $p = .18$, $\eta^2 = .05$, and all other effects from the initial ANOVA remained unaltered. Post-hoc independent sample t-tests revealed that HSA children reported higher levels of negative PEP than the LSA group 2.5 h, $t(38) = 3.96$, $p < .001$, $d = 1.20$, and one week after the social tasks, $t(38) = 3.68$, $p = .001$, $d = 1.17$. There were neither group differences in the amount of positive PEP between the groups after 2.5 h, $p = .496$, nor after one week, $p = .203$.

A partial correlation analyses showed significant correlations between SASC-R social anxiety and negative PEP at T1($r = .58$, $p < .001$) and T2 ($r = .52$, $p = .001$) while controlling for CDI-depression. Further, there was a borderline significant correlation between CDI-depression and negative PEP at T1 ($r = .31$, $p = .06$)

and a significant correlation at T2 ($r = .34$, $p = .04$), while controlling for levels of social anxiety.

In line with our first hypothesis, HSA children reported more negative PEP than children of the LSA group, which was independent from the time of the assessment. Further group differences were independent of levels of depression within the sample, and trait social anxiety and depression were both independently related to negative PEP. Unexpectedly, groups did not differ in their amount of positive PEP.

Hypothesis 2. Performance ratings in HSA children worsen over the course of one week and remain stable in LSA children.

Fig. 2 shows the course of PQ performance ratings over the week following the experimental session. The 2 (Group) $\times$ 3 (Time) ANOVA with repeated measures on the Time factor revealed significant main effects of Group, $F(1,38) = 7.49$, $p = .01$, $\eta^2 = .17$, indicating that HSA children rated their performance as generally worse than the LSA group. There was no main effect of Time, $F(2,76) = 1.39$, $p = .25$, $\eta^2 = .035$, but a trend toward a significant Group $\times$ Time interaction, $F(2,76) = 2.69$, $p = .08$, $\eta^2 = .07$. Post-hoc paired t-tests showed that performance ratings remained stable from immediately after the social tasks to 2.5 h in both groups, $ps > .266$. However, after one week there was a significant decrease in performance ratings from 2.5 h after the social tasks in HSA children, $t(19) = 2.37$, $p = .03$, $d = .26$, but not in LSA children, $t(19) = .71$, $p = .48$.

Thus, in line with our second hypothesis, performance ratings in HSA children decreased over the course of one week, while they remained stable in the LSA group.

Hypothesis 3. More frequent negative PEP is associated with negative performance ratings obtained immediately after the social tasks, and higher trait social anxiety. More negative performance ratings one week after the experimental session are related to more frequent negative PEP.

Table 2 shows the correlations of SASC-R social anxiety, age, negative PEP, and PQ performance ratings. As expected, negative PEP showed strong correlations with negative performance ratings during the social task, and SASC-R trait social anxiety. Further, there was a strong correlation between negative PEP and negative performance ratings at T2, indicating that the more negatively children ruminated after the end of the experimental session, the worse they appraised their performance one week later. There were no significant correlations between age and any of the other dependent variables.

An exploratory mediation analysis (cf. Baron & Kenny, 1986) evaluated whether negative PEP mediated the relationship
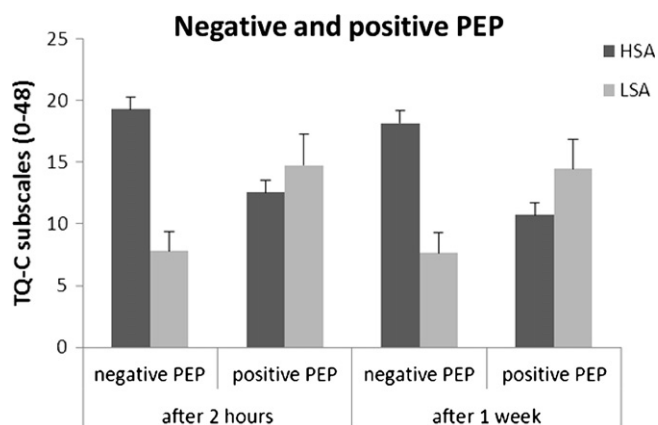

