



Social anxiety in adolescents and young adults from the general population: an epidemiological characterization of fear and avoidance in different social situations

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Abstract

Social Anxiety Disorder (SAD) and, more generally, social fears are common in young people. Although avoidance behaviors are known to be an important maintaining factor of social anxiety, little is known about the severity and occurrence of avoidance behaviors in young people from the general population, hampering approaches for early identification and intervention. Symptoms, syndromes, and diagnoses of DSM-5 mental disorders including SAD were assessed in a random population-based sample of 14-21-year-olds ($n=1,180$) from Dresden, Germany, in 2015/2016 using a standardized diagnostic interview (DIA-X-5/D-CIDI). An adapted version of the Liebowitz Social Anxiety Scale was used to ascertain the extent of social fears and avoidance. Diagnostic criteria for lifetime SAD were met by $n=82$ participants, resulting in a weighted lifetime prevalence of 6.6%. Social anxiety was predominantly reported for test situations and when speaking or performing in front of others. Avoidance was most prevalent in the latter situations. On average, anxiety and avoidance first occurred at ages 11 and 12, respectively, with avoidance occurring in most cases either at about the same age as anxiety or slightly later. In the total sample, lifetime prevalence for most DSM-5 disorders increased with the severity of social anxiety and avoidance. Results underline the need for preventive or early intervention efforts especially regarding test anxiety and fear and avoidance of speaking in front of others. These situations are particularly relevant in youth. Avoidance behaviors may also be discussed as diagnostic marker for early case identification.

Keywords Social anxiety disorder · Social fear and avoidance · Adolescents · Young adults · Epidemiology · Prevalence

Introduction

Social fears are very common in young people (Fehm et al., 2008) and are associated with considerable suffering and

severe impairments in psychosocial functioning as well as negative outcomes including suicidality and a range of mental disorders (Asselmann et al., 2018; Miché et al., 2018; Solano et al., 2016; Wong et al., 2012). Lifetime prevalence of social anxiety disorder (SAD) is estimated at around 7% with high incidence rates in childhood and early adolescence (Beesdo-Baum et al., 2012; Merikangas et al., 2010). In addition, a substantial proportion of young people does not meet the diagnostic criteria of threshold SAD, but nevertheless reports ever having had a strong fear of a social situation and/or the desire to avoid it (Knappe et al., 2015). According to the results from a large community sample of 14- to 24-year-olds, which was followed up for 10 years, almost half of the participants reported having fear of at least one social situation (Knappe et al., 2011).

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Regarding the prevalence of anxiety in different social situations in the general population, anxiety about speaking in front of others (6.2 – 24.8%) and taking tests (14.0 – 28.1%) seem to be the most widespread, whereas other social fears like eating/drinking in public (1.9 – 8.3%) or entering an occupied room (3.0 – 11.9%) are less frequently reported (Gren-Landell et al., 2009; Knappe et al., 2011; Ruscio et al., 2008; Tillfors & Furmark, 2007). The ranking order of reported social fears among people with SAD are similar to those without SAD, but prevalence estimations are usually considerably higher (Gren-Landell et al., 2009; Knappe et al., 2011; Ruscio et al., 2008; Tillfors & Furmark, 2007).

Strong fear of social situations is often accompanied by avoidance behavior, which in turn contributes to the maintenance of these fears (Wong & Rapee, 2016) and possibly the development of full blown SAD. Yet, there seems to be a lack of epidemiological studies providing data on the proportion and extent of avoidance behavior in social situations among youth from the general population, that is, that are not limited to adolescents diagnosed with SAD. Across clinical (Kodal et al., 2017), treatment-seeking (Beidel et al., 2007) or student samples (Heiser et al., 2009) with SAD, the most often avoided situations were initiation of or participation in a conversation, or reporting in front of others. Higher levels of anxiety were found to be associated with higher levels of avoidance (Heimberg et al., 1999), albeit anxiety and avoidance can also have different developmental trajectories (Sumter et al., 2009). Whether a social situation is avoided depends on the extent of the fear, as well as on the consequences and on how easily the situation or consequences can be avoided (Sunderland et al., 2016). Overall, however, there is little information on the extent to which avoidance behaviors occur in the general population of young people, its onset, the transition from anxiety to avoidance behaviors, and how this relates to SAD (Sumter et al., 2009; Sunderland et al., 2016).

