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# How shyness may lead to social anxiety: The role of negative social cognitions

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Running head: Shy youth becoming socially anxious

## Abstract

Shyness is a risk factor for the development of social anxiety. This three-wave longitudinal study spanning five years evaluated the mediating roles of social self-perception and social interpretation bias in the link between shyness and later social anxiety. Participants in this study were 262 (pre-)adolescents aged 8 to 17 years old. The study used a parent-reported measure of shyness while social anxiety and the mediator variables were self-reported. Results showed that shyness predicted the occurrence of social anxiety over time. Negative social self-perception mediated the shyness social anxiety link, but social interpretation bias did not. A moderated mediation analysis suggested that negative social self-perception was a mediator only for older adolescents.

Key words: adolescence; shyness; anxiety, emotional development; social cognition

The present study aimed to evaluate the mediating role of negative social cognitions in the link between (pre-)adolescent shyness and social anxiety. Both shyness and social anxiety are relatively common in youth but prevalence rates may vary depending on cultural background variables (Pines & Zimbardo, 1978). In Western countries, about 60% of the adolescents consider themselves as shy. (Henderson & Zimbardo, 1996). Prevalence rates of self-reported social anxiety vary between 27 and 47% (Essau, Conradt, & Petermann, 1999; Wittchen, Stein, & Kessler, 1999) with around 9% of adolescents meeting lifetime criteria for social anxiety disorder (Burstein et al., 2011).

In the literature, the constructs of shyness and social anxiety overlap to some extent (Rapee & Coplan, 2010), although shyness is a temperamental characteristic that describes an individual's personality and social anxiety is a clinical condition (Rapee et al., 2005). Several definitions of shyness exist, but the term is most frequently used interchangeably with behavioral inhibition (Crozier & Alden, 2001). It then refers to inhibited, fearful behavior in the presence of unfamiliar adults or children rated by parent judgment or behavioral observations (Crozier & Alden, 2001). Shyness has also been defined more generally as "the discomfort and inhibition that may occur in the presence of others" (Cheek & Buss, 1981, p. 330). In this definition it is at least partly similar to social anxiety. Social anxiety too is characterized by discomfort and inhibition in the presence of others but has as its core feature the fear of being scrutinized and negatively evaluated by others (APA, 2013). Therefore, the identification of social anxiety generally involves self-report of the socially anxious individual. Especially in school-aged children, shyness and social anxiety have much in common (Heiser, Turner, & Beidel, 2003); they share, among other things, their behavioral manifestation, their chronic nature (Rapee & Coplan, 2010), and in some interpretations also the fear of being evaluated by others (Crozier & Alden, 2001). The apparent similarities between the constructs notwithstanding, most researchers

view shyness and social anxiety as distinct constructs (Knappe, Sasagawa, & Creswell, 2015; Rapee, 2014; Rapee & Coplan, 2010). There are several reasons for this viewpoint. Not only are behavioral inhibition or shyness and social anxiety theoretically different, they are also only weakly (although significantly) correlated, and differ in terms of their responsiveness to interventions and the degree of life interference (Rapee, 2014; Rapee & Coplan, 2010).

Several studies have shown that behavioral inhibition or shyness in young children is a risk factor for the development of social anxiety in later life (Biederman et al., 2001; Hirshfeld-Becker et al., 2007; Prior, Smart, Sanson, & Oberklaid, 2000). A meta-analysis found that 43% of highly inhibited young children develop social anxiety disorder in late childhood or adolescence compared to 12% of less inhibited children (Clauss & Blackford, 2012). In relation to social anxiety symptoms, one study reported that 61% of young inhibited children showed social anxiety symptoms in adolescence, compared to 27% of non-inhibited children (Schwartz, Snidman, & Kagan, 1999).