Fig. 1. Means and SEMs of negative and positive PEP in both groups at 2.5 h and one week after the experimental session.
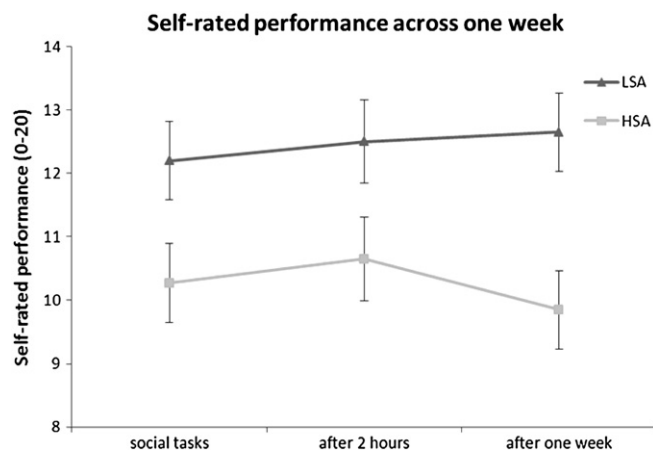

Fig. 2. Means and SEMs of self-rated performance across one week in the HSA and LSA group.

Table 2
Correlation analysis.

	SASC-R	Age	PQ_T0	PQ_T1	PQ_T2	NPEP_T1	NPEP_T2
SASC-R	—						
Age	.05	—					
PQ_T0	−.40*	−.06	—				
PQ_T1	−.42**	−.14	.87**	—			
PQ_T2	−.50**	−.03	.86**	.90**	—		
NPEP_T1	.58**	.09	−.63**	−.69**	−.63**	—	
NPEP_T2	.51**	.07	−.66**	−.71**	−.68**	.89**	—

PQ: Performance Questionnaire; SASC-R: Social Anxiety Scale for Children – revised; NPEP: Negative Post-event processing; T0: Immediately after the social tasks; T1: after 2.5 h; T3: after one week.
$^*p < .05$; $^{**}p < .001$.

between social anxiety within the tasks and negative performance ratings at T2. The predictor anxiety accounted for a significant amount of variation in the performance ratings ($r = −.53, p < .001$) and in the assumed mediator negative PEP ($r = .62, p < .001$). When the mediator was added to the first model, the relationship between anxiety and negative performance ratings no longer reached significance ($r = −.28, p = .09$) and significantly accounted for variation in the performance ratings ($r = −.68, p < .001$). Thus, negative PEP was a mediator for the relationship between subjective anxiety and negative performance ratings after one week.

Discussion

The aim of the current study was to replicate and extend previous research on PEP and its relation to self-rated performance in childhood social anxiety. In line with our hypotheses, we found that: (1) Children of the HSA group reported higher levels of negative PEP 2.5 h and 1 week after two social evaluative tasks, independent of levels of depression; (2) Self-rated performance in HSA children worsened over the course of one week but remained stable in LSA children; (3) More frequent negative PEP was associated with negative performance ratings obtained immediately after the social tasks and with higher trait social anxiety. More negative performance ratings one week after the experimental session were related to more frequent negative PEP. One surprising finding was that groups did not differ in the amount of positive PEP.

The result showing that HSA children engaged into more negative PEP following the social tasks after 2.5 h and one week is in keeping with both current theoretical models of SP (Clark & Wells, 1995; Rapee & Heimberg, 1997) and research on socially anxious adults and children (Abbott & Rapee, 2004; Dannahy & Stopa, 2007; Hodson et al., 2008; Schmitz et al., 2010). It is consistent with the idea that, following social stress, socially anxious individuals engage into a detailed review of the past situation with a focus on its negative aspects. Beside measures of trait social anxiety, negative PEP at 2.5 h and after one week was related to negative self-rated performance immediately obtained after the end of the social tasks, as proposed by Clark and Wells' (1995) model. So it seems that, the more negatively children appraised their own performance during the social performance tasks, the more frequent was their subsequent negative PEP.

Group differences in negative and positive PEP were independent of levels of depression within our sample, an important finding since rumination and repetitive thinking are commonly found to be strongly associated with depression (Thomsen, 2006). However, there was a significant correlation between PEP and CDI-depression after controlling for social anxiety, suggesting that negative PEP was not uniquely related to levels of social anxiety. From the existing adult and children literature to date, it remains unclear whether PEP may rather be a trans-diagnostic phenomenon generally associated with psychopathology (McEvoy, Mahoney, & Moulds, 2010; Rood, Roelofs, Bögels, & Alloy, 2010) or whether it is more a response style specific for social anxiety and social situations (Abbott & Rapee, 2004; Fehm, Schneider, & Hoyer, 2007; Kocovski & Rector, 2007). In our sample, the relationship between social anxiety and PEP was stronger than the relationship between depression and PEP suggesting that PEP in socially anxious children seems mostly to be influenced by social anxiety, but is also moderately influenced by depression (Schmitz et al., 2010). Future studies should further investigate which (situational) factors may contribute to the occurrence of negative PEP in children and assess the relation of PEP with other forms of repetitive negative thinking such as worry and emotion-focused rumination in samples of socially anxious children.

