

Testing Two Developmental Pathways Leading to Social
Anxiety: the Role of Shyness and Autistic Traits in Interaction
with Overprotective Parenting

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Abstract

Social anxiety disorder has been one of the most concerning of the anxiety disorders, affecting a substantial group of adolescents. Both clinical and sub-clinical social anxiety may be the result of a variety of interacting risk factors, making it hard to pinpoint one specific etiology. The current research investigates the distinct, longitudinal effects of shyness and autistic traits on social anxiety, thereby analyzing two different developmental pathways. In addition, the role of overprotective parenting on these two pathways is assessed. A three wave longitudinal sample of 11- to 15-year-old Dutch adolescents (N = 1,818) was derived from the TRAILS project. Data was collected through self-report and parent-reported measures and included shyness, autistic traits, protective parenting and social anxiety. Results showed that shyness at age 11 predicted social anxiety at age 15. In contrast no predictive effects was found of autistic traits at age 11. Overprotective parenting by the mother and/or the father did not modify developmental pathways to social anxiety. Future research should further investigate the different developmental pathways leading to social anxiety.

Keywords: social anxiety, shyness, autistic traits, overprotective parenting, developmental pathways

Samenvatting

Sociale angststoornis is een van de meest zorgwekkende angststoornissen en treft een grote groep adolescenten. Klinische en niet klinische sociale angststoornis kunnen het gevolg zijn van veel verschillende interacterende risicofactoren waardoor het moeilijk is om een specifieke etiologie vast te leggen. In het huidige onderzoek worden de longitudinale effecten van verlegenheid en autistische trekken op sociale angst bestudeerd. Daarmee worden twee ontwikkelingspaden geanalyseerd. Daarnaast wordt ook de rol van overbezorgd ouderschap op de twee paden onderzocht. Een longitudinale steekproef van 3 meetmomenten, bestaande uit 11 tot 15 jaar oude, Nederlandse adolescenten (N = 1,818) was ontleend van het TRAILS project. Data van de variabelen verlegenheid, autistische trekken overbezorgd ouderschap en sociale angst was verkregen op basis van zelfrapportage en rapportage door de ouders. De resultaten lieten zien dat verlegenheid op 11 jaar oud voorspellend was voor sociale angst op 15 jaar oud. In contrast, geen effect van autistische trekken op 11 jaar oud was gevonden. Overbezorgd ouderschap door de moeder en/of de vader had geen modererend effect op de ontwikkelingspaden. Toekomstig onderzoek wordt aangeraden om de verschillende ontwikkelingspaden die naar sociale angst leiden verder te onderzoeken.

Sleutelwoorden: sociale angst, verlegenheid, autistische trekken, overbezorgd ouderschap, ontwikkelingspaden

In recent years, anxiety disorders have become recognized as the most common class of mental disorders, affecting a large proportion of the population. In a review of over 20,000 American citizens over the age of 18, Mclean, Asnaani, Litz, and Hofmann (2011) found that 12-month and lifetime prevalence estimates of anxiety disorders were respectively 22.7% and 33.3% for women and 13.0% and 22.0% for men, indicating a substantial gender difference. One of the most concerning among the anxiety disorders is Social Anxiety Disorder (SAD). SAD is defined as a “marked fear or anxiety about one or more social situations in which the individual is exposed to possible scrutiny by others” (APA, 2013). SAD has a relatively high occurrence with 12-month and lifetime prevalence rates of respectively 6.5% and 10.3% for women and 4.8% and 8.7% for men (Mclean et al., 2011). SAD can cause considerable functional disability and suffering in the school, workplace and family environment. This is true even for subclinical social anxiety in childhood and adolescence (Filho et al., 2010). The risk for developing social anxiety is especially high during adolescence, when biological, cognitive and social maturation drastically change youth’s lives. Indeed, pubertal transition has been linked to increased internalizing problems, including social anxiety (Ge, Brody, Conger & Simons, 2006; Deardorff et al., 2007; Blumenthal et al., 2011).

Developmental Pathways

The onset of social anxiety is thought to be influenced by numerous risk factors, for example temperamental inhibition, shyness, deficits in social skills and familial environment (Kashdan & Herbert, 2001). Because there are so many contributing factors, it is not surprising that research has supported the existence of different developmental trajectories leading to social anxiety. For example, Nikolić and colleagues (2019) found a link between social anxiety and increased, as well as decreased facial recognition. Interestingly, the relationship between increased facial recognition and social anxiety was mediated by blushing, an indicator of increased self-consciousness, but this was not true for decreased facial recognition. These findings support the existence of different pathways leading to social anxiety; one involving heightened social awareness and the other involving decreased social awareness. Uncovering distinct pathways like this, is a fundamental practice in the context of treatment development. Therefore, the current study is aimed at further disentangling the developmental pathways that underly social anxiety. Specifically, the roles of shyness and autistic personality traits are examined, thereby sticking to the distinction between increased and decreased social awareness found by Nikolić, and colleagues (2019). In addition, the effect of overprotective parenting on each of these developmental pathways is assessed to see if the paths are affected differently.

