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Bias or reality? : negative perceptions of ambiguous social cues, social performance and physical arousal in socially anxious youth

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Chapter 2

Interpretation Bias and Social Anxiety in Adolescents

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Abstract

Interpretation bias, described as the tendency to interpret social situations in a negative or threatening manner, has been widely linked to social anxiety in adult populations. This study aimed to extend research on interpretation bias to an adolescent population. Thirty-seven high socially anxious and a control group of 36 non socially anxious adolescents rated the likelihood of different interpretations of ambiguous social and non-social situations coming to mind and which interpretation they most believed. Results showed that negative interpretations of social situations were more common in the high anxious than control group. Such negative bias could not be accounted for by high levels of negative affect. The groups did not differ as to their positive interpretations. Furthermore, there was evidence for content-specificity of interpretation bias; high anxious adolescents were not more negative than control participants in their interpretations of non-social situations. Findings are discussed in relation to the adult literature and their clinical relevance is considered.

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Introduction

Individuals who are socially anxious are said to interpret ambiguous social situations in a negative or threatening manner (Heinrichs & Hofmann, 2001). They show an interpretation bias that likely has a role to play in the maintenance of social phobia/social anxiety disorder (e.g., Beck, Emery, & Greenberg, 1985; Clark & Wells, 1995). The vast majority of studies to date has investigated presence of this bias in adults (Amir, Foa, & Coles, 1998; Butler & Mathews, 1983; Franklin, Huppert, Langner, Leiberg, & Foa, 2005; Stopa & Clark, 2000; Voncken, Bögels, de Vries, 2003; Wilson & Rapee, 2005). The aim of the current study was to extend findings concerning the existence of an interpretation bias to an adolescent population. The adolescent group is particularly important due to the fact that social anxiety, that is, fear of negative evaluation, appears to increase during the adolescent years (Weems & Costa, 2005; Westenberg, Drewes, Goedhart, Siebelink, & Treffers, 2004; Westenberg, Gullone, Bokhorst, Heyne, & King, 2007), and its clinical form, social phobia, usually has its onset in the early to mid teens (Rapee & Spence, 2004). Thus, despite adolescence being a critical period for investigation, to the authors' best knowledge, no studies have, as yet, specifically examined the presence of an interpretation bias in socially anxious adolescents.

In the adult literature, quite a large body of evidence now exists to support the presence of an interpretation bias in both clinical (Amir et al., 1998; Franklin et al., 2005; Stopa & Clark, 2000; Voncken et al., 2003) and non clinical populations (Brendle & Wenzel, 2004; Constans, Penn, Ihen, & Hope, 1999; Huppert, Foa, Furr, Filip, & Mathews, 2003). Individuals with higher levels of social anxiety rate negative interpretations of ambiguous social situations as more likely to come to mind than less anxious individuals. Negativity in explaining uncertain social situations also occurs when participants are asked to spontaneously produce an explanation (Franklin et al., 2005; Stopa & Clark, 2000). The bias has been reported in positive, mildly and profoundly negative social situations as well as ambiguous ones (Voncken et al., 2003), and in situations that are personally relevant (Amir et al., 1998; Constans et al., 1999).

Findings from the adult literature are linked to four main issues. These are: a) whether interpretation bias reflects an outright negative bias or only a lack of positive thinking, b) the importance of believing a certain explanation compared with how easily it comes to mind, c) whether interpretation bias is particular to social anxiety or reflective of an underlying factor (such as negative affect) common to a broader range of disorders including, for example, depression, and d) whether the bias is present only in social situations or in all types of situations (this issue is referred to as content specificity of interpretation bias). These four issues are of central importance to the study of interpretation bias in adults and should therefore be taken into account when investigating the nature of this bias in an adolescent population. The four issues will be discussed in more detail below.

Negative Bias or Lack of Positive Thinking

In a study by Constans et al. (1999), socially anxious university students were found to interpret statements concerning interpersonal evaluation in response to an ambiguous social situation (e.g., in the context of a date one person says to the other “You’re certainly not what I expected”), less positively than their non anxious peers. Constans et al. then raised the question of whether socially anxious individuals actually lack a positive bias rather than show an explicit negative bias. In contrast, Amir et al. (1998) and Stopa and Clark (2000) reported an outright negative bias. Differences in methodology may account for these disparities, the most important one being that Constans et al. scaled their interpretation scores from low to high positive, and the other two studies from low to high negative. Hence, the way in which the scores were scaled may have influenced finding a positive or negative bias.

