


## RESEARCH ARTICLE

# Associations of generalized anxiety and social anxiety with perceived difficulties in school in the adolescent general population

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## Abstract

**Introduction:** Generalized anxiety disorder (GAD), marked by excessive worry, and social anxiety disorder (SAD) are among the clinically most important anxiety disorders in the adolescent population. This study aimed to explore the associations between perceived difficulties in school and heightened levels of self-reported noncomorbid and comorbid GAD and SAD symptoms.

**Methods:** Survey data of 37,905 Finnish upper secondary school students with a mean age of 17.33 years (SD = 0.63) were obtained from the School Health Promotion study, implemented in April and May 2015 in Finland. Exploratory factor analysis was used to determine indicators of academic and social difficulties in school. Logistic regression analysis was conducted to examine multivariate associations between anxiety symptoms and difficulties in the school. The anxiety symptom thresholds were based on the seven-item Generalized Anxiety Disorder Scale ( $\geq 10$  points) for GAD-related symptoms and the Mini-SPIN ( $\geq 6$  points) for SAD-related symptoms.

**Results:** Self-reported generalized anxiety and social anxiety were both significantly associated with various perceived difficulties in school among this adolescent general population sample. Noncomorbid and comorbid GAD and SAD symptoms were both associated with an increased risk of academic and social difficulties, even when controlling for school performance. Comorbid symptoms were associated with significantly higher rates of social difficulties than noncomorbid symptoms of GAD or SAD. Furthermore, GAD symptoms were associated with a high risk for academic difficulties, irrespective of comorbidity.

**Conclusions:** Excessive worry, a defining feature of GAD, is central to school-related impairments among adolescents. The present study highlights the importance of school-based interventions for anxious adolescents. Interventions to improve adolescents' school functioning should account for the interference of pathological worry related to GAD.

## KEYWORDS

academic impairment, adolescents, difficulties in school, generalized anxiety, social anxiety, social impairment

# 1 | INTRODUCTION

The onset of anxiety symptoms typically occurs during childhood or adolescence and may result in significant functional impairment (Van Ameringen et al., 2003; Solmi et al., 2022). Generalized anxiety disorder (GAD) and social anxiety disorder (SAD) are among the clinically most important anxiety disorders in adolescents (Spence et al., 2018; Swan & Kendall, 2016). Diagnostic criteria for GAD include disproportional, uncontrollable, and often irrational anxiety and worry for at least 6 months (American Psychiatric Association, 2013). SAD is characterized by a persistent and excessive fear of one or more types of social situations, leading to significant distress or avoidance of such situations (American Psychiatric Association, 2013). Both disorders are relatively common among adolescents and can be considerably disabling (Merikangas et al., 2010; Wittchen et al., 1999). In the last few decades, evidence has shown a substantial increase in self-reported GAD symptoms among young people, and among females in particular (Parodi et al., 2022; Slee et al., 2021).

Adolescents with anxiety disorders experience significant problems related to both academic and social functioning (de Lijster et al., 2018; Wittchen et al., 1998). Such disorders are associated with phenomena that may cause various difficulties in the school environment, such as inability to concentrate, difficulties controlling worry about school performance, being repeatedly bullied, fear of public speaking, and fear of interacting with peers and teachers (Ranta et al., 2009; Spence et al., 2018; Wagner, 2001). Furthermore, previous studies have shown that anxiety disorders are linked to with compromised academic performance (de Lijster et al., 2018; Seipp, 1991), school refusal (Waite & Creswell, 2014), premature withdrawal from higher education (Van Ameringen et al., 2003; Kessler et al., 1995), and failure to attend university (Woodward & Fergusson, 2001). Around 50% of adolescents with GAD show significant concurrent impairment of functioning in the school setting (Essau et al., 2000; Wittchen et al., 1998), with the most common academic impairments related to concentrating on schoolwork and taking exams (Nail et al., 2015).

Studies focused on social anxiety suggest that elevated social anxiety and SAD are associated with lower educational achievement levels, lower grade point averages, slower academic progression, less communication with instructors, and being more negatively treated in class, relative to controls (Archbell & Coplan, 2021; Blöte et al., 2007; Ranta, La Greca, et al., 2016; Ranta et al., 2009; Ruscio et al., 2008; Soohinda & Sampath, 2016). SAD is also a predictor of students' failure to transition from high school to college (Kessler, 2003) and their ability to finish upper secondary school and start a university degree (Vilaplana-Pérez et al., 2021). Slow academic progression may be a problem specifically for socially anxious boys (Ranta, La Greca, et al., 2016). In addition, concentrating on schoolwork and giving oral reports are the most common impairments among adolescents with SAD (Nail et al., 2015).