Evidently, there is a time lag between the onset of shyness and social anxiety. Whereas shyness as manifestation of an inhibited temperament is noticeable from a very young age on (Fox, Snidman, Haas, Degnan, & Kagan, 2015; Kagan, Reznick, & Snidman, 1988), social anxiety, especially in its more extreme form, most often reveals itself at a later age, in late childhood or adolescence. The age of onset of social anxiety disorder as reported in longitudinal studies is somewhere between 10 and 17 years (Magee, Eaton, Wittchen, McGonagle, & Kessler, 1996; Wittchen & Fehm, 2003). The relatively late onset of social anxiety compared to shyness has been explained by a relatively late development of the cognitive abilities that play a role in social anxiety. It is in late childhood that cognitive development is assumed to have reached a level where children start to interpret social situations and other persons' behavior in those situations and evaluate their own social performance (Ollendick & Hirshfeld-Becker, 2002;

Wong & Rapee, 2016). When shy youth develop negative cognitions about other persons' behavior and the self in social contexts, they may become socially anxious (Clauss & Blackford, 2012; Fox, Henderson, Marshall, Nichols, & Ghera, 2005; Spence & Rapee, 2016).

The role of negative social cognitions in the development of social anxiety has been described in several highly influential cognitive models. Two cognitive models of adult social anxiety posit that negative social cognitions are an important maintaining factor in the development of social anxiety disorder (Clark & Wells, 1995; Rapee & Heimberg, 1997). The models describe a vicious circle where negative social cognitions and self-focused attention increase people's anxiety and the increased anxiety in turn causes even more negative cognitions. Recently, Spence and Rapee (2016) posited that negative social cognitions are not only an important maintaining but also an important causal factor in the development of social anxiety disorder. In their model, proposed pathways to social anxiety disorder start with a behaviorally inhibited temperament that, under the influence of personal and environmental factors such as poor social skills, negative social cognitions, and negative peer responses, leads to social anxiety and, in extreme cases, social anxiety disorder. The social cognitions concerned are (a) negative interpretation of ambiguous social information or situations, and (b) negative self-cognitions before, during, and after a social task. These negative cognitions might develop because inhibited children experience less satisfying or even adverse peer interactions, possibly due to relatively poor social skills (Fox et al., 2005; Spence & Rapee, 2016).

Empirical studies have found that social anxiety in youth indeed is associated with negative interpretation of ambiguous social information and situations (Bögels, Snieder, & Kindt, 2003; Miers, Blöte, Bögels, & Westenberg, 2008; S. P. Vassilopoulos & Banerjee, 2008). Studies also found links between social anxiety and negative social self-cognitions (Alfano, Beidel, & Turner, 2006; Hodson, McManus, Clark, & Doll, 2008; Inderbitzen-Nolan, Anderson, &

Johnson, 2007; Miers et al., 2008; Ranta, Tuomisto, Kaltiala-Heino, Rantanen, & Marttunen, 2014). Some of these negative self-cognitions are not, or not completely, warranted and are therefore considered to be negatively biased (Miers, Blöte, & Westenberg, 2011). There is also some empirical evidence for a link between shyness and negative social cognitions (Pérez-Edgar et al., 2010; Weeks, Ooi, & Coplan, 2016). Relevant to the present study, three studies evaluated the mediating role of social cognitions in the link between shyness/behavioral inhibition and (social) anxiety (Vassilopoulos, Brouzos, Moberly, and Spyropoulou, 2017; Viana & Gratz, 2012; Weeks et al., 2016).

Vassilopoulos and colleagues (2017) selected early adolescents to study the link between self-reported shyness and social anxiety. They found that adolescents' negative thoughts about presenting themselves in a social context mediated this link. The Viana and Gratz (2012) study selected young adolescents and addressed general anxiety. Their study found that negative interpretation bias and judgment bias (measured as the persons' perceptions of their control over a situation) are mediators in the link between behavioral inhibition and anxiety. The Weeks et al. (2016) study included early adolescents and addressed social anxiety. In their study, high judgments of the probability and cost of negative social situations (asking the participant to judge how likely it is that the situation is going to happen and, if it happens, how bad it will be for the participant) mediated the shyness – social anxiety link. However, because the assessment of the variables in those studies was concurrent, the authors of all three studies acknowledged that no conclusions could be drawn about the direction of the different links between shyness/behavioral inhibition, cognitions, and (social) anxiety. Furthermore, shyness/behavioral inhibition, and (social) anxiety were self-reported posing the problem of common method variance (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003).