The Role of Shyness

Many studies have pointed to shyness as an important contributing factor to the development of social anxiety. This has been a robust finding in cross-sectional (e.g. Chavira, Stein, Malcarne, 2002; Weeks, Ooi & Coplan, 2016), as well as longitudinal research (e.g. Blöte, Miers, Bos & Westenberg, 2019). One longitudinal study investigated developmental trajectories of shyness, anxiety and depression leading to internalizing symptoms in adolescence. The results indicated that higher shyness was associated with adolescent social phobia (Zdebik et al., 2019). In addition, a temperamental style characterized by behavioral inhibition at age 3 has been identified as an important precursor to shyness and subsequently to anxiety in middle childhood (Volbrecht & Goldsmith, 2010). These findings suggest that children who are born with an inhibited temperamental style have a higher probability of becoming shy and socially anxious in later life. However, despite the strong link between shyness and social anxiety, these constructs are not synonymous. Research has demonstrated that not all shy individuals go on to develop social anxiety and not all individuals with social anxiety are shy (Chavira et al., 2002). The first aim of this study is to investigate to what extent shyness at early adolescence predicts social anxiety at mid adolescence. In line with the literature it is expected that shyness at early adolescence will predict social anxiety at later adolescence (Hypothesis 1).

Autistic Personality Traits

Another concept that is associated with social anxiety is Autism Spectrum Disorder (ASD). ASD may contribute to social anxiety through sensitivity to (social) impulses, difficulties in perspective taking and limited capacity in socializing with others (APA, 2013). Indeed, research has consistently found a link between ASD and social anxiety (e.g. Kuusikko et al., 2008; Steensel, Bögels & Perrin, 2011). Interestingly, social anxiety symptoms are not limited to clinical autism-spectrum disorders alone. In a cross-sectional study using a non-clinical sample of 252 university students, a positive association was found between autistic traits and social anxiety (Liew, Thevaraja, Hong and Magiati, 2014). Moreover, this association was mediated by social problem-solving, social competence, teasing experiences and aversive sensory experiences indicating that communication skills play a role. The notion that autistic traits in the general population may contribute to the development of social anxiety has not yet been investigated specifically in longitudinal research. However, one longitudinal study showed that 7-year-old's social and communication difficulties, problems that are characteristic of ASD, may cause later social anxiety (Pickard, Rijdsdijk, Happé & Mandy, 2017). In the current study, the predictive

relationship between autistic traits and social anxiety in the normal population is investigated. This study is thereby, to our knowledge, the first to look into this relationship using a longitudinal design. Specifically, it is assessed to what extent early adolescent's autistic traits, as defined by the DSM-V criteria, predict social anxiety at mid adolescence. In line with previous research, it is expected that children's autistic traits contribute to the onset of social anxiety in later life (Hypothesis 2).

Thus, according to the literature social anxiety may be a consequence of both shy and autistic personality traits. However, the mechanisms by which these developmental paths operate are constructively different. On the one hand, recent research has suggested that the mechanisms by which shyness affects social anxiety involves heightened self-consciousness (Nikolić et al., 2019), negative social self-cognitions (Blöte et al., 2019) and judgmental biases regarding the probability and costs of negative social situations (Weeks et al., 2016). In contrast, the mechanisms by which autism leads to social anxiety are thought to work through social and communication difficulties (Pickard et al., 2017), and lowered social problem-solving skills and social competence (Liew et al., 2015). Put bluntly, the two paths leading to social anxiety seem to involve negative self-images and fear of possible scrutiny by others on the one hand, and social skill deficits and decreased social awareness on the other.

Overprotective Parenting

Overprotective parenting is characterized by parent's tendency to overmanage situations for their child, restrict child behaviours, discourage child independence and direct child activities. Prior research has suggested that children who are clinically anxious or shy are likely to have mothers who are relatively more controlling and less likely to grant autonomy during parent-child conversations (Wood, Mcleod, Sigman, Hwang & Chu, 2003). Support for this finding comes mainly from observational studies. Studies using parent- or child-reported parental control find smaller effect sizes and are less consistent. Additional support for the association between overprotective parenting and anxiety has been found in young age groups. For example, Möller, Nikolic, Majdandzic and Bogels (2016) conducted a meta-analysis among 0 to 5-year-old children to investigate associations between parenting behaviors and anxiety. Their findings suggest that for shy, inhibited children, social anxiety may be exacerbated by an overprotective parenting style though effect sizes were small. Moreover, overprotective parenting was found to moderate the link between shyness and internalizing problems in a longitudinal study of 4 to 6-year-olds (Coplan, Arbeau & Armer, 2007). In summary, prior research suggests that overprotective parenting does play a role in

general child anxiety, but no studies investigated social anxiety specifically. Moreover, evidence is limited mostly to cross-sectional data and young age groups composed of children. In the current study, these limitations are overcome by using longitudinal data from an older sample. Specifically, the impact of overprotective parenting on the link between shyness and social anxiety are assessed among early adolescents, thereby addressing a gap in the current body of literature.

There is hardly any research on the role of overprotective parenting on the relationship between autistic traits and social anxiety. One cross-sectional study found that parents display more overprotective behaviour towards children with ASD compared to their non-autistic siblings (Gau et al., 2010). This finding may reflect an increased need for guidance and routine that is indicative of autistic individuals. Research has supported the notion that children diagnosed with ASD benefit from routine in their daily life (Stoppelbein, Biasini, Pennick & Greening, 2016). Research on overprotective parenting in autism has not yet extended into the non-clinical domain. However, one might expect that overprotective parenting, to some extent, satisfies the need for routine and control that autistic individuals possess. Therefore, it is expected that overprotective parenting increases the relationship between shyness at age 11 and social anxiety at age 15 (Hypothesis 3), but decreases the relationship between autistic traits at age 11 and social anxiety at age 15 (Hypothesis 4).