According to several studies, adolescents with elevated levels of anxiety symptoms (La Greca & Lopez, 1998; Muris & Meesters, 2002; Ranta, La Greca, et al., 2016) and anxiety disorders (Brumariu et al., 2013; Reinherz et al., 1993; Swan & Kendall, 2016) tend to have more problems in their interpersonal relationships than their nonanxious peers. Interpersonal dysfunction may be a prominent feature of GAD (Malivoire et al., 2020), and even 80% of adolescents suffering from GAD may be impaired in their social contacts (Wittchen et al., 1998), having interpersonal problems such as avoidance of conflicts and passive interpersonal style (Waters et al., 2008). Adolescents with SAD also demonstrate lower-than-expected performance in social evaluative tasks and are rated as significantly less socially competent than their peers at school (Spence et al., 1999).

Anxiety disorders have frequent comorbidities that should be considered when investigating impairments related to them (Melton et al., 2016). A second anxiety disorder is present in as much as 75% of referred youth with GAD (Masi et al., 2004). SAD is also frequently comorbid with other anxiety disorders, at a rate of 40%–50% (Ranta et al., 2009; Wittchen et al., 1999). Thus, whether the comorbid occurrence of GAD and SAD is associated with a higher rate of difficulties in school than GAD or SAD alone, is a question worth paying attention to (Mychailyszyn et al., 2010). In comparison, adult patients with GAD or SAD both demonstrate a considerable degree of work, social and general impairment, even without any comorbidity (Aderka et al., 2012; Ebberwein, 2020; Wittchen, 1994; Wittchen et al., 1998). With respect to adolescents suffering from anxiety disorders, those with comorbid disorders seem to exhibit the greatest impairments in their functioning at school (Mychailyszyn et al., 2010).

There are well-established demographic correlates related to anxiety disorders among adolescents. Overall, girls are likelier to have anxiety disorders than boys (Merikangas et al., 2010), and such gender differences are seen among children as young as 6 years old (Lewinsohn et al., 1998). Anxious boys and girls may also exhibit different patterns and mediators related to educational and interpersonal impairments and peer victimization (La Greca & Harrison, 2005; La Greca & Lopez, 1998; Ranta, La Greca, et al., 2016; Ranta et al., 2013).

Although research evidence indicates that GAD and other anxiety disorders, such as obsessive-compulsive disorder and panic disorder, are associated with significant impairment during the worst episodes (Wittchen et al., 1998), on the whole, existing evidence regarding impairments associated with anxiety disorders other than SAD among adolescents is still somewhat limited and even mixed (de Lijster et al., 2018). While adjustment to school settings does seem to be more difficult for anxious youth than for their nonanxious counterparts (Barrett & Heubeck, 2000; Mychailyszyn et al., 2010), the range and severity of social and academic impairment among adolescents with different types of comorbid and noncomorbid anxiety

disorders and related anxiety symptoms are not yet well known. Thus, more studies focusing on different anxiety symptoms and anxiety disorders other than SAD are needed (de Lijster et al., 2018).

To address the abovementioned gaps in the literature, the aim of the current study was to investigate the associations of perceived difficulties in different school-related academic tasks and social interactions with self-reported GAD and SAD symptoms among adolescents. Specifically, we examined cross-national survey data from a large, representative sample of Finnish general upper secondary school (GUSS) students to answer the following research questions:

- 1) How strong are the associations between GAD symptoms and perceived difficulties in school?
- 2) How strong are the associations between SAD symptoms and perceived difficulties in school?
- 3) Is the comorbidity of GAD and SAD symptoms associated with higher rates of difficulties in school compared with GAD or SAD symptoms alone?

Corresponding to these questions, our hypotheses were as follows: (1) Self-reported GAD symptoms will likely be associated with perceived difficulties in school. (2) Self-reported SAD symptoms will likely be strongly associated with perceived difficulties in school. (3) Self-reported comorbid GAD and SAD symptoms may be associated with even higher rates of difficulties in school than GAD or SAD symptoms alone.

## 2 | MATERIALS AND METHODS

### 2.1 | Subjects and procedure

The material for the present study consisted of the responses of Finnish first- and second-year students attending GUSSs. In Finland, after obligatory education, students may apply for either vocational education or general upper secondary education which equips them with transversal general knowledge. The data were obtained from the School Health Promotion (SHP) study, a nationally representative survey conducted by the Finnish Institute for Health and Welfare every other year to examine the health, health behaviors, and school experiences of teenagers. The study design was a repeated cross-sectional survey, and the data collection was based on total sampling. Every municipality in Finland is approached for the SHP, and each decides whether the schools in the area will participate.

The survey data were collected online from April to May 2015. Each student completed the questionnaire independently and anonymously during a school lesson (45 min) under the supervision of a teacher. Completed questionnaires were received from 38,760 GUSS students, accounting for 62% of the targeted student group (Finnish Institute for Health and Welfare, 2022). Due to incomplete data, 855 (2.21%) questionnaires were excluded from the present study. Thus, the final, analyzable sample had a total of 37,905 participants (15,535 boys and 22,370 girls) aged 14–20 years. The mean ages (standard deviation) of the boys and girls in the sample were 17.34 (0.62) and 17.32 (0.63) years, respectively.

