Title: Biased self-perception of social skills in anxious children: The role of state anxiety

Running Head: State anxiety and social skill

Helen F. Dodd[1], Jennifer L. Hudson[1], Heidi J. Lyneham[1], Viviana Wuthrich[1], Talia Morris[1], Laurie Monier[1]

[1] Centre for Emotional Health, Department of Psychology, Macquarie University

Corresponding author:

Associate Professor Jennifer Hudson

Centre for Emotional Health

Department of Psychology

Macquarie University

NSW 2109

Australia

Email: jennie.hudson@mq.edu.au

Phone: +61 2 9850 8668

Fax: +61 2 98508062

Abstract

The role of state and trait anxiety on observer ratings of social skill and negatively biased self-perception of social skill was examined. Participants were aged between 7 and 13 years (mean=9.65; sd=1.77; N=102), 47 had a current anxiety diagnosis and 55 were non-anxious controls. Participants were randomly allocated to a high or low anxiety condition and asked to complete social tasks. Task instructions were adjusted across conditions to manipulate participants' state anxiety. Observers rated anxious participants as having poorer social skills than non-anxious controls but there was no evidence that anxious participants exhibited a negative self-perception bias, relative to controls. However, as participants' ratings of state anxiety increased, their perception of their performance became more negatively biased. The results suggest that anxious children may exhibit real impairments in social skill and that high levels of state anxiety can lead to biased judgements of social skills in anxious and non-anxious children.

Keywords: Social skills, state anxiety, social phobia, children, anxiety, cognitive bias.

Anxiety disorders are the most prevalent forms of psychopathology experienced by children and adolescents, with around 5% of children meeting criteria for an anxiety disorder at any given point in time (Merikangas et al., 2010; Rapee, Schniering, & Hudson, 2009). Anxiety disorders in children have been associated with a range of negative outcomes including academic underachievement and alcohol use in later life (Buckner et al., 2008; La Greca & Lopez, 1998; Wood, 2006). In addition, there is consistent evidence that children with anxiety disorders experience social difficulties, particularly in the context of peer relationships (Ginsburg, La Greca, & Silverman, 1998; Strauss, Frame, & Forehand, 1987; Strauss, Lease, Kazdin, Dulcan, & et al., 1989; Verduin & Kendall, 2008). In examining the causes of these social difficulties, research has provided some evidence that socially anxious children may exhibit impairments in social skill (Alfano, Beidel, & Turner, 2006; Inderbitzen-Nolan, Anderson, & Johnson, 2007; Spence, Donovan, & Brechman-Toussaint, 1999). However, there is some inconsistency in these findings and recent research has suggested that anxious children may perceive themselves as having poor social skills when in fact they do not (Cartwright-Hatton, Hodges, & Porter, 2003; Cartwright-Hatton, Tschernitz, & Gomersall, 2005; Levitan & Nardi, 2009). The aim of the present research is to examine the relative importance of state anxiety and trait anxiety in affecting children's social skills and the accuracy of self-perceptions. The findings have relevance for treatment recommendations, particularly with regards to social skills training and video feedback.

To assess social skills in anxious populations, research has typically used a paradigm in which anxious and non-anxious participants are videotaped completing a task. Social skills are then rated by participants themselves and by trained observers. Given the clear relevance of social skills for socially anxious individuals, extant research has typically focused on socially anxious populations. Typical social tasks include giving an impromptu speech, reading aloud or

interacting with a stranger. Using this paradigm, several studies have reported that socially

anxious adults exhibit poor social skills (Baker & Edelmann, 2002; Beidel, Turner, & Dancu, 1985)

and that they also exhibit a self-perception bias, underestimating their level of social skill (Rapee

& Lim, 1992; Stopa & Clark, 1993).

