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They won’t like me

Using a social evaluative learning task to detect expectancy bias in socially anxious people and to investigate how they learn from social feedback and update impressions of judgers

Master Thesis Child & Adolescent Psychology

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Abstract

The current study aimed to investigate the presence of a negative social evaluative expectancy bias in socially anxious participants. Moreover, this study investigated how participants overall, but especially socially anxious participants, learn from (negative and positive) social feedback and update impressions of the peers that gave negative feedback. Twenty-one participants aged between 18 and 25 (M = 20.49, SD = 1.81) were included in this study. The level of social anxiety was measured with the Liebowitz Social Anxiety Scale (LSAS). Participants were administered the Social Evaluative Learning through Feedback (SELF-) profile paradigm. During this task, participants had to create their online profile, consisting of 60 self-statements. The participants were told that 4 peers evaluated their online profile, by giving a like or a dislike to each of the 60 self-statements. In the lab, participants had to predict for each of the 4 peers and for each of the 60 self-statements, if they thought the peer gave a like or dislike. Participants were unaware that the four peers differed in their probability of giving a like (i.e., 85%, 70%, 30%, 15%). Results showed that (1) participants did not show social evaluative expectancy bias, (2) participants learned who were the positive peers, but not who were the negative peers, (3) socially anxious participants learned worse from positive feedback than non-socially anxious individuals, but not better from negative feedback, (4) participants downgraded their opinion about the peer who evaluated them negatively, and this effect was not stronger in socially anxious participants. Not learning adequately from previous social situations can contribute to developing and maintaining social anxiety. The results of this study are important, since it helps us understand the processes related to this inadequate learning, which is needed to develop suitable prevention and intervention programs.

Keywords: expectancy bias, feedback-based learning, social anxiety

Introduction

Social anxiety is characterized by fear of one or more social or performance situations (APA, 2013). According to Rapee and Spence (2004), social anxiety lies on a continuum. The lowest end of this continuum indicates a total absence of social anxiety. Further, in the middle of the continuum, there is a strong fear to be negatively evaluated. At the high end intense social anxiety is present. The high end of the continuum can be associated with social anxiety disorder (Rapee & Spence, 2004). In people with social anxiety disorder, the fear of social or performance situations is excessive and irrational, which leads to avoidance of these situations (APA, 2013). Social anxiety disorder is common all over the world, but has the highest prevalence in Western countries (Stein et al., 2017). The comorbidity from social anxiety disorder with other mental disorders is high, mostly with other anxiety and mood disorders (Acarturk, Graaf, Straten, Have, & Cuijpers, 2008). Fear of negative evaluation is seen as an important hallmark for social anxiety. In several studies, measures of fear of negative evaluation are used as an indication of social anxiety (Rossignol, Campanella, Bissot, & Philippot, 2013; Vassilopoulos, 2006; Wieser, Pauli, Alpers, & Mühlberger, 2009).

Many studies have shown that anxious people hold negative expectations about the future (e.g., Cabeleira et al., 2014; Miranda & Mennin, 2007; Steinman et al., 2013). This expectancy bias has also been found in studies on social anxiety in particular, whereby socially anxious individuals report negative expectations about future social situations; for example, they expect a negative evaluation from others (Cao, Gu, Bi, Zhu, & Wu, 2015; Chansky & Kendall, 1997; Gilboa-Schechtman, Franklin, & Foa, 2000; Smith & Sarason, 1975; Spence et al., 1999). In the study of Caoutte et al. (2015), for example, participants were asked to rate how much they expected that unknown peers would like to chat with them. Socially anxious participants had a greater expectancy that the peers would evaluate them in a negative way and for that reason would not like to chat with them (Caouette et al., 2015).

In addition to this negative social evaluative expectancy bias, a host of studies have indicated that socially anxious people show an attention bias. Individuals with a specific anxiety exhibit biased attention towards the stimuli that they fear (Aue & Okon-Singer, 2015), which means that socially anxious people show an attention bias towards negative or threatening social information, like negative feedback (e.g., Becker, Rinck, Margraf, & Roth, 2001; Mogg, Philippot, Bradley, 2004; Pishyar, Harris, & Menzies, 2004; Rapee & Heimberg, 1997; Veljaca & Rapee, 1998). When detecting attention biases in socially anxious individuals, paradigms such as the Emotional Stroop task or the Dot Probe task are often used (Becker et al., 2001; Pishyar et al., 2004). But, also performance tasks are sometimes used to detect attention bias. In the Veljaca and Rapee (1998) study, for example, participants had to give a speech and were asked to detect the reactions of the audience. Socially anxious people detected significantly more negative audience reactions and significantly fewer positive ones compared to low socially anxious people.

Studies revealed that there is an association between expectancy and attention bias (Aue & Okon-Singer, 2015). An explanation for this association can be that prior expectations, as well as representations of these expectations in memory, determine the focus of attention. So, people with certain expectations, are focused on information that matches with these expectations (Aue & Okon-Singer, 2015). In the case of socially anxious individuals, this would mean that their negative expectations lead them to focus on negative information that confirms their expectations. In short, this theory states that expectancy bias precedes attention bias (Aue & Okon-Singer, 2015).

Socially anxious people do not only show expectancy and attention biases towards negative social feedback, they also seem to learn poorly from social feedback (Koban et al., 2017). For example, in the study of Koban et al. (2017), participants had to give a speech, after which they received both positive and negative feedback from a jury. They found that socially

anxious individuals were more influenced by negative than positive feedback; they negatively updated their feelings about their performance and the self after the feedback. Healthy participants showed the exact opposite; they were more influenced by positive feedback and updated their feelings positively (Koban et al., 2017). To explain this negatively biased learning about the self from social feedback in socially anxious individuals, a link with attention bias was made by Koban et al. (2017). They suggested that socially anxious individuals better remembered and learned from negative social feedback, because they were more focused on this information. However, the study did not test the presence of attention bias and its relation to the learning process (Koban et al., 2017).

Although Koban et al. (2017) did examine how socially anxious people update feelings about the self after being evaluated, no research is done on how socially anxious people update feelings about the people who evaluated them. Research on this topic is important, since it provides more information on how socially anxious people process and integrate social feedback, and react to it. A study on healthy participants is done, however, in which participants received social feedback from unknown peers. Participants had to indicate, with a likeability score, how much they liked each peer. They had to do this before and after the task (Rodman, Powers, & Somerville, 2017). Rodman et al. (2017) showed that young adults updated impressions of peers based on whether that peer accepted or rejected them.