## 3 | MEASUREMENTS

### 3.1 | Self-reported generalized anxiety and social anxiety symptoms

Symptoms of GAD were assessed using the seven-item Generalized Anxiety Disorder Scale (GAD-7), a brief self-report scale developed to detect individuals with probable GAD (Spitzer et al., 2006). The GAD-7 has been psychometrically validated in both adult and adolescent populations (e.g., Löwe et al., 2008; Spitzer et al., 2006; Tiirikainen et al., 2019). In this measure, respondents are asked how often, over the past 2 weeks, they have been bothered by seven core symptoms of GAD (e.g., “worrying too much about different things” and “not being able to stop or control worrying”). The answers are rated on a four-point scale as follows: 0 (*not at all*), 1 (*several days*), 2 (*more than half the days*), and 3 (*nearly every day*); the total score ranges from 0 to 21 (Spitzer et al., 2006). A score of 10 points represents a moderate or severe level of generalized anxiety symptoms (Daig et al., 2009), and this was used as the cutoff point in the present study. In the present study, fully completed measures were included. In addition, if only one item response was missing, it was replaced with the average of the subject's answers to the other six questions ( $n = 861$ ), and the response was included.

Symptoms of SAD were assessed using the three-item Mini-Social Phobia Inventory (Mini-SPIN; Connor et al., 2001), which has been proven to be effective in the screening and identification of SAD among adolescents (Ranta et al., 2012). The Mini-SPIN consists of three questions rated on a five-point scale as follows: 0 (*not at all*), 1 (*a little bit*), 2 (*somewhat*), 3 (*very much*), and 4 (*extremely*); the total sum score ranges from 0 to 12. The questionnaire assesses symptoms during the preceding week. Items are as follows: (1) “Fear of embarrassment causes me to avoid doing things or speaking to people,” (2) “I avoid activities in which I am the center of attention,” and (3) “Being embarrassed or looking stupid are among my worst fears”

(Connor et al., 2001). In this study, the cutoff score was set at six points, which has been found to possess optimal sensitivity and specificity for detecting SAD among Finnish adolescents from the general population (Ranta et al., 2012).

To compare adolescents with pure and comorbid anxiety symptoms, four mutually exclusive groups were formed based on self-reported inventory scores: the GAD group scored  $\geq 10$  points on the GAD-7 and  $< 6$  points on the Mini-SPIN; the SAD group scored  $\geq 6$  points on the Mini-SPIN and  $< 10$  points on the GAD-7; the GAD+SAD group scored  $\geq 10$  on the GAD-7 and  $\geq 6$  on the Mini-SPIN, and the control group scored  $< 10$  on the GAD-7 and  $< 6$  on the Mini-SPIN.

### 3.2 | Perceived difficulties in school

The following SHP survey question was used to determine participants' difficulties in school: "How is your school going? Do you have difficulties in the following areas of schoolwork? (1) paying attention to teaching, (2) group work, (3) doing homework, (4) preparing for exams, (5) finding personal learning strategies, (6) doing activities requiring initiative, (7) doing reading tasks, (8) doing writing tasks, (9) doing calculation tasks, (10) getting along with peers, and (11) getting along with teachers." The response alternatives for each item were 0 (*not at all*), 1 (*not so much*), 2 (*quite much*), and 3 (*very much*). If only one item response was missing, it was replaced with the average of the subject's answers to the other 10 items ( $n = 1602$ ).

### 3.3 | Sociodemographic background variables

Parental education level was assessed by asking each adolescent participant about the educational qualifications of their parents, using the question, "What is the highest education your father/mother has completed?" The response alternatives were "comprehensive school only," "GUSS or vocational school," "GUSS or vocational school and further vocational studies" and "university or polytechnic." For the analyses, parental educational level was coded as low if neither parent had completed more than comprehensive school, GUSS, or vocational school.

Parental unemployment was assessed with the question, "During the past year, have your parents been unemployed or laid off work?" The response alternatives were "no," "one parent," and "both parents." Parental unemployment was classified as a dichotomous no/yes variable (at least one unemployed parent).

Family structure was assessed by asking the subjects with whom they lived. This elicited information on whether the adolescent's family included a mother and father, a mother and stepfather, a father and stepmother, a mother alone, a father alone, or some other option. In the analyses, any adolescent not living with both a mother and a father was coded as living in a family arrangement "other than nuclear family structure." The reference category consisted of adolescents living with both parents.

We controlled for the aforementioned variables, along with sex, because they have been shown to be associated with the prevalence rates of anxiety, subjective health, and the use of special school services among adolescents (Merikangas et al., 2010; Mohammadi et al., 2020; Sleskova et al., 2006; Somersalo & Solantaus, 2001). In addition, age was considered a continuous background variable in the analyses.

Data regarding the students' grade point averages or other objective measures of school performance were unavailable. Therefore, to control for school performance in the analyses, self-reported subjective school performance was chosen as a background variable. The adolescents were asked how they would rate their academic achievements, and the response options were "excellent," "good," "mediocre," and "poor." For the analyses, academic achievement was dichotomized as "not poor" (for the categories "excellent," "good," and "mediocre")/"poor".