 Following research with anxious adults, more recent studies have begun to examine

whether children with high levels of social anxiety also exhibit poor social skills and whether

social anxiety in childhood is associated with a self-perception bias that leads children to

underestimate their abilities. Several studies have reported that social anxiety in children is

associated with less competent social skills based on observer ratings, suggesting that children

who are socially anxious may have a genuine social skill deficit (Alfano, et al., 2006; Beidel,

Turner, & Morris, 1999; Inderbitzen-Nolan, et al., 2007; Spence, et al., 1999). However, this is

not consistently found across studies (Cartwright-Hatton, et al., 2003; Cartwright-Hatton, et al.,

2005; Erath, Flanagan, & Bierman, 2007). In general, social skill deficits tend to be found more

consistently in clinically anxious participants rather than in samples of typically-developing

participants with high scores on questionnaire measures of social anxiety (Levitan & Nardi,

2009). In addition, the type of task used to assess social skills also seems to have some affect on

findings. The majority of studies using an interaction task have found social skill deficits in

socially anxious participants (Alfano, et al., 2006; Beidel, et al., 1999; Inderbitzen-Nolan, et al.,

2007; Spence, et al., 1999), although not all (Cartwright-Hatton, et al., 2005). In contrast, studies

using speech and reading aloud tasks have provided relatively weaker evidence of social skill

deficits (Beidel, et al., 1999; Cartwright-Hatton, et al., 2003; Inderbitzen-Nolan, et al., 2007).

 With regards to self-perception bias, there is currently little evidence that socially

anxious children have a biased impression of their social skills. For example, Miers et al. (2009)

found that children high in social anxiety perceived themselves as having poorer social skills

than participants low in social anxiety but that this group difference was also apparent for observer-rated social skills, suggesting a genuine social skill deficit. Interestingly, some evidence for a bias was found, specifically for participant's ratings of how nervous they looked during the social task. These findings are consistent with those of previous research which has found evidence for a negative bias in socially anxious children but only in relation to nervousness rather than global or micro social skills (Cartwright-Hatton, et al., 2005; Inderbitzen-Nolan, et al., 2007).

One topic that has received almost no attention in the literature is the importance of state anxiety during task completion. This is surprising given that some cognitive models of social anxiety have focused on the generation and maintenance of social anxiety whilst the individual is in the social-evaluative situation (Rapee & Heimberg, 1997). There is some preliminary evidence that this may be an important line of research. In a study with non-clinical child participants, Cartwight-Hatton et al. (2003) found significant correlations between state, but not trait, social anxiety and participant-rated social skills during completion of a speech task. Importantly, however, no relationship was found between state social anxiety and observer-rated social skills. This suggests that, whilst high levels of social anxiety in general may not lead to biased perceptions of social skill, high levels of state anxiety may. If differences in state anxiety affect social skills judgements then differences in state anxiety across studies and tasks may help to explain some of the inconsistencies found in previous research.

To date, the relative importance of state anxiety and trait anxiety, as predictors of social skill and social cognitive bias has yet to be examined in a clinical population. In the present research this question is explored by manipulating state anxiety across two conditions in children diagnosed with anxiety disorders and non-anxious controls. Given the inconsistency of previous findings, both a speech task and an interaction task were used. For both tasks,

participants completed measures of state anxiety and social skill immediately after completing the tasks and independent observers rated social skill from video recordings of the tasks. Several authors have highlighted the importance of differentiating social skills from overall nervousness or appearing anxious, with the later not necessarily indicative of social skill (e.g. Cartwright-Hatton, et al., 2003). As the focus of this research is how anxiety affects social skills rather than nervousness, only social skills were rated.

The extent to which socially anxious children exhibit social skill impairments has important implications for treatment recommendations. Based on traditional conceptualizations of social anxiety, social skills training is often included in treatments for socially anxious children (Baer & Garland, 2005; Hayward et al., 2000; Masia, Klein, Storch, & Corda, 2001). However, more recent conceptualizations of social anxiety as being associated with a distorted view of social skill suggest that social skills training may not be necessary (Cartwright-Hatton, et al., 2003; Cartwright-Hatton, et al., 2005). Instead, video feedback has been proposed as a means of challenging these maladaptive cognitions. This approach has been used with some success in anxious adults (Rodebaugh, Heimberg, Schultz, & Blackmore, 2010; Rodebaugh & Rapee, 2005), with outcome moderated by severity of initial bias, and preliminary indications are that it may also be efficacious in socially anxious children (Parr & Cartwright-Hatton, 2009).