The present study used a longitudinal design to investigate the mediating role of two social cognitions, namely, social self-perception and interpretation of ambiguous social situations, in the link between shyness and social anxiety. The cognitions address two different aspects of social thoughts, one related to social self-evaluation and the other to the interpretation of other people's behavior and intentions towards the person concerned. Shyness was assessed as behavioral inhibition in the presence of unfamiliar adults and children and was reported by parents. Social anxiety and cognitions were self-reported by the participants. The study selected pre-adolescents and adolescents (hereafter referred to as youth) because at that age social anxiety is emerging as a serious problem in some youth.

Based on the reviewed literature, we posed two research questions. (1) Do negative social self-perception and negative social interpretation mediate the link between shyness and later social anxiety? (2) Are the putative mediation effects valid for both genders and for youth of different ages? The reason for studying the moderating effect of gender is that studies repeatedly find gender differences in self-reported social anxiety levels (Knappe et al., 2015). Some studies also found that gender moderated the relation between social anxiety and peer victimization (Blöte, Miers, Heyne, & Westenberg, 2015). Similar moderating effects may also occur in the relationships between shyness, social cognitions, and social anxiety. Age was included as a moderator because the sample had a relatively wide age range and the developmental relationships between shyness, social cognitions, and social anxiety may change from late childhood to adolescence due to the development of higher levels of social cognitions.

## **Method**

### *Design and procedure*

The present study used data from the Social Anxiety and Normal Development (SAND) study (Westenberg et al., 2009). The SAND study is a longitudinal study with four assessment



waves, the first three waves each a year apart and the fourth one taking place one to three years after Wave 3 (Miers et al., 2013). The varying time span between Wave 3 and 4 was due to practical reasons. The time span was relatively larger for older participants. The present study used data from Waves 1, 3, and 4 that are referred to in the following text as T1, T2, and T3, respectively. The time span between T1 and T2 is two years, between T2 and T3 one to three years, and between T1 and T3 three to five years. Shyness was measured at T1, social anxiety at T1 and T3, and social interpretation and self-perception at T1 and T2. At T1 and T2, the participants came to the university laboratory twice, once for a pre-lab session and one week later for a lab session that included giving a speech (i.e., the Leiden Public Speaking Task; Westenberg, et al., 2009). At T3, participants came only once for a session that was partly similar to the pre-lab sessions of T1 and T2. The difference was that at T3 participants did not complete questionnaires related to the speech. During the pre-lab sessions participants completed a number of questionnaires among them the self-report questionnaires used in the present study. The parent-reported shyness measure was collected by means of a questionnaire filled in at home by the primary care-giver.

### *Participants*

The SAND study selected youth from two primary schools and one secondary school in an urban area of The Netherlands. Pupils who were treated for mental health problems or had other medical conditions were excluded. The majority of the participants (91,5%) were born in the Netherlands and 49% of the biological mothers had completed tertiary education (Miers, Blöte, de Rooij, Bokhorst, & Westenberg, 2013). At T1, 331 youth participated in the SAND study. At T3, 236 still participated. Parents of 265 participants returned the questionnaire measuring their child's shyness. Seven participants had missing values on at least one of the social interpretation or self-perception assessments. At T1, participants were between 9 and 17

years of age and at T3 between 12 and 21 years (see Table 1). The SAND study was approved by the university's Medical Ethical Committee. Parents gave their written consent and youth their written assent for participation in the study.