This study aimed to gain more information about how socially anxious individuals learn from social feedback. Learning from social feedback is tracked by using a social evaluative probabilistic learning task: the Social Evaluative Learning through Feedback (SELF-) profile paradigm. The SELF-profile paradigm was developed to examine how individuals update (via feedback-based learning) their expectancies about peers that differ regarding the probability of giving the participant positive or negative social feedback. Participants were asked to create an own profile with a photo and 60 statements about the self. Also, participants looked at such

profiles of unknown peers, also containing a photo and self-statements, and chose 4 peers they liked the most. Unknown by the participant, these profiles of peers were generated by the computer. Participants were told that these peers evaluated their own profile, by giving a like or dislike for each self-statement. Participants had to predict, on a trial-to-trial basis, for each of the 4 peers and for each of the 60 self-statements, if they thought the peer gave a like or dislike. In total there were 240 trials (60 self-statements x 4 peers), split into two blocks (120 trials per block). Participants were unaware that the four peers differed in their probability of giving acceptance feedback (i.e., 85%, 70%, 30%, 15%). Participants got to learn these probabilities throughout the task. Moreover, this study aimed to investigate how socially anxious individuals update impressions of others after being evaluated by them. To do this, the participants were asked to rate how much they liked each of the 4 peers (i.e., 'likeability'), prior to and after the SELF-profile paradigm. Lastly, this study aimed to investigate whether negative social evaluative expectancy bias was present in socially anxious individuals; participants were asked to estimate the amount of likes they expected to receive prior to the SELF-profile paradigm.

Taken together, this study was focused on looking how socially anxious people update expectations about future social feedback based on received social feedback. This study was also focused on checking whether negative social evaluative expectancy bias is present in socially anxious people and on looking at how socially anxious people update impressions of others after being evaluated by them. It is important to learn as much as possible about the biases and processes associated with social anxiety, since they have a major impact on developing and maintaining social anxiety, which in turn has a major impact on the functioning and wellbeing (APA, 2013; Koban et al., 2017; Ran et al., 2018). As much information as possible is needed to develop the most suitable prevention and intervention programs.

The following three hypotheses were formulated in this study. Firstly, based on previous studies, which found that socially anxious individuals show a negative social evaluative expectancy bias and so expect negative evaluation from others (Cao et al., 2015; Caoutte et al., 2015; Chansky & Kendall, 1997; Gilboa-Schechtman et al., 2000; Smith & Sarason, 1975; Spence et al., 1999), it was hypothesized that socially anxious participants would display a negative expectancy bias regarding the social evaluation from the unknown peers prior to the learning task. That is, a significant negative correlation was expected to be found between social acceptance predictions and social anxiety. Secondly, based on the study of Will, Rutledge, Moutoussis and Dolan (2017), who also used a social evaluation task to track learning and found that the participants learned the probabilities of receiving positive feedback for the four groups, it was expected that the participants would learn who were the positive peers and who were the negative peers. However, based on previous studies, indicating that participants with higher levels of social anxiety display an attention bias towards negative social evaluative cues (Aue & Okon-Singer, 2015; Becker et al., 2001; Mogg et al., 2004; Pishyar et al., 2004; Rapee & Heimberg, 1997; Veljaca & Rapee, 1998), it was predicted that socially anxious participants would be more focused on the negative feedback they receive during the SELF-profile paradigm, and therefore would learn better that peer 4 is the negative peer and worse that peer 1 is the positive peer. Thirdly, based on the study of Rodman et al. (2017), that stated that young adults update impressions of peers based on whether that peer accepted or rejected them, it was expected that the opinions about the peers (likeability) would be negatively influenced by social rejection feedback in all participants. However, based on the fact that socially anxious individuals are more sensitive to rejection (Khdour et al., 2016; Yoon, Yang, Chong, & Oh, 2014), it was hypothesized that the opinions of participants with higher levels of social anxiety would be more influenced. Thus, likeability of the most negative peer (peer 4, 15% positive

feedback) was expected to be significantly reduced after the task, and this effect was expected to be larger for participants with high levels of social anxiety.

Method

Participants

A total of 126 people were recruited for this study, who completed the Social Anxiety Scale for Adolescents (LSAS; La Greca & Lopez, 1998) and were checked for the exclusion criteria. The people were recruited in the proximity of Leiden University, by advertisements and distribution of flyers. People were excluded if they were not aged between 18 and 25 years and if they had (history of) any psychiatric disorder, including social anxiety disorder and depression. They were also excluded if they had history of head trauma or if they used medication that possibly influence cognitive performance. A total of 92 people met the inclusion criteria and were invited to the testing days. Not everyone responded to the invitation and there were also people with whom an appointment was scheduled, but which had to be cancelled due to the corona crisis. Therefore, this study ultimately had 22 participants from Leiden University, but because one participant did not believe the cover story, data from 21 participants (19 female, mean age = 20.49; SD = 1.81) were used. All participants identified themselves as cisgender. Participants had to sign informed consent and received course credits and/or money for participation. The protocol of this study has been approved by the local Ethics Committee of the Institute of Psychology.

Measures

Social anxiety. To determine the level of social anxiety, the Liebowitz Social Anxiety Scale (LSAS; Liebowitz, 1987) was administered. This self-report questionnaire consists of 24 items, of which 11 are about social situations and 13 about performance situations. For each item, participants have to rate on a 4-points scale how much they fear (0 = not at all, 3 = sever) and avoid (0 = never, 3 = always) the situation normally. The item score is calculated by adding up the fear and avoidance score. Two subscales can be derived from the items: Performance Anxiety from the 13 items about performance situations and Social Situations from the 11 items

about social situations. The score on the subscale Performance Anxiety ranges from 0 to 78 and the score on the subscale Social Situations ranges from 0 to 66. This means that the total score can be in between 0 to 144; the higher the score, the higher the social anxiety. Scores below 30 mean low social anxiety and scores between 60 and 90 mean high social anxiety. When a score above 90 is reached, it is considered likely that that person suffers from social anxiety disorder (Liebowitz, 1987). Several studies indicated high internal consistency for the total score and high convergent validity (Baker, Heinrichs, Kim, & Hofmann, 2002; Heimberg et al., 1999).

SELF-profile paradigm. A couple of weeks prior to the SELF-profile paradigm (SPP), participants were asked, by using a cover story, to create their own online profile. The profile consisted of a profile photo that they uploaded and 60 self-statements. The self-statements were a result of answering 60 multiple choice questions, whereby participants had to select the statement that characterizes themselves the most. Prior to creating an own online profile, participants viewed the profile of peers of the same sex, that were constructed in the same way. Participants were told that these peers also participated in this study. First, participants only saw the profile pictures of 24 peers and they had to rate the profile photos, on a VAS scale, on whether they believed they could be friends with them and on likeability. Thereafter, the profiles of the 12 peers they found the most attractive and likeable were shown. These profiles only consisted of a set of self-statements, so the participants did not know which profile-picture belonged to which content-profile. After looking at these 12 content-profiles, participants had to choose four peers they liked the most. Participants were told that this selection was done in two steps to keep appearance and personal content impressions separate. In fact, the profile photos and content-profiles were not created by real peers but by the investigator. This was done to make sure that to all participants the same profile pictures and content-profiles were presented. Also, four profile photos that the participant could be friends with and found likeable were chosen by the investigator and used during the testing day for the SELF profile task. The

participants were told that these were the four peers they liked the most based on the content-profiles.