On the basis of existing theory and research, a number of hypotheses were evaluated. First, it was hypothesized that, across conditions, the anxious group would be rated by observers as having poorer social skills than non-anxious controls. Second, it was hypothesized that, across conditions, the anxious group would not exhibit a self-perception bias relative to the non-anxious controls. Third, it was hypothesized that a self-perception bias would be found in the high state anxiety condition, relative to the low state anxiety condition. The extent to which this effect of condition on cognitive bias was moderated by group was also examined. This

analysis was exploratory, but it was tentatively hypothesized that there might be a significant condition by group interaction such that higher levels of state anxiety might be related to a self-perception bias in the anxious group to a greater extent than in the non-anxious group.

Method

Participants

There were 102 participants in total. Participants were divided into two groups based on their diagnostic status. The first group comprised 47 participants who had a current anxiety disorder diagnosis (25 female, 22 male) aged between 7 and 13 years (M=9.59, SD=1.68). This group is referred to as the anxious group. Of the participants in the anxious groups, 29 had a diagnosis of Social Phobia. As is typical for anxiety disorders, all participants in the anxious group had at least one other anxiety diagnosis. The following comorbid diagnoses were also present: Separation Anxiety Disorder (N=19), Specific Phobia (N=36), Generalised Anxiety Disorder (N=41), Obsessive Compulsive Disorder (N=8), and Post-traumatic Stress Disorder (N=2). All clinical participants had sought treatment at the Emotional Health Clinic, Macquarie University and were invited to take part in the research prior to commencing treatment. Of the participants in the anxious group, 70% were Australian, 8% were Asian and 22% were European.

The second group comprised 55 children, (30 females, 25 males), aged between 7 and 13 years (M = 9.70, SD = 1.84) who did not meet criteria for any anxiety diagnoses; this group are referred to as the control group. Control participants were recruited via advertisements in school newsletters, sports organizations and a community magazine for parents. Preliminary screening questions were administered over the phone and the Anxiety Disorders Interview Schedule (ADIS-IV-C/P; Silverman & Albano, 1996) was conducted during the research session to exclude any children with emotional difficulties or disorders. Of the participants in the control group, 71% were Australian, 22% were Asian and 4% were European. There were no significant

differences between groups on age, t (100) = -.280, p = .780, or gender, χ^2 (1, N = 102) = .019, p = .891.

A further 16 clinical participants and 10 control participants were initially recruited but were excluded because of technical problems with video recording (12), task refusal (4), controls with anxiety disorders (3), incomplete questionnaire data (6) and inappropriate age (1). There was no significant difference between the group of participants with complete data and the group of participants who were excluded on age, group, gender or social anxiety symptoms (p > .05).

Materials

Anxiety Disorders Interview Schedule (ADIS-IV-C/P)

All participants were assessed using the ADIS-IV-C/P. Diagnoses were made based on both parent and child report using the criteria set out by the DSM-IV (American Psychiatric Association, 1994). Research from our clinic has demonstrated excellent reliability for the ADIS with interrater agreement of kappa = 1.00 for an overall anxiety disorder diagnosis and between kappa = .80 and kappa = .93 for specific anxiety diagnoses (Lyneham, Abbott, & Rapee, 2007). Diagnostic interviews were completed by clinical psychologists or postgraduate students training in clinical psychology, supervised by senior clinicians.

Spence Children's Anxiety Scale.

Children completed the Spence Children's Anxiety Scale (SCAS; Spence, 1998). The SCAS is a measure of stable anxiety symptoms that has been developed for use with children aged between seven and eighteen years. In the present study the SCAS was used as a measure of trait anxiety. Children are asked to indicate 'how often each of these things happen to you' and presented with 44 items. These items load to six scales: separation anxiety, social anxiety, fear of physical injury, obsessive-compulsive, panic and generalised anxiety. The sum of the scales

give a total score indicative of overall anxiety symptoms. Only the total score and social anxiety

scale are of relevance to the present research. The SCAS has good internal consistency,

adequate test-retest reliability over 6 months and good convergent and discriminant validity as

demonstrated by relations with measures of child anxiety and depression (Spence, 1998).

Internal consistency for the total score in this sample was Cronbach's alpha = .77 and for the

social anxiety scale was Cronbach's alpha = .82.

Subjective Fear Rating.

Immediately after completing each task, participants were asked to complete three

scales to indicate how (1) worried, (2) afraid, and (3) scared they felt during each task using a

scale from 0 to 8 (where 0 is 'not at all' and 8 is 'very, very much'). Participants' responses to the

three fear ratings were significantly correlated on both the speech and interaction tasks, ($r > .5$,

$p < 0.001$). These items were therefore combined into a single measure by calculating the mean

for each participant on each task.