<Insert Table 1 about here>

### *Instruments*

Shyness was measured with the parent form of the *Behavioral Inhibition Scale* (BIS; Gest, 1997). The Dutch version (Muris, Meesters, & Spinder, 2003) used in the present study has 8 items that reflect shyness, communication, fearfulness, and smiling when talking to an unfamiliar child and an unfamiliar adult, e.g., "My child is shy when talking to an unfamiliar child". Items are rated on a scale from *never* (1) to *always* (4). In a group of 11 to 15 year-old adolescents the parent form of the BIS had a good internal consistency, Cronbach's alpha = .91, and was related to anxiety and depression symptoms (Muris et al., 2003). Cronbach's alpha in the present study is .92.

The *Social Anxiety Scale for Adolescents* (SAS-A; La Greca & Lopez, 1998) translated into Dutch (Koot & Utens, unpublished) was used to measure social anxiety. The SAS-A contains 22 items, 18 of which are statements relating to social anxiety (e.g., 'I worry that others don't like me') and four are filler items. Participants rate each statement in terms of how true it is for them using a 5-point Likert scale (1 = *not at all*, 5 = *all the time*). The SAS-A has good psychometric properties (La Greca & Lopez, 1998; Storch, Masia-Warner, Dent, Roberti, & Fisher, 2004). Cronbach's alpha in the present study is .90 at T1 and .93 at T3.

The *Adolescents' Interpretation and Belief Questionnaire* (AIBQ; Miers et al., 2008) measures interpretation bias in social as well as non-social ambiguous situations. In the present study we used data from the social scale which contains five scenarios, e.g., "You're standing on your own at a school party and somebody you don't know looks at you. Why is he or she looking

at you?” For each ambiguous scenario, three interpretations of the situation, positive, negative and neutral, are presented individually and respondents are asked to rate, for each interpretation, how likely it is that it would pop up in their mind. The present study used participants’ ratings on the negative interpretation scale, e.g., “I stand out like a sore thumb. He or she probably thinks I am pathetic.”, for the just-mentioned party scenario. Labels of the five-point scale are: 1 = *Doesn’t pop up in my mind*, 3 = *Might pop up in my mind*, 5 = *Definitely pops up in my mind*. Cronbach’s alpha of the scale in the present study is .74 at T1 and .71 at T2.

A Dutch adapted version of the *Expected Performance questionnaire* (ExP; Miers, Blöte, Sumter, Kallen, & Westenberg, 2011; Spence, Donovan, & Brechman-Toussaint, 1999) was used to measure participants’ social self-perception. The items of the ExP ask about the expected performance for giving a speech. In the SAND study the items referred to the speech the participants were required to give one week later, e.g., “Compared to other kids your age, how good will you be at giving the speech?”. In addition to the items in the original version (Spence et al., 1999) that ask about the judgment by other children two items were added about the judgment by a teacher, e.g., “How good do you think a teacher watching the video (i.e., of your speech) will think you are at giving a speech?” The items are rated on a 5-point scale (1 = *lowest*, 5 = *highest* expectation). In the present study, Cronbach’s alpha of the ExP is .76 at T1 and .75 at T2.

### *Data analysis*

First, we performed some descriptive analyses and computed the inter-correlations between the study’s variables. We applied one-tailed tests for the correlations because, based on the reviewed literature, we expected that shyness, social anxiety, and negative social cognitions are positively related. In handling missing data we opted for pair-wise exclusion. Second, we

used Mplus (Muthén & Muthén, (1998-2010)) to evaluate the mediating roles of social self-perception and social interpretation bias in two respective mediation analyses. Shyness at T1 was entered as independent variable, social anxiety at T3 as outcome variable, and social self-perception and interpretation bias as respective mediators. In each analysis, we defined the two assessments of the mediator, at T1 and T2, as sequential mediators (see Fig. 1). Social anxiety at T1 was included as a control variable. Third, to check whether putative mediation effects were moderated by age or gender we performed two moderated mediation analyses one with age group at T1 (younger age group  $\leq 13.00$  years; older age group  $> 13.00$  years) and one with gender as moderator. The model computed moderation of the indirect effects.