## 4 | STATISTICAL ANALYSES

Explorative factor analysis (EFA) was used to determine the relationship patterns of associations among the 11 variables related to school difficulties and to explain a large portion of the total variance in terms of a smaller number of factors. The parameters were estimated using the maximum likelihood method, after which varimax rotation was performed. To assess the factor structure of school difficulties, the number of factors was evaluated using the scree method, parallel analysis, and the Kaiser rule (factors with eigenvalues greater than 1.0 were retained). All the assessment criteria supported the choice of a two-factor structure, which was also theoretically justified because the original survey items covered academic and social difficulties.

In the two-factor solution, Factor 1 represented mainly academic difficulties (Items 1 and 3–9 with factor loadings  $> 0.50$ ), and Factor 2 represented mainly social difficulties (Items 2, 10, and 11 with factor loadings  $> 0.50$ ) in the school environment. Composite variables that predicted the location of each individual on the factor were computed as regression-based factor scores. Details of the EFA are presented in Appendix S1.

The two factors were chosen as indicators for academic and social difficulties, and the factor scores were classified into two separate categories for boys and girls by the 90th percentile. The bivariate associations between anxiety symptom group membership (GAD/SAD/GAD + SAD/control) and perceived academic and social difficulties (yes/no), as defined by factor score percentiles, were examined using  $\chi^2$  comparisons.

Logistic regression analysis (LRA; Hosmer et al., 2013; Vehkalahti & Everitt, 2019) was used to examine the multivariate associations between anxiety symptom group membership and perceived difficulties in school, with academic difficulties and social difficulties serving as the dependent variables. Given the gender differences in psychopathology, all analyses were conducted separately for boys and girls, and three different models were used for each dependent variable. In the first set of models, the anxiety symptom group variable and age (continuous) were entered. In the second set of models, low parental education, parental unemployment, and family structure were added to the models. In the third (full) set of models, poor school performance was also controlled for. The Hosmer–Lemeshow test was used to assess the goodness of fit for logistic regression models, with significant *p*-values indicating problems with the model fit. The Nagelkerke  $R^2$ , indicating how close the prediction of the model is to the observed 0 and 1 outcomes, was used as the measure of the explained variation in each model. Cook's distance was used to determine the influential outliers in a set of predictor variables. The details of the LRA fit indicators can be found in Appendix S2.

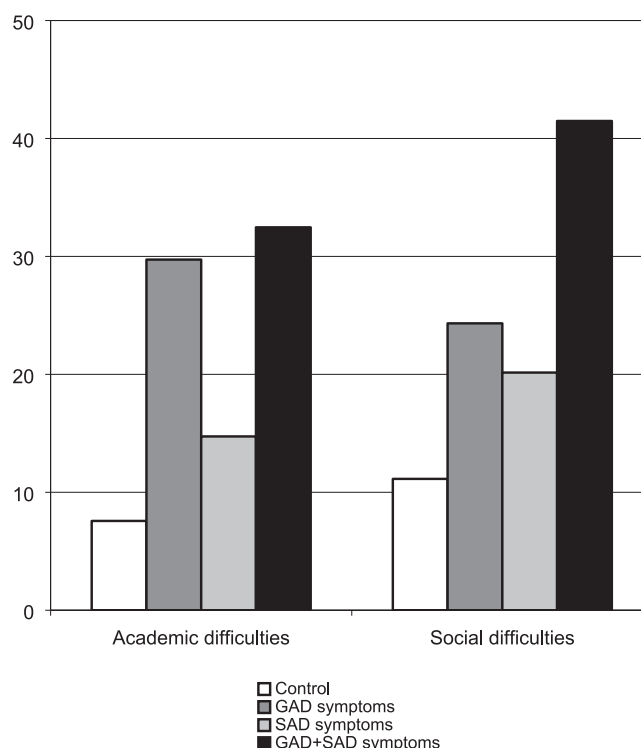
**TABLE 1** Symptom groups of self-reported anxiety, socioeconomic background variables, and school-related academic and social difficulties in the study sample, *n*, and %.

	Boys <i>n</i> = 15,535		Girls <i>n</i> = 22,370	
Group		%		%
Control	12,284	79.07	14,852	66.39
GAD symptoms only	370	2.38	1616	7.22
SAD symptoms only	2382	15.33	4007	17.91
Comorbid GAD + SAD symptoms	499	3.21	1895	8.47
Low parental education				
No	12,971	83.50	18,038	80.63
Yes	2564	16.50	4332	19.37
Parental unemployment				
No	11,231	72.29	15,867	70.93
Yes	4304	27.71	6503	29.07
Other than nuclear family structure				
No	11,196	72.07	15,285	68.33
Yes	4339	27.93	7085	31.67
Poor school performance				
No	14,572	93.80	21,229	94.90
Yes	963	6.20	1141	5.10
Academic difficulties				
No	13,982	90.00	20,133	90.00
Yes	1553	10.00	2237	10.00
Social difficulties <sup>a</sup>				
No	13,390	86.19	19,644	87.81
Yes	2145	13.81	2726	12.19

Abbreviations: GAD, generalized anxiety disorder; SAD, social anxiety disorder.

