

Social anxiety disorder in adolescents: Prevalence and subtypes in the Young-HUNT3 study

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ABSTRACT

Background: Few studies have examined the prevalence of social anxiety disorder (SAD) among adolescents and the associated sex-specific fears. No previous studies have reported variance in SAD prevalence among adolescents based on a stepwise diagnostic approach.

Methods: Using various diagnostic thresholds from the Anxiety Disorders Interview Schedule child version, and the diagnostic criteria from both the 4th and 5th editions of the Diagnostic and Statistical Manual of Mental Disorders (DSM), we explored the point prevalence of SAD among a population-based sample of 8216 adolescents aged 13–19 years.

Results: Overall, 2.6% of adolescents met the SAD diagnostic criteria. The prevalence varied from 2.0% to 5.7% depending on the criteria-set. Twice as many females met the overall SAD criteria. The DSM-IV generalized SAD subtype was assigned to 86.5% of the sample, while 3.5% met the DSM-5 performance-only subtype. Compared with males aged 16–19 years, significantly more of those aged 13–15 years met the SAD criteria; no significant age group differences were found among females.

Conclusions: This is the first study to demonstrate variance in SAD prevalence among adolescents based on the diagnostic threshold method. Depending on the threshold applied, SAD prevalence among adolescents varied from 2.0% to 5.7%. Age and sex differences in social fear experiences highlight the importance of considering developmental heterogeneity in SAD, especially for adapting prevention and treatment interventions.

1. Introduction

Social anxiety disorder (SAD) is characterized by marked or intense fear or anxiety about one or more social or performance situations in which the individual may be scrutinized by others (American Psychiatric Association, 2013). SAD is one of the most common and incapacitating anxiety disorders (Aderka et al., 2012) and, after major depression and alcohol abuse, it is the most common psychiatric disorder (Stein & Stein, 2008). According to the DSM-5, prevalence rates decrease with age (APA, 2013, p. 204), with a median onset age of 13 years. SAD is ranked among the top 10 chronic disorders, mental or physical, in terms of its effects on objective outcomes such as days of work lost (Alonso et al., 2004). However, prevalence rates among

adolescents vary across epidemiological studies (Aune & Stiles, 2009a; Burstein et al., 2011; Essau, Conradt, & Peterman, 1999). These differences may reflect varying assessment methods, divergent sampling strategies, changes in the diagnostic criteria, and whether the studies assessed subtypes (Burstein et al., 2011).

Compared with children, adolescents seem to have higher SAD rates (Brook & Schmidt, 2008; Mohammadi et al., 2020). Most studies report that significantly more females are affected by SAD (Aune & Stiles, 2009b; Burstein et al., 2011; Demir, Karacetin, Eralp Demir, & Uysal, 2013; Essau et al., 1999; Wittchen, Stein, & Kessler, 1999), although Spence, Zubrick, and Lawrence (2018) reported an equal prevalence among males and females. Despite this general finding, few studies have investigated sex differences regarding specific social fears.

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1.1. Assessment methods

Because various assessment methods can yield diverging prevalence rates, it is important to consider how SAD is assessed (Furmark, 2002). Using clinical interviews, Burstein et al. (2011) and Essau et al. (1999) reported a SAD prevalence among adolescents of 8.6% and 1.6%, respectively. In contrast, prevalence based on self-report questionnaires has ranged from 3.2% to 19.9% (Aune & Stiles, 2009a; Demir et al., 2013; Gren-Landell et al., 2009; Kuusikko et al., 2009; Ranta, Kaltiala-Heino, Rantanen, & Martunen, 2009; Storch, Masia-Warner, Dent, Roberti, & Fisher, 2004).

Eaton, Neufeld, Chen, and Cai (2000) pointed out that self-report is an inadequate diagnostic tool, and that diagnostic agreement between clinical interviews and self-report instruments is low. Thus, to obtain reliable SAD prevalence estimates, population-based studies should preferably use clinical diagnostic interviews. However, even when using a clinical diagnostic interview, minor variations in applying the diagnostic criteria, or diagnostic thresholds, can influence estimated prevalence rates (Furmark, 2002; Knappe et al., 2011; Mohammadi et al., 2020; Stein & Stein, 2008). Application of a disability threshold exceeding that required by the Diagnostic and Statistical Manual of Mental Disorders, 4th edition (DSM-IV) may explain some studies' lower SAD prevalence rates (Stein & Stein, 2008). The extent to which these findings apply to adolescents is currently unknown.

During the past decade, several population-based studies, conducted across continents, have assessed SAD prevalence among adolescents using clinical diagnostic interviews (e.g., Copeland, Angold, Shanahan, & Costello, 2014; Georgiades, Duncan, Wang, Comeau, & Boyle, 2019; Spence et al., 2018). As shown in Table 1, these studies have differed considerably with respect to the type of clinical diagnostic interview, participants (i.e., youths, parents, teachers), sampling strategy, response rate, and types and number of social situations assessed. To our knowledge, no previous study has used a stepwise diagnostic approach, reporting population-based prevalence for various diagnostic thresholds.

1.2. Divergent sampling strategies

Prevalence inconsistencies can also result from divergent sampling strategies. For instance, two German studies reported considerably different rates using the same diagnostic interview, but with different participant inclusion criteria, age ranges, and sample sizes (i.e., a convenience sample of students [Essau et al., 1999] vs a population-based sample of students as well as employed and unemployed adults [Wittchen et al., 1999]). Spence et al. (2018) and Georgiades et al. (2019) used nationally and provincially representative samples of households, respectively, with modest participation rates (50.8%). Assessing a nationally representative sample of children and adolescents in schools, the participation rate in the NHS Digital England study was only 52.6%. Burstein et al. (2011) used a weighted sample that included a combination of participants from households and schools, with a relatively high response rate. There is no simple answer to what an appropriate response rate is (Morton, Bandara, Robinson, & Atatoa Carr, 2012). Despite this, the lower the response rate is, the higher the probability is that respondents constitute a selected rather than a random sample. For instance, a lower response rate is associated with decreased demographic representativeness (Holbrook, Krosnick, & Pfent, 2007).

Further, in one Australian study (Spence et al., 2018), the interviewers were not clinically trained, and only parent/caregiver-reported prevalence rates were reported. For internalizing disorders in particular, parents and caregivers may not always know the child's mental state (Grills & Ollendick, 2003).