Huppert et al. (2003) examined the relative contribution of positive and negative interpretation biases to social anxiety. In their measure of interpretation bias, ambiguous social and non-social scenarios were presented to respondents (students and employees of a university). After a few minutes respondents were given four interpretations of each scenario and asked to rate how similar each sentence was to the original scenario. Interpretations were either positively or negatively worded and consistent or inconsistent with the scenario (termed bias and foil, respectively), creating

four types of explanation. In a regression analysis which included both positive and negative biases of social scenarios only the negative bias significantly predicted social anxiety. These results stipulate that, in an adult population, social anxiety is associated not with an absence of positive interpretations but rather with a propensity to have more negative explanations.

Interpretations Coming to Mind and/or Strength of Belief

Clark et al. (1997) stated that how much individuals believe different explanations of an ambiguous situation is as important as how easily these interpretations come to mind. A couple of studies that have included belief in their measure of interpretation bias have shown inconsistent results. For example, Clark et al. found that patients with panic disorder were more likely to believe in negative interpretations of bodily sensations, for example, heart racing, compared to patients with other anxiety disorders. In contrast, Stopa and Clark (2000) found that belief did not discriminate a socially phobic group from a group of participants with other anxiety disorders, that is, the social phobic group did not have a higher score for believing the negative interpretation of social situations, whereas the likelihood of negative interpretations coming to mind did discriminate. The potential dissociation between strength of believing negative interpretations and the ease with which such explanations come to mind thus remains an open question.

Is Interpretation Bias Particular to Social Anxiety?

Three studies have controlled for the effect of depression or negative affect on the relationship between interpretation bias and social anxiety (Constans et al., 1999; Franklin et al., 2005; Huppert et al., 2003). Constans et al. accounted for negative affect in predicting interpretation bias. Their findings showed that participants' ratings of social interpretation items were predicted solely by their trait social anxiety and not negative affect. In a similar vein Huppert et al. reported a significant positive correlation between social anxiety and negative bias of interpretations, after controlling for both state anxiety and depression.

More recently Franklin et al. (2005) suggested that social interpretation bias is in fact a feature of a general cognitive style common to other disorders such as depression and is not particular to social anxiety. Correlations between their participants' social anxiety and social interpretation bias on the one hand and depression and social interpretation bias on the other, were similar in magnitude; this held after controlling for the effect of depression and social anxiety scores, respectively. Thus, interpretation bias of social situations was equally associated with social anxiety and depression. In sum, contradictory findings have been reported between studies that address the issue of whether interpretation bias is particular to social anxiety.

Content Specificity of Interpretation Bias

With regard to the content specificity issue a number of studies have found that socially anxious individuals make significantly more negative interpretations of social situations compared to their non anxious peers but do not differ in their interpretations of non-social situations (Amir et al., 1998; Constans et al., 1999; Huppert et al., 2003; Voncken et al., 2003; Wilson & Rapee, 2005). These studies cover both clinical and non-clinical populations, and employ different methodologies, such as rank order and rating scales, to tap into the interpretation bias. Two other studies do, however, in fact show a more general negative bias that extends to social and non-social scenarios (Franklin et al., 2005; Stopa & Clark, 2000). According to Franklin et al. the discrepancy in findings may be attributed to differences in levels of depression in the respective patient samples, with more highly depressed samples showing a more general negative bias. A second possibility is the use of different instruments, which all vary with regard to the social and non-social situations included.

Studies of Interpretation Bias in Child Populations

A number of studies has investigated whether a threat interpretation bias is present in anxious children (e.g., Barrett, Rapee, Dadds, & Ryan, 1996; Bögels & Zigterman, 2000; Bögels, Snieder & Kindt, 2003; Creswell, Schniering & Rapee, 2005; Chorpita, Albano, & Barlow, 1996; Micco & Ehrenreich, 2008; Muris, Merckelbach, & Damsma, 2000; Muris, Rapee, Meesters, Schouten & Geers, 2003). These studies

consistently show that children aged between 7 and 15 years with an anxiety disorder, or with high levels of trait anxiety, interpret ambiguous situations as more threatening (negative) than non anxious peers. In contrast to the adult literature, however, most studies do not focus on social anxiety in relation to interpretation bias, and instead pool together participants with different types of anxious symptoms or anxiety disorders (cf. Bögels et al., 2003; Muris et al., 2000). Furthermore, content of ambiguous scenarios varies across studies (e.g., physical, social, separation anxiety or generalized anxiety related) and findings are often based on children's interpretation of all types of situations, precluding the possibility of drawing conclusions about the specificity of interpretation bias.

