

Rejection sensitivity and the development of social anxiety symptoms during adolescence: A five-year longitudinal study

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Abstract

Rejection sensitivity is a bias toward expecting rejection that can result from negative social experiences and degrade emotional adjustment. In this study, rejection sensitivity was expected to predict patterns of adolescent social anxiety over 5 years when considered alongside other known or expected risk and protective factors: peer rejection (peer-reported), emotion dysregulation, self-worth, temperament (parent-reported), female gender, and grade. Participants were 377 Australian students (45% boys; 79% White, 15% Asian) aged 10 to 13 years ($M = 12.0$, $SD = .90$) and their parents (84%) who completed seven repeated surveys across 5 years. In an unconditional latent growth model, social anxiety symptoms had a significant quadratic pattern of growth, with symptoms increasing about midway into the study when adolescents were age 14, on average. In a model with all predictors, rejection sensitivity was uniquely associated with a higher intercept and a more pronounced quadratic growth pattern of social anxiety symptoms. Other predictors of growth in symptoms were the temperamental trait of negativity affectivity and emotion dysregulation; negative affectivity was associated with a higher intercept and a more pronounced quadratic pattern, and emotion dysregulation was associated with a higher intercept and a less pronounced quadratic pattern. Gender was associated with the intercept, with girls higher in symptoms than boys.

Keywords

Rejection sensitivity, social anxiety, emotion regulation, peer influence, temperament

The adolescent years have been identified as a high-risk time for the escalation of social anxiety symptoms and the onset of disorder, with the median age of onset typically reported to occur at or before age 15 (Nelemans et al., 2019; Rapee et al., 2019). With the goal of prevention and intervention of adolescent social anxiety in mind, theorists have drawn from developmental and clinical perspectives to identify early socio-environmental risk factors for social anxiety, including exposure to violence; inconsistent, coercive, or rejecting parenting practices; and rejection, victimization, or isolation from peers (e.g., Clear et al., 2020; Spence & Rapee, 2016). What the above social-environmental risks have in common is their potentially negative impact on children's social-cognitive beliefs about the behaviors they can expect from other people (Bowlby, 1969).

Negative social-cognitive beliefs about others include attentional biases to the possibility of judgment by others (Spence & Rapee, 2016; Weeks et al., 2009) and biased appraisals or interpretation of others' behaviors as more rejecting and hostile (Downey et al., 1998a; Gardner & Zimmer-Gembeck, 2018). One form of biased appraisal of others' behaviors is rejection sensitivity, defined as a cognitive-affective processing system that involves anxiously expecting, readily perceiving, and defensively reacting in situations where rejection or exclusion is possible or threatened (Downey & Feldman, 1996). Rejection sensitivity theory argues that it develops through environmental experiences (Downey et al., 1999) and research finds that it is elevated among adolescents with a greater history of rejection and victimization by parents or peers (Chango et al., 2012; Rowe et al., 2015). Thus, rejection sensitivity may be

a proximal mechanism that explains why aversive social experiences coalesce in emotional maladjustment, including being a risk for the development of social anxiety symptoms (Abela & Hankin, 2009; Zimmer-Gembeck et al., 2014). However, there has been limited empirical examination of the role of rejection sensitivity in the development of adolescents' social anxiety symptoms. The purpose of this study was to investigate the risk conferred by elevated rejection sensitivity at the transition to adolescence for development of social anxiety symptoms across the following 5 years, while simultaneously accounting for peer rejection and other known or possible personal risk factors for social anxiety symptom development.

Peer Rejection, Rejection Sensitivity, and Social Anxiety

Peer relationships play an important role in the lives of adolescents, impacting on their sense of acceptance and belonging (Laursen & Collins, 2009; Troop-Gordon, 2017). Yet, peer relationships are not

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always accepting and inclusive. In fact, research indicates that between 10% and 16% of adolescents report peer rejection or victimization (Duffy et al., 2020), and such rejection has been associated with rejection sensitivity (Gómez-Ortiz et al., 2017; Zimmer-Gembeck et al., 2013). Furthermore, rejection sensitivity has been described as a mechanism that explains why rejection experiences are associated with maladjustment in multiple domains (Downey & Feldman, 1996; Downey et al., 1998a), and rejection sensitivity does seem to have far-reaching negative implications for psychosocial adjustment (see Duffy et al., 2020 or Zimmer-Gembeck, 2016 for reviews). Most relevant to the current study, rejection sensitivity has been associated with more social anxiety among adolescents (Bowker et al., 2011; Ding et al., 2020), and rejection sensitivity has been identified as a predictor of increased symptoms across a short period of time during late adolescence and young adulthood (Gardner et al., 2020).

It may not be surprising that previous research has found positive concurrent (and even short-term prospective) associations between rejection sensitivity and social anxiety, as they do share some conceptual similarity. In particular, rejection sensitivity and social anxiety each refer to emotions in situations of perceived or actual interpersonal threat or challenge. However, there are also important distinctions between them. First, focusing on rejection sensitivity narrows the focus from general self-presentational concerns of social anxiety to a specific focus on expectations and anxious concerns about rejection and exclusion by others. This more explicitly ties risk for the development of social anxiety to early socio-environmental experiences and expectations for others' behaviors, areas that deserve more attention in interventions and treatments. Second, social anxiety symptoms and rejection sensitivity are differentiated by an emphasis on responses versus expectations. Social anxiety symptoms identify how individuals themselves respond or react to social interactions and events, whereas rejection sensitivity focuses on expectations of others' responses. Third, like other attentional, perceptual, and social-information processing biases that have been shown to be associated with social anxiety and share some conceptual similarity (e.g., attentional vigilance to threat), there is a great deal of clinical theory and research that identifies biases as risk factors for the development of symptoms and disorder, not part of the disorder itself (Rapee et al., 2019; Spence & Rapee, 2016). We argue here that this is especially true in longitudinal studies when a bias is measured prior to the known timing of the escalation or onset of disorder.