When starting with the SPP, the online profile the participants created of themselves was shown to them again. See Figure 1 for an example. For each of the 60 self-statements on their profile, participants had to indicate, on a VAS scale, to what extent the self-statement describes themselves. After doing this, the profile photos of the four peers they allegedly chose one to two weeks earlier were shown. Participants were told that these four peers evaluated their profile, by giving a like or dislike to each of the 60 self-statements of the participant. Participants did not know that this feedback actually was generated by a computer and that the four peers differed in their probability of giving a like (i.e., 85%, 70%, 30%, 15%). Participants had to predict, on a trial-to-trial basis, for each of the four peers and for each of the 60 self-statements, if they thought the peer liked of disliked the participant for this self-statement. In total there were 240 trials (60 self-statements x 4 peers), split into two blocks (120 trials per block). Between the two blocks, participants got a 10-minute break.

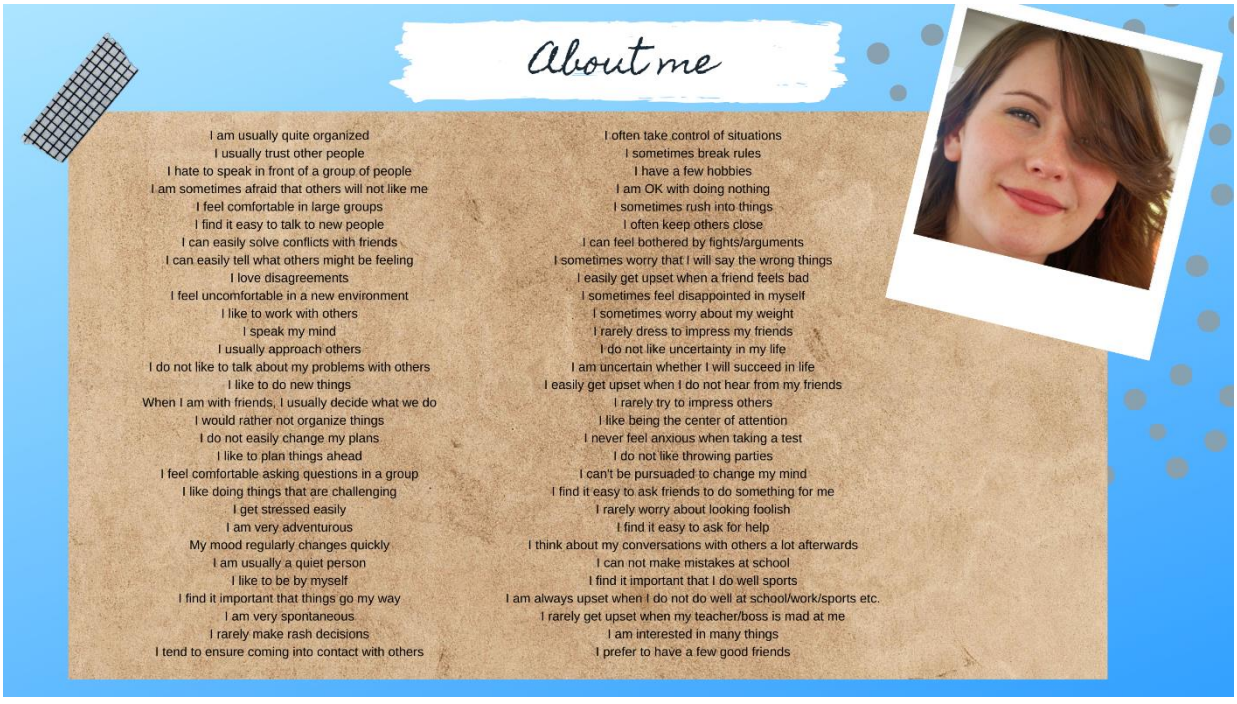

Figure 1. An example of a participant's online profile

At the start of each trial, a self-statement was shown for 2000 ms. After this, the picture of one of the four peers was shown, and participants got 3000 ms to indicate whether they thought the peer gave a like or dislike for the self-statement. When the participant pressed the key for expecting a like, a green line appeared around the photo of the peer for another 3000 ms. When the participant pressed the key for expecting a dislike, a red line appeared. After this, the participant received the actual feedback. In the place of the photo of the peer, a thumb's up appeared for 2000 ms if a like was given, or a thumb down if a dislike was given. Between trials, a fixation point is shown on the screen for between 500 and 1500 ms. See Figure 2 for a schematic of a single trial. Before and after the trials, participants were asked to indicate, on a VAS scale, how many likes they expected to receive/have received from each peer and in total, and to indicate how likeable they found each peer and to what extent they believed they could be friends with them, and how accepted/rejected they felt by them (only after the task).

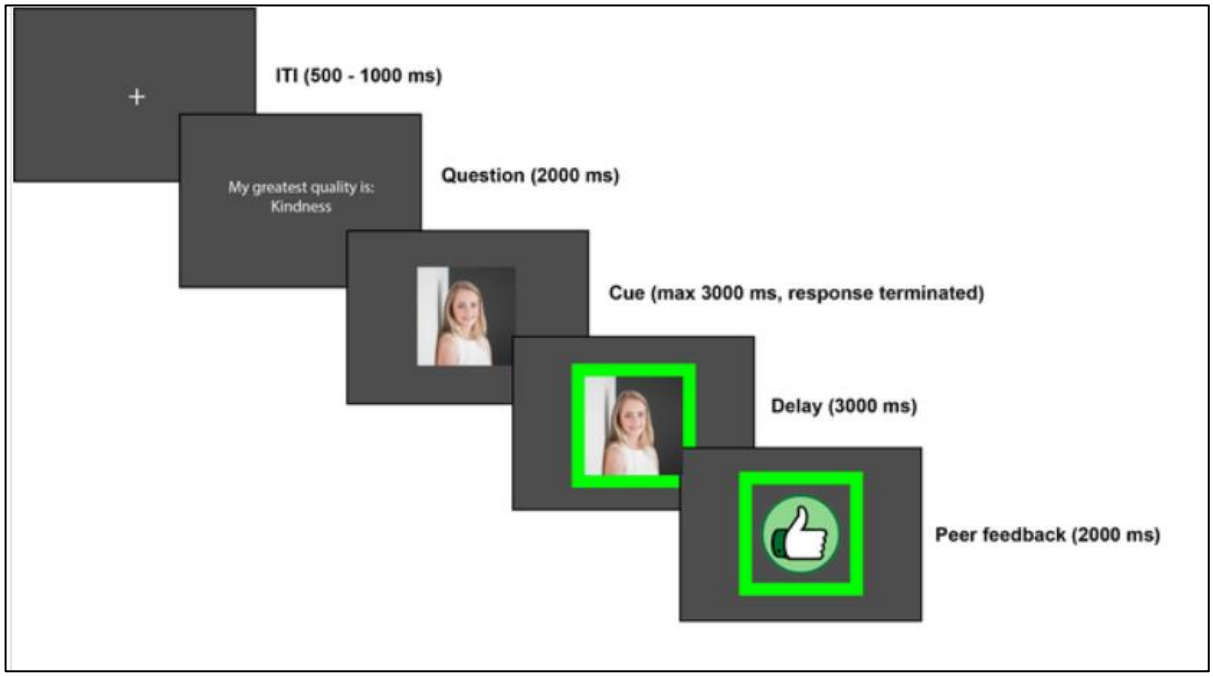

Figure 2. An example of a single trial of the SELF Profile paradigm

Procedure

First, participants filled in the LSAS and were screened for the exclusion criteria. After that, a first testing day took place, of which data were not used in this study. At the end of the first testing day, participants were asked to create their own profile and chose four peers, which was needed for de SPP as explained before.