One study which has looked at the content specificity of interpretations in a child population (aged 7 – 12 years) included a generalized anxious, social phobic and separation anxious group (Bögels et al., 2003). Instead of using social and non-social situations this study compared children's interpretations of different situations reflecting social, separation and generalized anxiety. Partial support was found for content specificity; children in the social phobia group made significantly more negative interpretations of social situations and significantly fewer negative interpretations of separation stories compared to the separation anxiety group. However, no differences were found between the three anxiety groups on the generalized stories. Thus, the socially phobic group's interpretations were not wholly specific to social situations. Unfortunately, as no control group was included in this study it is difficult to draw firm conclusions about the specificity of interpretation bias in a child population.

The Present Study

The present study sought to take a first look at the relationship between interpretation bias and social anxiety in an adolescent population. In line with other work using adult (Brendle & Wenzel, 2004; Constans et al., 1999; Huppert et al., 2003) and child (Bögels et al., 2003; Muris et al., 2000; Muris et al., 2003) samples the current study included a non clinical population. In light of the fact that gender differences are often found on self-report measures of social anxiety (Rapee & Spence, 2004) the potential effects of gender on the relationship between social anxiety and interpretation

bias were controlled. Based on the issues described here, four research questions were formulated, these are: 1) Do high socially anxious adolescents have more negative interpretations and/or less positive interpretations in socially ambiguous situations? 2) Do socially anxious adolescents believe negative interpretations of social situations more than non socially anxious adolescents? 3) Could a high level of negative affect account for the possible presence of a more negative interpretation style among socially anxious adolescents or is this style specifically related to social anxiety symptoms? And, 4) Is a negative interpretation bias, if it occurs, specific to social situations or is it also found in the presence of non-social situations? We hypothesized that high socially anxious adolescents would rate negative interpretations of social situations as more likely to come to mind than non socially anxious adolescents, however these groups would not differ on positive interpretations (Amir et al., 1998; Huppert et al., 2003; Stopa & Clark, 2000). In addition, we tentatively expected to find no difference between high and non anxious adolescents on negative interpretations of non-social situations (Amir et al., 1998; Constans et al., 1999; Huppert et al., 2003; Voncken et al., 2003; Wilson & Rapee, 2005). Due to the lack of consistent evidence in previous studies specific hypotheses could not be formulated with regards to the strength of belief in negative interpretations and whether social anxiety has a unique relationship with negative interpretations, whilst accounting for negative affect.

Method

Participants

A total of 416 adolescents was initially invited to take part in this study. Parents of the adolescents were informed about the study by letter and their consent requested. Forty seven adolescents were ill or absent at the time of testing, 10 had refused participation and parental consent was not received for 3 adolescents. The final data set consisted of 356 secondary school children attending one of the first four years of secondary school in the Netherlands (equivalent to American grades 7 to 11). Pupils came from one of 3 different schools, all of which were located in one city. There were

195 boys, with a mean age of 14.28 years (range 12.10 to 16.70 years) and 161 girls, with a mean age of 14.18 years (range 11.91 to 16.39 years). Pupils followed two different education levels designed as precursors to higher education (“havo”: senior general secondary education and “vwo” pre-university education). 40.4 % of participants followed senior general secondary education and 59.6% pre-university education. The majority of participants (67.7%) had a Dutch background, 7.3% were Surinamese, 3.4% were Turkish, and 16.5% were of other ethnic backgrounds (5.1% of answers to this question were missing). Eighty three percent of adolescents lived with both biological parents.

Two social anxiety groups were selected from the total sample using the following criteria; the high anxious group scored in the top 10% and the non anxious (control) group scored between 45% and 55% on the sample’s Social Anxiety Scale for Adolescents (SAS-A; La Greca & Lopez, 1998) frequency distribution. The selection of middle anxious children in the control group was motivated by the wish to have “normal” controls and not participants who scored in the extreme non anxious range. Separate cut off points were used for boys and girls according to their individual distributions. The high anxious group consisted of 37 adolescents (17 girls and 20 boys; mean age 13.65 years, $SD = 1.01$) and 36 participants made up the control group (16 girls and 20 boys; mean age 13.56 years, $SD = .94$). The two groups differed significantly on the SAS-A with a mean sum score of 55.46 ($SD = 7.52$) for the high anxious group and 34.67 ($SD = 2.33$) for the control group, $t(43 \text{ adjusted } df) = -16.06$, $p < .001$, $d = 3.73$. Participants in the two groups did not differ on age, gender, and frequency of studying at pre-university education level, living with both biological parents, or having a Dutch background.

Materials

Social Anxiety Scale for Adolescents (SAS-A).