<sup>a</sup>The 90th percentile for social difficulties represents all observations with a factor score value less than 1.04156 for boys and girls. Because the mentioned value was repeated in the data by 649 boys and 490 girls, the 90th percentile sort out more than exactly 10% of the observations.





**FIGURE 1** The percentage (%) of boys with perceived academic and social difficulties in school among four groups of Finnish upper secondary school students: no self-reported GAD/SAD (control), self-reported GAD, self-reported SAD, and self-reported comorbid GAD and SAD (GAD+SAD). Pairwise comparisons ( $\chi^2$ ): Academic difficulties: control group <SAD ( $p < .001$ ); SAD < GAD ( $p < .001$ ); no difference between GAD and GAD+SAD. Social difficulties: control group <SAD ( $p < .001$ ); control group <GAD ( $p < .001$ ); no difference between SAD and GAD; SAD < GAD+SAD ( $p < .001$ ); GAD < GAD+SAD ( $p < .001$ ). GAD, generalized anxiety disorder; SAD, social anxiety disorder.

## 5 | RESULTS

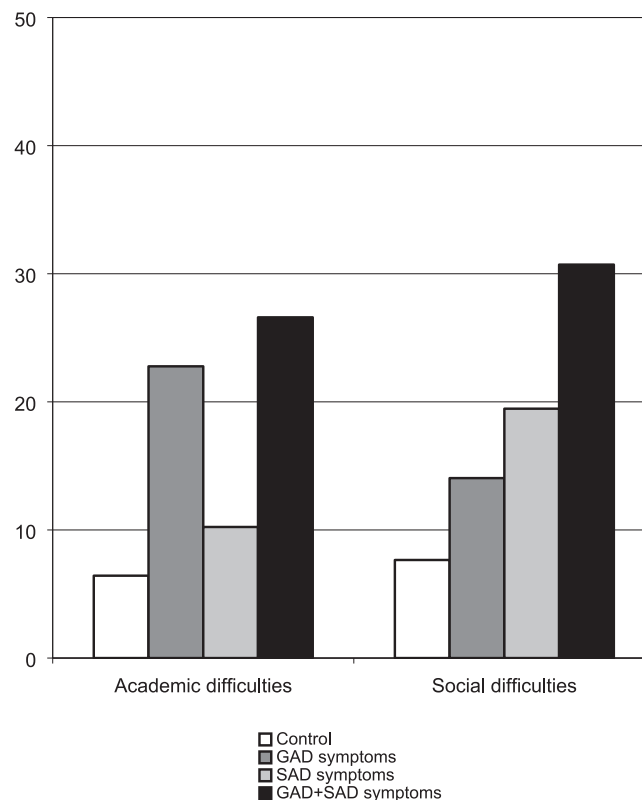
Among the boys in this study, 5.59% had either comorbid or noncomorbid GAD symptoms, and 18.55% had either comorbid or noncomorbid SAD symptoms. Among the girls, 15.70% had either comorbid or noncomorbid GAD symptoms and 26.38% had either comorbid or noncomorbid SAD symptoms. The rates of comorbid GAD and SAD symptoms were also much higher among girls (8.47%) than among boys (3.21%) ( $\chi^2$ :  $p < .001$ ). The counts and frequency of GAD and SAD symptoms, school difficulties, and basic descriptive data on background variables are given in Table 1. In terms of academic and social difficulties in school, significant differences were found between the symptom groups (Figures 1 and 2).

The LRA results showed significant differences in academic difficulties based on the symptom group membership (Table 2). In particular, for both boys and girls, LRA indicated that elevated GAD, SAD, and GAD+SAD symptoms were associated with an increased risk of experiencing academic difficulties relative to the risk associated with the control group. The highest increase in risk relative to the control group was associated with comorbid symptoms, but the increase in risk for noncomorbid GAD symptoms was almost as high. Noncomorbid SAD symptoms were also associated with an increased risk for academic difficulties, but not as strongly as the GAD symptoms. Among the other independent variables, age, family structure, and poor school performance were associated with perceived academic difficulties among both boys and girls.

For perceived social difficulties in school, both elevated GAD and SAD symptoms were associated with an increased risk relative to having no symptoms (Table 3). Comorbid GAD and SAD symptoms were associated with the highest relative risk. Furthermore, parental education and parental unemployment were associated with a slight increase in the risk of social difficulties among boys and girls, respectively, while poor school performance was associated with social difficulties among boys and girls.

## 6 | DISCUSSION

This study examined the academic and social school difficulties experienced by Finnish adolescents reporting either heightened or normative levels of generalized and social anxiety symptoms. The main finding was that the symptoms of both types of anxiety were associated with perceived difficulties in school in this population sample. Noncomorbid and comorbid



**FIGURE 2** The percentage (%) of girls with perceived academic and social difficulties in school among four groups of Finnish upper secondary school students: no self-reported GAD/SAD (control), self-reported GAD, self-reported SAD, and self-reported comorbid GAD and SAD (GAD+SAD). Pairwise comparisons ( $\chi^2$ ): Academic difficulties: control group <SAD ( $p < .001$ ); SAD < GAD ( $p < .001$ ); GAD < GAD+SAD ( $p = .009$ ). Social difficulties: control group <GAD ( $p < .001$ ), GAD < SAD ( $p < .001$ ), SAD < GAD+SAD ( $p < .001$ ). GAD, generalized anxiety disorder; SAD, social anxiety disorder.