Overall, rejection sensitivity may be a particularly powerful and unique risk factor for social anxiety symptom increase during adolescence. Not only does it imply interference in fulfilling the need for belongingness and acceptance by others, which can cause worry and distress about social relationships and impact negatively on emotional health (Baumeister & Leary, 1995), it also captures biased views of the quality of social interactions and relationships that may be generally positive. Thus, even when relationships may appear generally positive by an external standard, individuals high in rejection sensitivity may not experience the benefits, making them even more concerned and worried about their social interactions over time (Ayduk et al., 1999; Downey et al., 1998a). Thus, a wider and wider set of social events may be perceived as possibilities for rejection and exclusion (e.g., simply eating lunch in front of others, speaking in class), eventually culminating in social anxiety symptoms and, possibly, disorder. Furthermore, rejection sensitivity may lead to self-blame (Hankin & Abramson, 2001;

Zimmer-Gembeck et al., 2016) and interfere with positive responses (e.g., positive thinking, seeking support) that could repair negative emotions following (real or perceived) poor social interactions, instead being linked to social withdrawal, hostile reactions, or seeking retribution for either real or perceived rejection (Williams, 2001; Zimmer-Gembeck et al., 2016). As negative responses become more chronic and interfere with existing relationship development, they can involve a cycle of perceived poor social interactions, more worries, and maladaptive responses to social situations that, together, sustain social isolation, limit remedial experiences (e.g., acceptance by others), and result in growth in social anxiety symptoms.

Emotion Dysregulation and Social Anxiety

In the present study, it was our aim to consider the unique risk of rejection sensitivity for social anxiety development independent from the effects of other established risk factors. Emotion dysregulation was one of these other risk factors, given it has been found to be positively related to concurrent and increasing social anxiety symptoms (Carthy et al., 2010; Gross & Jazaieri, 2014). For example, in a 3-year study from the initial waves of the data analyzed here, emotion dysregulation was associated with more elevated social anxiety symptoms about 1 year later, and social anxiety, in turn, predicted worsening dysregulation 1 year later (Masters et al., 2019). However, this study focused only on bidirectional associations between each wave rather than growth in social anxiety symptoms across adolescence and considered only emotion regulation and psychological maladjustment, not rejection sensitivity or other potential risks for social anxiety development. More generally, there has been an upsurge in research on emotion regulation and dysregulation as risk markers and/or protective factors in the ontogenesis of social anxiety symptoms and disorder (Carthy et al., 2010; Gross & Jazaieri, 2014). Influenced by theories of stress and coping, emotion regulation has been described as a transdiagnostic risk for many disorders that are amenable to intervention efforts (Compas et al., 2017; Dryman & Heimberg, 2018), and it is possible that emotion dysregulation positively covaries with rejection sensitivity in adolescents, as has been found in university students (Gardner et al., 2020).

Emotion dysregulation encompasses a multifaceted set of processes, such as heightened emotional reactivity, prolonged duration and failure to modulate emotions, and less awareness, efficacy or flexibility in recognizing and responding to this reaction; any of which may interfere with daily functioning and goal-directed activity (Adrian et al., 2019; Thompson, 2019). In adolescence, youth continue to learn, through socializing agents, how to adaptively regulate emotions, and failures of regulation can give rise to chronic negative affect, increased symptomology, and for some, the development of emotional disorders (Mathews et al., 2014; Rapee et al., 2019; Thompson, 2019). Evidence exists that, compared to non-anxious youth, youth with a diagnosis of an anxiety disorder (Suveg & Zeman, 2004), including social anxiety disorder (Sackl-Pammer et al., 2019), demonstrate greater emotional intensity and dysregulated emotional expression, feel less confident in regulating emotions, and report using more maladaptive strategies (e.g., rumination and avoidance) and fewer adaptive strategies (e.g., cognitive reappraisal). Similar associations have been found in community samples of adolescents (Golombek et al., 2019; Mathews et al., 2014).

Perceived Self-Worth and Social Anxiety

Just as negative socio-environmental experiences of rejection, victimization, and exclusion have been found to be linked to elevated rejection sensitivity, they can also result in poor self-worth, which could, in turn, be a proximal link to emotional problems such as social anxiety (Lopez & DuBois, 2010). Adolescents with more social anxiety symptoms report poorer self-esteem and poorer perceptions of their self-worth (Bowker et al., 2011; Gómez-Ortiz et al., 2017; Weeks et al., 2009). Such associations suggest that higher self-worth would provide some protection from the development of social anxiety symptoms. Given some similarity in the socio-environmental predictors of self-worth and rejection sensitivity, as well as similar links with social anxiety, we considered global self-worth as a predictor (along with emotion dysregulation) to better isolate rejection sensitivity as a unique risk for the development of social anxiety symptoms during adolescence.

Child Temperament and Social Anxiety

Child temperamental traits that indicate greater inhibition are also well-established risk factors for social anxiety (La Greca & Ranta, 2015; Muris & Ollendick, 2005). In particular, shyness and behavioral inhibition, which are closely related temperamental traits defined as reticence and withdrawal from novel social and nonsocial situations, have been associated with heightened risk for social anxiety symptoms and disorder in childhood and adolescence (Spence & Rapee, 2016). For example, among a sample of adolescents, high levels of behavioral inhibition (comprised of infant behavioral observations and maternal reports of shyness) when reported multiple times from as early as 14 months of age were associated with higher parent- and self-reports of social anxiety symptoms and increased risk for a diagnosis of social anxiety disorder by adolescence (Chronis-Tuscano et al., 2009).

Negative affectivity is another often identified temperamental risk for anxious symptomatology in youth. Negative affectivity involves general subjective distress, unpleasurable engagement with one's social environment, and negative mood states (Eisenberg et al., 2000). Numerous studies have reported that preadolescent negative affectivity increases the risk for many disorders including social anxiety (Eisenberg et al., 1998; Waters et al., 2012). Given this past evidence, these multiple indicators of temperamental traits were considered as potential predictors that would also uniquely account for adolescent social anxiety symptoms.

The Current Study

Theory and research on the development of anxiety during childhood and adolescence identify biases in the form of attentional allocation to threat (e.g., threat vigilance) and social-information processing biases (e.g., interpretation of ambiguous information) as risk factors for the development of anxiety. Yet, one cognitive-affective bias that involves expectations and emotional reactions to social information regarding acceptance and rejection (i.e., rejection sensitivity) has rarely been examined as an early risk factor for social anxiety symptom development during adolescence. Given the substantial evidence that fulfilling human needs for belongingness and acceptance are basic to human health and well-being (Baumeister & Leary, 1995), rejection sensitivity would be expected to be a risk for many forms of maladjustment, but perhaps most especially social anxiety. The primary purpose of this 5-year

longitudinal, multi-reporter study was to determine the role of rejection sensitivity in predicting growth in social anxiety symptoms over adolescence unique from other known or expected risk and protective factors for social anxiety, including peer rejection (peer-reported), emotion dysregulation, global self-worth, and temperament (parent-reported). Finally, we accounted for the impact of gender (La Greca & Ranta, 2015; Masters et al., 2019; Nelemans et al., 2019) and tested if growth in social anxiety symptoms varied depending on the grade students were in at the first assessment.