Looking at the most often feared and avoided social situations, it is noticeable that these are mostly performance-related situations (Beidel et al., 2007; Dell’Osso et al., 2015; Heiser et al., 2009; Kodal et al., 2017). According to the DSM-5 (American Psychiatric Association, 2013), it can be specified whether social anxiety does only occur in performance-related situations, as it seems that people who exclusively suffer from performance fears form a distinct group within SAD that is less impaired and less comorbid (Fuentes-Rodriguez et al., 2018; Heimberg et al., 2014; Knappe et al., 2011). The prevalence of performance-only social anxiety among people with diagnosed SAD varies between 0% and 26% in adolescents (Burstein et al., 2011; Fuentes-Rodriguez et al., 2018; Garcia-Lopez et al., 2018; Kerns et al., 2013) and 0.3% in adult samples (Crome et al.,

2015). Given this high variance in findings among adolescents, further investigation of prevalence is warranted.

At last, it needs to be emphasized that SAD often co-occurs with other mental disorders (Knappe et al., 2015; Wittchen & Fehm, 2003), in adolescents especially with other anxiety disorders, predominantly generalized anxiety disorder and specific phobia, depressive disorders and substance use disorder (Garcia-Lopez et al., 2016; Wittchen et al., 1999). In adults, comorbidity rates typically range from 69 to 99% (Fehm et al., 2005; Knappe et al., 2015; Steinert et al., 2013), in adolescents and young adults the proportions seem to be lower (33–72%) (Garcia-Lopez et al., 2016; Wittchen et al., 1999). Moreover a dose-response pattern is observed in adults in which comorbidity increases with severity of social anxiety (Fehm et al., 2008) or number of feared situations (Ruscio et al., 2008). In adolescents and young adults, there was likewise an increase in comorbidity when comparing non-generalized vs. generalized social phobia based on DSM-IV (Wittchen et al., 1999), however current data in this age group are missing.

The current study aims to extent basic epidemiologic knowledge on DSM-5 SAD and social fears as well as avoidance behavior of adolescents and young adults from the general population. In addition to prevalence estimates based on current (DSM-5) criteria, it will be reported how often SAD is limited to performance-related situations, i.e. the prevalence of the DSM-5 performance-only specifier, as previous findings on the specifier in this age group are inconclusive (Burstein et al., 2011; Fuentes-Rodriguez et al., 2018; Garcia-Lopez et al., 2018; Kerns et al., 2013). Further, the level of fear and avoidance of a wide spectrum of typical social situations will be presented separately as well as the age of onset of anxiety and avoidance. In accordance with previous findings (Gren-Landell et al., 2009; Knappe et al., 2011; Kodal et al., 2017; Sunderland et al., 2016), we expect performance-related situations, especially speaking in front of others, to be most often feared and avoided, and that avoidance will mostly occur after fear. Last, comorbidity rates in SAD and the prevalence of social fears and avoidance behaviors in other mental disorders, based on DSM-5 criteria, will be examined. Here we expect to find a similar dose-response pattern as in other studies (Ruscio et al., 2008), i.e., comorbidity rates increase with higher levels of social anxiety. This allows for a broader description of basic epidemiological data which are currently missing, particularly regarding avoidance behavior.

Methods

Sample and procedures

The Behavior and Mind Health (BeMIND) study is a prospective-longitudinal cohort study of a general population sample of adolescents and young adults from Dresden, Germany, to investigate developmental trajectories of mental and behavioral disorders. The present study uses data from the BeMIND baseline investigation ($n = 1,180$), thus comprising a cross-sectional epidemiological study design. The study protocol as well as its amendments were approved by the ethics committee of the Technische Universität Dresden (TUD: EK381102014). Details on sampling and methods of the BeMIND study are provided in detail elsewhere (Beesdo-Baum et al., 2020).

Briefly, an age- and sex-stratified random sample of 14–21-year-olds was drawn from the population registry of the city of Dresden in 2015. Exclusion criteria were not living in a household in Dresden during the field period, institutionalization, and insufficient German language skills. Written informed consent/assent after complete study information was required to participate in the study; in minors, all legal guardians also provided written informed consent.