Performance Questionnaire (PQ-C/O).

The Performance Questionnaire Child (PQ-C) and the Performance Questionnaire

Observer (PQ-O) developed by Cartwright-Hatton et al. (2003) were used to capture participant

and observer ratings of social skills. For the purposes of this study, six items were extracted from

both measures. These items corresponded to the global social skills and micro social skills

subscales outlined by Cartwright-Hatton et al. (2003). Items from the 'nervousness' scale were

not included as not appearing nervous was not considered a social skill (see earlier discussion).

The items asked to what extent the child smiled, looked at the audience/other person, had a

clear and loud voice, looked friendly, looked clever and gave a good speech/conversation. Each

item was rated on a scale ranging from 1 to 4 (1 = 'very much', 4 = 'not very much'). Items were

originally developed for a speech task and were therefore adapted to be also suitable for ratings

of skill during the interaction task. Higher scores indicated poorer social skills. Internal

consistencies were as follows: PQ-C Speech task - .81; PQ-C Interaction task - .79; PQ-O Speech

task - .74, PQ-O Interaction task - .79.

Social Skills Tasks.

There were two social skills tasks: A speech task and an interaction task. For both tasks

there were two conditions: A high anxiety condition and a low anxiety condition. Participants

assigned to the high anxiety condition completed the high anxiety version of both tasks;

participants assigned to the low anxiety condition completed the low anxiety version of both

tasks.

For the speech task, participants were asked to give a two minute speech about

anything they liked and told that they could change topics during the speech if they wanted to.

The experimenter then gave further instructions depending on which condition the participant

was assigned to. Participants in the high anxiety condition were told: "*I want you to do your best

as two teachers and two children your own age will watch your speech later and mark you on

how well you did".* Participants in the low anxiety condition were told: "*I want you to do your

best but it doesn't really matter. This is for me as I am interested in hearing about what things

kids talk about".* As part of the anxiety manipulation the experimenter also used a different tone

of voice for the two conditions. Throughout the low anxiety condition the experimenter was as

friendly as possible and tried to put the child at ease. In the high anxiety condition, the

experimenter used a matter of fact tone of voice, rather than a friendly tone.

After giving the task instructions, the experimenter left the room for one minute to

allow the participant to prepare their speech alone, the child's parent was not present. Upon

returning to the room, the experimenter sat facing the participant and gave them final

instructions. In the high anxiety condition participants were told: "*Remember, teachers and*

children will be marking you on how well you do". In the low anxiety condition participants were told: *"Take your time. I am really interested in hearing about the different things kids talk about".* The experimenter remained neutral throughout the speech, regardless of condition. If the child did not speak for over ten seconds, the experimenter provided the following prompts, one at a time: *"Would you like to talk about a movie you saw recently?", " Would you like to talk about something you did recently – your last holiday?", " Would you like to talk about something you are learning at school?".* If the child still hadn't spoken after the third prompt the experimenter terminated the task.

For the interaction task, the participant was told that an adult would be joining them shortly and that they were to talk to them for three minutes. They were told they could talk about anything they wanted and to try and ask the adult questions. The experimenter then gave the participant specific instructions depending on which condition they had been assigned to. Participants in the high anxiety condition were told: *"This person is going to be rating you on how good you are at talking. I just want you to do your best".* Participants in the low anxiety condition were told: *"This person is just interested in having a chat. I want you to try your best to talk to him/her but it doesn't really matter how well you do. I just want to give my friend some practice at talking and listening to young people".* As part of the anxiety manipulation the experimenter also used a different tone of voice for the two conditions, as described above. After giving the instructions the experimenter left the room and an adult confederate entered. The confederate reminded the participant of the condition specific instructions. If the child had not spoken for more than 10 seconds the confederate asked the following three cue questions, one at a time: *"What is your favourite subject at school?", " What did you do at the weekend?", "Do you have any brothers or sisters?".* If after three cues there was a further ten second pause

the task was terminated. At the end of three minutes the confederate thanked the participant

and left the room

Coding

Both social skills tasks were videoed and subsequently coded by a graduate student in

psychology who was blind to the study hypotheses and the participants' group membership.