Method

Participants

The participants were 377 boys (45%) and girls (55%) in Grades 5 (26%), 6 (32%), or 7 (42% overall participation rate) at T1 who participated in at least one wave of a 7-wave longitudinal study conducted over 5 years. At study entry, students attended one of three participating schools in an urban area of Australia and ranged in age from 10 years to 13 years ($M = 12.0$, $SD = .90$). The three schools (referred to as *colleges* in Australia) were comprised of both junior (preparatory year to Grade 6) and senior (Grades 7 to 12) schools that were in close proximity to each other on the same campus. Each grade level in each school had approximately 80–120 students.

Most students endorsed White/Caucasian (79%) or Asian (15%) sociocultural background, with 1% Australian First People/Torres Strait Islander/Pacific Islander, and the remaining 5% endorsing “other.” At the last wave (T7) of the study, students were in grades 10 to 12 and were age 15 to 18 years ($M = 16.7$, $SD = .86$). Parents (almost always the mother, $n = 318$, 84%) also completed a short survey during the consent process. Parents' mean age at T1 was 44.4 years ($SD = 5.8$ years). Most parents reported being married or living with a partner (85%), with 14% reporting divorce or separation, and 1% single, never married. About 49% of parents had some university education, 21% reported no education beyond high school, and the remaining parents (30%) reported some technical or other training beyond high school.

We considered publicly available school and regional demographic information to assess the representative of the participating students. It is important to note that questions regarding birth country and language spoken at home are often asked in Australia instead of the questions asked about race/ethnicity in this study. The schools from which the students were drawn report that their student population (all grades) is approximately 52% boys, with 1% Australian first peoples or Pacific Islander, and about 20% speaking a language other than English at home. The schools report that 10% of students are in the lowest income quartile, 61% are in the middle two income quartiles, and 29% are in the highest income quartile. A regional demographic survey reports 64% of adults born in Australia, 1.7% First Peoples or Pacific Islander, 17% with a university degree (18% Year 12 high school maximum, 12% Year 10 high school maximum, with 53% reporting some education beyond high school), and 45% married. Relative to the available school demographic information, our study participants had a slightly higher proportion of girls but was representative otherwise. In comparison to the region, the students in this study had more educated parents, which was likely also reflected in the distribution of income levels in the schools. Students had a higher proportion of married parents than in the adult population in the region, but this would likely be the result of families defined by having children.

Procedure

Study approval from the Griffith University Human Research Ethics Committee (Protocol #2013/13) was obtained before school principals were contacted and parent/student consent were sought. Overall, 58% of consent forms were returned to the school, and there was a 42% participation rate. The return and consent rate may have been adversely affected by the request that parents complete a questionnaire. No student with parent consent declined W1 participation. A small gift (e.g., key ring) was given to students after each survey was completed.

Students completed the first four assessments 6 months apart. A planned missingness design (Little & Rhemtella, 2013) was used so that 50% of students completed the social anxiety measure items at Wave 1 and the other 50% of students completed it at the next wave, alternating this for the first four waves. All students completed the social anxiety measure at Wave 5 to Wave 7. For the measure of rejection sensitivity, 50% of students completed it at Wave 1, and the other 50% completed it at Wave 2. All students completed the measure of general self-worth and ratings of peers at both Wave 1 and Wave 2. At Wave 1, parents completed a survey to report child temperament, and emotion dysregulation was only collected at Wave 3. For this study, we collapsed the social anxiety data across Wave 1 and Wave 2 and across Wave 3 and Wave 4. We also collapsed scores for rejection sensitivity, general self-worth, and peer rejection across Wave 1 and Wave 2. Thus, a total of five waves of data were formed for the analyses reported here (Wave 1/2, Wave 3/4, Wave 5, Wave 6, and Wave 7). To account for different timing of symptom measures, we created a dichotomous variable indicating whether students first completed social anxiety items at Wave 1 or Wave 2 and included this indicator as a control variable in the conditional growth curve models. This indicator was not associated with anxiety and did not change the study results substantially; thus, it was trimmed from the models reported here.

We refer to the five reconfigured waves of data as Time 1 (T1) to Time 5 (T5). The lag between waves was about 1 year. All T1, T2, and T3 assessments were conducted in students' regular classrooms. At T4 and T5, one school opted for students to complete questionnaires in their regular classrooms (as before), but other students were contacted individually and completed an online survey or completed the survey via mail.

Measures

Social anxiety symptoms. The 18-item Social Anxiety Scale for Adolescents (SAS-A; La Greca & Lopez, 1998) assessed social anxiety symptoms at each wave of the study. Each item (e.g., "I worry what others say about me") has five response options, ranging from 1 (*not true*) to 5 (*very true*). The SAS-A contains items that assess fear of negative evaluation, social avoidance, and distress in new situations, and general social avoidance and distress. Items were averaged to form a total social anxiety score, with higher scores indicating more anxiety. Cronbach's α ranged from .92 to .95, with Cronbach's α of .92 for the items merged across Waves 1 and 2, and .92 for Waves 3 and 4.

Anxious rejection sensitivity. Participants completed a short form of the Children's Rejection Sensitivity Questionnaire (Downey et al., 1998b). Six hypothetical rejection scenarios were used, with three related to peers and three related to teachers ("Imagine that a

famous person is coming to visit your school. Your teacher is going to pick five kids to meet this person. You wonder if she will choose YOU"). Following each scenario, two questions were answered. The first two questions assessed anxiety (e.g., "How nervous would you feel about whether or not your teacher will choose you?") about the situation. The response options for these questions ranged from 1 (*not at all*) to 6 (*extremely*). The second question asked the participant to report their response expectation (e.g., do you think your teacher will choose you?). Response options to this question ranged from 1 (*Yes!*) to 6 (*No!*). Rejection sensitivity anxious expectation scores for each scenario were calculated as the cross product of the anxiety item and the response expectation item. The cross products were then averaged to form a composite rejection sensitivity score, Cronbach's $\alpha = .76$ at Wave 1 and .77 at Wave 2. Cronbach's α was .76 for the merged Wave 1 and 2 items.