Mplus used boot-strapping, with bias-corrected bootstrap CIs based on 1000 bootstrap samples, for calculating the confidence intervals (CI) in the mediation analyses and two-tailed  $p$ -values in the moderated mediation analyses. .

Because a relatively large portion of the data were missing due to the longitudinal design of the study and the non-response of some parents we checked whether the groups with complete scores differed from those with missing values. In the Mplus analyses missing data were handled using Maximum Likelihood estimation. Mplus analyses used 261 cases, 136 boys and 125 girls. The younger age group comprised 113 and the older age group 148 youth. **Results**

The group participants who participated in the measurements of all three time points did not differ from the group that dropped out prematurely on any of the study's variables at T1 (all  $ps > .21$ ). The group of youth whose parents completed the BIS did not differ from the group whose parents did not complete it on any of the present study's variables (all  $ps > .22$ ).

*Relations between the key study variables*

Descriptive analyses and correlations between the study's variables are presented in Table 2. In answer to the first research question we found that shyness was significantly, although not strongly, associated with social anxiety, not only when measured concurrently but also when social anxiety was measured three to five years later than shyness. Additionally, results showed that shyness was also significantly related to low social self-perception both measured concurrently and two years later, but not to social interpretation bias. Social anxiety was significantly and moderately strongly related to (negative) social self-perception and interpretation bias both concurrently and over time. (Negative) social self-perception and interpretation bias were also significantly correlated both concurrently and over time. Age was related to self-perception at T1 and interpretation bias at T3. At T1 older youth had less positive self-perceptions and at T3 they had (slightly) less negative interpretations of ambiguous social situations. Gender was significantly related to social anxiety at T3 but not at T1. We found that at T3 girls reported higher social anxiety than boys. Girls also had lower self-perception at T1 and more negative social interpretations both at T1 and T3. Individual differences in social self-perception and interpretation bias were relatively consistent over the two-year period they were measured. Individual differences in social anxiety measured with an interval of three to five years were moderately consistent,  $r = .35$ . When we controlled for the time span between T3 and T1 measurements (the number of months between the dates of T3 and T1 differed between participants), correlations between social anxiety at T3 and the other variables at T1 and T2 only showed minimal changes in the second decimal and the statistical significance was not affected.

<Insert Table 2 about here>

*Negative social cognitions as mediators in the link between shyness and later social anxiety*

The first mediation analysis showed that negative self-perception mediated the link between shyness and later social anxiety (see Fig. 1). The pathway between shyness and social anxiety through self-perception at T1 and T2 was significant (the 95%-CI of the estimated effect did not include zero). The pathways through self-perception at T2 but not T1 and through self-perception at T1 but not T2 were significant when a 90%-CI but not when a 95%-CI was used. The direct effect was not significant. It should be noted that the analysis controlled for social anxiety at T1, removing the variance due to concurrent social anxiety from the shyness variable.

<Insert Fig. 1 about here>

The second mediation analysis with assessments of social interpretation bias at T1 and T2 as sequential mediators of the link between shyness and social anxiety yielded no significant effects. The indirect effect of the three paths were -.006 (-.020 to .002), .00 (-.039 to .051), and .006 (-.004 to .039) respectively, and the direct effect was .07 (-.06 to .18). The regression analysis pertaining to the first path in the mediation, showed that shyness did not significantly predict social interpretation bias at T1, coefficient = -.08 -.22 to .04, while social anxiety at T1 did, coefficient = .77 (.65 to .87). The regression analysis pertaining to the second path, with social interpretation bias at T2 as outcome variable yielded similar results, with for shyness a coefficient of -.001 (-.13 to .15) and for social anxiety of .31 (.12 to .47).