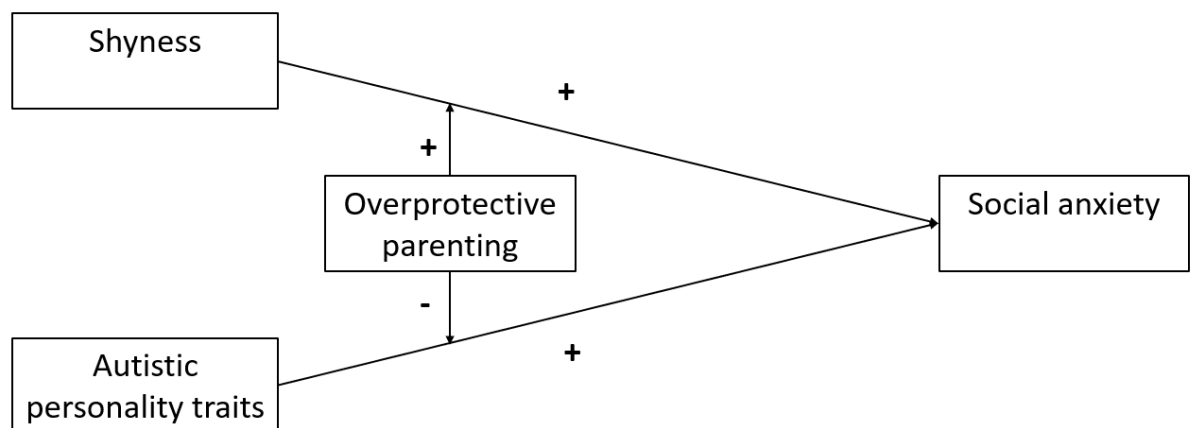


Figure 1. Research model describing the interrelations between the variables.

The current study seeks to identify the distinct effects of shyness and autistic traits on the development of social anxiety, thereby analyzing two separate pathways. In compliance with prior research, a distinction is made between heightened and lowered social awareness. This research model resembles the principle of equifinality; different pathways can lead to the

same outcome. In addition, the role of overprotective parenting is assessed to see if the two paths are affected differently. This implies the principle of multifinality; one component may function differently depending on the organization of the system in which it functions. The interrelations between the variables are displayed in Figure 1. Finding support for the existence of distinct pathways, can provide implications for customized treatment of social anxiety. For example, the relative importance of parenting interventions for the treatment of social anxiety in shy and/or autistic individuals may be uncovered.

Method

Participants

The data used in this study was derived from the first and third measurement waves of the ongoing Tracking Adolescent's Individual Lives Survey (TRAILS). TRAILS is a population based, multidisciplinary research, investigating Dutch adolescents' psychological, social and physical development. During the first measurement wave in 2001, the cohort consisted of 2,229 participants. The two subsequent waves occurred every 2 or 3 years. After deletion of the respondents with a missing measure of social anxiety at T₃ the sample consisted of 1,818 participants (T₁: M = 11.01, SD = 0.56; T₃: M = 16.14, SD = 0.71; 52.3% female). A large majority of the sample had a Dutch background (88.4%).

Procedure

The TRAILS study was approved by the Dutch Central Committee on Research Involving Human Subjects. Written consent was provided by the parents at all waves and by the adolescents at the second and third measurement wave. At the first wave, trained interviewers visited one of the parents or guardians at home to assess their child's developmental history and somatic health by interview. In addition, during this visit a written questionnaire was filled in by the parents. In subsequent waves, parents completed a questionnaire that they received by email. During the first three waves, adolescents completed questionnaires at school under supervision of a research assistant.

Measures

Shyness. Shyness was reported by the adolescent at T₁ using the Early Adolescent Temperament Questionnaire – Revised (EATQ-R; Ellis & Rothbart, 2001). Brief inspection of the data revealed an odd pattern in the shyness items. The scale has 2 items that are exclusive to one or the other gender: "If you are a boy (girl), choose this statement: I am shy around girls (boys)". Thus, respondents were instructed to pick only one of the statements based on their gender. However, many participants filled in both questions, indicating that the

questionnaire did not have a clear skip function or rule installed. To address this, a new variable was computed that displays the correct answer depending on the respondent's gender. After this adjustment the scale consisted of four items (Cronbach's $\alpha = .65$). Items were scored by the adolescent on a 5-point Likert scale ranging from 1 ("almost never true") to 5 ("almost always true"). An example question is "I feel shy when I meet new people". One item was re-coded and scores were calculated using the mean with higher scores indicating higher levels of shyness.