One surprising finding of our study was that children of the HSA group did not differ from LSA children in the amount of reported positive PEP. While this finding is consistent with studies on socially anxious adults (Abbott & Rapee, 2004; Dannahy & Stopa, 2007; Edwards et al., 2003), it contradicts our previous findings (Schmitz et al., 2010). In our former study, SP children reported more negative PEP, while HC children reported more positive PEP. A possible explanation for these differences could be that in the current study we did not assess PEP in children with clinically relevant but high social fears and subjective anxiety within the tasks was only moderate in HSA children. It may be conceivable that only childhood SP but not high social anxiety is characterized by both more negative and less positive cognitions, indicating a more severe/negative post-event processing. However one should note that in adults the pattern of negative and positive PEP seems not to be different between SP and high anxious samples (Abbott & Rapee, 2004; Dannahy & Stopa, 2007; Edwards et al., 2003). A second possible explanation could relate to developmental influences: In our former study we argued that our groups reported either all positive or all negative PEP, possibly as a result of younger children's inability to integrate emotions and cognitions of opposing valence (Alfano, Beidel, & Turner, 2002; Harter, 1986; Kendall & Chansky, 1991). Empirical research suggests that the ability to experience and report opposing emotions and cognitions develops at the age of 10–12 years (Caroll & Steward, 1984). Advances in cognitive development may explain why HSA children in our sample simultaneously reported both positive PEP and negative PEP, more than the younger children in our former study. It thus seems that the pattern of PEP becomes more adult like with increasing age and that negative and positive PEP are orthogonal dimensions in older children (Abbott & Rapee, 2004), further supported by the null correlations between negative and positive PEP in our sample. They are in keeping with Kendall and Chansky's (1991) finding that mental health in (older) children seems to be mainly characterized by less negative but not more positive cognitions, labeled as "the power of non-negative thinking".

In line with our second hypothesis and both Clark and Wells' assumptions and research on adults (Dannahy & Stopa, 2007), the performance ratings in SP children worsened from 2.5 h to one week after the experimental session, presumably because negative PEP in HSA children led to the review of negative aspects of the social tasks and the reinforcement of negative self-images, supported by a negative correlation between the frequency of negative PEP and self-rated performance after one week. Further, negative PEP mediated the relationship between state anxiety during the tasks and the negative performance ratings one week later. Importantly, our results extend our previous findings (Schmitz et al., 2010), by showing that negative PEP in children was stable across a longer time frame (i.e. the course of one week) and that children's self-appraisals worsen as negative PEP persists over time.

Thus, they underline the damaging effects negative PEP can have on self-evaluations children already have and may help to understand why social fears in socially anxious children persist despite repeated exposure to social situations in everyday life (Brozovich & Heimberg, 2008). Previous adult research has shown that negative PEP, beside a higher frequency of negative cognitions, is also highly intrusive and interfering with the persons' concentration, which may add to its' damaging effects (Rachman et al., 2000). As already implemented in treatment protocols for socially anxious adults (e.g. Hope, Turk, & Heimberg, 2006), child-appropriate cognitive interventions could be developed to address the negative effects of PEP on self-evaluations in socially anxious children, such as psycho-education about dysfunctional rumination and strategies to counteract post-event processing.

The present study has a number of limitations that must be considered. First, while our results address the persistence of PEP in socially anxious children across one week, they do not address when exactly PEP occurs and whether it is stable beyond a time frame of seven days. Multiple repeated measures over the course of several weeks, as in adult studies (Dannahy & Stopa, 2007; Laposa & Rector, 2011), may provide clarification here. Second, the sample in our study was rather small and we assessed children with high and low levels of social fears but without the diagnosis of SP. Another concern related to our sample could be that only certain families may have responded to our flyers (e.g. more families with a low socio-economic status due to monetary compensation for participation). Thus, future studies should investigate whether our results also hold for larger samples of SP children and could integrate additional measures to assess the characteristics of the participating families. Further, examination of PEP in children has so far focused mostly on PEP following social performance situations. However, social interactions with same-aged peers are common and strongly feared in the everyday life of socially anxious children (Beidel, 1991). Usually social interactions are less structured and contain more ambiguous social information than social performance situations (Alfano et al., 2006). Thus, they may leave more room for negatively biased interpretations and other cognitive processes that characterize social anxiety, including negative PEP.

Beside these limitations, we believe that our results add significantly to the current empirical literature on the cognitive bases of childhood anxiety, and emphasize that negative cognitive processing following social stress may play a key role for the understanding, maintenance, and treatment of social anxiety during childhood.

Acknowledgments

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