At the start of the second testing day, participants were asked to fill in some extra questionnaires[1] that were not used for this study. Then, participants got a refreshment break and EEG and ECG recordings were prepared for the SPP, but of which data were not used in this study. After this, participants started with the SPP. After the SPP, participants had to do another task. Only data of the SPP were used in this study. At the end of the testing day, a debriefing took place, whereby the cover story was revealed and the true purpose of the study was explained.

Statistical approach

Data were checked for meeting the assumptions before the statistical analyses were performed. All analyses were performed in IBM SPSS Statistics 23 (IBM, Armonk, NY, USA). Alpha was set at 0.05 for significance testing. Effect sizes were reported as partial eta squared (η_p^2).

First, we hypothesized that a negative social evaluative expectancy bias was present in socially anxious individuals. To test the hypothesis, a correlation analysis was performed between social anxiety level (LSAS score) and the total expected amount of positive feedback (VAS percent score) collected before the SPP task. A negative, significant correlation was expected to be found.

[1] Parental Bonding Instrument (PBI), Experiences in Close Relationships Questionnaire-Revised (ECR-R), Cognitive Emotion Regulation Questionnaire, (CERQ), Sensitivity to Punishment and Reward Questionnaire (SPSRQ), Almost Perfect Scale Revised (APS-R), Multidimensional Offline and Online Peer Victimization Scale (MOOPV) and the modified Kendler Social Support Inventory (MKSSI).

Second, we hypothesized that socially anxious individuals would learn better that peer 4 is the negative peer and worse that peer 1 is the positive peer. Before testing this hypothesis, it was investigated whether an overall social learning effect occurred during the SPP, by checking if the participants learned that peer 1 and 2 were positive peers and that peer 3 and 4 were negative peers. A baseline of 55% was taken to assume learning, which meant that participants learned that peer 1 and 2 were positive peers if they expected positive feedback on significantly more than 55% of the trials from these peers during the task. They learned that peer 3 and 4 were the negative peers if they expected negative feedback on significantly more than 55% of the trials from these peers. Four one sample *t*-tests were performed between the baseline of 55% and the on-task expected positive feedback from peer 1 and 2, and the on-task expected negative feedback from peer 3 and 4. All four *t*-tests were corrected for multiple comparisons (Bonferroni). Significant, positive effects were expected to be found. Subsequently, the hypothesis was tested that socially anxious individuals would learn better that peer 4 is the negative peer and worse that peer 1 is the positive peer. First, a difference score was calculated between the on-task expected amount of negative feedback from peer 4 and the baseline of 55%. Thereafter, a correlation analysis was performed between social anxiety level (LSAS score) and the difference score. A positive, significant correlation was expected to be found. Also, a difference score was calculated between the on-task expected amount of positive feedback from peer 1 and the baseline of 55%. A correlation analysis was performed between social anxiety level (LSAS score) and the difference score. A negative, significant correlation was expected to be found.

Third, we hypothesized that the opinions (likeability) about the most negative peer were negatively influenced by social rejection feedback in all participants, and that this effect was stronger in socially anxious individuals. To test whether all participants were influenced by negative social feedback, a paired sample *t*-test was done with the likeability (VAS percent)

scores of the most negative peer (peer 4) prior and after the task as variables. A significant reduction of the likeability scores was expected to be found. Subsequently, to check whether socially anxious individuals were more influenced by negative social feedback, a difference score was calculated first. This score was calculated by subtracting the likeability score of the most negative peer (peer 4) prior to the SELF-task from the likeability score after the task, so that a lower score reflects a greater reduction of likeability. After this, a correlation analysis was performed between social anxiety level (LSAS score) and the difference score. A negative, significant correlation was expected to be found.

Results

Descriptive statistics

See Table 1 for participant characteristics, as well as scores on the LSAS and behavioural data from the SPP. See Figure 3 for pre-vs-post task likeability data for all peers.

Table 1.

Participant characteristics, scores on the LSAS and behavioural data from the SPP, N = 21

	M (SD)	Range
Participant characteristics		
Sex		F: 19 M: 2
Age	20.49 (1.81)	18 – 25
Social anxiety (LSAS score)	33.76 (16.62)	11 – 73
Behavioural data (SPP)		
Pre-task expected positive feedback (%)	59.19 (9.49)	33 – 76

Abbreviations: LSAS = Liebowitz Social Anxiety Scale; SPP = SELF-profile paradigm