Autistic personality traits. Autistic personality traits were reported by the parents at T₁ using the Dutch version of the Children's Social Behaviour Questionnaire (CSBQ; Hartman et al., 2007). The questionnaire has good psychometric qualities in terms of reliability and validity (Luteijn, Luteijn, Jackson, Volkmar & Minderaa, 2000). This study used two subscales from the questionnaire. Parents were asked to indicate to what extent each statement applies to their child on a 3-point Likert scale ranging from 0 ("not") to 2 ("clearly"). The first subscale "reduced contact and social interest" contained 12 items. An example question is: "Does not make eye contact". The other subscale "difficulties in understanding social information" contained 7 items, for example "Is very naïve, believes everything you tell them". Principal Component Analysis revealed a distinction between the two subscales. However, some items loaded on both scales. Reliability analysis of the combined scale indicated a high internal consistency (Cronbach's $\alpha = .81$). For further analyses the two autism subscales were combined into one. Scores were calculated using the mean with higher scores indicating higher levels of autistic traits.

Overprotective parenting. Overprotective parenting was reported by the adolescent at T₁ using the Egena Minnen Betreffande Uppfostran (EMBU-C; Markus, Lindhout, Boer, Hoogendijk, Arrindell, 2003). Respondents filled in 12 items for each parent (Mother: Cronbach's $\alpha = .71$; Father: Cronbach's $\alpha = .70$). Items were scored on a 5-point Likert scale ranging from 0 ("never") to 4 ("always"). An example question is: "Is your mother/father very concerned about your health?". Scores were calculated using the mean with higher scores indicating the experience of more overprotective parenting.

Social anxiety. Social anxiety was measured at T₁ and T₃ using nine items (T₁: Cronbach's $\alpha = .78$; T₂: Cronbach's $\alpha = .86$) from the Revised Child Anxiety and Depression Scale (RCADS; Chorpita, Yim, Moffitt, Umemoto, & Francis, 2000). Items consisted of statements and were scored by the adolescent on a 4-point Likert Scale ranging from 0 ("never") to 3 ("always"). For each statement adolescents were asked to indicate how often

they experience it. An example is: “I worry about what other people think of me”. Scores were calculated using the mean with higher scores indicating higher levels of social anxiety.

Data Analysis

Descriptive statistics were obtained describing the demographic variables (gender, age, ethnicity and level of education), the personal variables (shyness and autistic traits), the parenting variables (overprotective parenting from the mother and the father) and finally, the outcome variable. Gender differences were analysed using an independent sample T-test.

The longitudinal relationships were examined using hierarchical linear regression with three steps to allow for model comparison. Two hierarchical models were created examining the effect of either shyness or autistic traits in combination with overprotective parenting on later social anxiety. At the first step, only control variables gender and social anxiety at T₁ were included. At the second step, the main predictor (shyness or autistic traits) was entered into the analysis. At the last step, main effects of the parenting variables as well as the centered interaction terms were entered into the analysis. All analyses were carried out using the statistical computing software R, version 3.6.1.

Results

Descriptive Statistics

Descriptive statistics were calculated for the full sample and for boys and girls separately (Table 1). Girls reported higher levels of shyness, $t(1635) = -5.79$, $p < .001$, and higher levels of social anxiety at both measurement points, T₁: $t(1751.3) = -6.77$, $p < .001$; T₃: $t(1644) = -11.69$, $p < .001$, compared to boys. Parents reported higher levels of autistic traits in boys, $t(1697.2) = 4.87$, $p < .001$, than in girls and boys reported higher levels of overprotective parenting from both parents (mother: $t(1641.9) = 2.42$, $p < .05$; father: $t(1611.2) = 2.60$, $p < .01$) compared to girls.

Correlations between the constructs that were used in this study can be found in Table 2. First of all, social anxiety at T₃ was significantly related to shyness at T₁, but not to autistic traits at T₁. Social anxiety at T₃ was also significantly related to protective parenting from both parents at T₁ and with social anxiety at T₁. Moreover, both shyness at T₁ and autistic traits at T₁ were positively related to social anxiety at T₁. In addition, both shyness and autistic traits at T₁ were related to overprotective parenting from the mother and the father at T₁. Finally, social anxiety at T₃ was significantly related to gender, but not to any of the other demographic variables (i.e. education level, ethnicity and age). Therefore, only gender will be included as a control variable in subsequent analyses.

Shyness and Overprotective Parenting in Social Anxiety

The results of the model testing the longitudinal link between shyness and social anxiety and the role of overprotective parenting can be found in Table 3. First of all, the control variables gender and social anxiety at T₁ had a significant effect on social anxiety at T₃. In addition, when only the main effect of shyness at T₁ was entered into the analysis in step 2, results showed a significant effect on social anxiety at T₃. In step 3, the effect of shyness at T₁ became non-significant. In addition, effects of overprotective parenting by the mother and the father, and the interaction terms between shyness and overprotective parenting of the mother and father were not significant. Overall, step 2 represented the best fitting model, explaining around 20% of the variance in the dependent variable.

Autistic Traits and Overprotective Parenting in Social Anxiety

The results of the model testing the longitudinal link between autistic traits and social anxiety and the role of overprotective parenting can be found in Table 4. The control variables gender and social anxiety at T₁ showed a significant effect on social anxiety at T₃. The addition of the main effect of autistic traits in step 2 showed no significant effect. Furthermore, the main effects of overprotective parenting by the mother and the father and the interaction terms included in step 3 did not show any significant effects. The model with only control variables included explained around 19% of the variance in the dependent variable. Explained variance did not increase significantly after addition of the predictor variables.