The Dutch translation (Koot & Utens, unpublished) of the Social Anxiety Scale for Adolescents (SAS-A; La Greca & Lopez, 1998) provided the measure of social evaluative anxiety. A 22 item instrument, the SAS-A contains 18 descriptions of social fears (e.g., “I worry about what other kids think of me” and “I get nervous when I meet new kids”)

and 4 filler items (e.g., “I like to read”). Respondents are asked to rate each item according to the degree to which the item “is true for you” (1 = not at all, 5 = all the time). Scores on the SAS-A can range between a minimum of 18 and a maximum of 90. The SAS-A has good internal consistency (LaGreca & Lopez, 1998; Myers, Stein, & Aarons, 2002). In the current study the Cronbach’s α over all 18 items was .90.

Adolescents’ Interpretation and Belief Questionnaire (AIBQ).

The Adolescents’ Interpretation and Belief Questionnaire (AIBQ)¹ measures interpretation bias and is a combination of the instruments developed by Voncken et al. (2003) and Stopa & Clark (2000) for adult populations. The AIBQ contains five social and five non-social ambiguous situations. The social scenarios reflect events that may commonly occur at school and are relevant to the age group in question, such as giving a presentation in front of your class after which no-one asks a question, standing on your own at a school party when somebody looks at you, and inviting classmates to your birthday party some of whom do not reply. The non-social scenarios focus on events which do not have an element of social evaluation and which impact upon the protagonist alone, for example, seeing a long queue of people at the cashier for the cinema and you don’t know why, and locking up your bike somewhere but then wondering why you can’t find it later on. The majority of these situations were selected from those contained in the Interpretation and Judgmental Questionnaire of Voncken et al. (2003) and adapted to be suitable for older children and adolescents. For example, the word ‘acquaintance’ was replaced with ‘classmates’ and situations were framed in a school, as opposed to a work, context.

For each item respondents are firstly presented with the situation followed by a specific question to address the ambiguity of the scenario. For example, “You’ve invited a group of classmates to your birthday party, but a few have not yet said if they’re coming. Why haven’t they said something yet?” Secondly, three interpretations of the situation, positive, negative and neutral are presented individually and respondents are asked to rate, for each statement separately, how likely it is that it would pop up in their

¹ An English and Dutch version of the AIBQ is available from the first author on request.

mind. Each interpretation is rated on a five-point Likert scale (1 = Doesn't pop up in my mind, 3 = Might pop up in my mind, 5 = Definitely pops up in my mind). Finally, the three interpretations are shown again and the respondent has to choose the statement which he/she believes to be most correct by marking the appropriate explanation. The addition of this belief question was based on Stopa and Clark's (2000) measure of interpretation bias. Social and non-social situations are presented in a random order. Interpretations per situation and the alternatives for the belief questions are also shown in a fixed random order. Each situation was checked to make sure that the three interpretations appeared in a different order from the belief question alternatives. The whole questionnaire was verified by a psychologist experienced in the field of interpretation bias and social anxiety. See Table 2.1 for an example of a social and non-social situation, their corresponding interpretations and the belief question.

Positive, neutral and negative interpretation subscales, for the respective social and non-social situations, were formed by adding up scores from each interpretation/situation combination and dividing by the number of situations (five; subscale scores range from 1 to 5)². For the belief question choosing the positive interpretation was given a score of 1, a neutral interpretation a score of 2 and a negative interpretation a score of 3. Thus, a higher score indicated believing a more negative interpretation. Belief subscales were created by taking the mean of individual belief scores across the five social and five non-social situations, respectively.

Positive and Negative Affect Scale (PANAS).

The Positive and Negative Affect Scale is a 20 item instrument containing words representing the two most common affective structures; positive and negative (Watson, Clark & Tellegen, 1988). Ten words reflect positive affect, a tendency to be active and enthusiastic, and ten reflect negative affect. The latter dimension is quite general in the sense that it covers one's distress and a variety of unpleasant mood states, e.g., anger, disgust and fear (Watson et al.). The PANAS can be used with a variety of instructions

² A preliminary look at correlations between positive, neutral and negative interpretations of social and non-social situations and social anxiety showed that the neutral subscales did not correlate significantly with social anxiety ($r = .02$ and $r = -.05$ respectively). Neutral interpretation subscales were therefore excluded from the main analyses.