A total of $n = 6,321$ subjects were invited by written information letter to participate in the study with a maximum of two reminder letters, $n = 893$ were found to be ineligible and of $n = 2,708$ the eligibility remained unknown. Of the remaining $n = 5,428$ individuals, $n = 1,180$ participated in the study assessments which were conducted between 11/2015 and 12/2016 at the study center at the Technische Universität Dresden (response rate: 21.7%, cooperation rate: 43.4%; (*The American Association for Public Opinion Research*, 2016)). Most common reported reasons for non-participation were no interest and lack of time.

At baseline, subjects participated in a standardized clinical-diagnostic assessment, in an experimental assessment approximately one week later, and in an Ecological Momentary Assessment (EMA) as well as an online questionnaire assessment in between these two personal appointments.

Assessments

Self-reported sociodemographic information containing age, sex, nationality, education, social class, financial and living situation were assessed during the standardized computer-assisted personal interview.

Diagnostic status of the participants was assessed with an updated version (DIA-X-5/D-CIDI; Hoyer et al., 2020) of the Munich Composite International Diagnostic Interview (DIA-X/M-CIDI; Wittchen & Pfister, 1997) providing lifetime and 12-month diagnoses of a range of mental disorders

including SAD according to DSM-5 (APA, 2013). The fully standardized computer-assisted personal interviews were conducted face-to-face by trained clinical (psychology/medical) interviewers. Via tablet computers, supporting lists and dimensional symptom scales were applied.

SAD was assessed within the anxiety disorders (D)-Section of the DIA-X-5, starting with the stem question phrase: “In the list you will find some typical situations that some people have a strong fear of or avoid. Have you ever had a strong fear or avoidance of doing things in front of others or of being in the center of attention? Please read all situations carefully and tell me if you ever had a strong fear of such situations or avoided them.” The presented list included eight typically feared social situations (e.g., writing while being watched, taking an exam or test, speaking in front of others). If the participant affirmed the stem question, they were prompted to rate the degree of fear and avoidance related to each of the situations endorsed on the tablet (see details below), followed by more detailed interview questions to assess whether the criteria for SAD were met. The performance-only specifier was given to participants who indicated only performance-related situations in the stem question, i.e., taking an exam or test, speaking in front of others, or performing in front of an audience. Participants who positively affirmed the CIDI stem question for social anxiety but did not meet the criteria for lifetime SAD comprise the group lifetime symptomatic social anxiety (SA) only. Participants who negated the CIDI stem question for social anxiety comprise the group no lifetime social anxiety.

Regarding the age of onset, participants first indicated the approximate age at which they began to fear or avoid each of the positively affirmed social situations and then reported the situations which they feared or avoided first. If the participant reported that the situation was always feared or avoided, the age of onset was set at 2 years. If the participant had difficulties to remember the age, the age was set at 4 years if it was before school, 12 years if it was before adolescence, 19 years if it was before adulthood and 20 years otherwise. $N = 1$ participant did not fill the SAD section and was conservatively counted as having no SAD diagnosis. Regarding the diagnostic test-retest reliability of the DIA-X-5, agreement and kappa for SAD diagnosis were estimated at 80.0% and 0.29, and for the SAD stem item at 91.7% and 0.83 (Hoyer et al., 2020). The intraclass coefficient for SAD age of onset was 0.73 (Hoyer et al., 2020). The validity evaluation of the DIA-X-5 is still pending, yet the validity of the DSM-IV social phobia diagnosis assessed with the DIA-X/M-CIDI was estimated with a kappa of 0.80 (Reed et al., 1998).

Feared and avoided social situations were assessed via an adapted version of the *Liebowitz Social Anxiety Scale* (LSAS; Liebowitz, 1987) presented on a tablet screen. It

comprises 8 upper categories and 27 subcategories of social situations and the extent of anxiety and avoidance in these situations. The upper categories, which corresponded to the categories of the list mentioned above, and the subcategories were only presented when the corresponding social situation was affirmed in the stem question of the DIA-X-5. Respondents reported the extent of anxiety on a scale ranging from 0 (no) to 100 (high) as well as the avoidance from 0 (never) to 100 (usually) by using a slider.