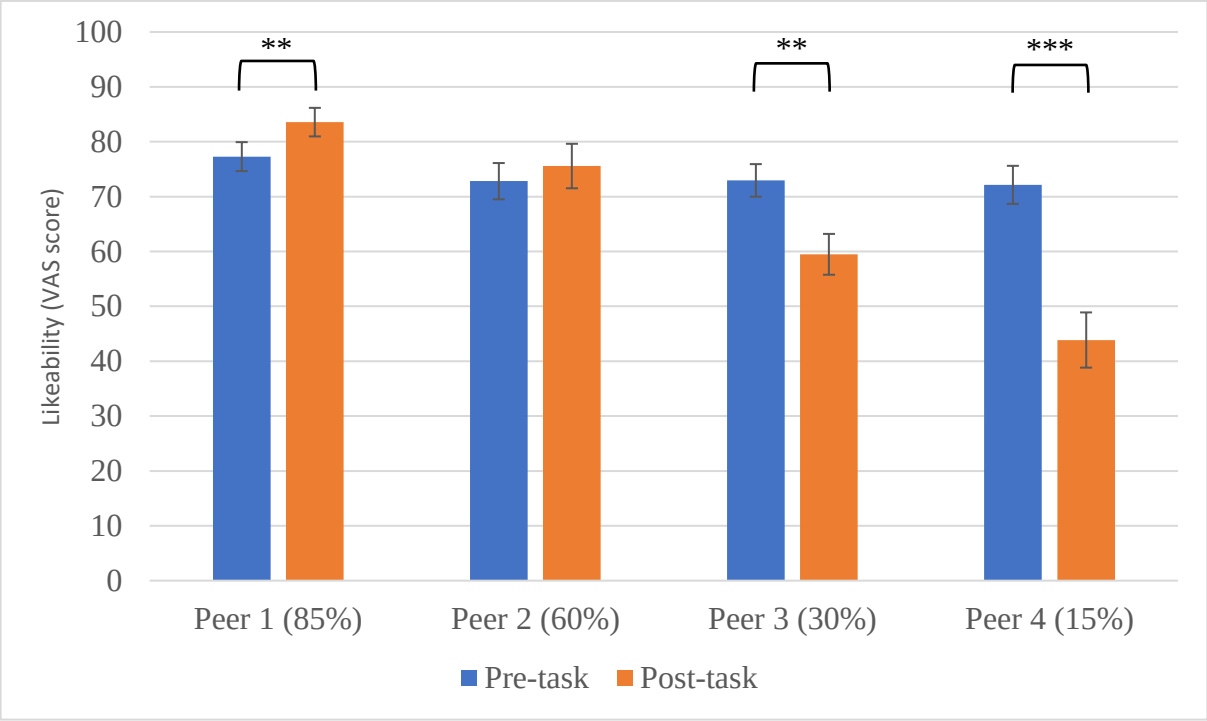

Figure 3. Pre-vs-post task likeability data for all peers

Note. * = p <.05 ** p <.01 *** p < .001

Statistical analyses

Negative social evaluative expectancy bias. To test whether a negative social evaluative expectancy bias was present in socially anxious individuals, a correlation analysis was performed between social anxiety level (LSAS score) and the total expected amount of positive feedback (VAS percent score) collected before the SPP task. When checking the assumptions, the Shapiro-Wilk test of normality made clear that the total expected amount of positive feedback was not normally distributed, $W(21) = .903$, $p = .039$. For this reason, the Spearman correlation was used. Results showed a non-significant, negative correlation between social anxiety level and expected amount of positive feedback before the SPP task, $r(20) = -0.050$, $p = 0.829$. Based on these results, it can be stated that socially anxious participants did not show negative social evaluative expectancy bias prior to the task.

Social learning effect. To test the presence of a learning effect during the SPP, 4 one sample *t*-tests were performed between the baseline of 55% and the on-task expected positive feedback from peer 1 and 2, and the on-task expected negative feedback from peer 3 and 4. As shown in Table 2, participants expected positive feedback from peer 1 and 2 on significantly more than 55% of the trials, meaning that they learned that peer 1 and 2 were positive peers. Also, a significant difference between the baseline of 55% and the on-task expected negative feedback from peer 3 was found. However, this was a negative effect, meaning that participants expected negative feedback from peer 3 on significantly less than 55% of the trials, and so they did not learn that peer 3 was a negative peer. No significant difference was found between the baseline of 55% and the on-task expected negative feedback from peer 4, meaning that participants also did not learn that peer 4 was a negative peer. In summary, participants learned that peer 1 and 2 were positive peers, but they did not learn that peer 3 and 4 were negative peers. See Figure 4.A. for a visual representation of the learning during the task.

Table 2.

Results of one-sample *t*-tests, comparison value = 55%

	M	SD	df	t	p
On-task expected positive feedback from peer 1	73.99	10.81	20	8.06	.000*
On-task expected positive feedback from peer 2	65.47	16.03	20	2.99	.007*
On-task expected negative feedback from peer 3	44.33	14.53	20	-3.37	.003*
On-task expected negative feedback from peer 4	47.74	16.41	20	-2.03	.056

Note. * = significant effect after Bonferroni correction: Alpha / 4.

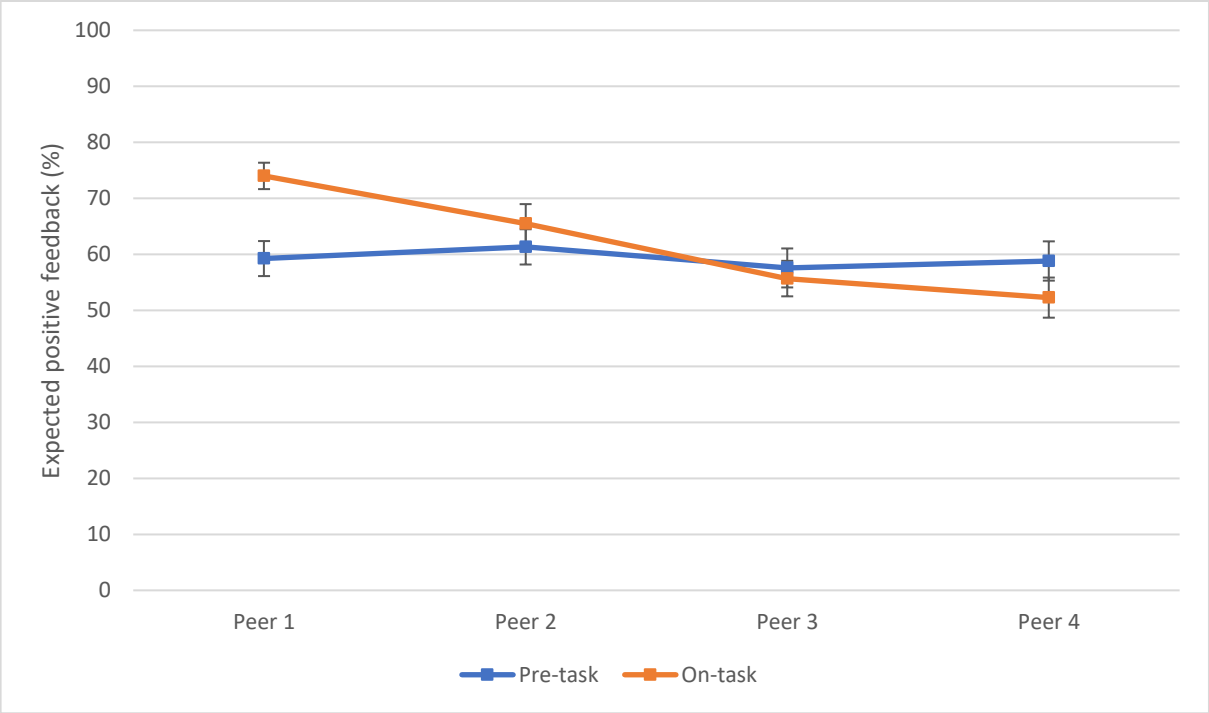

Figure 4.A. Pre-task and on-task expected positive feedback for all peers

Exploratively, we examined whether there was a difference in learning between the two blocks. 8 one sample *t*-tests were performed between the baseline of 55% and the block 1 and block 2 expected positive feedback from peer 1 and 2, and the block 1 and block 2 expected negative feedback from peer 3 and 4. Results are shown in Table 3. In block 1, participants already expected positive feedback from peer 1 on significantly more than 55% of the trials, meaning that they already learned that peer 1 was a positive peer in block 1. Participants

expected positive feedback from peer 2 on significantly more than 55% of the trials in block 2, but not yet in block 1. Participants have not learned that peer 3 and 4 were negative peers, neither in block 1 nor in block 2. They even expected negative feedback on less than 55% of the trials from these peers, both in block 1 and 2.

Table 3.