1.3. Diagnostic criteria—DSM-IV vs DSM-5

Differences in prevalence rates may also reflect changes in the diagnostic criteria and whether the studies assessed subtypes. The essential features of SAD are the same in the DSM-5 and DSM-IV. According to the DSM-5 (APA, 2013) the essential feature of SAD is an intense fear of one or more social or performance situations in which the individual may be scrutinized and negatively evaluated or rejected by others (criteria A and B). The social situations almost always provoke fear or anxiety resulting in avoidance, or the feared situation is endured with intense distress (criteria C and D). In children, the fear or anxiety does not need to be recognized as excessive or unreasonable but must also occur in same-age peer settings, not just during interactions with adults. Further, the fear, anxiety, or avoidance is persistent, out of proportion, causes clinically significant distress or impairment in important areas of functioning (Criteria E, F, and G). Furthermore, the intense fear or avoidance is not attributed to the physiological effects of substance use or better explained by symptoms of other mental disorders such as panic, body dysmorphic disorder or autism spectrum disorder, or another medical condition (e.g., Parkinson's disease, obesity) (Criteria H, I, and J) (DSM-5, APA, 2013). A significant change in the DSM-5 (APA, 2013) is that the generalized subtype (DSM-IV, APA, 1994) was deleted and replaced with a performance-only subtype, now called the "performance-only specifier" (DSM-5, APA, 2013, p. 203). The DSM-IV generalized SAD subtype refers to intense fear that is present in most social situations (APA, 1994, p. 412). However, the term "most" may be ambiguously defined, and researchers have used different criteria for defining subtypes (Beidel, Rao, Scharfstein, Wong, & Alfano, 2010). For individuals who did not meet the criteria for the described generalized subtype (DSM-IV, APA, 1994), a nongeneralized label was used to describe intense fear in one or a few situations (Beidel et al., 2010).

Although the general phenomenology of SAD is the same in the DSM-IV and DSM-5, the designation of what constituted a subtype was altered in the DSM-5. In the former, the subtype was assigned based on the number of situations feared, while in the latter the subtype designation refers to specific, performance-based anxiety that impairs an individual's professional life (e.g., musicians, dancers, performers, athletes, or those in roles that require public speaking). Although the DSM-5 does not specifically describe or define how this subtype presents in children or adolescents, it does state that performance fears may manifest at work or school, or in academic settings where regular public presentations are required (APA, 2013, p. 203).

In a sample of 204 treatment-seeking children and adolescents aged 6–19 years, Kerns, Comer, Pincus, and Hofmann (2013) used the Anxiety Disorders Interview Schedule for DSM-IV, child version (ADIS-C) clinical interview (Silverman & Albano, 1996) to examine six performance situations (Answering questions in class, Giving a report or reading aloud in front of the class, Writing on the chalkboard, Asking the teacher questions or for help, Speaking to an adult, and Musical or athletic performances). They did not find any support for the existence of a performance-only SAD subtype. However, this may have been due to the treatment-seeking nature of the sample. Using the same categorical approach as Burstein et al. (2011) and Kerns et al. (2013), Kodal et al. (2017) similarly reported a very low prevalence of a performance-only subtype among a sample of treatment-seeking young people aged 8–15 years (i.e., only 2 of 131 participants, or 1.5%). In contrast, Fuentes-Rodriguez, Garcia-Lopez, and Garcia-Trujillo (2018) found that 20.0% of their SAD-diagnosed sample ($n = 50$) met the criterion for the performance-only subtype ($n = 10$). Important differences in the Fuentes-Rodriguez study were that the authors used the ADIS child/parent version (C/P) for DSM-5, and their participants were 2–3 years older, with a mean age of 15.4 years, compared with those assessed by both Kerns et al. (2013) and Kodal et al. (2017).

Table 1
Studies reporting social anxiety disorder prevalence among children and adolescents.

Author (s), Year	Country or Region	Recruitment	Diagnostic instrument	Number of situations assessed	Age (s) (years)	Social anxiety disorder prevalence	Timeframe
Essau et al. (1999)	38 schools in Bremen, Germany	Convenience sample N = 1034 Male: n = 421 (40.7%) Female: n = 614 (59.3%)	Composite International Diagnostic Interview, Munich version (M-CIDI, computerized)	7	Mean: 14.3 SD: 1.7 Range: 12–17	Total: n = 17 (1.6%) Male: n = 4 (1.0%) Female: n = 13 (2.1%)	Lifetime
Wittchen et al. (1999)	Community sample in Munich, Germany	Random sample Population: N = 4263 Sample: n = 3021 (71.0%) Male: n = 1533 (51.7%) Female: n = 1488 (49.3%)	Composite International Diagnostic Interview, Munich version (M-CIDI, computerized)	7	Range: 14–24	Total: n = 220 (7.3%) Male: n = 74 (4.9%) Female: n = 110 7.2%) Total: n = 158 (5.2%) Male: n = 48 (3.2%) Female: n = 146 (9.5%)	Lifetime cumulative incidence 12-month prevalence
Spence et al. (2018)	Australia	Nationally representative household sample N = 6310 (55% of eligible households) Male: n = 3254 (51.6%) Female: n = 3056 (48.4%)	Diagnostic Interview Schedule for Children–Version IV (DISC- IV, parent version)	1 general, 2 specific	Mean: 11.0 SD = 4.0 Range = 4–17 11–17 Mean: 14.5 SD = 2.0	Age 11–17 years: Total: n = 104 (3.4%) Male: n = 48 (3.3%) Female: n = 56 (3.4%)	Past 12 months
NHS Digital (2018)	England	Nationally representative sample Population: N = 18,029 Sample: n = 9117 (52.6%) 11–16 years old Male: n = 1553 (49.8%) Female: n = 1568 (50.2%)	Development and Well-Being Assessment (DAWBA)	6	Mean: 14.5 Range = 2–19	Age 11–16 years: Total: n = 31 (1.0%) Male: n = 12 (0.8%) Female: n = 20 (1.3%) Age 17–19 years: Total: n = 9 (1.8%) Male: n = 5 (1.0%) Female: n = 12 (2.6%)	Past 4 weeks
Georgiades et al. (2019)	Ontario, Canada,	Provincially representative sample Population: N = 12,871 households Sample: n = 6537 households (50.8%) (N = 10,802 children) Youth aged 12–17 years: n = 2728 Male: n = 1390 (51.0%) Female: n = 1338 (49.0%)	Mini International Neuropsychiatric Interview for Children and Adolescents (MIMI- KID, modified version)	1 general social situation	Mean: 10.6 CI: 10.5–10.8 Range: 4–17	Age 12–17 years: Parents' reports: Total: n = 131 (4.8%) Male: n = 71 (5.1%) Female: n = 60 (4.5%) Adolescents self-report Total: n = 94 (3.4%) Male: n = 18 (1.3%) Female: n = 76 (5.7%)	Past 6 months
Copeland et al. (2014) (The Great Smoky Mountains Study)	11 counties in North Carolina, USA	Screening—stratified sampling Population: N = 12,450 Sample: n = 1420 Male: n = 694 (48.9%) Female: n = 726 51.1%)	Structured Child and Adolescents Psychiatric Assessment (CAPA), Young Adult Psychiatric Assessment (YAPA)	6,3	Range: 9–26	Age 13–19 years: < 1% for both sexes Total: n = (4.2%) Male: n = (2.5%) Female: n = (5.2%)	3-month cumulative prevalence
Burstein et al. (2011) (NSC-A)	USA	Nationally representative sample of households and schools (weighted) Sample: N = 10,123 Male: n = 4953 (48.9%) Female: n = 5170 (51.1%)	Composite International Diagnostic Interview, v. 3.0 (CIDI)	12	Mean: 15.2 SE: 0.1 Range: 13–18	Any social phobia Total: n = 848 (8.6%) Male: n = 366 (7.9%) Female: n = 482 (9.2%) Generalized SAD Total: n = 496 (4.8%)	Lifetime