Table 2.1

Example of a Social and a Non-social Situation and their Different Interpretations

Social Situation						Non-social Situation					
You've invited a group of classmates to your birthday party, but a few have not yet said if they're coming. Why haven't they said something yet?						You've locked your bike up somewhere and when you go back for it later on, you can't find it. Why can't you find your bike?					
They don't know yet if they can come or not.						It's been stolen.					
Doesn't pop up in my mind		Might pop up in my mind		Definitely pops up in my mind		Doesn't pop up in my mind		Might pop up in my mind		Definitely pops up in my mind	
1	2	3	4	5		1	2	3	4	5	
They don't want to come because they don't like me.						I'm looking in the wrong place but it's definitely around here somewhere.					
Doesn't pop up in my mind		Might pop up in my mind		Definitely pops up in my mind		Doesn't pop up in my mind		Might pop up in my mind		Definitely pops up in my mind	
1	2	3	4	5		1	2	3	4	5	
They're definitely coming; they don't need to tell me that.						There are just so many bikes here that it's difficult to find it.					
Doesn't pop up in my mind		Might pop up in my mind		Definitely pops up in my mind		Doesn't pop up in my mind		Might pop up in my mind		Definitely pops up in my mind	
1	2	3	4	5		1	2	3	4	5	
Which thought is most believable?						Which thought is most believable?					
• They don't want to come because they don't like me.						• There are just so many bikes here that it's difficult to find it.					
• They don't know yet if they can come or not.						• I'm looking in the wrong place but it's definitely around here somewhere.					
• They're definitely coming; they don't need to tell me that.						• It's been stolen.					

specifying the time frame in which the different feelings and emotions have been felt. Instructions might refer to how a person is feeling “at the present moment”, how they have been feeling “during the past few days”, “past few weeks” or even in “the past year”. Each feeling or emotion item is rated on a 5 point Likert scale (1 = very slightly or not at all, 2 = a little, 3 = moderately, 4 = quite a bit, 5 = extremely). Sum scores on each subscale of the PANAS can range between 10 and 50. Watson et al. reported high internal consistencies for both scales across the different instructions (α 's ranging from .86 to .90 for the Positive Affect subscale and between .84 and .87 for the Negative Affect subscale). In the present study a modified Dutch version of the original PANAS, asking how respondents have felt in the past few weeks was used. This modified version is appropriate for the age group under study (Reijntjes, Stegge, Meerum Terwogt, Kamphuis, & Telch, 2006). One item was changed in the version used here as in a pilot study it was found to load on both positive and negative affect subscales. The internal consistency of the negative affect subscale, the only scale used in the analyses of the present study, was .81.

Procedure

Participants completed the questionnaires in their school classroom in the presence of a teacher and experimenter (a Master's psychology student). The experimenter ensured that participants filled in the questionnaires independently, including not copying from a classmate. One additional questionnaire not utilized for the present study was also distributed. Before completing the questionnaires the aims of the study were explained, highlighting that participation was voluntary and anonymous. It took approximately 50 minutes for participants to complete the questionnaires. Once finished, participants were thanked for their time and any questions addressed.

Data Analysis

The effect of high social anxiety on positive and negative interpretations and belief were tested using MANOVA, followed up with univariate ANOVA. This was

performed for social and non-social situations separately³. Due to its robustness to departures from normality and the homogeneity assumption, Pillai's Trace statistic is reported in all MANOVA results (Tabachnick & Fidell, 2007). In all analyses gender was included as a control variable.

As for missing items, if a participant missed more than 25% of items on a particular subscale, a missing value was assigned to that case for the relevant subscale. This applied to only four participants out of the 356; 1 missed the social belief subscale, 2 the non-social belief subscale and 1 the negative affect subscale.

Results

Interpretations and Belief in Social Situations

A 2 (Social anxiety group) x 2 (Gender) MANOVA was conducted with positive and negative interpretations, and belief of interpretations for social situations as the dependent variables (Table 2.2 presents the *M*'s and *SD*'s of this analysis). The MANOVA tested the first two research questions ("Do high socially anxious adolescents have more negative interpretations and/or less positive interpretations in socially ambiguous situations?" and "Do socially anxious adolescents believe negative interpretations of social situations more than non-socially anxious adolescents?"). The multivariate test yielded significant effects for social anxiety, $F(3, 67) = 10.36, p < .001$, partial $\eta^2 = .32$; and gender, $F(3, 67) = 4.60, p < .01$, partial $\eta^2 = .17$. The Social Anxiety group by Gender interaction was not significant. Subsequent ANOVAs showed that the largest effect for social anxiety was on participants' negative interpretations, $F(1, 69) = 31.00, p < .001$, partial $\eta^2 = .31$. The high anxious group made significantly more negative interpretations than the control group (see Table 2.2). A significant, although much smaller, effect was found for belief, $F(1, 69) = 5.55, p < .05$, partial $\eta^2 = .07$. Participants in the high anxious group were more negative in their belief than the control group. The high anxious group

³ A repeated measures design is often used to examine interpretation bias in social and non-social situations simultaneously. This approach was not employed here due to the fact that such a design would produce too many combinations of factors (a repeated measures factor with 6 levels, and Social Anxiety Group and Gender as between subjects factors) relative to the sample size.