### *Moderating effects of age and gender*

We checked whether the mediation effects in the first analysis, that used self-perception at T1 and T2 as sequential mediators, were moderated by age or gender. For none of the three pathways the age group effect was significant, although for the pathway through self-perception at T1 and T2 it nearly reached significance (estimated effect = -.04,  $SE = .021$ ,  $p = .055$ ). Follow

up analyses showed that in the younger age group this pathway was not significant (estimated effect = .002,  $SE = .005$ ,  $p > .05$ ), whereas in the older age group it was significant (effect = -.04,  $SE = .02$ ,  $p < .05$ ). As far as gender is concerned, we found no differences in the three indirect pathway estimates between boys and girls ( $ps$  for the differences  $> .10$ ). .

A second set of moderated mediation analyses with social interpretation bias at T1 and T2 as mediators and age and gender as respective moderators did not yield any significant effects for age group or gender,  $ps > .20$ .

## Discussion

The present study aimed to extend our knowledge about the mediating role of social cognitions in the link between shyness and later social anxiety in youth. The study used a longitudinal design and evaluated the mediating effect of two kinds of social cognitions, namely, interpretation bias of ambiguous social situations and social self-perception. The main conclusions of the study are that (a) shyness in youth predicts later social anxiety through negative social self-perception but not negative social interpretation bias, (b) this mediating effect of social self-perception occurs only in girls. These key findings are discussed below.

The association between shyness and later social anxiety is in line with the results from previous studies (Rapee, 2014; Schwartz et al., 1999; Weeks et al., 2016) as is the relation between social anxiety and negative social cognitions (Alfano et al., 2006; Hodson et al., 2008; Inderbitzen-Nolan et al., 2007; Miers et al., 2008; Ranta et al., 2014). However, to the best of our knowledge the present study is the first to show that, at least in girls, social cognitions, in particular negative social self-perceptions, mediate the link between shyness and later social anxiety. It appears that shy youth develop negative perceptions about their social performance

(see also Pérez-Edgar & Fox, 2005; Weeks et al., 2016). In girls, these negative self-perceptions result in relatively high levels of social anxiety some years later. In contrast, the results do not convincingly show that shy youth interpret other people's behavior and intentions towards them in a negative way, neither concurrently (although the correlation of .15 was still significant) nor later. Negative social interpretation bias, however, is related to social anxiety both concurrently and later. Taken together, these findings suggest that shy youth first develop negative self-perceptions, subsequently become socially anxious and start to interpret ambiguous social situations in a negative way. It appears that youth first develop a low perception of their own social performance that later extends to negative interpretations of the social signals received from others.

The finding that social self-perception explains the relation between shyness and later social anxiety seems to be in line with the Viana and Gratz (2012) study on general anxiety. Although self-perception in our study was operationalized as expected social performance and in their study as perceived control over situations, both measures focus on acts of the persons themselves. As far as the mediating role of negative interpretations is concerned, our results are partly in line with the Viana and Gratz (2012) study. In both studies, interpretation bias was less important than self-perception. In our study, the mediating effect of interpretation bias was not significant and in their study it was less strong than that of perceived control. It should be noted, that in the Viana and Gratz (2012) study behavioral inhibition and anxiety were concurrently measured and rather strongly correlated. Their inhibited participants were already anxious and therefore may have had a higher interpretation bias.

It is somewhat difficult to conclude whether our results corroborate the finding of the Weeks et al. (2016) study that a judgment bias mediates the shyness – social anxiety link. In their



study, participants were asked to estimate the probability and cost of negative social events. This variable is possibly related to social interpretation bias, although it also refers to the perception how bad a certain negative event would be for the child. So, it seems more self-directed than a social interpretation bias. In this latter interpretation of the Weeks et al. (2016) mediator our results would indeed be in line. Our results seem to be in line with the Stephanos P Vassilopoulos et al. (2017) study as far as the mediating role of self-directed social thoughts are concerned. The current study's measure of youth's negative social self-perception and their study's measure of youth's negative thoughts about their own social functioning are both focused on negative cognitions about the participants' themselves and not their social context.