(continued on next page)

Table 1 (continued)

Author (s), Year	Country or Region	Recruitment	Diagnostic instrument	Number of situations assessed	Age (s) (years)	Social anxiety disorder prevalence	Timeframe
						Male: <i>n</i> = 191 (3.8%) Female: <i>n</i> = 305 (5.9%) Performance only Total = 43 (0.7%)	

Note: CI = Confidence Interval, SD = Standard Deviation, SE = Standard Error.

1.4. Stepwise diagnostic approach

Accurate assessment, within the context of a reliable and valid classification system, is a critical first step in effective interventions for childhood anxiety disorders (Chou, Cornacchio, Cooper-Vince, Crum, & Comer, 2015). According to Silverman and Ollendick (2005), the Anxiety Disorders Interview Schedule for Children (ADIS-C) is considered the gold standard for assessing and diagnosing anxiety disorders among children and adolescents. To overcome some of the prior sampling limitations, we conducted a large-scale study to determine the current prevalence of SAD among adolescents aged 13–19 years, using a stepwise diagnostic interview (ADIS-C) that incorporates both the DSM-5 (APA, 2013) and DSM-IV (APA, 1994) diagnostic criteria. The ADIS-C has three entrance questions and four additional steps assessing specific social fears, distress, avoidance, and impairment. This approach makes it possible to study the variation in prevalence at various diagnostic criteria/thresholds. In addition to enhancing our understanding of the nature of SAD in general, the results obtained herein may prove useful in future studies examining the effects of tailored preventive and treatment interventions. Our aim was thus to assess point prevalence based on the DSM-IV and DSM-5 criteria, to examine the role of sex in this disorder, and to identify which social situations are most feared among male and female adolescents.

2. Material and methods

2.1. Participants

The Young-HUNT3 study represents a segment of the larger, cross-sectional HUNT3 survey. Our cohort was students aged 13–19 years (grades 8–13) in Nord-Trøndelag County, Norway, from among a population of 10,464 adolescents. Altogether, 8216 (78.5% of the population) adolescents completed the questionnaires. The highest rate of participation (84.8%; *n* = 4759) was among those attending junior high school (grades 8–10), whereas 76.7% (*n* = 3342) participated from the senior high schools (grades 11–13). The lowest rate of participation (23.3%; *n* = 115) was among those not attending or absent from school (*n* = 493). There were 6610 (80.5%) from the total number of participants (*N* = 8216) who completed the SAD section from the ADIS-C structural clinical interview. Nord-Trøndelag County, comprised of 23 municipalities, serves as a representative sample of Norway regarding geography, industry, income source and level, age distribution, morbidity, and mortality (Holmen et al., 2003). Norwegian schools integrate all children and adolescents (i.e., including those with learning, behavioral and physical disabilities) (Holmen et al., 2014).

2.2. Procedure

Schools were the primary study sites for all three Young-HUNT surveys. In Norway, all adolescents are expected to attend junior (ages 13–16 years) and senior (ages 16–19 years) high schools. The principals of each of the county's 66 schools gave written consent for their school's participation. Every student attending these schools and their parents

received a letter inviting them to participate, with information about the study and its intended data uses. Using information from the Norwegian National Population Register (birth date, name, address, and national identity number), adolescents who were not attending school (according to county school authorities) were also invited to participate via a letter sent to their home address. Thus, the entire cohort of young people aged 13–19 years living in Nord-Trøndelag County were invited to participate. The young-HUNT3 study was conducted from September 2006 to May 2008. Data collection included self-report questionnaires, a structured interview, clinical measurements, and a buccal smear. Students completed the questionnaires during school hours. The questionnaire packet was marked with a barcode without names, which the students then sealed in a blank envelope. Within a month, specially trained nurses visited each school for face-to-face interviews and measurements. On average, the students completed these surveys in 45 min. Students absent on the day of the questionnaire were encouraged to complete it when the nurses visited the schools. Because of extended time requirements, the Young-HUNT3 steering committee decided not to include the ADIS-C interview assessment at seven schools, resulting in 6610 interviews instead of 8216. See Holmen et al. (2014) for more detailed information regarding Young-HUNT3 study assessments and procedures.

2.3. Interviewer training and preparation

The ADIS-C interviews were conducted by four clinically experienced, registered psychiatric nurses who passed specific training for the Young-HUNT3 study. Two of the interviewers conducted most of the interviews, while the others served as replacements. To qualify, the interviewers underwent three weeks of rigorous clinical trials training and reliability evaluation, as well as ongoing reliability checks to ensure diagnostic rigor. In addition to the three weeks of training, interviewers underwent a five-day workshop, three days of which focused on ADIS-C interviewing, led by one of the developers of the ADIS-C (W. Silverman). During this workshop, the trainees observed several ADIS-C diagnostic interview video cases, and degrees of consensus on the diagnoses were evaluated. Lack of consensus was explored and any variance between interviewers and assessment norms was discussed. Assessment of two SAD types (generalized and nongeneralized) was emphasized. Interrater reliability was assessed based on video-recorded interviews; during the five-day workshop, the agreement based on 12 interviews was 80.0% for presence or absence of a SAD diagnosis. Fleiss' kappa was .571 for interrater reliability on SAD diagnosis among the four interviewers, indicating acceptable-to-high agreement. For the nongeneralized subtype, the agreement was 74.3% (Fleiss' kappa = 0.483), indicating acceptable agreement. Excellent interrater reliability was revealed for the two main interviewers, .917 and .833, who completed 70.8% of the interviews, for the presence or absence of the SAD diagnosis and for the nongeneralized type, respectively.

During the first year of data collection, the interviewers worked with supervisors, and diagnostic reliability checks were conducted to prevent rater drift. The consensus among the four interviewers and supervisors was consistent and improved during this period. Thus, training and

practice before beginning data collection, and monitoring during the study period, showed satisfactory interrater reliability for SAD diagnosis.