Table 2.2*Means (SDs) of the AIBQ Social Situations' Interpretations and Belief by Social Anxiety Group and Gender*

AIBQ Variable	Social anxiety group	Gender	<i>M</i> (<i>SD</i>)	<i>n</i>
Positive Interpretation	Control	Girls	2.70 (0.52)	16
		Boys	3.16 (0.67)	20
		All	2.96 (0.64)	36
	High	Girls	2.58 (0.90)	17
		Boys	2.94 (0.47)	20
		All	2.77 (0.71)	37
	Total	Girls	2.64 (0.73)	33
		Boys	3.05 (0.58)	40
Negative interpretation	Control	Girls	2.56 (0.37)	16
		Boys	2.38 (0.60)	20
		All	2.46 (0.51)	36
	High	Girls	3.51 (0.67)	17
		Boys	2.85 (0.47)	20
		All	3.15 (0.65)	37
	Total	Girls	3.05 (0.72)	33
		Boys	2.62 (0.58)	40
Belief question	Control	Girls	2.00 (0.22)	16
		Boys	1.86 (0.36)	20
		All	1.92 (0.31)	36
	High	Girls	2.26 (0.40)	17
		Boys	1.98 (0.34)	20
		All	2.11 (0.39)	37
	Total	Girls	2.13 (0.35)	33
		Boys	1.92 (0.35)	40

Note. AIBQ = Adolescents' Interpretation and Belief Questionnaire.

did not differ significantly from the control group on positive interpretations of social situations. Univariate ANOVAs also showed that girls were significantly less positive, $F(1, 69) = 7.11, p < .02$, partial $\eta^2 = .09$, and more negative, $F(1, 69) = 10.91, p < .01$, partial $\eta^2 = .14$, in their interpretations than boys, and had more negative beliefs, $F(1, 69) = 6.78, p < .02$, partial $\eta^2 = .09$.

Interpretation Bias and Negative Affect: Specificity to Social Anxiety

To answer the third research question ("Can a high level of negative affect account for the presence of a more negative interpretation style among socially anxious adolescents or is this style specifically related to social anxiety symptoms?") a second MANOVA, similar to the first, was run but this time the negative dimension of the PANAS was added as a covariate to control for negative affect. The multivariate tests showed a trend for negative affect having an effect on adolescents' interpretations and belief, $F(3, 66) = 2.34, p = .08$, partial $\eta^2 = .10$. After controlling for negative affect, the social anxiety effect was still significant, $F(3, 66) = 6.09, p < .01$, partial $\eta^2 = .22$. Follow up ANOVA's showed a significant difference between the two social anxiety groups for negative interpretations, whilst accounting for negative affect, $F(1, 68) = 18.04, p < .001$, partial $\eta^2 = .21$. Belief remained borderline significant in the presence of negative affect, $F(1, 68) = 2.98, p = .09$, partial $\eta^2 = .04$.

Content Specificity of Interpretation Bias: Non-social Situations

A 2 (Social anxiety group) x 2 (Gender) MANOVA was conducted with positive and negative interpretations, and belief of non-social situations as the dependent variables to test the fourth research question regarding content-specificity of interpretation bias. As gender did not yield either a main or interaction effect a second analysis was performed without this factor. Table 2.3 presents the means and standard deviations for non-social situation subscales by social anxiety group. The multivariate effect of social anxiety was significant, $F(3, 69) = 2.84, p < .05$, partial $\eta^2 = .11$. Subsequent ANOVAs showed that high socially anxious adolescents rated negative interpretations of non-social situations as more likely to come to mind, $F(1, 71) = 7.02, p < .02$, partial $\eta^2 = .09$, and were more likely to believe the negative interpretations,

$F(1, 71) = 6.21, p < .02$, partial $\eta^2 = .08$, than adolescents in the control group. There was no significant difference between the high anxious group and control group on positive interpretations of non-social situations. To check whether the difference between the high and median social anxiety groups could be explained by underlying levels of negative affect, the negative dimension of the PANAS was added as a covariate in the MANOVA. This yielded a significant multivariate effect for negative affect, $F(3, 68) = 3.52, p < .05$, partial $\eta^2 = .13$. However, while accounting for negative affect the multivariate effect of social anxiety was not significant anymore.