General self-worth. Five items from the Self-Perception Profile for Adolescents (SPPA; Harter, 2012) measured self-worth. The SPPA employs an alternate choice format (e.g., "Some people are often disappointed with themselves" BUT "Other people are pretty pleased with themselves"). First, respondents decided which of the pair of statements best reflected them, and second, they decided if it was "really true" or "sort of true." Response options were rescored to range from 1 (*low esteem*) to 4 (*high esteem*) and averaging items formed the total score. In the present study, Cronbach's α was .76 at Wave 1 and .86 at Wave 2 and was .78 for the items averaged across the two waves.

Emotion dysregulation. The Difficulty in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004) measured emotion dysregulation (Neumann et al., 2010). Five subscales from the DERS were included: lack of emotional clarity, nonacceptance of emotional responses, impulse control difficulties, limited access to strategies, and difficulties engaging in goal-directed behavior. Response options ranged from 1 (*never*) to 5 (*almost always*). Some items required reverse coding prior to averaging to form subscales and then averaging to form a DERS composite score. Cronbach's α was .90 for all DERS items.

Peer report of peer rejection. The roster-rating method of liking was used (Asher & Dodge, 1986; see also Bukowski et al., 2000). The method involved participants rating liking of each student in the classroom on a scale from 1 (*not at all*) to 5 (*very much*). To produce a score for each participant, ratings of 1 or 2 were treated as "not liked" and these received ratings were counted. A final proportional score to indicate peer rejection was formed for each participant by dividing the total number of 1 or 2 ratings by the total possible number of ratings. The possible range for these scores was 0 to 1; 96.3% of students received at least one rating of 1 or 2 and 83% of students had scores of .5 or less. Only one student received all ratings of 1 or 2 (i.e., a score of 1). The proportional rejection score was correlated with the (reversed) average of all ratings received, $r = .70$, $p < .001$. The rejection score was slightly more strongly correlated with all other measures when compared to the average of all ratings.

Parent report of adolescents' temperamental traits. Parents completed the 60-item Early Adolescent Temperament Questionnaire (EATQ-R; Ellis & Rothbart, 1999). The EATQ-R measures seven temperamental (activation control: 7 items, affiliation: 6 items, attention: 6 items, fear: 6 items, frustration: 6 items, high intensity

Table 1. Means and Standard Deviations of Measures and Correlations Between Measures ($N = 377$).

	1	2	3	4	5	6	7	8	9	10	11	12	13
1 Social anxiety	—												
2 T2 social anxiety	.64**	—											
3 T3 social anxiety	.57**	.77**	—										
4 T4 social anxiety	.51**	.61**	.65**	—									
5 T5 social anxiety	.52**	.61**	.63**	.79**	—								
6 Rejection sensitivity	.63**	.52**	.47**	.38**	.39**	—							
7 Self-worth	-.40**	-.42**	-.35**	-.30**	-.33**	-.49**	—						
8 Emotion dysregulation	.46**	.57**	.60**	.42**	.40**	.43**	-.42**	—					
9 Peer-report rejection	.17**	.09	.11*	.08	.12*	.21**	-.18**	.13	—				
10 Affiliation	.02	.02	.03	-.06	-.06	-.01	.06	-.11*	-.12*	—			
11 Effortful control	-.15**	-.14**	-.09	-.08	-.15**	-.23**	.29**	-.21**	-.26**	.17**	—		
12 Surgency	-.09	-.09	-.09	-.12*	-.19**	-.09	.07	-.09	-.13*	.21**	.14**	—	
13 Negative affectivity	.27**	.22**	.20**	.21**	.25**	.22**	-.31**	.16**	.24**	-.32**	-.44**	-.13*	—
Mean	2.22	2.20	2.25	2.48	2.53	9.19	3.26	2.09	.32	3.96	3.39	3.58	2.50
SD	.83	.78	.84	.91	.96	4.62	.71	.63	.19	.46	.50	.52	.43

Note. All measures were completed at Time 1 (T1) except where indicated with Time 2 (T2) to Time 5 (T5). The possible range for all measures was 1 to 5, with the exceptions of peer-report rejection, rejection sensitivity, and self-worth. Peer-report rejection range was 0 to 1. Rejection sensitivity possible range was 1 to 36. Self-worth possible range was 1 to 4.

* $p < .05$. ** $p < .01$.

pleasure: 9 items, inhibitory control: 5 items, and shyness: 5 items) and two behavioral scales (aggression: 6 items and depressive mood: 5 items). These can be combined into three global composites to indicate effortful control (attention, inhibitory control, activation control), surgency (high-intensity pleasure, reversed fear, reversed shyness), and negative affect (frustration, depressive mood, aggression). Affiliation is maintained as a separate trait. Item response options ranged from 1 (*almost always untrue of your child*) to 5 (*almost always true of your child*). To produce global temperament trait scores, items were averaged within subscales and then averaged to form global composites. Cronbach's α was .89 for effortful control, .81 for surgency, .84 for negative affect, and .70 for affiliation.

Overview of Analyses

Overall, 33 students missed one (9%), 19 students missed two (7.5%), 11 students missed three (3%), and 11 students missed four (3%) of the waves of data collection. Also, 318 (84%) parents completed the measure of temperament. Given there few participants had missing data at T1, most missing data were due to attrition at follow-up assessments (i.e., social anxiety measures) and parent-reported temperament. There were no missing data for peer ratings. Based on Little's (1988) MCAR test, student-reported data were missing completely at random (MCAR), $\chi^2 = 88.9$, $p = .101$, and Little's MCAR was also not significant, $\chi^2 = 201.5$, $p = .061$ when parent-reported data were included in the analysis. We also tested whether any measure under consideration in this study predicted overall missingness. T1 social anxiety and T1 parent-reported effortful control, but no other measures, were significantly associated with the count of total missing scores, with adolescents higher in social anxiety, $r = .11$ ($p = .036$), and lower effortful control, $r = -.15$ ($p = .011$), missing more data. Considering these findings, we maintained all participants in this study by replacing missing data using multiple imputation (20 imputed data sets), and pooled means, SDs, and correlations between all variables were reported. For the primary analyses, missing data were estimated with FIML while fitting growth curve models using AMOSv25.