2.4. Measurements

2.4.1. Diagnostic interview

The ADIS-C is a semi-structured interview schedule for the diagnosis of anxiety disorders in children and adolescents (Albano & Silverman, 1996). It provides information about symptoms beyond those required for diagnosis. Although the ADIS-C was specifically developed to assess SAD according to the DSM-IV criteria, its structure also allows SAD assessment according to the DSM-5 criteria.

SAD diagnosis using the ADIS-C has a high interrater reliability, from .92 (Silverman, Saavedra, & Pine, 2001) to .86 (Rapee, Kennedy, Ingram, Edwards, & Sweeney, 2005); in a Norwegian study by Aune, Stiles, and Svarva (2008), interrater reliability was .75. The ADIS-C has both child/adolescent and parent forms, and a composite diagnosis is usually based on both. However, parent-child concordance for both primary and general SAD diagnoses show poor kappa coefficients (Choudhury, Pimentel, & Kendall, 2003; Grills & Ollendick, 2003), and it has been asserted that adolescents are the most accurate informants about their social anxiety symptoms (La Greca & Lopez, 1998). Herein, only adolescents were interviewed, using the complete SAD section of the ADIS-C.

2.4.2. Stepwise diagnostic approach

The stepwise diagnostic approach is illustrated in Fig. 1. Step 1 shows all participants (N = 8216) included in the Young-HUNT3 study. Step 2 shows all participants (n = 6610) who completed the three initial ADIS-C SAD screening questions that assess general social interactions

including, *When you are in certain places with other people, like school, restaurants, parties, do you feel that people might think that something you do is stupid or dumb?* If the participant responded “yes” to at least one of these questions (step 3), the interviewer administered the complete SAD section, asking how they think, feel, and act in each of 22 situations. Response options were “yes” or “no” to: *Do you think you get more nervous or scared in these situations than other kids your age do?*, with the instruction to answer “yes” only if these situations, *almost always make you scared or nervous* and “no,” *if it has happened just once or twice*. Situations included: *Answering questions in class, Oral reports or reading aloud, and Asking the teacher a question or asking for help*. For each situation for which they answered “yes,” adolescents were asked how anxious they were in that situation, using a “feeling thermometer” ranging from 0 to 8 (step 4). For each situation in which they rated their fear severity as 4 (some) or higher (step 5), they were asked to respond “yes” or “no” to *Do you ever try to avoid or stay away from these situations?* If they answered “yes” to one or more of the three entry questions and “yes” to one or more of the 22 situations with a fear rating of 4 or higher, and indicated that this/these situation(s) are either avoided or endured with marked distress (step 6), the interviewer followed up with, *Now I want to find out more details about some of the things that bother you (e.g., When you tell me that you don’t like to start a conversation, does it make a difference if the people are friends or strangers?; Does it make a difference if the group is boys, girls, or boys and girls?; Does the age of the people matter?; Does the size of the group make a difference?; What do you think will happen when you are in ... situation?)*. Finally (step 7), the adolescents were asked whether they experienced impairment for each of the items for which they had answered “yes” (e.g., *How much do you feel this problem has messed things up in your life? That is, how much has it messed things up for you with friends, in school, or at home? How much does it stop you from doing things you would like to do? Tell me how much by using the feeling thermometer we*

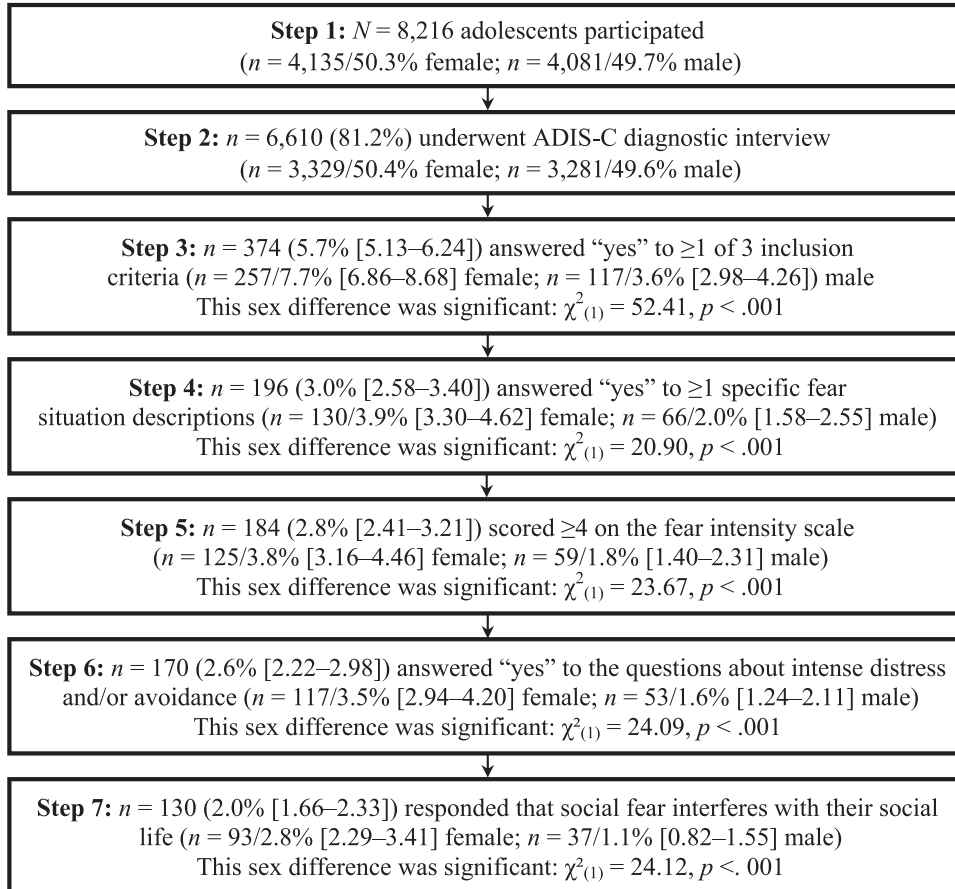


Fig. 1. Flow chart of the selection process, with numbers of participants who fulfilled the social anxiety criteria at each ADIS-C step, prevalence estimates [with 95% confidence intervals], and chi-square tests of independence for sex differences. Note 1: For steps 3–7, total (n = 6610), female and male percent values are based on the sample selected in step 2. Note 2: 95% confidence intervals were calculated using Wilson’s method. Note 3: In step 6 both the DSM-IV and DSM 5 criteria are used, and the prevalence estimate is calculated.

discussed earlier).