GAD and SAD symptoms were, in accordance with our first and second hypotheses, associated with an increased risk of both academic and social difficulties, respectively, even when school performance was controlled for. Furthermore, comorbid GAD and SAD symptoms were associated with increased risks for academic and social difficulties in the school, consistent with our third hypothesis. Notably, GAD symptoms were associated with a particularly high risk for academic difficulties, irrespective of comorbidity. For the most part, the associations were similar for boys and girls.

This study provides further insights into the degree of academic and social difficulties faced by adolescents with noncomorbid and comorbid GAD symptoms. Our results concur with epidemiological samples from Germany (Essau et al., 2000; Wittchen et al., 1998) and with those of earlier studies using smaller samples, which have shown that adolescents' anxiety symptoms are associated with problems in academic and social functioning (e.g., Nail et al., 2015; Waters et al., 2008). However, findings related to anxious adolescents' school functioning compared with healthy students have been somewhat mixed (de Lijster et al., 2018).

In this study, academic difficulties involved problems in doing homework and preparing for examinations, among others. These difficulties were strongly related to GAD symptoms, irrespective of comorbidity. The clear finding of school-related impairments among adolescents with generalized anxiety is logical, considering that pathological worry—one of the key features of GAD—has been shown to be associated with problems in cognitive processes, especially interfering with concentration when high levels of anxiety are prolonged (Ellis & Hudson, 2010). Youth with generalized anxiety demonstrate significant deficits in sustained attention, visual memory, working memory, and learning (Ellis & Hudson, 2010; Luo et al., 2022). In addition, GAD is associated with emotion regulation deficits, regardless of whether SAD comorbidity is present (Mennin et al., 2009).

In the present study, social difficulties involved problems in teamwork and getting along with peers and teachers. While it was expected that adolescents with SAD symptoms would experience communication difficulties (e.g., de Lijster et al., 2018), GAD symptoms were also related to perceived social impairment. For the boys in this study, the risk associated with GAD was as high as that associated with SAD relative to adolescents with normative levels of anxiety. This is consistent with previous findings indicating that adolescents with non-SAD anxiety disorders may show dysfunction in peer relationships, a greater degree of social impairment, and less social acceptance than their healthy peers (Brumariu et al., 2013; Early et al., 2017; Essau et al., 2000). Evidence from neurobiological research showing that neural activity during social interactions

**TABLE 2** OR of academic difficulties by sex (99% CI) based on the presence of self-reported noncomorbid or comorbid GAD and SAD symptoms among Finnish upper secondary school students when (1) age, (2) age and confounding family covariates, (3) age and confounding family covariates and school performance were controlled for.

	(1) OR (99% CI)		(2) OR (99% CI)		(3) OR (99% CI)	
<i>Boys (n = 15,535)</i>						
Anxiety symptoms						
Control	1.00		1.00		1.00	
GAD symptoms (without SAD)	<b>5.14</b>	(3.78, 6.98)	<b>5.05</b>	(3.71, 6.88)	<b>4.06</b>	(2.67, 6.18)
SAD symptoms (without GAD)	<b>2.12</b>	(1.79, 2.53)	<b>2.11</b>	(1.77, 2.51)	<b>1.97</b>	(1.57, 2.48)
Comorbid GAD + SAD symptoms	<b>5.83</b>	(4.49, 7.58)	<b>5.62</b>	(4.32, 7.33)	<b>4.23</b>	(2.94, 6.09)
Age	<b>1.31</b>	(1.17, 1.46)	<b>1.30</b>	(1.16, 1.45)	<b>1.31</b>	(1.13, 1.51)
Low parental education						
No			1.00		1.00	
Yes			0.88	(0.73, 1.07)	0.85	(0.66, 1.10)
Parental unemployment						
No			1.00		1.00	
Yes			1.16	(1.00, 1.35)	1.14	(0.93, 1.39)
Other than nuclear family structure						
No			1.00		1.00	
Yes			<b>1.35</b>	(1.16, 1.57)	<b>1.26</b>	(1.03, 1.54)
Poor school performance						
No					1.00	
Yes					<b>6.57</b>	(5.12, 8.42)
<i>Girls (n = 22,370)</i>						
Anxiety symptoms						
Control	1.00		1.00		1.00	
GAD symptoms (without SAD)	<b>4.25</b>	(3.56, 5.06)	<b>4.11</b>	(3.44, 4.90)	<b>3.58</b>	(2.97, 4.30)
SAD symptoms (without GAD)	<b>1.67</b>	(1.42, 1.96)	<b>1.64</b>	(1.40, 1.93)	<b>1.53</b>	(1.30, 1.80)
Comorbid GAD + SAD symptoms	<b>5.29</b>	(4.51, 6.21)	<b>5.10</b>	(4.34, 5.98)	<b>4.31</b>	(3.64, 5.11)
Age	<b>1.22</b>	(1.11, 1.34)	<b>1.21</b>	(1.10, 1.33)	<b>1.23</b>	(1.11, 1.35)
Low parental education						
No			1.00		1.00	
Yes			1.13	(0.98, 1.31)	1.05	(0.91, 1.22)
Parental unemployment						
No			1.00		1.00	
Yes			1.11	(0.97, 1.26)	1.09	(0.95, 1.24)
Other than nuclear family structure						
No			1.00		1.00	
Yes			<b>1.37</b>	(1.21, 1.55)	<b>1.33</b>	(1.17, 1.51)