Each task was coded using the six items on the Performance Questionnaire. Performances from

67% of participants were second-coded by a second rater who was also blind to the study

hypotheses and child's group membership. Good inter-rater reliability was found for both tasks

and both scales: speech task micro behaviours ICC = .795; speech task global behaviours ICC =

.726; interaction task micro behaviours ICC = .880; interaction task global behaviours ICC = .730.

Design

Participants from both groups were randomly assigned to either a high anxiety or low

anxiety condition. A computerized random number generator was used to assign an equal

number of participants from each group to each condition. Due to the missing data specified

previously, the final sample included 47 participants allocated to the high anxiety condition (23

anxious, 24 control) and 55 participants allocated to the low anxiety condition (24 anxious, 31

control). There were no significant differences between conditions on group membership, age,

gender or anxiety symptoms ($p > .1$). All participants completed both the speech and interaction

tasks.

Procedure

All participants visited the university for a two hour session during which the

experiment outlined above, and additional research not reported here, were completed. To

ensure that the additional tasks did not affect the participants' level of state anxiety, the speech

and interaction task were completed first. The task order was counterbalanced across

participants. Mothers provided written informed consent and children provided assent to the study procedures. All procedures were approved by Macquarie University Human Ethics Committee. The tasks were conducted as described above and both tasks were filmed for subsequent coding. Immediately following each social skill task, participants were asked to complete the Performance Questionnaire and the Subjective Fear Ratings. Once both social skills tasks had been completed, participants were debriefed. They were told that the tapes would only be examined by the researchers in the study and were praised for their performance.

During the research session, the ADIS was conducted with control participants and their parents. As the clinical participants were recruited through the Emotional Health Clinic, the ADIS was completed as part of the standard intake assessment at the clinic, typically 1-2 weeks prior to the research session. The SCAS was completed by all participants prior to the research session. Research participation occurred prior to clinical participants commencing treatment. The control participants were compensated for their time.

Data Analysis

    Dependent variables.

In order to examine the relationship between trait and state anxiety and children's social skills and self-perception bias, two dependent variables are relevant. First, the observer ratings of social skill provide an objective measure of the child's social skill. Second, the discrepancy between the observer ratings of social skill and the child's rating of their own social skill provide a measure of cognitive bias. A bias score was therefore calculated for all participants by subtracting the observer rating from the child's rating. Keeping in mind that a high score indicate social skill deficits, a positive bias score suggests the child has a negatively biased view of their social skills and a negative bias score suggests the child has a positive view of their social skills. Across the analyses, these two dependent variables are of interest.

Independent variables.

In order to examine the effect of trait anxiety, participant group membership and SCAS total score and social anxiety scale score are relevant. By including both the SCAS total score and the social anxiety scale score, it will be possible to differentiate between high levels of anxiety in general and high levels of social anxiety more specifically. To examine the effect of state anxiety, condition (high vs low state anxiety) and participants' subjective fear ratings were used.

Analysis outline.

Identical analyses were conducted for the speech task and the interaction task. Clinical anxiety group and SCAS scores were conceptualised as reflecting 'trait' anxiety and condition and fear ratings were conceptualised as reflecting 'state' anxiety. Initially, the effect of trait (clinical) and state anxiety on social skill is examined using t-tests and bivariate correlations. Secondly, the effect of state and trait anxiety on self-perception bias is considered using t-tests and bivariate correlations. Finally, to assess whether any relationship between state anxiety and social skills or self-perception bias was moderated by group, a general linear model was used to evaluate the significance of the interaction term. To compensate for multiple comparisons, a p-value of .01 was used to indicate significance.

Results

Descriptives and preliminary analyses

Table 1 provides the mean and sd of trait and state anxiety across group, condition and task. The anxious group reported significantly higher levels of both trait and state anxiety with higher SCAS total scores, t (96) = 6.35, $p < .01$, d=1.27, higher SCAS social anxiety scores, t (96) = 5.82, $p < .01$, d=1.15, and higher fear ratings for both the speech task, t (100) = 4.01, $p < .01$, d=0.78, and the interaction task, t (100) = 2.93, $p < .01$, d=0.57. The high/low anxiety condition manipulation was successful, with participants reporting significantly higher levels of state

anxiety in the high anxiety condition on both the speech task t (100) = 3.44, $p < .01$, d=0.66, and

the interaction task, t (100) = 2.58, $p = .01$, d =0.50. Although participants reported slightly

higher state anxiety during the speech task than the interaction task, the difference was not

statistically significant, t (101) = 1.77, $p = .08$, d=0.14. No significant difference between the

tasks on state anxiety was found for either the high anxiety or low anxiety condition separately,

$p > .05$.