Data preparation and statistical analyses

To improve representativeness regarding sex and age, sample weights were applied to make sure that the sample distribution of sex and age is equal to the one of the target population of the 14-21-year-old people living in Dresden; *n* are reported unweighted. Descriptive statistics (weighted percent, %w; mean values, *M*; standard deviation, *SD*, median, *Mdn*) are provided regarding sociodemographic characteristics, both for the total sample as well as separately for those with lifetime SAD and with symptomatic social anxiety (SA) only and no lifetime social anxiety. Logistic regressions adjusted for age and sex were calculated for each sociodemographic characteristic and comorbid diagnoses to examine associations (odds ratios, OR) with 95% confidence intervals (95%CI) for SAD vs. symptomatic SA only and no SA, respectively, and symptomatic SA only vs. no SA. The alpha level was set to $\alpha=0.05$.

To report the extent of fear and avoidance of social situations, the parts of the LSAS that were not filled were set to 0, since the presentation of the categories depended on the answers to the stem question in the DIA-X-5. If the category was not selected in the stem question, it was assumed that there was no fear or avoidance in its subcategories either. The raw values for anxiety and avoidance were then divided into 4 categories, respectively: no/never (0–10), low/occasionally (11–40), moderate/often (41–70), high/usually (71–100). Weighted relative frequencies were graphically presented for each situation and category for anxiety and avoidance in the total sample as well as in the lifetime SAD and symptomatic SA group.

To report social anxiety and avoidance behavior in the context of other DSM-5 lifetime diagnoses, DIA-X-5/CIDI lifetime diagnoses and LSAS data categorized in the manner described above were combined. The highest rating of all situations was used to classify severity, regardless of how many situations were rated at that level, e.g., moderate anxiety includes all individuals who reported moderate anxiety in at least one situation. As for SAD, individuals with missing sections within the DIA-X-5 were assumed to not meet the criteria for the respective diagnosis. Depending on the diagnosis, this applied to between *n*=0 and *n*=16 cases.

Wald-tests with $\alpha=0.05$ were calculated to compare the onset of anxiety and onset of avoidance between and within the groups with SAD and symptomatic SA only. To report the sequence of onset, i.e., whether a person first feared or first avoided situations, the difference of both onset data was calculated. No consideration was given to whether the first feared situation and the first avoided situation were identical. *N*=9 of those with SAD and *n*=121 of those with symptomatic SA only reported never avoiding a feared social situation, so no age of onset of avoidance was available in these cases. In addition, onset of anxiety was missing in *n*=3 and onset of avoidance in *n*=30 of those with symptomatic SA only. There were no missing values in those with SAD. Missing values were not included in the analyses. For the graphical illustration of onset of anxiety respective avoidance, the weighted proportions were calculated for the age of first occurrence for each situation and then cumulated. All observed cases including the multiple answers were considered, respectively.

Results

Demographic sample characteristics

Table 1 presents the descriptive characteristics of the total sample, participants with lifetime SAD, lifetime symptomatic SA only and no lifetime social anxiety. Higher age (SAD vs. symptomatic SA only: OR=1.15; 95%CI: 1.03–1.28; *p*=.012; SAD vs. no SA: OR=1.12; 95%CI: 1.01–1.25; *p*=.031) and female sex (SAD vs. symptomatic SA only: OR=2.37; 95%CI: 1.35–4.16; *p*=.003; SAD vs. no SA: OR=3.52; 95%CI: 2.01–6.17; *p*<.001) were associated with lifetime SAD compared to lifetime symptomatic SA only and no lifetime SA. Female sex was also associated with lifetime symptomatic SA only compared with no lifetime SA (OR=1.54; 95%CI: 1.21–1.96; *p*<.001).

Prevalence of SAD and social anxiety

The DSM-5 criteria for lifetime SAD were fulfilled by 6.6% (*n*=82) of all participants (9.9% of girls, *n*=65, and 3.6% of boys, *n*=17) and 4.8% (*n*=63) for 12-months SAD (7.9% of girls, *n*=54 and 2.0% of boys, *n*=9). Lifetime SAD restricted only to performance-related situations applied to 0.9% (*n*=10) of the total sample, thereof *n*=6 girls and *n*=4 boys. Of those with lifetime SAD, 13.2% met the criteria of the performance-only specifier. In the total sample, 17.4% (*n*=209, thereof 53.4% female, *n*=134) reported ever having strongly feared or avoided exclusively performance-related social situations, and 34.3% (*n*=415, thereof 53.9% female, *n*=266) feared or avoided social situations