Table 1*Descriptive statistics for the full sample and separately for boys and girls*

Variable	M (SD)		
	Total	Girls (53.2%)	Boys (46.8%)
Education level (% low)	49.2	50.9	50.5
Ethnicity (% Dutch)	88.4	88.1	88.7
Age (T ₁)	11.10 (0.56)	10.99 (0.55)	11.12 (0.56)
Shyness (T ₁)	2.44 (0.92)	2.56 (0.89)	2.30 (0.92)***
Autistic traits (T ₁)	1.21 (0.22)	1.19 (0.21)	1.24 (0.23)***
Overprotective parenting – Mother (T ₁)	1.93 (0.39)	1.91 (0.38)	1.95 (0.41)*
Overprotective parenting – Father (T ₁)	1.79 (0.38)	1.76 (0.37)	1.81 (0.39)*
Social anxiety (T ₁)	1.78 (0.42)	1.84 (0.43)	1.71 (0.39)***
Social anxiety (T ₃)	1.73 (0.50)	1.86 (0.52)	1.58 (0.44)***

Note. The symbol “*” indicates whether boys significantly differ from girls.

* $p < .05$, ** $p < .01$ and *** $p < .001$. SD: Standard Deviation.

Table 2*Spearman pairwise correlations for all measured constructs*

Variable	1	2	3	4	5	6	7	8	9	10
1. Gender	1.00									
2. Education level	-.01	1.00								
3. Ethnicity	.01	-.02	1.00							
4. Age (T ₁)	-.03	-.02	-.10***	1.00						
5. Shyness (T ₁)	.12***	.01	-.03	.00	1.00					
6. Autistic traits (T ₁)	-.12***	-.01	-.11***	.02	.05*	1.00				
7. Overprotective parenting – Mother (T ₁)	-.06*	.01	-.13***	.01	.16***	.06*	1.00			
8. Overprotective parenting – Father (T ₁)	-.06*	.01	-.14***	-.02	.13***	.09***	.81***	1.00		
9. Social anxiety (T ₁)	.15***	.03	-.02	-.04*	.37***	.07**	.37***	.33***	1.00	
10. Social anxiety (T ₃)	.28***	.04	-.01	.03	.26***	-.02	.12***	.07**	.36***	1.00

* $p < .05$, ** $p < .01$, *** $p < .001$.

Table 3*Summary of hierarchical regression analysis for variables predicting social anxiety at wave 3 (N = 1286)*

Variable	Step 1			Step 2			Step 3		
	B	SE (B)	Beta	B	SE (B)	Beta	B	SE (B)	Beta
Gender	.213	.026	.208***	.202	.026	.198***	.203	.026	.198***
Social anxiety (T ₁)	.414	.030	.351***	.361	.032	.306***	.356	.035	.302***
Shyness (T ₁)				.072	.015	.128***	.058	.066	.104
Overprotective parenting – Mother (T ₁)							.075	.150	.059
Overprotective parenting – Father (T ₁)							-.096	.158	-.072
Shyness* <i>Mother</i>							.003	.055	.002
Shyness* <i>Father</i>							.005	.058	.004
R-squared		.19			.21			.21	
F for change in R-squared		152.5***			22.83***			0.69	
Adjusted R-squared		.19			.20			.20	

Note. The reduction in sample size is the result of missing values in the variables; * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 4*Summary of hierarchical regression analysis for variables predicting social anxiety at wave 3 (N = 1286)*

Variable	Step 1			Step 2			Step 3		
	B	SE (B)	Beta	B	SE (B)	Beta	B	SE (B)	Beta
Gender	.213	.026	.208***	.215	.026	.209***	.215	.026	.209***
Social anxiety (T ₁)	.414	.030	.351***	.413	.030	.350***	.406	.033	.344***
Autistic traits (T ₁)				.035	.061	.015	-.389	.320	-.161
Overprotective parenting – Mother (T ₁)							-.049	.314	-.038
Overprotective parenting – Father (T ₁)							-.216	.336	-.162
Autistic traits* <i>Mother</i>							.112	.257	.109
Autistic traits* <i>Father</i>							.109	.275	.093
R-squared		.19			.19			.19	
F for change in R-squared		152.5***			0.33			1.16	
Adjusted R-squared		.19			.19			.19	

Note. The reduction in sample size is the result of missing values in the variables; * $p < .05$. ** $p < .01$. *** $p < .001$.

Discussion

The goal of the present study was to examine whether shyness and autistic traits at age 11 predicted the development of social anxiety at age 15, thereby analysing two developmental pathways. The pathway leading from shyness to social anxiety involves heightened social awareness and negative self-cognitions. The pathway leading from autistic traits to social anxiety involves decreased social awareness and social skill deficits. This distinction is in line with previous research showing a link between social anxiety and both heightened and lowered social awareness (Nikolic et al., 2019). In addition, it was investigated whether overprotective parenting by the mother and the father weakened or strengthened these relationships. The results suggested that shyness, but not autistic traits, predicts later social anxiety symptoms. Moreover, overprotective parenting by the mother and the father did not affect the strength of the relationship between shyness and social anxiety or autistic traits and social anxiety. Results also suggested that in general girls display more shyness and social anxiety, whereas boys display more autistic traits and experience slightly more overprotective parenting by both parents.