Results of one-sample *t*-tests separate for the two blocks, comparison value = 55%

	M	SD	df	*t*	*p*
Block 1 positive feedback from peer 1	70.99	12.46	20	5.88	.000**
Block 1 positive feedback from peer 2	60.38	16.59	20	1.49	.153
Block 1 negative feedback from peer 3	40.51	17.26	20	-3.85	.001**
Block 1 negative feedback from peer 4	41.86	13.76	20	-4.38	.000**
Block 2 positive feedback from peer 1	76.99	12.49	20	8.06	.000**
Block 2 positive feedback from peer 2	70.59	18.73	20	3.81	.001**
Block 2 negative feedback from peer 3	48.17	13.69	20	-2.28	.033*
Block 2 negative feedback from peer 4	53.61	22.29	20	-.29	.778

Note. * = significant effect without Bonferroni correction ** = significant effect after Bonferroni correction: Alpha / 8.

Additional exploratory research is done to check whether there was a difference between the two blocks in the expected positive feedback from each peer. A RM ANOVA with on-task positive feedback predictions was performed with two within-subject factors: Block (2 levels: block 1, block 2) and Peer (4 levels: peer 1, peer 2, peer 3, peer 4). Results showed no significant main effect of Block, $F(1, 20) = .242$, $p = .628$, $\eta_p^2 = .012$. A significant main effect of Peer was found, $F(3, 60) = 12.475$, $p < .001$, $\eta_p^2 = .38$, as well was a significant interaction effect between Block and Peer, $F(3, 60) = 12.281$, $p < .001$, $\eta_p^2 = .380$. Follow-up paired samples *t*-tests showed that participants expected significantly more positive feedback from peer 1 in block 2 than in block 1, $t(20) = 2.211$, $p = .039$. This was also found for peer 2, $t(20) = 3.087$, $p = 0.006$. In block 2, participants expected significantly less positive feedback from peer 3

than in block 1, $t(20) = -3.092$, $p = 0.006$. The same effect was found for peer 3, $t(20) = -3.211$, $p = 0.004$. So, although participants did not really learn that 3 and 4 were the negative peers, there was a significant reduction in expected positive feedback from this peers. See Figure 4.B. for a visual representation of the learning during the task, split into the 2 blocks.

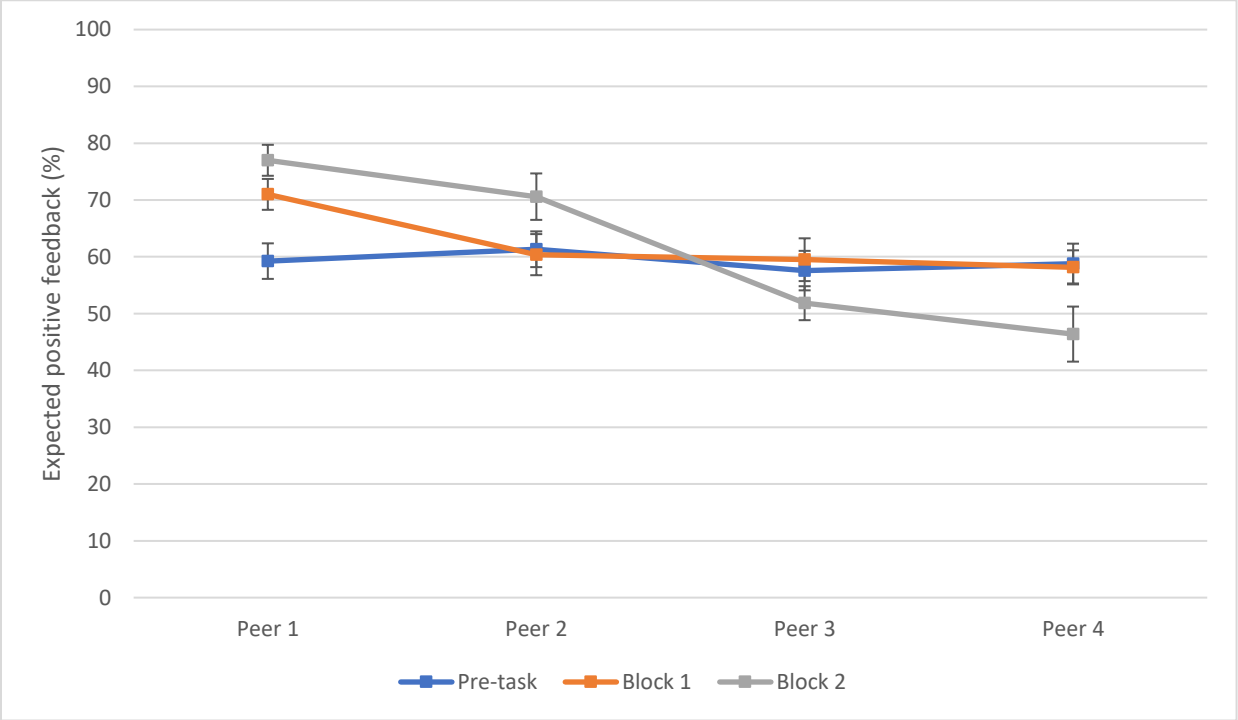

Figure 4.B. Pre-task, block 1 and block 2 expected positive feedback for all peers

Next, we examined whether socially anxious participants learned better that peer 4 was the most negative peer. A Pearson correlation analysis was performed between social anxiety level and the difference score (on-task expected negative feedback from peer 4 - the baseline of 55%). Results showed a non-significant, negative correlation, $r(20) = -.200$, $p = .384$. Participants with higher levels of social anxiety did not learn better that peer 4 was a negative peer.

Exploratory, to check whether an effect could be found when looking at the two blocks separately, two new difference scores were calculated for each of the two blocks (block 1 expected negative feedback from peer 4 - 55% and block 2 expected negative feedback from

peer 4 - 55%). Pearson correlation analyses between social anxiety level and the difference scores showed no significant correlations, $r(20) = -.1.08$, $p = .641$, $r(20) = -.200$, $p = .384$. So, both in block 1 and 2, participants with higher levels of social anxiety did not learn better that peer 4 was a negative peer.

Second, we examined whether socially anxious participants learned worse that peer 1 was the most positive peer. A Pearson correlation analysis between social anxiety level and the difference score (on-task expected amount of positive feedback from peer 1 - the baseline of 55%) showed a significant, negative correlation, $r(20) = -.510$, $p = .018$. This indicated that participants with higher levels of social anxiety learned worse that peer 1 was a positive peer.

Exploratory research is done to investigate whether this effect occurred in or after block 1. Again, two new difference scores were calculated for the two blocks apart (block 1 expected positive feedback from peer 1 - 55% and block 2 expected positive feedback from peer 1 - 55%). Pearson correlation analyses between social anxiety level and the difference scores both showed significant, negative correlations, $r(20) = -.434$, $p = .049$, $r(20) = -.451$, $p = .040$. This meant that already in block 1, participants with higher levels of social anxiety learned worse that peer 1 was a positive peer.

Updating the opinions about the peers. To test whether the participants negatively updated the likeability of the most negative peer after receiving social rejection feedback, a paired sample *t*-test was done with the likeability (VAS percent) scores of the most negative peer (peer 4) prior and after the task as variables. There was a significant difference in likeability of the most negative peer prior to (M = 72.14, SD = 15.89) and after (M = 43.86, SD = 23.06) the task, $t(20) = 5.569$, $p < 0.001$. Also said, there was a significant reduction in likeability of the most negative peer after the task. The rejection feedback participants received from this peer has led them to like this peer less.