Notably, social self-perception mediated the shyness – social anxiety link in girls but not in boys. In both boys and girls shyness was related to negative self-perception, but only in girls the negative self-perception seemed to result in higher social anxiety a few years later. Furthermore, at that time girls reported more social anxiety than boys. These two findings may be explained by adolescent boys finding it less socially acceptable to acknowledge feelings related to anxiety (Ingles, La Greca, Marzo, Garcia-Lopez, & Garcia-Fernandez, 2010). Not, or under-, reporting anxiety would affect the relationship between social anxiety and self-perception. An alternative explanation is that girls are more susceptible to peer responses than boys. Grills and Ollendick (2002) evaluated the mediating role of self-worth in the link between peer victimization and anxiety and found that self-worth was a mediator in girls but not in boys. The authors explained this gender difference by proposing that girls are more easily influenced by negative peer behavior, internalize the negative peer feedback, and then become socially anxious. Accordingly, shy girls may be more negative about their social competence than shy boys (see Kashani, Orvaschel, Rosenberg, & Reid, 1989). Boys' (negative) expectations about how their

social performance will be judged by peers and teachers may have less impact on their feelings of competence compared to girls and may therefore not produce feelings of anxiety.

Evidently, the negative social self-perceptions of shy youth will be at least partly warranted just as those of socially anxious youth (Miers, Blöte, & Westenberg, 2011). Their self-cognitions may reflect a kernel of truth as a result of negative peer experiences. Future studies are needed to clarify the role of peer behavior in the development of shy children's negative social self-cognitions and possible emergence of social anxiety.

This study presents evidence supporting the idea that shyness and social anxiety are distinct constructs and do not represent low versus high values on a severity scale of social anxiety (Knappe et al., 2015; Rapee, 2014; Rapee & Coplan, 2010). The  $r = .25$  correlation between concurrently measured shyness and social anxiety is, although significant, rather weak. It confirms the correlation reported by Muris et al. (2003) who also used parent-reported shyness and child-reported social anxiety in their study.

Two strong points of the present study are its longitudinal design and its parent-reported assessment of shyness and child-reported social anxiety. There are also some limitations to this study that need mentioning. First, because of the age range of the participants, the youngest being 9 years of age, we could not evaluate the development from early shyness to social anxiety in adolescence. Second, the study utilized a sample of mainly Caucasian youth from two elementary schools and one secondary school. The extent to which our results are generalizable to the broader population of Western youth remains unclear. Third, we used a non-clinical assessment of social anxiety and did not determine whether participants developed a social anxiety disorder.

Future research needs to determine whether our findings are relevant to the development of clinical levels of social anxiety.

Future studies are also needed to evaluate gender differences in the development of social anxiety. Until now, very few studies on the relation between shyness and social anxiety paid attention to possible gender effects. Studies that do not include gender as one of their variables suggest that their results are valid for both genders, while they in fact may only be valid for girls. Research should pay more attention to specific developmental paths to social anxiety for boys and girls.

In conclusion, shy girls may become socially anxious when they develop negative self-perceptions about their social performance. Prevention programs in the domain of social anxiety should therefore pay attention to the negative consequences of shy behavior and low social self-perception for the development of social anxiety in girls.

### Footnote

1. In recent thinking about mediation the significance of paths a and b of a model are not required as long as ab is significant (Hayes, 2013).

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Table 1. Age per Time-point in Years

<b>Time-point</b>	<b>Min</b>	<b>Max</b>	<b><i>M</i></b>	<b><i>SD</i></b>
T1	8.87	17.33	13.34	2.25
T2	11.05	18.98	15.25	2.23
T3	12.22	21.86	17.48	2.72

Table 2. Pearson Correlations (*ns*) and *Ms* (*SDs*) of the Variables in the Study