We fit unconditional and conditional latent-variable growth curve models of social anxiety symptoms, and model fits were assessed with commonly used indices, including the χ^2 -test and associated level of significance, and the comparative fit index (CFI) (Bentler & Bonett, 1980). The root mean square error of approximation (RMSEA) (Browne & Cudeck, 1993) gave an estimate of error due to approximate fit of the models.

First, unconditional latent growth curve models were estimated to identify the best fitting model of social anxiety symptom growth for all participants and to test whether there was significant inter-individual variability in intercepts and patterns of growth. Next, three conditional latent growth models were fit. The first model was constructed to test whether rejection sensitivity was predictive of the intercept and growth in social anxiety. In this model, grade and gender were entered as additional predictors because T1 grade level ranged from 5 to 7, which is a period where some grade- or age-related differences in social anxiety symptoms have been found (Ding et al., 2020), and gender differences in social anxiety symptom levels have been widely supported in past research (Bowker et al., 2011; Nelemans et al., 2019). In a second latent growth curve model, we added all time-invariant predictors (i.e., self-worth, emotion dysregulation, peer rejection, and temperamental traits) to determine whether associations of rejection sensitivity with social anxiety intercept and growth parameters remained significant despite adjustment for multiple other, more widely studied, correlates of social anxiety patterns during adolescence. Third, a trimmed latent growth model was fit, removing all predictors that were not significantly associated with any social anxiety growth parameter.

Results

Descriptive Statistics and Correlations Between Measures

Correlations between measures and the means and SDs of measures are provided in Table 1. Social anxiety was positively correlated with T1 rejection sensitivity, emotion dysregulation, and negative

Table 2. Associations of Gender, Grade, Rejection Sensitivity, Self-Worth, Emotion Dysregulation, Peer Rejection, and Temperamental Traits With Patterns of Growth in Social Anxiety Across Adolescence ($N = 377$).

	Social anxiety growth trajectory		
	Intercept B (95% CI)	Linear slope B (95% CI)	Quadratic B (95% CI)
Model 1: Gender, grade and rejection sensitivity			
Mean	2.197 (2.104, 2.277)***	.012 (-.041, .060)	.011 (.002, .021)*
Variance	.187 (.129, .277)***	.069 (.023, .126)**	.003 (.001, .005)***
Time-invariant predictors			
Gender (girl)	.186 (.035, .314)**	.035 (-.061, .159)	-.011 (-.032, .010)
Grade	.059 (-.012, .133)	.048 (-.020, .103)	-.012 (-.024, -.002)*
Rejection sensitivity	.105 (.088, .120)***	-.023 (-.037, -.013)***	.003 (.001, .005)**
Model 2: All measures			
Mean	2.198 (2.099, 2.276)***	.011 (-.042, .061)	.011 (.002, .021)*
Variance	.137 (.080, .218)***	.055 (.019, .106)*	.003 (.001, .005)***
Time-invariant predictors			
Gender (girl)	.151 (.022, .288)*	.025 (-.101, .129)	-.009 (-.029, .014)
Grade	.031 (-.037, .105)	.031 (-.049, .086)	-.010 (-.019, .005)
Rejection sensitivity	.077 (.062, .097)***	-.030 (-.041, -.061)***	.004 (.002, .006)***
General Self-worth	-.086 (-.176, .043)	-.008 (-.025, .010)	.027 (-.071, .124)
Emotion dysregulation	.289 (.146, .406)***	.225 (.111, .329)***	-.043 (-.064, -.023)***
Peer-report rejection	.100 (-.218, .440)	-.102 (-.344, .105)	.016 (-.024, .064)
Affiliation	.110 (-.017, .252)	-.040 (-.184, .084)	.004 (-.018, .032)
Effortful control	.036 (-.085, .170)	.035 (-.072, .157)	-.001 (-.028, .014)
Surgency	-.157 (-.308, -.001)*	-.001 (-.142, .131)	-.008 (-.033, .013)
Negative affectivity	.157 (.005, .342)*	-.129 (-.311, .052)	.026 (-.003, .058)
Model 3: Trimmed			
Mean	2.198 (2.108, 2.277)***	.010 (-.042, .060)	.025 (.002, .022)*
Variance	.144 (.087, .234)***	.059 (.019, .104)**	.003 (.001, .004)***
Time-invariant predictors			
Gender (girl)	.181 (.034, .303)*	.025 (-.072, .141)	-.009 (-.031, .009)
Rejection sensitivity	.082 (.066, .103)***	-.032 (-.046, -.019)***	.005 (.002, .007)***
Emotion dysregulation	.312 (.180, .427)***	.221 (.115, .326)***	-.043 (-.062, -.022)***
Surgency	-.124 (-.274, .012)	-.004 (-.154, .105)	-.008 (-.028, .019)
Negative affectivity	.145 (-.007, .311)	-.143 (-.304, -.003)*	.029 (.006, .060)*

Note. Unstandardized coefficients are shown. CI = confidence interval. Model 1: $\chi^2(14) = 37.02$, $p < .01$, CFI = .98, RMSEA = .066 (.041 to .092), $p = .138$; Model 2: $\chi^2(43) = 98.71$, $p < .01$, CFI = .97, RMSEA = .059 (.043 to .074), $p = .164$; Model 3: $\chi^2(19) = 43.90$, $p < .01$, CFI = .99, RMSEA = .059 (.036 to .082), $p = .236$. * $p < .05$. ** $p < .01$. *** $p < .001$.

affectivity, and intermittently positively correlated with T1 peer rejection. Social anxiety was consistently negatively correlated with general self-worth, effortful control, and surgency. Most T1 measures were significantly intercorrelated with each other.