Adolescents met the DSM-IV and DSM-5 criteria for SAD if they reported marked and persistent fear, in both peer and adult interactions, in one or more of the 22 social situations, if they showed both intense fear and avoidance/distress, and if the condition had been evaluated by the clinician to cause significant distress or functional impairment for the adolescent (step 6). At this step, the clinicians also assessed the extent to which anxiety occurred in peer settings (i.e., not just during interactions with adults).

Consistent with the modified Structured Clinical Interview for the DSM-IV generalized subtype definition (Hazen & Stein, 1995), SAD was also considered a positive indication for adolescents who reported four or more social situations; that is, one general and three or more specific social situations. In addition, for comparison and according to the Burstein et al. (2011) definition of “most,” prevalence using the DSM-IV generalized subtype was also calculated for a majority (more than 50%) of the social situations assessed. Regarding the performance-only subtype, this is indicated “if the social fear is restricted to speaking or performing in public” (APA, 2013, p. 203). The ADIS-C includes a specific item examining the extent to which adolescents fear speaking and/or performing in public (e.g., giving an oral report, reading aloud in front of the class). Prevalence of the performance-only subtype reflects how many answer “yes” and show intense fear or avoidance to this specific item. However, because the criteria require endorsing one of the three initial screening questions on the SAD section of the ADIS-C to progress to the next step, participants who fulfilled the DSM-5 performance-only subtype may have been excluded. To address this possibility, a self-report index specifically assessing the DSM-5 performance-only specifier was created and calculated.

2.4.3. Self-report index assessing the DSM-5 performance-only subtype

The Young-HUNT3 study questionnaire includes six items, each using a five-point Likert scale (never–seldom–sometimes–often–always) from the Social Phobia and Anxiety Inventory for Children (SPAI-C) (Aune et al., 2008; Beidel, Turner, & Morris, 1995) and the Social Phobia and Anxiety Inventory (Turner, Beidel, Dancu, & Stanley, 1989) self-report inventories. Applying an item-analysis approach (Pather & Uys, 2008), items specifically reflecting the DSM-IV SAD criteria (Aune et al., 2008; Aune, Juul, Beidel, Nordahl, & Dvorak, 2021) were selected to create a SAD self-report index. To evaluate the prevalence of the DSM-5 performance-only subtype, we created a new specific index. The DSM-5 performance-only subtype index was calculated for those who indicated “always” only on item 3 (*I feel anxious when I have to speak or read aloud in front of a group of people*) but who indicated “seldom to never” on each of the five other social fear items. Cronbach’s alpha for these six items was .86, indicating adequate internal consistency. For a more detailed description of the specific items and psychometric properties of the index, please see Aune et al. (2021).

2.5. Statistical analysis

Statistical analyses were conducted using the SPSS software package version 23 (IBM, 2016). The dataset included $N = 8216$ participants. Data were missing within individual surveys. For the self-report index assessing the performance-only subtype, data were incomplete for 379 participants, resulting in a final sample of 7837. Cross-tabulations were applied to estimate specific SAD prevalence rates and social fears. Chi-square tests of independence were used to calculate effects and differences in prevalence values, based on categorical sex and age groups. Two-sided tests were used and an alpha of .05 was considered statistically significant.

2.6. Ethics

Study participants, and the parents or guardians of those under age 16 years, gave written consent to participate. The Norwegian Data

Inspectorate, the Regional and National Committees for Medical and Health Research Ethics, and the Norwegian Directorate of Health all approved the Young-HUNT3 study. To meet the requirements by the Regional and National Committees for Medical and Health Research Ethics (REK 2010/1020-2), interviewers were trained and supervised in case trial protocol use, which guided how they dealt with participants who expressed an interest in, or a need for, psychological services following the clinical interview.

3. Results

3.1. Young-HUNT3 participation

The final sample completing the ADIS-C was 6610 participants (age mean $[M] = 15.98$ years, standard deviation $[SD] = 1.70$), among whom 50.4% ($n = 3329$) were female and 49.6% ($n = 3281$) were male. Participants who did not complete the interview ($n = 1606$; age $M = 15.51$ years, $SD = 1.85$) were 800 (49.8%) male and 806 (50.2%) female. An independent samples t test, $t[7835] = -1.484$, $p = .14$ of the SAD self-report index summary score, did not show any differences between participants who completed ($M = 11.46$, $SD = 4.30$) or did not complete ($M = 11.28$, $SD = 4.45$) the ADIS-C interview. No between-groups differences were found based on demographics (e.g., family income $t(7634) = 0.995$, $p = 1.00$; number of close friends $t(7739) = 1.123$, $p = .26$) or clinical data (e.g., Hopkins Symptom Checklist (SCL-5) $t(7709) = 0.398$, $p = .69$; Rosenberg Self-Esteem $t(7712) = 1.402$, $p = .16$; insomnia $t(7796) = 1.775$, $p = .08$; Resilience Scale for Adolescents (READ) $t(7551) = 0.606$, $p = .54$). For a description of the various instruments, see Ranøyen, Jozefiak, Wallander, Lydersen, and Indredavik (2013) and the variable list available from the HUNT research center website: <https://hunt-db.medisin.ntnu.no/hunt-db/variablelist>.

3.2. Prevalence of social anxiety disorder

The flow chart in Fig. 1 shows the study selection process, including numbers and proportions of participants who satisfied the SAD criteria at each diagnostic stage.

Fig. 1 shows that 5.7% of interviewed participants (Step 3) endorsed one or more of the three screening questions from the social phobia section of the ADIS-C. At this initial interview stage, more than twice as many females (7.7%) as males (3.6%) were retained for further assessment. In Step 6, intense fear in one or more specific situations and avoidance/distress in one or more situations was reported by 2.6% ($n = 170$) of participants (3.5% of females, 1.6% of males). Finally, in Step 7, 2.0% of participants reported that their social anxiety created significant negative impairment or prevented them from doing things they would like to do. Our results indicate that females have a significantly higher prevalence of SAD across all diagnostic steps (Fig. 1), with a female to male ratio varying from 2.2 to 2.6:1. Although these results are consistent with most studies assessing population-based samples of adolescents (see Table 1), the female to male ratio was higher herein compared with previous reports.

According to the DSM-IV and DSM-5 criteria, the crucial feature of SAD is a marked and intense fear of social situations resulting in functional impairment. Although 40 participants rated their functional impairment below the cutoff, the interviewers’ clinical judgment was that each of these participants had interference in functioning and thus met the minimum criteria. Therefore, all 170 participants who met the diagnostic criteria in Step 6 were considered to have fulfilled the SAD diagnostic criteria.

3.3. Prevalence of social anxiety disorder across age groups

Table 2 shows the prevalence of SAD based on sex and age group for all participants ($n = 170$) reporting a high intensity of stress, fear, and

Table 2
Prevalence rates of social anxiety disorder among adolescents, by sex and age group (N = 6610).