Social skills

Trait anxiety.

Table 2 shows the mean ratings for social skills as rated by the independent observer on

both tasks. A significant difference between groups was found for both the speech task, t (100) =

2.818, $p = .01$, d=.56, and the interaction task, t (100) = 2.517, $p = .01$, d=.51, the anxious group

having significantly poorer social skills when compared to the control group. In keeping with

this, a marginally significant correlation between SCAS total score and observer rated social skills

was found for both the speech task, $r = .22$, $p = .03$, and the interaction task, $r = .22$, $p = .03$. The

correlation between scores on the SCAS social scale and observer ratings of social skill was not

significant for either the speech task, $r = .18$, $p = .08$, or the interaction task, $r = .15$, $p = .13$.

State anxiety.

No significant effect of condition on observer ratings of social skill was found on either

the speech task, t (100) = 1.36, $p = .18$, d=.28, or the interaction task, t (100) = .70, $p = .49$, d=.13.

Similarly, no significant correlation was found between participant fear ratings and observer

ratings of social skill on the speech task, $r = .02$, $p = .81$, or the interaction task, $r = -.10$, $p = .30$.

Self-perception bias

Trait anxiety.

Table 3 shows the mean cognitive bias scores on both tasks. No significant difference between groups was found on either the speech task, t (100) = .823, p = .41, d=.15, or the interaction task, t (100) = .67, p = .51, d=.13. In keeping with this, no significant correlation between SCAS total score and cognitive bias was found on either the speech task, r = .-.04, p = .52, or the interaction task, r = -.07, p = .52. Similarly, no significant correlation was found between scores on the SCAS social scale and cognitive bias scores for either the speech task, r = .07, p = .48, or the interaction task, r = .12, p = .25.

State anxiety.

In the high anxiety condition, participants showed a larger cognitive bias than in the low anxiety condition. This effect approached significance on both the speech task, t (100) = 1.91, p = .06, d=.28, and the interaction task, t (100) = 2.00, p = .05, d=.40. In support of a relationship between state anxiety and cognitive bias, a significant correlation was found between participant fear ratings and cognitive bias scores on the speech task, r = .29, p = .003, and the interaction task, r = .37, p < .001.

To examine whether the relationship between state anxiety and self-perception bias differed according to group, a general linear model analysis was conducted with self-perception bias as the outcome variable and fear ratings, group and the group by fear rating interaction as the predictor variables. No significant interaction between group and fear rating was found for either the speech task, b = -.003, 95% CIs [-.205, .198], SE = .102, t = -.034, p = .97, or the interaction task, b = -.132, 95% CIs [-.351, .088], SE = .111, t = -1.189, p = .24.

Discussion

The present research examined the relative importance of state anxiety and trait anxiety on observer ratings of social skill and biased self-perception of social skill. This is the first study to examine this question in a clinical sample. Previous research has provided some evidence that

socially anxious children exhibit impairments in social skill (Alfano, et al., 2006; Inderbitzen-

Nolan, et al., 2007; Spence, et al., 1999). However, there is some inconsistency in these findings

(Levitan & Nardi, 2009). In the present research, it was hypothesized that participants with an

anxiety diagnosis would be rated by objective observers as having poorer social skills than non-

anxious controls. The results supported this hypothesis; on both the speech task and the

interaction task, the anxious participants were rated as having significantly poorer social skills

than the control participants. The second hypothesis was that the anxious group would not

exhibit a self-perception bias relative to the non-anxious controls. This hypothesis was also

supported; no significant differences between groups were found on cognitive bias. These

findings are consistent with previous research that has reported social skill impairments but no

self-perception bias in socially anxious children (Inderbitzen-Nolan, et al., 2007; Miers, et al.,

2009).