Unconditional Growth Models

To test unconditional growth in social anxiety, we fit a linear growth model, followed by fitting a second model to test for a quadratic growth pattern. In each model, the growth parameters were free to covary with each other (e.g., the intercept and the slope). In the linear growth model, social anxiety linearly increased from T1 to T5 ($B = .08$, $p < .001$) and there was significant inter-individual variability ($p < .001$) in both the estimated intercepts and slopes of social anxiety. This model had an adequate fit to the data, $\chi^2(10) = 54.55$, $p < .001$, CFI = .96, RMSEA = .109 (.082 to .138), $p < .001$. The quadratic model also had a good fit, $\chi^2(6) = 23.90$, $p < .01$, CFI = .99, RMSEA = .089 (.054 to .128), $p = .037$, which was significantly better than the fit of the linear model, $\Delta\chi^2(4) = 30.65$, $p < .01$. The quadratic term was significant ($B = .01$, $p = .026$), and the linear slope estimate was no longer significantly larger than 0 ($B = .02$, $p = .556$). There was significant variability

in the estimated intercepts ($p < .001$), linear slopes ($p = .017$), and quadratic growth ($p < .001$) in social anxiety. Thus, we fit conditional growth curve models building on the quadratic latent growth model.

Conditional Models of Social Anxiety Growth Patterns

Gender, grade, and rejection sensitivity. The first conditional latent growth model estimated the effect of T1 rejection sensitivity on social anxiety symptoms, when considered alongside only gender and grade (see Table 2, Model 1). Rejection sensitivity, gender, and grade were freed to have directional effects on social anxiety intercept, slope, and quadratic terms, and the intercept, slope, and quadratic terms were freed to covary with each other. Also, rejection sensitivity, gender, and grade were first freed to covary with each other, but nonsignificant covariances were trimmed. This model had a very good fit to the data, $\chi^2(14) = 37.02$, $p < .01$, CFI = .98, RMSEA = .066 (.041 to .092), $p = .138$. Rejection sensitivity was associated with a higher intercept and less positive slope in social anxiety from T1 to T5 and also was associated with a more prominent quadratic pattern of growth. Gender (girls higher than boys), but not grade, was associated with a higher social anxiety

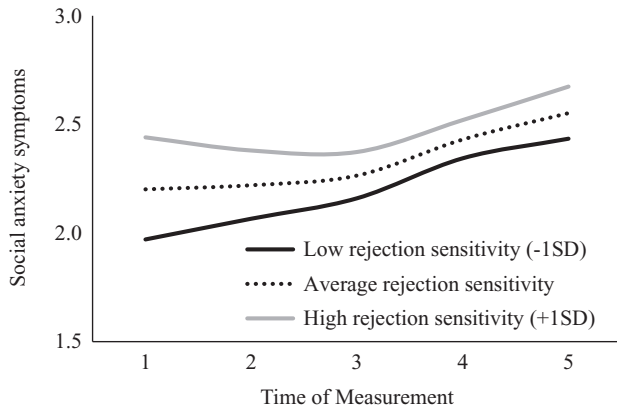


Figure 1. Illustration of Predicted Growth Patterns of Social Anxiety Symptoms for Adolescents With Low ($-1 SD$), Average, and High ($+1 SD$) T1 Rejection Sensitivity Scores ($N = 377$).

Note. There was an approximate 1-year lag between each time of measurement. Social anxiety scores can range from 1 to 5. Other predictors in the model (gender, negative affectivity, emotion dysregulation, and surgency) were set to the mean.

intercept (see Table 2). Grade also had a significant association with the quadratic pattern, with grade level associated with a lesser quadratic shape. The significant intercept, slope, and quadratic variances indicated interindividual variation in social anxiety growth left to explain.

Full model: Gender, grade, rejection sensitivity, and all other predictors. The second conditional model built on the first by adding all additional measured predictors (see Table 2, Model 2). In this model, all predictors were first freed to covary with each other, but nonsignificant covariances were trimmed. This model had a very good fit to the data, $\chi^2(43) = 98.71$, $p < .01$, CFI = .97, RMSEA = .059 (.043 to .074), $p = .164$. Gender (girl), rejection sensitivity, emotion dysregulation, and negative affectivity were each associated with a higher intercept of social anxiety. Surgency was associated with a lower intercept. Regarding predictors of the linear slope of social anxiety symptoms, rejection sensitivity was associated with a less positive slope, and emotion dysregulation was associated with a more positive slope. Two T1 predictors were also associated with quadratic growth, with a positive association for rejection sensitivity and a negative association for emotion dysregulation.

Final model. A final conditional model was fit after trimming predictors that were not significantly associated with social anxiety intercept and growth patterns (see Table 2, Model 3). This model had a very good fit to the data, $\chi^2(19) = 43.90$, $p < .01$, CFI = .99, RMSEA = .059 (.036 to .082), $p = .236$. The results were similar to those for the full model for gender, rejection sensitivity, and emotion dysregulation. However, trimming nonsignificant predictors slightly modified some of the associations of negative affectivity and surgency with social anxiety. Negative affectivity was negatively associated with the linear slope but positively associated with the quadratic growth pattern. Surgency was not associated with social anxiety intercept, slope, or quadratic growth.

To depict the effect of rejection sensitivity on social anxiety patterns over time in this model, predicted growth patterns are shown in Figure 1 for adolescents low ($-1 SD$), average, and high

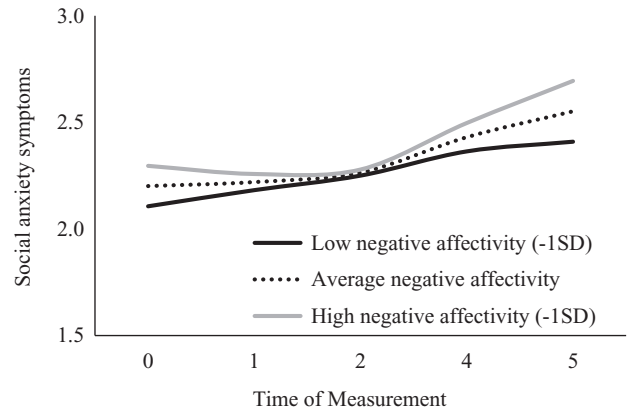


Figure 2. Illustration of Predicted Growth Patterns of Social Anxiety Symptoms for Adolescents With Low ($-1 SD$), Average, and High ($+1 SD$) T1 Negative Affectivity Scores ($N = 377$).

Note. There was an approximate 1-year lag between each time of measurement. Social anxiety scores can range from 1 to 5. Other predictors in the model (gender, rejection sensitivity, emotion dysregulation, and surgency) were set to the mean.