	1	2	3	4	5	6	7	8	9	<i>M</i> ( <i>SD</i> )
1. Shyness _T1	-									2.10 (0.64)
	(265)									
2. Social Anxiety_T1	.24**	-								2.26 (0.71)
	(262)	(328)								
3. Social Anxiety_T3	.14*	.35**	-							2.03 (0.65)
	(194)	(233)	(235)							
4. Self- perception_T1	-.24**	-.42**	-.35**	-						3.28 (0.49)
	(261)	(323)	(230)	(325)						
5. Self- perception_T2	-.21**	-.22**	-.31**	.51**	-					3.25 (0.48)
	(200)	(242)	(231)	(239)	(244)					
6. Interpretation bias_T1	.10	.62**	.23**	-.28**	-.13*	-				2.64 (0.81)
	(261)	(326)	(232)	(322)	(241)	(327)				
7. Interpretation bias_T2 <sup>a</sup>	.10	.43**	.39**	-.23**	-.26**	.45**	-			2.59 (0.77)
	(203)	(246)	(235)	(243)	(244)	(245)	(248)			
8. Age	-.05	-.01	-.03	-.23**	.02	.01	-.12*	-		15.25 (2.35)
	(265)	(328)	(235)	(325)	(244)	(327)	(248)	(331)		
9. Gender (1=female)	.03	.08	.16**	-.15*	-.03	.16**	.13*	.01	-	
	(265)	(328)	(235)	(325)	(244)	(327)	(248)	(331)	(331)	

) $p < .05$ , \*\* $p < .01$ , 1- tailed



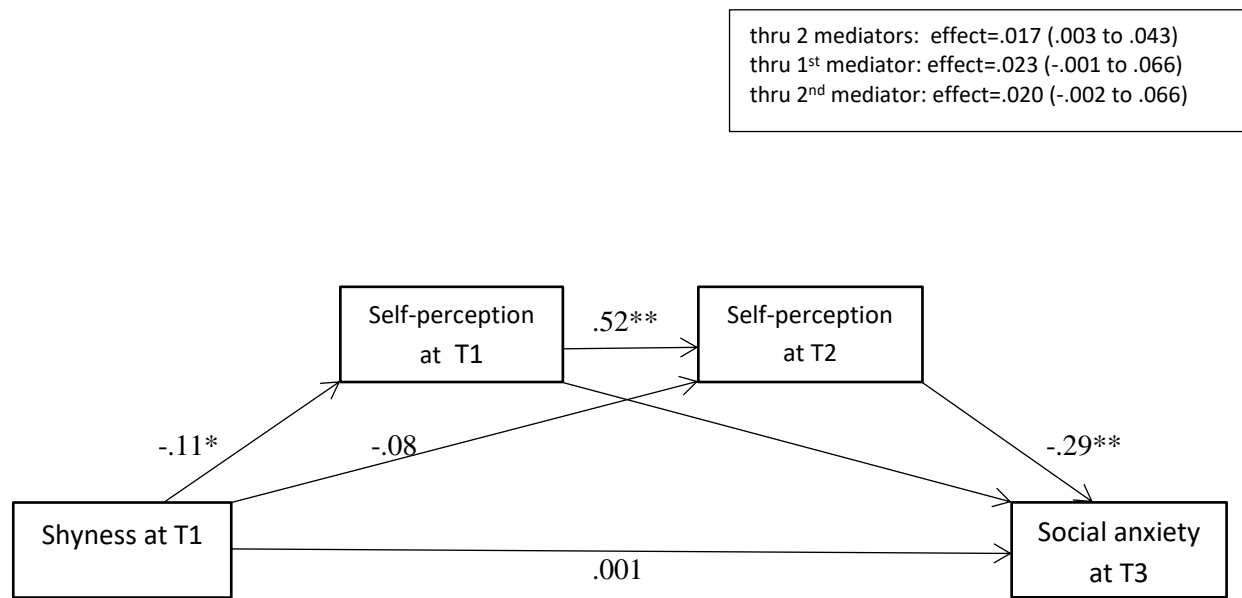


Figure 1. Non-standardized coefficients in the mediation model with social self-perception at T1 and T2 as sequential mediators of the link between shyness at T1 and social anxiety at T3.

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