From Shyness to Social Anxiety

In line with hypothesis 1, the results indicate that shyness at age 11 predicts social anxiety at age 15, supporting prior research that has shown this association in childhood and adolescence (Weeks, Ooi & Coplan, 2016; Blöte, Miers, Bos & Westenberg, 2019). This is a robust finding, considering that the analyses controlled for gender and social anxiety at age 11. The link between shyness and social anxiety seems to be especially worrying for girls as they generally experience more shyness and social anxiety than boys. This finding can be understood in light of self-construal theory (Cross & Madson, 1997) which states that boys and girls have a different way of looking at the self in relation to others. Boys tend to maintain an independent self-view that represents others as separate from the self, whereas girls tend to have an interdependent self-view that represents others as part of the self. This contrast in self-view may cause girls to be more sensitive to social relationships and subsequently, may cause them to experience more anxiety in the context of interpersonal interactions than boys (Asher & Aderka, 2018).

From Autistic Traits to Social Anxiety

Counter to our expectations, this study did not reveal an effect of autistic traits at age 11 on social anxiety symptoms at age 15 (Hypothesis 2). This is in contrast with previous longitudinal research indicating that non-clinical autism is predictive of social anxiety (Pickard et al., 2017). This zero finding may have resulted from the particular measure of

autistic traits that was used in this study. Only two of the original 6 subscales were used to construct autistic trait scores: “reduced contact and social interest” and “difficulties in understanding social information”. It is possible that these particular aspects of autism fail to capture the crucial aspects that cause social anxiety. Indeed, prior research reporting a link between autistic traits and social anxiety has used multiple aspects to measure autism (e.g. Liew et al., 2015) Another possible explanation for the zero finding is that autistic traits need to be relatively severe to increase social anxiety symptoms. This is in line with prior research showing a link between clinical ASD and social anxiety. For example, Bejerot, Eriksson and Mörtberg (2014) found that social anxiety disorder was diagnosed in one out of four people with ASD. In addition, children and adolescents with high functioning autism or Asperger syndrome reported significantly more social anxiety symptoms compared to controls (Kuusikko et al., 2008). More research is needed to pinpoint if and when autistic traits lead to social anxiety and which aspects of autism are the most important.

Overprotective Parenting and Shyness (hypothesis 3)

In contrast with hypothesis 3, overprotective parenting by the mother and the father did not strengthen the relationship between shyness at age 11 and social anxiety at age 15. In addition, no main effect of overprotective parenting on social anxiety was found. These findings suggest that parental control does not place shy, 11-year-olds at increased risk for developing social anxiety at age 15. Perhaps, no effect was found due to reporting bias in the measures that were used. This is in line with findings by Wood et al. (2003) who showed in a meta-analysis that studies using parent or child reported parental control often yielded small or insignificant results. In contrast, observational studies have more consistently found a link between overprotective parenting, shyness and social anxiety. Correlations indicate that shyness was significantly associated with overprotective parenting from the mother and the father. These findings suggest that shy adolescents generally experience more overprotective parenting by both their parents. Interestingly, between age 11 and 15 social anxiety scores remained constant for girls whereas they decreased for boys. It is possible that the effect of shyness in combination with overprotective parenting on the development of social anxiety takes place before age 11. This could explain why no effect was found in the current sample of 11 to 15-year-olds. This notion is more or less consistent with prior research. Some studies have found support for an interaction between shyness and overprotective parenting. Most of these studies are conducted among a younger sample. For example, Coplan et al. (2007) found that 4 to 6-year-olds’ shyness was more strongly associated with internalizing problems and social dissatisfaction at higher rates of a mother’s overprotective parenting. In

addition, Möller et al. (2016) noted in a meta-analysis that most studies show small but significant associations between parenting behaviors and anxiety in 0 to 5-year-olds. These studies suggest that overprotective parenting is associated with the link between shyness and social anxiety. However, direction of effects and the exact mechanisms underlying this relationship are still unclear due to the limitations that come with cross-sectional research. Future research examining the role of overprotective parenting on the link between shyness and social anxiety should use a longitudinal design. In addition, using measures from multiple informants (e.g. teacher report or observation) is recommended to provide meaningful insight into reporting bias.

Overprotective parenting and autistic traits (hypothesis 4)

Overprotective parenting did not have an effect on the strength of the relationship between autistic traits at age 11 and social anxiety at age 15. This study was one of the first to investigate the effect of overprotective parenting on the relationship between autistic traits and social anxiety. It was expected that overprotective parenting, to some extent, satisfies the need for routine and control that autistic individuals possess. As noted before, in the current sample the prevalence of autistic traits was relatively low. This may explain why no interaction effect was found because a need for routine, and thus parental control, is generally more associated with severe cases of autism (Stoppelbein, et al., 2016).

Strengths and limitations

The strengths of the current study are its large sample size and the population based cohort. In addition, the longitudinal design used in this study allows for the interpretation of the order and direction of effects. Furthermore, the rigorous statistical procedures, controlling for level of social anxiety at T₁ and the possible confounder gender, are noteworthy. The analyses were controlled for by gender and prior social anxiety, thereby providing convincing evidence for the longitudinal effect of shyness on later social anxiety. However, some limitations should be noted as well, for example the fact that the mean score for autistic traits was relatively low, thereby potentially causing the link between autistic traits and social anxiety to be underestimated. In addition, autistic trait scores were reported by the parents, which may have introduced some bias. Seifer, Sameroff, Dickstein, Schiller and Hayden (2004), investigated discrepancies between parents' and observers' reports of children's temperamental assessments. Parents' reports were similar to those of trained observers when observing standard children. However, when observing their own children, there was little correspondence, indicating that parent-reported measures of one's own children may be biased. Parents may not be familiar with their child's behaviour in different contexts causing

them to overestimate their child's social adjustment. In the future, this problem can be solved by using composite scores from multiple sources. For example, teacher-reported measures may provide some important information on a child's social adjustment at school.