($+1 SD$) in T1 rejection sensitivity. As shown, the temporal pattern of social anxiety symptoms had a more pronounced concave shape at a high ($+1 SD$) level of rejection sensitivity relative to a low or average level. Similar illustrations of the effects of negative affectivity and emotion dysregulation are shown in Figures 2 and 3, respectively. As can be seen in Figure 2, patterns of social anxiety symptoms over time at low, average, and high levels of negative affectivity were similar to those for rejection sensitivity. As can be seen in Figure 3, the temporal patterns of social anxiety symptoms followed a more pronounced concave pattern at a low level ($-1 SD$) of emotion dysregulation relative to average and high levels of dysregulation.

Follow-Up Model of Rejection Sensitivity Anxiety and Expectations

As a follow-up, we refit the final model including the anxious component of rejection sensitivity separate from the expectation component of rejection sensitivity. This model had an adequate fit to the data, $\chi^2(24) = 103.03$, $p < .01$, CFI = .96, RMSEA = .094 (.075 to .113), $p < .001$. The rejection sensitivity components were each associated with a higher social anxiety intercept ($B = .201$ and $.303$ for anxiety and expectation, respectively, both $p < .001$), but only rejection sensitivity expectation (not anxiety) was significantly associated with the linear slope ($B = -.132$, $p < .001$) and with quadratic growth in social anxiety ($B = .021$, $p < .001$).

Discussion

The preadolescent to early adolescent transitional period is crucial for the identification and prevention of several factors that can increase adolescents' vulnerability to social anxiety (Chronis-Tuscano et al., 2018; La Greca & Ranta, 2015; Spence & Rapee, 2016). Even if symptoms are transient and never rise to the level of seeking mental health care or a clinical diagnosis of disorder, higher levels of social fear and avoidance of negative evaluation in social situations can be disruptive to optimal development. Therefore,

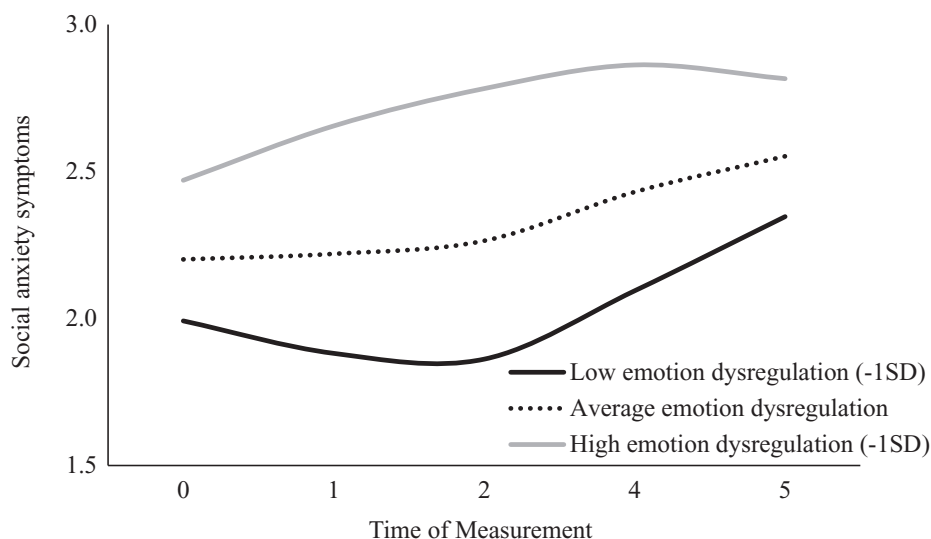


Figure 3. Illustration of Predicted Growth Patterns of Social Anxiety Symptoms for Adolescents With Low (-1 SD), Average, and High ($+1$ SD) TI Emotion Dysregulation ($N = 377$).

Note. There was an approximate 1-year lag between each time of measurement. Social anxiety scores can range from 1 to 5. Other predictors in the model (gender, rejection sensitivity, negative affectivity, and surgency) were set to the mean.

identifying factors that may help to prevent or protect against social anxiety symptoms in adolescence remains a central focus for developmental and clinical scientists. We investigated whether rejection sensitivity measured at the transition to adolescence, characterized by early occurring biases in expecting and misinterpreting cues of rejection, might be a catalyst for growth in social anxiety across adolescence, when considered alongside other known or expected risk and protective factors.

Rejection Sensitivity and Social Anxiety Growth During Adolescence

As expected, there were associations of early rejection sensitivity with the intercept of social anxiety symptoms but also with the linear slope and quadratic (i.e., curvilinear) pattern of symptoms over the following 5 years of adolescence. Generally consistent with what was expected, adolescents highest in rejection sensitivity at the start of the study had the highest level of social anxiety symptoms. In addition, adolescents who reported more rejection sensitivity had a more pronounced quadratic (i.e., curvilinear) shape of symptoms over the following 5 years. However, somewhat unanticipated was the finding that youth higher in rejection sensitivity had less linear increase in anxiety so, conversely, adolescents with average and even low rejection sensitivity relative to their peers showed a pattern more consistent with linear increase. Although unanticipated, this finding is not an uncommon one when considering risk factors for changes in symptomatology over time; linear growth can be less pronounced among adolescents who initially report a high level of risk or have the most elevated symptom intercept (see Zimmer-Gembeck et al., 2018). Thus, overall, adolescents who report high rejection sensitivity at the transition to adolescence are higher in social anxiety symptoms from the first years of adolescence and their symptoms do not abate when assessed into later adolescence. Also noteworthy, adolescents with average, and even low, rejection sensitivity scores have a concerning

pattern of growth in social anxiety symptoms as they move into and through middle adolescence.

Even when considered alongside other known or expected risk and protective factors for social anxiety, including peer rejection, emotion dysregulation, self-worth, and temperament (as well as female gender), rejection sensitivity conferred risk for social anxiety symptoms. These findings suggest that rejection sensitivity is a unique risk factor for a high level of social anxiety symptoms across the early years of adolescence and can identify youth at risk of continued symptoms into middle to later adolescence. In particular, and consistent with theory and research on the risk that social-information biases present in the development of youth anxiety (Spence & Rapee, 2016), adolescents higher in rejection sensitivity are more likely to interpret neutral or ambiguous social cues as rejection, react strongly to overt experience of rejection, and become more distressed from these social interactions into the future (Downey & Feldman, 1996; Gardner et al., 2020; Zimmer-Gembeck, 2016). These findings support the relevance for continued examination of rejection sensitivity as another cognitive-affective risk factor for maintenance of, or increases in, social anxiety symptoms. It is possible that adolescents higher in rejection sensitivity experience greater attentional allocation to threat within their social interactions, become more overwhelmed by such threat (Zimmer-Gembeck, 2016), all of which may place them at continued risk for social anxiety. It would be useful for future research to test these notions by focusing on identifying the more precise mechanisms by which rejection sensitivity confers risk for social anxiety disorder in later adolescence or adulthood.