Although research has typically failed to find evidence for a self-perception bias in

socially anxious children, Cartwright-Hatton et al. (2003) found some initial evidence that state

anxiety might cause participants to underestimate their social skill. To examine this further,

state anxiety was manipulated in the present study across two conditions. It was hypothesized

that participants in the high anxiety condition would underestimate their level of social skill

relative to observer ratings but that no bias would be apparent in the low anxiety condition. The

results provided some support for this hypothesis; higher cognitive bias scores were found in

the high anxiety condition (although the effect of condition only approached significance on

both tasks). In addition, significant correlation was found between participants' fear ratings and

their self-perception bias scores. This suggests that participants' state anxiety during task

completion was related to the extent to which they underestimated their social skill;

participants who experienced higher levels of state anxiety were more likely to exhibit a self-

perception bias. This effect did not depend upon group, indicating that all children exhibit a self-perception bias when they experience elevated state social anxiety, not just clinically anxious children. This pattern of findings is in keeping with the preliminary findings of Cartwright-Hatton et al. (2003) suggesting that there may be a relationship between state anxiety and biased judgements of social skill on a speech task (Cartwright-Hatton et al., 2003).

In light of discrepancies in previous research, both a speech task and interaction task were included in the present study. The results were consistent across both tasks and suggest that the type of task used is unlikely to be a source of inconsistency in previous research. Instead, it seems more likely that differences between samples on trait anxiety and differences in state anxiety caused by specific tasks and experimental settings are more likely to be related to these inconsistencies. In the present study, significant differences between groups were found for observer-rated social skills and this was supported by a marginally significant correlation with a questionnaire measure of trait anxiety. However, there was no significant correlation between social anxiety severity, as reported by participants using a questionnaire measure, and observer ratings of social skill. This suggests that trait anxiety in general might be more closely related to social skills deficits than social anxiety specifically. The majority of previous research has been conducted with community populations using questionnaire measures of social anxiety. The extent to which samples that are high in social anxiety differ from samples that are low in social anxiety on social skills may therefore depend on the overall levels of trait anxiety present in the sample. In addition, the present findings suggest that participant state anxiety during task completion is significantly associated with a self-perception bias, leading participants to underestimate their social skill. The implications of this are that studies using tasks that lead to higher levels of state anxiety are more likely to find evidence for

a self-perception bias and studies using relatively benign tasks are less likely to find evidence for

a bias.

Strengths and limitations

        One of the primary contributions of this research is the manipulation of state social

anxiety. By successfully manipulating state anxiety across conditions, this research has

demonstrated that state anxiety can lead to biased performance evaluations in anxious and

non-anxious children. A further strength is the use of both a speech task and an interaction task

with the same sample. This allows inconsistencies in previous findings to be examined. Whereas

previous research has utilized analogue populations who report high or low levels of social

anxiety, in the present research a sample of children with anxiety disorders was selected and

compared with a sample of children without anxiety disorders. The use of a clinical population

represents an additional strength of the present study. It is worthy of discussion, however, that

not all of our anxious participants met criteria for social anxiety disorder. We chose to include

children who did not have a diagnosis of social anxiety disorder to be consistent with research

showing that children with anxiety disorders in general, not just those with social anxiety

disorder, experience social difficulties (Ginsburg, et al., 1998; Strauss, et al., 1987; Strauss, et al.,

1989). Our findings in fact suggest that overall levels of anxiety, rather than social anxiety

specifically, are related to observable social skill deficits. This finding supports our decision to

include participants without a social anxiety disorder diagnosis as it suggests that the

assessment of social skills is important in all anxious children. Unfortunately, our sample size

was not adequate to reliably compare participants who had a diagnosis of social anxiety

disorder with those who were clinically anxious but did not have this diagnosis. It will be

important for future research to replicate our findings with regards the relative importance of

social anxiety as compared with anxiety in general, by comparing these different clinical populations.

Consistent with other research in this field, social skills were assessed during social tasks conducted in the laboratory. Whilst this allows extraneous variables to be controlled, the behaviour observed is not necessarily representative of what would be observed in the 'real world'. It would be useful for future research to further examine social skills outside of the laboratory context such as at the child's school (Spence et al., 1999). Related to this, it is likely that the impressions of peers are more important to children in middle childhood than the impressions of unfamiliar adults (Brown, 2004). It may be useful, therefore, to use peer observers, rather than adult observers, to rate children's social skills. Recent research using peer observers has shown that peers rate high socially anxious children as having poorer social skill than low socially anxious children during a speech task (Miers, Blote, & Westenberg, 2010).