		Age group						Total N interviewed	
		Participants in each age group, interviewed with ADIS-C							
		13 years	14 years	15 years	16 years	17 years	18 years	> 18 years	6610
		960	1206	1202	1101	1084	859	198	
Male	Number interviewed	458	588	612	557	545	378	90	3228
	SAD diagnosed	10	13	13	7	8	1	1	53
	Prevalence estimate	2.2%	2.2%	2.1%	1.3%	1.5%	0.3%	1.1%	1.6%
Female	Number interviewed	474	576	561	527	507	466	101	3212
	SAD diagnosed	18	29	16	10	24	14	6	117
	Prevalence estimate	3.8%	5.0%	2.9%	1.9%	4.7%	3.0%	5.9%	3.6%
Total	Number interviewed	932	1164	1173	1084	1052	844	191	6440
	SAD diagnosed	28	42	29	17	32	15	7	170
	Prevalence estimate	3.0%	3.6%	2.5%	1.6%	3.0%	1.8%	3.7%	2.6%

Note: ADIS-C; Anxiety Disorders Interview Schedule for Children.

avoidance in one or more of the ADIS-C situations.

Prevalence varied across age groups from 1.6% to 3.7%, with rates for females and males ranging from 1.9% to 5.9% and 0.3–2.2%, respectively. A chi-square test of independence revealed a nonsignificant difference in SAD prevalence between the group aged 13–15 years ($n = 99$) compared with those aged 16–19 years ($n = 71$), $\chi^2(1, N = 6610) = 3.70, p = .054$. Follow-up chi-square tests for each sex revealed a nonsignificant age group difference for females, $\chi^2(1, n = 3329) = 0.62, p = .43$, while there was a significant age group difference for males, $\chi^2(1, n = 3281) = 5.73, p = .017$, with a higher prevalence among younger males.

3.4. Challenging social situations

Table 3 provides an overview of the number and percent of each of the 22 ADIS-C social situations evaluated by the 170 participants who met the SAD diagnosis (Step 6).

Table 3 shows that *Giving a report or reading aloud in front of the class* (64.1%) and *Talking to persons you don't know well* (e.g., *strangers, new and unfamiliar people*) (66.5%) were the two most feared and avoided situations among our sample of adolescents who met SAD criteria. At the other end of the scale, *Walking in the hallways or hanging out by your locker*, *Inviting a friend to get together*, and *Answering or talking on the telephone* were considered less fearful/avoided, with ratings of 9.6%, 10.0%, and 14.1%, respectively. Conditions assessing self-assertiveness, *Being asked to do something that you really don't want to do, but you can't say no ...* and *having someone do something that you really don't like, but you can't tell them to stop ...* were avoided by nearly 50% of these adolescents with SAD.

Chi-square tests examining the number of males and females who reported situation avoidance revealed that more females reported both intense fear and avoidance/distress when *Working and playing with a group of kids/adolescents*: $\chi^2(1, n = 170) = 4.00, p = .045$; *Gym class*: $\chi^2(1, n = 170) = 18.14, p < .001$; *Using school or public bathrooms*: $\chi^2(1, n = 170) = 7.89, p = .027$; *Eating in front of others* (e.g., *at home, in the school cafeteria, at restaurants*): $\chi^2(1, n = 170) = 7.42, p = .006$; *Meetings, such as girl and boy scouts or team meetings*: $\chi^2(1, n = 170) = 7.36, p = .007$; *Speaking to an adult* (e.g., *store clerk, waiter, principal*): $\chi^2(1, n = 170) = 6.86, p = .009$; and *Having your picture taken*: $\chi^2(1, n = 170) = 5.92, p = .015$.

3.5. Subtypes

Answering “yes” to one or more of the three initial screening questions and confirming “fearfulness in three or more specific social situations” as the criteria for the generalized SAD subtype, 147 (86.5%) of 170 participants fulfilled the criteria. In contrast, if “most situations” is understood as the majority (i.e., 12 or more) of social situations, only

13.5% ($n = 23$) of these adolescents fulfilled the generalized subtype criteria and 86.5% fulfilled the nongeneralized type criteria.

Among participants who met SAD criteria ($n = 170$), six endorsed “yes” to only one item: *Giving a report or reading aloud in front of the class*. This indicates a prevalence of 3.5% for the DSM-5 performance-only specifier among those with a SAD diagnosis. Similarly, Kerns et al. (2013) identified six ADIS-C situations meeting the performance-only subtype. Examining responses to these six situations, seven (4.1%) participants reported “yes” to one or more of the six ADIS-C situations. In addition to the six participants who endorsed the item *Giving a report or reading aloud in front of the class*, one additional participant reported both this item and the *Musical or athletic performances item*. None of these seven participants reported any of the four other items, indicating minimal concordance among these six items. This indicates that giving a report or reading aloud in front of the class is the item endorsed by adolescents who meet the performance-only SAD subtype criteria. Moreover, Table 3 shows that the specific performance-only subtype “public speaking” is highly prevalent (64.1%) and ranked as the second most fearful situation, closely following *Talking to persons you don't know well* (e.g., *strangers, new and unfamiliar people*) (66.5%). Despite this, only six (3.5%) of 170 participants with SAD ranked the item *Giving a report or reading aloud in front of the class* as their only fearful situation. Using the self-report index assessing the prevalence of the DSM-5 performance-only subtype yielded a prevalence estimate of 2.4% ($n = 190/7837$) for the DSM-5 performance-only subtype. A chi-square test of independence revealed a significant difference $\chi^2(1, n = 7836) = 8.91, p = .003$ between females ($n = 117, 2.9%$) and males ($n = 73, 1.9%$), with a female to male ratio of 1.6:1.

4. Discussion

To our knowledge, this is the first study to demonstrate that SAD point prevalence among adolescents can vary from 2.0% to 5.7% based on the diagnostic threshold used in the DSM-5 (APA, 2013). Our results demonstrate that assessing three general social situations reveals an overall prevalence of 5.7%. However, assessing more specific social situations and asking adolescents to compare their nervousness to their peers reduces the prevalence by nearly half (to 3.0%). Further, applying more rigorous diagnostic procedures for distress, avoidance, and clinician-evaluated interference reduced the total prevalence of SAD by 0.4% (to 2.6%). Asking adolescents to evaluate their own functional impairment further reduced the prevalence by 0.6% (to 2.0%). Stein and Stein (2008) showed that applying a threshold for a SAD disability that exceeds the DSM-IV threshold may explain differences in prevalence across adult studies of SAD. Our results indicate that this may also apply to younger populations.