Other Findings

Gender and grade level. Turning to other findings, consistent with previous studies and reviews on the developmental course of social anxiety (e.g., La Greca & Ranta, 2015; Nelemans et al., 2019; Rapee et al., 2019), on average, social anxiety symptoms appeared stable in level in the early adolescent years but then showed an

upturn beginning at about age 14. Further, when gender and grade level were considered in the full model, gender was associated with the social anxiety intercept in the most comprehensive model (girls higher in social anxiety than boys), but grade level was not. These findings confirm past research identifying girls' greater vulnerability to social anxiety (La Greca & Lopez, 1998; Nelemans et al., 2019), but linear or quadratic change in symptoms was not significantly predicted by gender.

Other measured risk factors for social anxiety growth. In addition to the key findings for rejection sensitivity, both emotion dysregulation and the temperamental trait of negative affectivity (as reported by parents) were associated with a higher intercept of social anxiety and related to growth in symptoms over adolescence in our most comprehensive models. Adolescents who reported a higher level of dysregulation in early adolescence (such as fewer strategies for managing emotions and more impulsive emotions) were more likely to follow a linear pattern of symptoms over time (thus, flatter quadratic growth in symptoms). Furthermore, adolescents who were reported to be higher in negative affectivity by their parents had more social anxiety symptoms and showed a sharper quadratic pattern of growth in social anxiety beginning in middle adolescence. Theory has identified emotion regulation deficits combined with high negative affectivity as a general risk for psychopathology (e.g., Thompson, 2019). Although this view suggests examining an interaction effect, which we did not do here given our focus on rejection sensitivity, our findings do support the importance of emotion dysregulation and negative affectivity in social anxiety symptom development during adolescence.

Although associated with a lower intercept of social anxiety in the full models, it was surprising that surgency, another temperamental trait considered as a risk for social anxiety, was not associated with social anxiety growth in the final trimmed model. Surgency comprised aspects of fear and shyness (albeit reversed and focused on lack of fear and shyness); fearfulness has been identified as a risk for heightened social anxiety (Chronis-Tuscano et al., 2018; Spence & Rapee, 2016). This finding could be a result of tapping low shyness when measuring surgency. Studies of temperament in children often find that shyness is not always associated with social anxiety, providing a distinction between individuals who are highly inhibited (compared to stable patterns of inhibition) often preferring to be alone, demonstrating a non-fearful tendency to be alone (similar to preference for solitude) compared to the fearful anxiety and avoidance shown in social anxiety (Eisenberg et al., 1998, 2000). Previous studies also suggest that indices of effortful control, inhibition, and positive affectivity may interact with high emotionality or negative affectivity to predict social anxiety (Muris & Ollendick, 2005; Rapee et al., 2019; Rothbart et al., 2011). Future research designed to identify a range of personal and social risks for social anxiety development would benefit from making finer distinctions between aspects of regulation, affectivity, fear, and shyness and include a measure that taps each aspect.

It is also noteworthy that general self-worth was not significantly associated with social anxiety growth in our final model. Nevertheless, general self-worth was correlated with fewer symptoms of social anxiety. Thus, consistent with previous findings (Bowker et al., 2011; Gómez-Ortiz et al., 2017), self-worth can be positive for well-being, but it was not a unique predictor of social anxiety growth during adolescence when rejection sensitivity, emotion dysregulation, and negative affectivity were simultaneously considered.

Study Limitations, Future Research Directions, and Conclusion

Before concluding, there are four study limitations to mention. First, some measures were reported by parents and peers, but self-report was the predominant data collection method. We did this because self-report is often the most accurate when assessing symptoms or perceptions of others (e.g., Costello & Angold, 1995). Nevertheless, reliance on self-report for multiple measures may have resulted in shared method variance, which has the potential to inflate associations. Second, about 16% of parents did not complete the measure of temperament and there were additional data missing when adolescents were not present at school or available for personal follow-up. We imputed missing data using best practices to maintain all participants in the study. However, the higher amount of missing parent-report data may have had some influence on the results. Third, while we addressed a significant gap by examining rejection sensitivity as a unique predictor of social anxiety growth, we did not examine change in predictors. Therefore, we did not examine how risk and protective factors may covary over time with social anxiety symptoms and did not test whether social anxiety symptoms also convey risk for increased rejection sensitivity over time. Future research could address these limitations. A final limitation to mention is the grade range of adolescents at the start and throughout each wave. This range was somewhat wide, spanning three grades (and three ages). Future research could focus on a narrower age range or recruit a larger sample to allow for age-specific analyses.

In summary, the average pattern of social anxiety symptoms found in this study was quadratic in shape, showing an increase starting when adolescents were, on average, 14 years of age. This quadratic pattern was shifted upwards toward higher symptoms in girls relative to boys. Regarding risk factors, as predicted, youth higher in rejection sensitivity at the transition to adolescence had more symptoms and were also at risk for continued or increased symptoms into later adolescence. Also, adolescents higher in emotion dysregulation and negativity affectivity at the start of the study were at greater risk for social anxiety symptom development. These findings suggest multiple risk factors for social anxiety. Studies of adolescents designed to identify additional biases and risk experiences associated with social anxiety would add to the findings presented here. Research that considers social anxiety disorder (rather than or in addition to symptoms), other aspects of temperament, and other forms of peer problems would be particularly useful. Also relevant, researchers could include measures of family risk factors (such as parent mental health disorders and overprotection or accommodation of anxious symptoms; Hudson & Rapee, 2001; Waters et al., 2012) and biological and neuropsychological development (e.g., puberty; Guyer et al., 2016). Overall, however, we expect that expanding our models to include additional risk factors would not undermine the relevance of rejection sensitivity, emotion dysregulation, and temperamental negative affectivity in the development of social anxiety during adolescence.

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