Table 2.3

Means (SDs) of the AIBQ Non-Social Situations' Interpretations and Belief by Social Anxiety Group

AIBQ Variable	Social anxiety group	<i>M (SD)</i>
Positive Interpretation	Control	3.69 (0.50)
	High	3.51 (0.64)
Negative interpretation	Control	2.51 (0.60)
	High	2.90 (0.66)
Belief question	Control	1.56 (0.30)
	High	1.74 (0.31)

Note. AIBQ = Adolescents' Interpretation and Belief Questionnaire.

Discussion

In the adult literature, it has quite consistently been shown that individuals with social phobia or high levels of social anxiety display a negative bias in the way in which they interpret and give meaning to ambiguous social situations. The present study's aim was to take an initial look into whether an interpretation bias could be found in an adolescent population. Drawing from the adult literature four issues were taken into account. The study's findings will be discussed below in relation to these four key issues.

The first issue concerned whether interpretation bias reflects a tendency to be more negative, and/or whether it reflects an absence of positive thinking. Consistent

with previous research conducted with adult samples (Huppert et al., 2003; Wilson & Rapee, 2005), the present study found that high socially anxious adolescents were significantly more likely to rate negative interpretations of social situations as coming to mind than adolescents with an average level of social anxiety. However, the high anxious group was not less likely than the control group to rate positive interpretations as coming to mind in social situations. In line with other studies (Huppert et al., 2003; Wilson & Rapee, 2005) these findings suggest that it is the likelihood of negative interpretations coming to mind in social situations, and not a lack of positive interpretations, which distinguish socially anxious from non socially anxious adolescents. On the other hand, findings contradict studies in which individuals with high levels of social anxiety (Brendle & Wenzel, 2004; Constans et al., 1999) are shown to make less positive interpretations of social situations. It is important to note, however, that unlike in the current study Constans et al. did not measure positive and negative interpretations on two separate dimensions, which could account for the different findings. In the Brendle and Wenzel study, socially anxious individuals were found to be both more negative and less positive, although the positive bias was particularly strong when participants were asked to interpret a situation 48 hours after being presented with that situation. Possibly, this methodological difference can explain why the present study as well as the Huppert et al. and Wilson and Rapee studies did not corroborate Brendle and Wenzel's finding.

These results are consistent with what Kendall (1984) called "the power of non-negative thinking." That is, using a slightly different paradigm of assessing the frequency of negative and positive self-statements of children and adults with various anxiety disorders, the majority of studies have found that individuals with anxiety disorders are characterized by a higher frequency of negative self-statements but not by a lower frequency of positive self-statements, compared to individuals without anxiety disorders (e.g. Bögels & Zigterman, 2000, Ronan, Kendall, & Rowe, 1994; Zatz & Chassin, 1983). The clinical intuition of this finding might be that cognitive interventions should focus on decreasing negative interpretations, rather than increasing positive interpretations. However, it might be the case that during the process of treatment,

brainstorming about all possible positive interpretations is an effective way of decreasing negative interpretations.

The second issue of the current study focused on socially anxious adolescents' belief in negative interpretations of social situations and their importance relative to thoughts that come to mind. Our findings indicated that social anxiety is significantly related to a greater likelihood of choosing the negative interpretation of a social situation as the correct one. However, the effect size for the differences between groups on belief was less than half that for the likelihood of negative interpretations coming to mind in social situations. Given this difference between negative interpretation and belief, it may be suggested that the likelihood of a negative interpretation coming to mind is more indicative of adolescent social anxiety than believing in the negative interpretation, as the right interpretation, relative to a neutral and positive one. This reasoning is supported by the work of Stopa and Clark (2000). Alternatively, difference in effect size between interpretations and belief might have resulted from the different type of measurement: dimensional measurement of interpretations coming to mind versus categorical measurement of belief (choosing the most believable interpretation). Future research measuring both interpretation and belief in a dimensional way may help clarify this issue further.