To test whether the opinions about the most negative peer of participants with higher levels of social anxiety were more influenced, a Pearson correlation analysis was performed between social anxiety level and the difference score (after-task likeability of peer 4 minus pre-task likeability of peer 4). Results showed a non-significant, positive correlation, $r(20) = .334$, $p = .138$. It can be stated that the opinions about the most negative peer of participants with higher levels of social anxiety were not more influenced.

Discussion

This study examined whether negative social evaluative expectancy bias was present in socially anxious individuals and so whether they expected more negative feedback prior to the SPP. Also, this study investigated how socially anxious individuals learned from social feedback, by looking at how they update expectations about future social feedback based on received social feedback. Lastly, this study looked at how socially anxious individuals update impressions of others after being evaluated by them. Results revealed, contrary to expectations, that socially anxious participants did not expect more negative feedback, so negative social evaluative expectancy bias was not present. Also contrary to expectations, results showed that socially anxious participants did not learn better that peer 4 was the negative peer. However, they learned worse that peer 1 was the positive peer, which was in line with expectations. Lastly, results indicated, as expected, that participants overall negatively updated the likeability of the most negative peer after receiving social rejection feedback, but it was against expectations that the opinions about the most negative peer of participants with higher levels of social anxiety were not more influenced by the rejection feedback.

A negative social evaluative expectancy bias in socially anxious participants was not found in this study, as a negative significant correlation between social anxiety level and the expected amount of positive feedback before the SPP task was absent. This finding is in contract with previous studies where it was found that socially anxious people did show an expectancy bias (Cao et al., 2015; Caoutte et al., 2015; Chansky & Kendall, 1997; Gilboa-Schechtman et al., 2000; Smith & Sarason, 1975; Spence et al., 1999). Only in the study of Van der Molen, Harrewijn and Westenberg (2018), in which also a social judgement paradigm was used, a negative social evaluative expectancy bias was found neither in socially anxious participants. The study consisted of a non-socially anxious group and a socially anxious group. The socially anxious group expected to receive 55.3% positive feedback, which meant that a negative

expectancy bias was absent. However, the low socially anxious group did expect significant more positive feedback than the socially anxious group (Van der Molen et al., 2018). In previous studies that demonstrated social expectancy bias, often people with social anxiety disorder participated (e.g. Cao et al., 2015; Caoutte et al., 2015). In the present study, however, people were excluded if they suffered from social anxiety disorder. Moreover, the number of socially anxious participants was very small in the present study. This can serve as an explanation for the fact that the present did not found a relationship between higher levels of social anxiety and lower expected amounts of positive feedback.

This study found a weak social learning effect during the SPP. Overall, participants learned that peer 1 and 2 were positive peers, but they did not learn that peer 3 and 4 were negative peers. When the social learning effect was studied for the two blocks separately, it became clear that the participants already learned that peer 1 was a positive peer in block 1. They learned that peer 2 was a positive peer after block 1. Neither in block 1 nor in block 2 participants have learned that peer 3 and 4 were negative peers. The finding of a weak social learning effect is in contract with the study of Will et al. (2017), which also used a social evaluation task to track learning, and did find a complete social learning effect. In the study, a name of a person who supposedly rated the participant was presented on a screen each trial and a cue was shown under the name. The cue had a colour, indicating the group the 'rater' belonged to. Each trial, participants had to indicate whether they expected a like or a dislike from the rater. In total, there were 4 different groups a rater could belong to and the probability of receiving a like was dependent on the group (respectively 85%, 70%, 30% and 15%). A big difference between the present study and the study of Will et al. (2017) is the way in which the social learning has been researched. In the study of Will et al. (2017), the social learning was tracked by looking at whether there were differences between the groups in expected positive feedback. Participants had to expect most positive feedback from group 1, thereafter the most

from group 2, less from group 3 and least from group 4. In the present study, however, the social learning was investigated by checking whether the expectations from each peer during the task deviated from a chance level (55%). Despite this difference, it is striking that the participants of the Will et al. (2017) study expected 70% negative feedback from group 3 and 87% from peer 4, while the participants of the present study expected only 44% negative feedback from peer 3 and 48% from peer 4. Therefore, the participants of the Will et al. (2017) study were much more aware that 3 and 4 were the negative ones than the participants of the current study. A possible reason for this is the information that the participants received prior to the task. In the present study, participants were given minimal information. They were only told that they had to indicate, each trial, whether they expected a like or dislike from the peer that was shown on the screen. They were not told that the peers differed in the probability of giving positive feedback, they had to find this out for themselves. On the other hand, Will et al. (2017) did inform their participants about the fact that the probabilities of receiving positive feedback differed for the four rater groups. Although the exact probabilities were not told, they did tell the rank ordering of the four groups to the participants. For this reason, the participants were much more oriented and aware that there were negative groups. An explanation for the fact that, in the present study, participants learned that peer 1 and 2 were positive peers, but not that peer 3 and 4 were negative peers, could be the presence of optimism bias. When people have to predict what will happen in the future, they tend to overestimate the chance that positive things will happen, which is called optimism bias. Optimism bias is consistent, robust and difficult to break (Sharot, 2011). This also can be seen during the SPP; although the participants expected more negative feedback in block 2 than in block 1, they still did not expect enough negative feedback to have learned that peer 3 and 4 were negative.

As expected, this study found that higher levels of social anxiety were related to worse learning that peer 1 is the positive peer. Taylor, Bomyea and Amir (2010) did research on how

socially anxious individuals process positive social information. They found a relationship between social anxiety and diminished processing of positive relative to neutral social information. Also, Bautista and Hope (2015) did study how socially anxious individuals respond to positive social information, or to be precise, positive social feedback. One of the conditions in the Bautista and Hope (2015) study was the mixed-positive condition, in which a lot of positive feedback was given to the participants and little negative feedback, which is very similar to the feedback from peer 1 in the present study. Results showed that socially anxious participants had significant fewer positive thoughts in this condition compared to non-socially anxious participants. The reduced impact that positive social information, or positive social feedback, has on socially anxious individuals may be a reason for the fact that the current study found that socially anxious participants were worse at learning that peer 1 was the positive peer.