In conclusion, in this study an attempt was made to disentangle the mechanisms that contribute to social anxiety. Specifically, two distinct developmental pathways were proposed leading from shyness and autistic traits to social anxiety. This study was, to our knowledge, the first to investigate the longitudinal relationship between autistic traits and social anxiety in the normal population. In addition, the role of overprotective parenting on the two pathways was assessed, thereby addressing a gap in the current literature. Convincing support was found for a longitudinal relationship between shyness among 11-year-olds and social anxiety three years later, but this was not found for autistic traits. In addition, the effects of overprotective parenting on each pathway were not supported by the results. Thus, the existence of two different pathways is only partially supported. It is recommended that future research further investigates the proposed pathways, potentially using different measures but sticking to the increased versus decreased social awareness paradigm. The investigation of distinct developmental pathways remains a fundamental scientific practice and could provide important implications for customized social anxiety interventions.

References

- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). <https://doi.org/10.1176/appi.books.9780890425596>
- Asher, M., & Aderka, I. M. (2018). Gender differences in social anxiety disorder. *Journal of Clinical Psychology, 74*(10), 1730-1741. doi:10.1002/jclp.22624
- Bejerot, S., Eriksson, J. M., & Mörtberg, E. (2014). Social anxiety in adult autism spectrum disorder. *Psychiatry Research, 220*(1-2), 705–707. doi: 10.1016/j.psychres.2014.08.030
- Blöte, A. W., Miers, A. C., Bos, E. V. D., & Westenberg, P. M. (2019). Negative social self-cognitions: How shyness may lead to social anxiety. *Journal of Applied Developmental Psychology, 63*, 9–15. doi: 10.1016/j.appdev.2019.05.003
- Blumenthal, H., Leen-Feldner, E. W., Babson, K. A., Gahr, J. L., Trainor, C. D., & Frala, J. L. (2011). Elevated social anxiety among early maturing girls. *Developmental Psychology, 47*(4), 1133–1140. doi: 10.1037/a0024008
- Chavira, D. A., Stein, M. B., & Malcarne, V. L. (2002). Scrutinizing the relationship between shyness and social phobia. *Journal of Anxiety Disorders, 16*(6), 585–598. doi: 10.1016/s0887-6185(02)00124-x
- Chorpita, B. F., Yim, L., Moffitt, C., Umemoto, L. A., & Francis, S. E. (2000). Assessment of symptoms of DSM-IV anxiety and depression in children: A revised child anxiety and depression scale. *Behaviour Research and Therapy, 38*(8), 835-855. doi:10.1016/s0005-7967(99)00130-8
- Coplan, R. J., Arbeau, K. A., & Armer, M. (2007). Don't Fret, Be Supportive! Maternal Characteristics Linking Child Shyness to Psychosocial and School Adjustment in Kindergarten. *Journal of Abnormal Child Psychology, 36*(3), 359–371. doi: 10.1007/s10802-007-9183-7
- Cross, S. E., & Madson, L. (1997). Models of the self: Self-construals and gender. *Psychological Bulletin, 122*(1), 5-37. doi:10.1037/0033-2909.122.1.5
- Deardorff, J., Hayward, C., Wilson, K. A., Bryson, S., Hammer, L. D., & Agras, S. (2007). Puberty and Gender Interact to Predict Social Anxiety Symptoms in Early Adolescence. *Journal of Adolescent Health, 41*(1), 102–104. doi: 10.1016/j.jadohealth.2007.02.013
- Ellis, L. K., & Rothbart, M. (2001). Early Adolescent Temperament Questionnaire-Revised. *PsycTESTS Dataset*. doi:10.1037/t07624-000