The third issue was whether a negative cognitive bias (i.e., negative interpretations coming to mind and belief in these interpretations) among socially anxious adolescents could be accounted for by high levels of negative affect. In agreement with studies using adult populations (Constans et al., 1999; Huppert et al., 2003; Wilson & Rapee, 2005), the present investigation found that socially anxious adolescents' relatively strong negative bias is not due to higher levels of negative affect. Contrary to Franklin et al.'s findings with adults (2005), the current study suggests that, among *adolescents* interpretation bias and, to a lesser extent, belief in negative interpretations are particular to social anxiety, rather than reflecting a more general underlying factor characteristic of a wider range of emotional disorders. The relationship between negative interpretation bias and negative affect may still hold for the adult population. If, as some authors suggest (e.g., Stein et al., 2001; Wittchen, Kessler, Pfister, & Lieb, 2000), depression grows out of (social) anxiety it is indeed

possible that a more general relationship with negative affect may develop over time. Related to this, Franklin et al. used patients with social phobia whereas we used analogue groups. In samples of social phobia patients there is generally high comorbidity with depression, which may explain why in Franklin et al.'s study the social interpretation bias was not specific to social anxiety but reflected general emotional disorders.

The fourth issue related to the content specificity of interpretation bias. In line with a number of studies conducted among adult samples (Amir et al., 1998; Constans et al., 1999; Huppert et al., 2003; Stopa & Clark, 2000; Voncken et al., 2003; Wilson & Rapee, 2005), the present research found evidence to support content specificity of interpretation bias in socially anxious adolescents. Although socially anxious adolescents rated negative interpretations of social situations as significantly more likely to come to mind than adolescents with an average level of social anxiety, no difference was found for non-social situations, after controlling for the level of negative affect reported by participants. In the present study's socially anxious adolescent population then, interpretation bias manifests itself specifically in social situations. Unfortunately however, we were not able to examine whether interpretation bias for social situations is specific to social anxiety compared to other anxieties, for example generalized and separation anxiety, and panic. Future research should therefore include groups of adolescents with different anxiety disorders and use situations which are thematically relevant to these different types of anxiety to test the content specificity hypothesis in a more methodical way.

A final point should be made about gender differences. Although not a main focus of this study, gender differences were examined in relation to negative and positive interpretations and negative beliefs of social and non-social situations. Results indicated that girls were significantly more likely to endorse negative interpretations, less likely to endorse positive interpretations and more likely to believe the negative interpretation of social situations. By contrast, girls and boys were equally likely to indicate that a negative interpretation would come to mind in response to non-social situations. Clearly, the thoughts that come up in the minds of adolescent girls concerning social situations have a strong theme of being negatively judged by other people and their

decision making is guided by such evaluative interpretations. This stronger negativity in relation to social events shown by girls is consistent with previous research reporting a greater concern for feelings of social inadequacy among adolescent girls compared to boys (Kashani, Orvaschel, Rosenberg, & Reid, 1989).

Although the current study yielded new and important results, it only took a first look into interpretation bias among adolescents and some limitations need to be noted. Firstly, participants were the only source of information for all variables measured. This can inflate the chance of finding significant effects as a result of shared method variance (Campbell & Fiske, 1959). Future research would benefit from employing more than one modality of assessment to measure study variables, for example an objective measurement of social anxiety. Secondly, it is also necessary that future studies employ a variety of methodologies to measure interpretation bias, such as computerized reaction time tasks, which have the advantage of measuring “on-line” interpretations (i.e., interpretations produced immediately at the moment social information is first presented; Hirsch & Clark, 2004), rather than relying solely on self-report. Thirdly, whilst the use of a community sample is regarded as a strong point of this study because it informs research on how such a bias may develop within a normal population, it is still important to study the nature of interpretation bias among a clinical group of adolescents diagnosed with social phobia to further understanding of this phenomenon.

Existence of a negative interpretation bias may have serious implications for an adolescent’s daily life; for example, social situations may become increasingly unpleasant, worrisome and threatening. It is therefore imperative to help the socially anxious adolescent as early as possible in their development. Cognitive strategies are effective not only in treating adult social phobia but also in adolescent social phobia (Albano, Marten, Holt, Heimberg & Barlow, 1995; Hayward et al., 2000; Rodebaugh, Holaway & Heimberg, 2004). However, it has not yet been examined how effective these cognitive strategies are in reducing the likelihood of negative interpretations and/or belief of negative interpretations, compared to for example behavioral strategies or medication. Moreover, it is unknown whether reduction in these biases mediates the reduction of social anxiety in adolescents. Applying instruments such as the AIBQ before and after treatment of adolescents with social phobia may give insight into the process of change

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of social phobia during treatment. Also, one important prevention strategy indicated by the treatment of adult social phobia may be to target the popping up and belief of negative social interpretations in adolescence. To that end, adolescents could be selected based on the valence of their social interpretations, and randomized to a cognitive intervention or natural course. Such studies can increase our knowledge of the role of adolescent social interpretation bias in the etiology, prevention and treatment of social phobia.