TABLE 2 (Continued)

	(1) OR (99% CI)	(2) OR (99% CI)	(3) OR (99% CI)
Poor school performance			
No			1.00
Yes			<b>7.65</b> (6.42, 9.11)

Note: Bold font indicates statistical significance.

Abbreviations: CI, confidence interval; GAD, generalized anxiety disorder; OR, odds ratio; SAD, social anxiety disorder.

differs between anxious and healthy adolescents across anxiety disorders (McClure-Tone et al., 2011) may also explain that generic factors related to biological anxiety response could contribute to social impairment.

In particular, the results from the present study contribute to the literature examining the effects and correlates related to comorbid and noncomorbid anxiety disorders among adolescents. This study found a clear link between the comorbidity of GAD and SAD symptoms and an increased risk for social difficulties. This finding is consistent with the results of Mychailyszyn et al. (2010), who found that youth with another anxiety disorder in addition to their GAD or SAD tended to display a greater impairment in school functioning than those with a principal anxiety disorder with no comorbidity. However, our results regarding the link between GAD symptoms and a particularly high risk for academic difficulties, irrespective of comorbidity, are consistent with past findings suggesting that patients with GAD demonstrate a considerable degree of impairment even when the disorder is not comorbid (Ebberwein, 2020; Wittchen, 1994; Wittchen et al., 1998). Consistent with previous research in normal populations (Merikangas et al., 2010), the prevalence of both types of anxiety symptoms was higher among girls than boys.

As there has been a substantial increase in the prevalence of GAD symptoms among young people during the past decades (Slee et al., 2021), the strong association between GAD symptoms and adolescents' impairments found in this study is a cause for concern. In a German study, most adolescents suffering from an anxiety disorder did not seek any help, and only a few reported contact with a psychotherapist (Niermann et al., 2021). Given that an acute positive response to anxiety treatment may reduce the risk of chronic anxiety disability (Ginsburg et al., 2018), it is essential to organize interventions that change the focus of anxious apprehension, thereby enabling adolescents with GAD symptoms to concentrate on schoolwork. Many negative feelings related to academic performance and interpersonal problems, such as adolescents' predictions of their peers' negative responses toward self, manifest in school environments (Ranta, Laakkonen, et al., 2016). Consequently, easily accessed interventions are important in school settings. Widely regarded as an effective evidence-based treatment for adolescent anxiety disorders, cognitive behavioral therapy (CBT) typically seems to lead to reductions in worry (Perrin et al., 2019; Wehry et al., 2015) and may be usable in schools. In a Japanese study of a brief CBT intervention in a school setting, the intervention group showed promising improvements in emotion regulation and a decrease in generalized anxiety levels (Kato et al., 2022).

## 6.1 | Limitations and future research

The key strength of this study was its use of large, comprehensive data that enabled the examination of anxiety-related phenomena at the population level. This is important because the extent to which GAD symptoms are related to problems in academic and social functioning during adolescence has been relatively unexamined with comparable data. This study also used well-validated self-report scales for GAD and SAD symptoms.

In terms of limitations, it was not possible to obtain additional, objective information related to the students' academic performance, specifically their grade point averages, as the survey respondents remained anonymous. Therefore, the criterion for poor school performance was not based on actual grades. In addition, standard instruments for assessing perceived difficulties in school were not available in the survey. No diagnoses of anxiety disorders based on clinical interviews could be generated because only self-reports were considered. As such, a considerable part of the adolescents defined as suffering from heightened levels of GAD and SAD symptoms in this study may not suffer from clinical anxiety disorders (Jefferies & Ungar, 2020; Ranta et al., 2007).

In addition, about 10%–15% of students were out of school on the day the survey was conducted (Kaltiala-Heino et al., 2016). It is also possible that GUSS students who do not attend school may suffer more commonly from psychosocial problems than those present. Hence, data for some of the anxious students who experience difficulties in school may not have been included. Nevertheless, the data covered 62% of all first- and second-year GUSS students in Finland and can be considered nationally generalizable. The results, however, may not necessarily highlight the situations of adolescents in

**TABLE 3** OR of social difficulties by sex (99% CI) based on the presence of self-reported noncomorbid or comorbid GAD and SAD symptoms among Finnish upper secondary school students when (1) age, (2) age and confounding family covariates, (3) age and confounding family covariates and school performance were controlled for.