- Filho, A. S., Hetem, L. A. B., Ferrari, M. C. F., Trzesniak, C., Martín-Santos, R., Borduqui, T., ... Crippa, J. A. S. (2010). Social anxiety disorder: what are we losing with the current diagnostic criteria? *Acta Psychiatrica Scandinavica*, *121*(3), 216–226. doi: 10.1111/j.1600-0447.2009.01459.x
- Gau, S. S.-F., Chou, M.-C., Lee, J.-C., Wong, C.-C., Chou, W.-J., Chen, M.-F., ... Wu, Y.-Y. (2010). Behavioral problems and parenting style among Taiwanese children with autism and their siblings. *Psychiatry and Clinical Neurosciences*, *64*(1), 70–78. doi: 10.1111/j.1440-1819.2009.02034.x
- Ge, X., Brody, G. H., Conger, R. D., & Simons, R. L. (2006). Pubertal Maturation and African American Children's Internalizing and Externalizing Symptoms. *Journal of Youth and Adolescence*, *35*(4), 528–537. doi: 10.1007/s10964-006-9046-5
- Hartman CA, Luteijn E, Moorlag H, et al. (2007) *VISK. Vragenlijst voor Inventarisatie van Sociaal gedrag van Kinderen, herziene handleiding 2007*. Amsterdam: Hartcourt.
- Kashdan, T. B., & Herbert, J. D. (2001). Social Anxiety Disorder in Childhood and Adolescence: Current Status and Future Directions. *Clinical Child and Family Psychology Review*, *4*(1), 37-61. doi: 10.1023/A:1009576610507
- Kuusikko, S., Pollock-Wurman, R., Jussila, K., Carter, A. S., Mattila, M.-L., Ebeling, H., ... Moilanen, I. (2008). Social Anxiety in High-functioning Children and Adolescents with Autism and Asperger Syndrome. *Journal of Autism and Developmental Disorders*, *38*(9), 1697–1709. doi: 10.1007/s10803-008-0555-9
- Liew, S. M., Thevaraja, N., Hong, R. Y., & Magiati, I. (2014). The Relationship Between Autistic Traits and Social Anxiety, Worry, Obsessive–Compulsive, and Depressive Symptoms: Specific and Non-specific Mediators in a Student Sample. *Journal of Autism and Developmental Disorders*, *45*(3), 858–872. doi: 10.1007/s10803-014-2238-z
- Luteijn, E., Luteijn, F., Jackson, S., Volkmar, F., & Minderaa, R. (2000). The Children's Social Behavior Questionnaire for Milder Variants of PDD Problems: Evaluation of the Psychometric Characteristics. *Journal of Autism and Developmental Disorders*, *30*(4), 317-330. doi: 10.1023/A:1005527300247
- Markus, M. T., Lindhout, I. E., Boer, F., Hoogendijk, T. H., Arrindell, W. A. (2003). Factors of perceived parental rearing styles: The EMBU-C examined in a sample of Dutch primary school children. *Personality and Individual Differences*, *34*(3), 503-519. doi:10.1016/s0191-8869(02)00090-9

- McLean, C. P., Asnaani, A., Litz, B. T., & Hofmann, S. G. (2011). Gender differences in anxiety disorders: Prevalence, course of illness, comorbidity and burden of illness. *Journal of Psychiatric Research*, *45*(8), 1027–1035. doi: 10.1016/j.jpsychires.2011.03.006
- Möller, E. L., Nikolić, M., Majdandžić, M., & Bögels, S. M. (2016). Associations between maternal and paternal parenting behaviors, anxiety and its precursors in early childhood: A meta-analysis. *Clinical Psychology Review*, *45*, 17–33. doi: 10.1016/j.cpr.2016.03.002
- Nikolić, M., Storm, L., Colonnese, C., Brummelman, E., Kan, K. J., & Bögels, S. (2019). Are Socially Anxious Children Poor or Advanced Mindreaders? *Child Development*, *90*(4), 1424–1441. doi: 10.1111/cdev.13248
- Pickard, H., Rijdsdijk, F., Happé, F., & Mandy, W. (2017). Are Social and Communication Difficulties a Risk Factor for the Development of Social Anxiety? *Journal of the American Academy of Child & Adolescent Psychiatry*, *56*(4), 344–351. doi: 10.1016/j.jaac.2017.01.007
- Seifer, R., Sameroff, A., Dickstein, S., Schiller, M., & Hayden, L. C. (2004). Your own children are special: Clues to the sources of reporting bias in temperament assessments. *Infant Behavior and Development*, *27*(3), 323–341. doi:10.1016/j.infbeh.2003.12.005
- Steensel, F. J. A. V., Bögels, S. M., & Perrin, S. (2011). Anxiety Disorders in Children and Adolescents with Autistic Spectrum Disorders: A Meta-Analysis. *Clinical Child and Family Psychology Review*, *14*(3), 302–317. doi: 10.1007/s10567-011-0097-0
- Stoppelbein, L., Biasini, F., Pennick, M., & Greening, L. (2015). Predicting Internalizing and Externalizing Symptoms Among Children Diagnosed with an Autism Spectrum Disorder: *The Role of Routines*. *Journal of Child and Family Studies*, *25*(1), 251–261. doi:10.1007/s10826-015-0218-3
- Volbrecht, M. M., & Goldsmith, H. H. (2010). Early temperamental and family predictors of shyness and anxiety. *Developmental Psychology*, *46*(5), 1192–1205. doi: 10.1037/a0020616
- Weeks, M., Ooi, L. L., & Coplan, R. J. (2016). Cognitive Biases and the Link Between Shyness and Social Anxiety in Early Adolescence. *The Journal of Early Adolescence*, *36*(8), 1095–1117. doi: 10.1177/0272431615593175

- Wood, J. J., Mcleod, B. D., Sigman, M., Hwang, W.-C., & Chu, B. C. (2003). Parenting and childhood anxiety: theory, empirical findings, and future directions. *Journal of Child Psychology and Psychiatry*, *44*(1), 134–151. doi: 10.1111/1469-7610.00106
- Zdebik, M. A., Boivin, M., Battaglia, M., Tremblay, R. E., Falissard, B., & Côté, S. M. (2019). Childhood multi-trajectories of shyness, anxiety and depression: Associations with adolescent internalizing problems. *Journal of Applied Developmental Psychology*, *64*, 1–12. doi:10.1016/j.appdev.2019.101050