Clinical implications

Traditionally, social-skills training has been a core feature of treatments for childhood social anxiety (Baer & Garland, 2005; Hayward et al., 2000; Masia, Klein, Storch, & Corda, 2001). However, more recently, video feedback has been used as a means to challenge children's self-perception biases. This approach has met with some success (Parr & Cartwright-Hatton, 2009). The results of the present research provide some support for both approaches. As between-group differences were found for observer-rated social skills, some social skills training may be useful. In light of the findings, it may be useful to include social skills training in treatment for children with anxiety disorders in general, rather than just for children who have high levels of social anxiety. This is common practice already in some manualised treatment programs (Lyneham, Abbott, Wignall, & Rapee, 2003).

The use of video feedback as a treatment for social anxiety is based on the assumption that socially anxious individuals have a self-perception bias that leads them to underestimate their social skill. In the present study there was no evidence that children with anxiety disorders were more likely to underestimate their social skill or that biased estimates of social skill were related to social anxiety or overall trait anxiety. Instead, all participants underestimated their social skills when levels of state anxiety were high. What is important, therefore, is to ascertain what differentiates anxious from non-anxious children.

One possibility is that anxious children might differ from non-anxious children with regards their processing after the event. Clark and Wells' cognitive model of social anxiety (Clark & Wells, 1995) proposes that socially anxious individuals engage in post-event processing after social interaction, during which they review their social performance. If socially anxious children engage in more post-event processing than non-anxious children, as has been found in recent research (Schmitz, Kramer, Blechert, & Tuschen-Caffier, 2010), the underestimation of social skill made immediately following a social interaction in which state anxiety was high might have a more long-term negative effect on an anxious child. If this is the case then treatment that allows children to challenge the belief that they performed poorly during a social situation will be important. Video feedback is one technique that may achieve this. It will be interesting for future research to examine post-event processing following social tasks to examine this hypothesis. One important point to emphasise in relation to this is that, when state anxiety is not high, anxious children do not seem to have a biased impression of their social skill and, in fact, they may actually demonstrate social skill deficits. As a consequence, video-feedback must be used carefully, only in situations when the child clearly has a biased impression of their skill; if video-feedback were used in a context where the child accurately rated themselves as having

poor social skill, the video would just serve to confirm this and potentially exacerbate the child's anxiety.

Conclusion

The results suggest that, relative to non-anxious children, children with anxiety disorders display impairments in social skills that are apparent to observers. Children with anxiety disorders are not more likely than non-anxious children, however, to underestimate their level of social skill. By manipulating state anxiety, the present study demonstrates for the first time that higher levels of state anxiety during task completion are associated with underestimation of social skills in children with and without anxiety disorders.

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Table 1

State and trait anxiety scores for speech task and interaction task by group

		Anxious Group	Control Group
Trait Anxiety	Total SCAS score	40.41 (22.39)	15.59 (16.22)
	Social Anxiety Scale	6.52 (4.39)	2.46 (2.40)
	Anxiety Condition		
	High	N = 23	N = 24
State anxiety -		2.78 (2.43)	1.10 (1.39)
Speech task	Low	N = 24	N = 31
		1.26 (1.04)	0.46 (0.85)
	High	N = 23	N = 24
State anxiety –		1.94 (1.04)	1.06 (1.21)
Interaction task	Low	N = 24	N = 31
		1.15 (1.17)	0.44 (0.84)

Table 2

The effect of group and condition on observer-rated social skills; M (sd).

	Anxious Group		Controls	
	High	Low	High	Low
Speech Task	2.15	2.29	1.85	2.02
	(.33)	(.57)	(.51)	(.54)
Interaction Task	2.18	2.30	1.94	2.01
	(.35)	(.54)	(.57)	(.58)

Note. Positive scores indicate poorer social skills.

Table 3

The effect of group and condition on cognitive bias scores; M(sd).

	Anxious Group		Controls	
	High	Low	High	Low
Speech Task	.62	.24	.68	.45
	(.91)	(.71)	(.71)	(.72)
Interaction Task	.56	.27	.48	.18
	(.63)	(.68)	(.79)	(.88)

Note. Positive scores indicate a negative bias.