Among those receiving a SAD diagnosis, 23.5% ($n = 40$) denied that their fear interfered in their daily functioning, even though behavioral

Table 3
Percent and number of adolescents who reported various fearful social situations on the ADIS-C (N = 170).

ADIS-C questions	Answering YES		Answering NO	
	n	%	n	%
	Total		Total	
	Girls	Boys	Girls	Boys
Talking to persons you don't know well (e.g., strangers, new and unfamiliar people)	113	66.5	57	33.5
	80	68.4	37	31.6
	33	62.3	20	37.7
Giving a report or reading aloud in front of the class	109	64.1	61	35.9
	78	66.7	39	33.3
	31	58.5	22	41.5
Writing on the chalkboard	91	53.5	79	46.5
	67	57.3	50	42.7
	24	45.3	29	54.7
Answering questions in class	84	49.4	86	50.6
	63	53.8	54	46.2
	21	39.6	32	60.4
Being asked to do something that you really don't want to do, but you can't say no (e.g., if someone wants to borrow your homework or favorite toy)	82	48.2	88	51.8
	56	47.9	61	52.1
	26	49.1	27	50.9
Having someone do something that you really don't like, but you can't tell them to stop (e.g., if someone is teasing you, is it hard for you to tell them to leave you alone?)	82	48.5	87	51.5
	56	48.3	60	51.7
	26	49.1	27	50.9
Having your picture taken (e.g., for the yearbook)	68	40.0	102	60.0
	54	46.2	63	53.8
	14	26.4	39	75.6
Starting or joining in on a conversation	67	39.4	103	60.6
	51	43.6	66	56.4
	16	30.2	37	69.8
Musical or athletic performances	61	35.9	109	64.1
	42	35.9	75	64.1
	19	35.9	34	64.1
Attending parties, dances, or school activity nights	56	32.9	114	67.1
	41	35.0	76	65.0
	15	28.3	38	71.7
Dating	53	31.2	117	68.8
	35	29.9	82	70.1
	18	34.0	35	66.0
Eating in front of others (e.g., home, school cafeteria, restaurants)	42	24.7	128	75.3
	36	30.8	81	69.2
	6	11.3	47	88.7
Gym class	42	24.7	128	75.3
	40	34.2	77	65.8
	2	3.8	51	96.2
Speaking to adults (e.g., store clerk, waiter, principal)	37	21.8	133	78.2
	32	27.4	85	72.6
	5	9.4	48	90.6
Asking the teacher questions or for help	33	19.4	137	80.6
	24	20.5	93	79.5
	9	17.0	44	83.0
Using school or public bathrooms	33	19.4	137	80.6
	28	23.9	89	76.1
	5	9.4	48	90.6
Working or playing with a group of kids/adolescents	31	18.2	139	81.8
	26	22.2	91	77.8
	5	9.4	48	90.6
Taking tests	25	14.7	145	85.3
	18	15.4	99	84.6
	7	13.2	46	86.8
Meetings such as girl or boy scouts or team meetings	25	14.7	145	85.3
	23	19.7	94	80.3
	2	3.8	51	96.2
Answering or talking on the telephone	24	14.1	146	85.9
	19	16.2	98	83.8
	5	9.4	48	90.6
Inviting a friend to get together	17	10.0	153	90.0
	11	9.4	106	90.6
	6	11.3	47	86.7
Walking in the hallways or hanging out by your locker	16	9.4	154	90.6
	11	9.4	106	90.6
	5	9.4	48	90.6

Note 1: For the item "Having someone do something that you really don't like...", there were one missing (n = 169 responders).

Note 2: ADIS-C; Anxiety Disorders Interview Schedule for Children.

dysfunction was readily apparent to the interviewing clinicians. It is possible that these young adolescents were reluctant to admit, or perhaps did not understand, how their fears affected their behavior.

A lack of reported functional impairment has also been observed among victims of bullying (Wolke & Lereya, 2015). Openly expressing that they are being bullied, or that they feel different from others, highlights the victims' perceived defect, makes them feel powerless and weak, and may lead to embarrassment and shame. Aune and Stiles (2009b) and Ingul, Aune, and Nordahl (2014) have reported this phenomenon in clinical interviews. This discrepancy between self- and interviewer-assessed functional impairment emphasizes the importance of using clinical diagnostic interviews to assess SAD among adolescents. It also highlights the importance of clinical interviewers having a good working knowledge of the DSM and the psychopathology of the disorder, to ensure that minimum criteria are met rather than simply relying on the interviewee's self-report. According to the DSM-5 (APA, 2013), SAD prevalence decreases with age. Our findings indicate that this holds only for males. For females, prevalence varied by age but was not significantly different across the age range in this study (13–19 years). Thus, the effects of sex and age on SAD prevalence are more complex than previously understood. Is the decreasing prevalence among males due to an actual change in fear, or is it a reflection of the tendency among boys to minimize or deny their fears? Because all data were collected via subjective means, it is difficult to control for social desirability. In contrast, there may be an actual difference in how many females and males experience various social situations as threatening. Laporte et al. (2017) reported that experiencing fear in interactive social situations (e.g., *meeting many people, meeting new people, and eating in front of others*) indicates greater functional impairment problems, even when reported at a mild intensity. Findings by both Knappe et al. (2011) and Bögels et al. (2010) suggest that interaction-related social fears differ qualitatively from those that are more performance-related. Isolated performance-related fears (e.g., *taking tests, speaking in front of others*) appear at some points to be less impairing, and less often comorbid, than isolated interaction-related social fears (Knappe et al., 2011). More clearly defining the specific type of social fear will result in more tailored treatment programs.

Our results indicate that few adolescents who meet the SAD diagnostic criteria fulfill the criteria for the DSM-IV-based nongeneralized specifier or the DSM-5-based performance-only subtype. There is arguably a continuum, rather than a categorical difference between generalized and nongeneralized SAD, while there remains a lack of consensus-based definition of generalized SAD. In earlier studies, subjects were classified based on individual investigator criteria, while later investigators used an operational definition, based on a certain number or percentage of social situations assessed (Nagata, Suzuki, & Teo, 2015).

Among our participants who met the criteria for SAD, 86.5% reported intense fear and avoidance in three or more social situations. In contrast, Burstein et al. (2011) reported that 55.8% of adolescents met the criteria for the generalized subtype. That study defined generalized as showing fearfulness in a majority (i.e., seven or more) of 12 social situations. In contrast, we first selected adolescents who reported fear of embarrassment, being laughed at, or doing something "dumb or stupid" in front of others. Within this group, we considered the "generalized subtype" to include those who show intense fearfulness and avoidance in three or more of the specific 22 ADIS-C situations. Applying Burstein et al.'s criteria, (i.e., showing intense fear and avoidance/distress in 12 or more of 22 social situations), only 13.5% of our sample would have met the generalized subtype criteria. Correspondingly, using a cutoff of three or more situations, 57.1% of those who qualified for SAD fulfilled the generalized subtype SAD criteria (Knappe et al., 2011). This comparison demonstrates how methodological differences influence

prevalence rates for the DSM-IV generalized subtype. Whether SAD type is best defined by a precise number of fears or phenomenology and inequalities in psychopathology is both a pragmatic and empirical question (Burstein et al., 2011).