	(1) OR (99% CI)		(2) OR (99% CI)		(3) OR (99% CI)	
<i>Boys (n = 15,535)</i>						
Anxiety symptoms						
Control	1.00		1.00		1.00	
GAD symptoms (without SAD)	<b>2.56</b>	(1.86, 3.53)	<b>2.49</b>	(1.81, 3.44)	<b>2.40</b>	(1.74, 3.32)
SAD symptoms (without GAD)	<b>2.01</b>	(1.73, 2.34)	<b>1.98</b>	(1.70, 2.30)	<b>1.96</b>	(1.69, 2.28)
Comorbid GAD + SAD symptoms	<b>5.65</b>	(4.42, 7.23)	<b>5.38</b>	(4.20, 6.89)	<b>5.14</b>	(4.00, 6.60)
Age	1.01	(0.91, 1.11)	1.00	(0.91, 1.10)	1.00	(0.91, 1.10)
Low parental education						
No			1.00		1.00	
Yes			<b>1.22</b>	(1.05, 1.43)	<b>1.22</b>	(1.04, 1.43)
Parental unemployment						
No			1.00		1.00	
Yes			<b>1.15</b>	(1.01, 1.32)	1.15	(1.00, 1.31)
Other than nuclear family structure						
No			1.00		1.00	
Yes			1.14	(1.00, 1.30)	1.13	(0.99, 1.29)
Poor school performance						
No					1.00	
Yes					<b>1.32</b>	(1.06, 1.65)
<i>Girls (n = 22,370)</i>						
Anxiety symptoms						
Control	1.00		1.00		1.00	
GAD (without SAD)	<b>1.97</b>	(1.61, 2.41)	<b>1.95</b>	(1.59, 2.38)	<b>1.90</b>	(1.55, 2.32)
SAD (without GAD)	<b>2.92</b>	(2.56, 3.32)	<b>2.88</b>	(2.53, 3.28)	<b>2.86</b>	(2.51, 3.26)
Comorbid GAD + SAD	<b>5.35</b>	(4.60, 6.22)	<b>5.24</b>	(4.50, 6.10)	<b>5.07</b>	(4.35, 5.90)
Age	1.02	(0.94, 1.12)	1.02	(0.94, 1.11)	1.02	(0.94, 1.11)
Low parental education						
No			1.00			
Yes			1.14	(1.00, 1.30)	1.13	(0.99, 1.29)
Parental unemployment						
No						
Yes			<b>1.13</b>	(1.01, 1.27)	<b>1.13</b>	(1.01, 1.27)
Other than nuclear family structure						
No			1.00			
Yes			1.00	(0.89, 1.12)	0.99	(0.89, 1.12)

**TABLE 3** (Continued)

	(1) OR (99% CI)	(2) OR (99% CI)	(3) OR (99% CI)
Poor school performance			
No			
Yes			<b>1.43</b> (1.17, 1.76)

Note: Bold font indicates statistical significance.

Abbreviations: CI, confidence interval; GAD, generalized anxiety disorder; OR, odds ratio; SAD, social anxiety disorder.

educational settings other than GUSS. It may be that associations between anxiety and school-related functioning differ in other sociocultural or geographical contexts and educational levels.

Although the results of the current study showed that anxiety symptoms were associated with the students' difficulties in studying, no conclusions could be made about the causal relationship between these factors based on cross-sectional survey data. For example, it could not be determined whether problems in academic and social functioning result from anxiety symptoms or precede them; it is possible that the adolescents experienced anxiety symptoms due to difficulties in schoolwork. It was also not possible to investigate other mental health disorders that might have contributed to the difficulties faced by the students. Comorbidities with disorders such as attention deficit hyperactivity disorder and depression, which may have had a confounding effect on the results of the study, were not assessed in this study. For example, depression is known to have a strong comorbidity with the surveyed anxiety disorders (Ranta et al., 2009; Wittchen et al., 1999), but the symptoms of depression and other disorders could not be accounted for in the present study.

It is important to design intervention strategies directed at this specific age group that focus on the prevalent key mental health symptoms related to academic and social impairments. Further evidence is needed to assess the associations of different comorbid and noncomorbid disorders in clinical studies, as well as the different domains of school functioning among adolescents with anxiety disorders. In addition, moderating factors that may affect such associations also warrant further study.

## 7 | CONCLUSION

Based on a large representative sample of adolescents, this study revealed that self-reported GAD and SAD symptoms are both strongly associated with academic and social difficulties at school and that generalized anxiety symptoms seem to play a key role in both types of difficulties. The results highlight the importance of school-based interventions that aim to improve anxious adolescents' functioning taking into account the interference of excessive worrying associated with both academic and social impairments.

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## CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

## DATA AVAILABILITY STATEMENT

Research data are not openly available.

## ETHICS STATEMENT

This study was approved by the ethics committee of the Finnish Institute for Health and Welfare.

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## SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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