This study showed that social anxiety was not related to better learning that peer 4 is the negative peer, which was against expectation. Many studies found an attention bias towards negative social information in socially anxious individuals (e.g., Becker, Rinck, Margraf, & Roth, 2001; Mogg, Philippot, Bradley, 2004; Pishyar, Harris, & Menzies, 2004). Based on this information it was expected that, in the present study, socially anxious participants would be extremely focused on the negative feedback they received during the SELF-profile paradigm and therefore would learn better that peer 4 was the negative peer compared to non-socially anxious participants. There are two theories that could serve as an explanation for the fact that this study did not find what was expected. Firstly, Clark and Wells (1995) stated that people with social anxiety have an enhanced focus on the self when they experience fear to get a negative evaluation. Their attention can be directed to their own thoughts, behaviour or physical response, like a high heart rate. As a result of this self-focused attention, social anxious people pay less attention to external negative social information, which in turn restricts the processing of this information (Bögels & Mansell, 2004; Durlik, Brown, & Tsakiris, 2014). This can be an

explanation for the fact that the socially anxious participants in the present study did not learn better from the negative feedback than healthy participants. Moreover, the vigilance-avoidance theory of Mogg, Bradley, Miles and Dixon (2004) stated that anxious individuals initially pay excessive attention to threatening cues, but when they are exposed to these cues for a longer time, they start to avoid these cues. The avoidance can be seen as a way of coping. This was also found in studies on social anxiety in particular (Bögels & Mansell; 2004; Vassilopoulos, 2005). It is possible that the socially anxious participants in the present study initially payed attention to the negative feedback of peer 4, but started to show avoidance behaviour after a while and this also could serve as a reason for the finding that they did not learn better from the negative feedback than non-socially anxious participants.

The current study did find that participants overall negatively updated the likeability of the most negative peer after receiving social rejection feedback. This is in line with the study of Rodman et al. (2017), who also used a social evaluation task to find out that their adult participants downgraded the likeability of the peers who had evaluated them in a negative way. Overall, people respond to negative feedback by disliking the people who evaluated them negatively in an attempt to weaken the validity of the sources of the rejection feedback. Moreover, it is an attempt to prevent that these people will give negative feedback again in the future (Rodman et al., 2017).

Based on the fact that socially anxious people generally show greater sensitivity to negative social information, such as negative feedback (Khdour et al., 2016; Yoon et al., 2014), it was expected that the opinions about the most negative peer of participants with higher levels of social anxiety would be more influenced and therefore would be downgraded more. However, this study did not find a relationship between social anxiety and a greater difference between pre-task and after-task likeability of peer 4. A possible explanation for this finding could be that healthy, adult people show self-protective biases after receiving social feedback. They

externalise negative feedback and do not let it affect their self-image (Rodman et al., 2017). They sometimes even show compensatory behaviour by enhancing their self-image after receiving negative feedback. This can be seen as a way of coping with the negative affect that it causes (Rudman, Dohn, & Fairchild, 2007). People with social anxiety, on the other hand, internalise negative feedback by lowering their self-image (Koban et al., 2017). Because healthy people generally externalize negative feedback and tend not to blame themselves for it, they may blame the judges more by labeling them as unlikeable after receiving negative feedback from them. This could explain the fact that in the present study even a slight negative correlation was found between social anxiety and the size of the decline in likeability of the most negative peer (peer 4).

It is important to highlight the biggest limitations of this study. A first major limitation is the small number of participants (n = 22). For example, the program G*Power 3.1.9.4 (Faul, Erdfelder, Lang, & Buchner, 2007) showed that for performing a correlation analysis with an effect size *r* of 0.3 and a power of 0.8 a total sample size of 82 participants is needed. This is way more than the actual sample size of 22 participants. This could have caused that this study overall found small to medium effects. Many more testing days were planned actually, but due to the corona crisis these had to be cancelled. A second major limitation is the small number of socially anxious participants in the study. Only 2 of the 21 participants had a LSAS total score above 60 and therefore were high socially anxious. In contrast, 10 participants met the criteria for low social anxiety by scoring below 30. For this reason, no equal groups of high and low socially anxious participants could be made, which was initially the intention. It is hard to recruit high socially anxious participants for social studies. A few highly socially anxious people with whom a testing day was planned, cancelled the appointment or did not show up. A third limitation was the skewed distribution between females (n = 19) and males (n = 2) participants in this study. Benenson et al. (2013) found that females show greater sensitivity to

social rejection compared to males. This is a reason to expect that women respond differently to the SPP than men. The combination of the small sample size, the few socially anxious participants and the skewed distribution between women and men makes it difficult to consider the results as reliable. Fourth, it was sometimes difficult to estimate whether participants believed the cover story and so if their data could be included in the analyses. Some participants had just some small doubts, because, for example, it seemed too much work for the researcher for them. In addition, there will always be a chance that participants did not believe the cover story, but did not dare to say this to the researcher. Only for one participant it was very clear that she did not believe the cover story, since she participated in many other studies in which deception was used and told not to believe that her profile was shown to anyone and that she was judged. It was therefore decided to only exclude the data from this participant from the study. Believing the cover story is important, since disbelief can cause results that are not reliable (Furr & Bacharach, 2013).

However, the manipulations that were used during the SPP, such as telling the participants that the peers also participated in this study and showing 'real' profiles and photos, and the simulation of a social media environment, by using online profile and giving likes or dislikes, enhanced engagement. This makes the SPP a promising task to investigate feedback-based learning. Further research is recommended to draw more reliable conclusions about the presence of a negative social evaluative expectancy bias in socially anxious people, about how socially anxious people learn from positive and negative feedback and how they update impressions of peers after receiving feedback from them. Especially how socially anxious individuals learn from social feedback and update impressions of the people who gave the feedback has not been studied often before. This study provided indications that socially anxious people learn less from positive feedback than non-socially anxious people. Not learning adequately from previous social situations can contribute to the development and maintenance

of fear of future social situations, which is an important symptom of social anxiety (APA, 2013). Moreover, not learning adequately from previous social information can be a reason for the fact that socially anxious individuals underestimate their own social performance (Hirsch, Clark, Mathews, & Williams, 2003; Koban et al., 2017). This study also provided indications that people with higher levels of social anxiety do not downgrade opinions about people who gave them negative feedback more than non-socially anxious people. This, in combination with earlier findings that socially anxious individuals lower their self-image after receiving rejection feedback (Koban et al., 2017), while non-socially anxious individuals do not (Rodman et al., 2017), are important signs that socially anxious people internalize negative feedback more than healthy people. This can contribute to an overall low self-esteem and negative affect, which is often found in socially anxious individuals (Iancu, Bodner, & Ben-Zion, 2015). In short, these topics are very important, since they can contribute to the development and the maintenance of symptoms of social anxiety, and information is needed to develop a suitable prevention and intervention. For further research, it is important to recruit more participants and make equal groups of low and high socially anxious participants. This way you can better draw conclusions about the difference between low and high socially anxious individuals. It is also advised to make equal groups of male and female participants, to investigate the role of gender. Moreover, at least one extra break and in-between feedback about the total number of correct predictions is advised during the SPP, to reduce tiredness and enhance engagement.

To conclude, this study investigated whether socially anxious individuals show a negative social evaluative expectancy bias. Moreover, it examined how they learned from positive and negative feedback and how they update impressions of peers who gave them negative feedback. Against expectations, this study did not demonstrate a negative social evaluative expectancy bias. However, it indicated that socially anxious individuals learned worse from positive feedback than non-socially anxious individuals. They did not learn better

from negative feedback. In addition, all participants downgraded the opinion about the peer who evaluated them negatively. Socially anxious individuals did not downgrade their opinions more. These results are important for understanding the processes related to the development and maintenance of symptoms of social anxiety. Further research is needed with more participants and equal groups of high and low socially anxious participants for more reliable results.

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