The performance-only subtype in the DSM-5 is restricted to specific performance-based fears, like public speaking, which impair one's "professional" life. Nearly all participants in this cohort were students and were therefore unlikely to have a professional life. However, students must typically give reports or read in front of the class, which is a form of regular public presentation (APA, 2013, p. 203).

Our results indicate that some adolescents meet the criteria for the SAD performance-only subtype. Among those diagnosed with SAD, approximately 3.5% met criteria for the DSM-5 performance-only subtype, compared with 8.0% reported by Burstein et al. (2011). Both investigations demonstrate a higher prevalence than Kodal et al. (2017) and Kerns et al. (2013). Both latter studies used a clinical treatment-seeking sample, whereas the former two used an older, population-based sample. Although Chou et al. (2015) questioned both the epidemiological and clinical relevance of the performance-only subtype, the results herein and those in other studies support its validity among adolescents. One interpretation of the varying prevalence rates is the likelihood that few adolescents with the performance-only subtype seek treatment. Including all participants in this sample (6610) who completed the ADIS-C interview as a reference, the overall prevalence for the performance-only subtype is estimated at 0.09%. Results by Burstein et al. (2011) indicate an overall prevalence of 0.7% for the performance-only subtype. However, due to the ADIS-C assessment procedure, participants who fulfill the DSM-5 performance-only subtype may initially have been excluded. Thus, the present study applied a self-report index assessing the DSM-5 performance-only subtype to yield an overall prevalence estimate of 2.4%. One interpretation of this is that adolescents with the performance-only subtype are not identified using clinical interviews like the ADIS-C. Further studies are needed to clarify the prevalence and clinical relevance of the SAD performance-only subtype, and to investigate whether this subtype precedes the development of the generalized SAD subtype.

Our results have several important implications. Measurement procedure and case classification are vital components of prevalence studies, which may help researchers design or clarify the purpose of the study. For example, is the purpose to determine (a) who endorses fear of social encounters, (b) who endorses fear of social encounters to the point of functional impairment, or (c) who endorses fear and meets every diagnostic criterion for SAD? Such decisions contribute not only to the outcomes of an investigation and its interpretation but to the logistical, economic and human resources needed to conduct the investigation (Polanczyk, Salum, Sugaya, Caye, & Rohde, 2015). For example, assessing functional impairment makes it possible to identify and estimate the proportion of adolescents who are most likely to need treatment, and to tailor treatment for young people with generalized SAD versus those who suffer from the performance-only subtype.

Our findings are generally consistent with those among adults (Asher, Asnaani, & Aderka, 2017; Cabello, Salazar, Irutia, Arias, & Hofmann, 2014; Wittchen et al., 1999), and expands upon them by demonstrating that adolescent females also experience various social fears to a greater extent compared with males. Like Wittchen et al. (1999), our findings show that females report more intense fear in situations like eating in front of others, speaking to an adult, and participating in meetings. In contrast to Cabello et al. (2014), we did not find significant sex differences on the items dating the opposite sex, talking to a person you don't know well, and being asked to do something that you really don't want to do, but to which you can't say no. Cabello et al. (2014) contextualized their sex difference findings in relation to sex roles in Latin American societies where women appear to play a more passive role in their relationships with men. Women in these cultures are also more strictly controlled by their parents, who tolerate fewer mistakes, which may trigger greater embarrassment. The extent to which

these considerations apply to other Western countries was beyond the scope of our investigation. Nevertheless, our findings, the review from Asher et al. (2017), and the results from Cabello et al. (2014) have implications for assessment and for treatment. Understanding that different situations are feared by males and females should guide treatment planning. For instance, there may be a need to tailor psychoeducation, based on the notion that females and males with SAD may experience social situations differently. Understanding gender differences in feared situations may also help us tailor exposure uniquely for men and women. Moreover, therapists should be aware that females and males may experience these exposures differently (Asher et al., 2017) and be prepared for different emotional reactions.

The study has some important strengths and a few weaknesses. The Young-HUNT3 study is population-based and achieved a high rate of participation, a distinct advantage because a low response rate can significantly threaten reliability and validity. As a subset of the larger HUNT studies, the Young-HUNT3 study was supported by school authorities, teachers, politicians, and inhabitants of Nord-Trøndelag County. Our use of a widely recognized, robust clinical interview to assess SAD in a large, population-based sample of adolescents gives a high level of assurance that the reported prevalence rates are reliable and valid, according to both the DSM-IV and DSM-5 criteria (Gwet, 2008).

Adolescents who did not participate were primarily absent from the school-based assessment; thus, under-representativeness of individuals with school-absence could lead to lower prevalence of SAD. Although clinical interviews provide an important diagnostic benchmark and represent rigorous methodology, differences in prevalence across population-based studies may stem from cultural norms. Hofmann, Anu Asnaani, and Hinton (2010) revealed that the largest gap in SAD prevalence rates is between the US and Asian countries, differences that may result from an individualistic versus collectivistic societal orientation. The DSM-5 (APA, 2013) explicitly recognizes the role of sociocultural context when examining the prevalence of fear or anxiety.

Finally, although the assessments described herein were completed 13 years ago, these results may be even more applicable today. Hou, Bi, Jiao, Luo, and Song (2020) demonstrated that there has been an increased prevalence of depression and anxiety during the COVID-19 epidemic, with females experiencing more severe anxiety symptoms compared with males. Additionally, adolescents are probably most likely to experience loneliness (Loades et al., 2020) and SAD during and after enforced isolation.

5. Conclusion

This population-based study found that among adolescents, the prevalence of SAD varies from 2.0% to 5.7% depending upon the diagnostic threshold. Approximately 3.5% of those diagnosed with SAD had the DSM-5 performance-only subtype. As demonstrated, variation in assessment methods and sampling strategies, as well as general diagnostic procedures, influence the estimated prevalence rates. We believe that SAD assessment using a standardized method is needed; these results may have important implications for administrative, scientific, and intervention purposes. We know that social anxiety in young people is a strong predictor of mental health problems in adulthood. Thus, quantifying more precise prevalence rates and diagnoses could contribute to development of superior assessments of societal and economic burdens from this disorder, and to better distribution of resources.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in his paper.

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