Table 1 Sample characteristics

	Total Sample		Lifetime SAD		Lifetime Symptomatic SA only		No Lifetime Social Anxiety		Lifetime SAD vs. Lifetime Symptomatic SA only		Lifetime SAD vs. No Lifetime Social Anxiety		Lifetime Symptomatic SA only vs. No Lifetime Social Anxiety									
	<i>M(SD)</i>	(<i>n</i> = 1180)	<i>M(SD)</i>	(<i>n</i> = 82)	<i>M(SD)</i>	(<i>n</i> = 542)	<i>M(SD)</i>	(<i>n</i> = 556)	OR	95%CI	<i>p</i>	OR	95%CI	<i>p</i>	OR	95%CI	<i>p</i>					
Age	17.93 (2.33)		18.42 (1.98)		17.91 (2.34)		17.88 (2.36)		1.15	1.03	1.28	1.03	1.25	0.012	1.12	1.01	1.25	0.031	1.00	0.95	1.05	0.915
	<i>n</i>	%w	<i>n</i>	%w	<i>n</i>	%w	<i>n</i>	%w														
14–17	635	41.0	32	28.9	299	41.9	304	41.9	Ref.						Ref.							
18–21	545	59.0	50	71.1	243	58.2	252	58.1	1.93	1.20	3.12	1.93	1.10	0.007	1.78	1.10	2.88	0.020	0.96	0.76	1.22	0.743
Sex																						
Female	685	48.3	65	72.1	335	51.2	285	42.3	2.37	1.35	4.16	2.37	2.01	0.003	3.52	2.01	6.17	<0.001	1.54	1.21	1.96	<0.001
Male	495	51.7	17	27.9	207	48.8	271	57.7	Ref.			Ref.			Ref.				Ref.			
Nationality																						
German	1150	97.1	79	95.2	529	97.5	542	97.1	Ref.			Ref.			Ref.				Ref.			
Non-German	30	2.9	3	4.8	13	2.5	14	2.9	2.16	0.58	7.97	2.16	0.41	0.249	1.53	0.41	5.69	0.525	1.00	0.47	2.17	0.992
Education																						
Low	25	2.3	1	0.9	13	2.9	11	1.9	0.61	0.08	4.80	0.61	0.10	0.635	0.78	0.10	6.35	0.815	1.34	0.59	3.05	0.483
Middle	232	18.5	18	22.8	104	17.5	110	18.7	1.40	0.78	2.52	1.40	0.67	0.265	1.20	0.67	2.16	0.541	0.99	0.73	1.35	0.959
High	882	76.5	61	74.1	403	76.3	418	77.0	Ref.			Ref.			Ref.				Ref.			
Other	41	2.8	2	2.2	22	3.3	17	2.4	0.82	0.18	3.70	0.82	0.17	0.801	0.78	0.17	3.54	0.744	1.35	0.70	2.61	0.368
Social Class																						
Lowest	23	2.6	4	4.7	8	2.3	11	2.5	2.82	0.79	10.05	2.82	0.67	0.110	2.27	0.67	7.72	0.188	0.82	0.32	2.07	0.668
Lower middle	144	14.6	12	19.1	74	16.7	58	12.0	1.06	0.53	2.14	1.06	0.56	0.870	1.14	0.56	2.36	0.715	1.37	0.93	2.01	0.111
Middle	710	60.6	48	58.8	321	58.9	341	62.4	Ref.			Ref.			Ref.				Ref.			
Upper middle	272	21.7	16	16.4	126	21.9	130	22.3	0.91	0.49	1.68	0.91	0.45	0.761	0.83	0.45	1.54	0.559	1.03	0.77	1.37	0.864
Upper	6	0.5	1	1.0	1	0.2	4	0.8	5.00	0.31	81.88	5.00	0.17	0.259	1.58	0.17	15.16	0.690	0.26	0.03	2.38	0.234
Financial Situation																						
Very bad	80	8.1	8	11.5	39	8.8	33	7.1	1.59	0.66	3.83	1.59	0.89	0.298	2.18	0.89	5.36	0.089	1.42	0.86	2.34	0.174
Average	406	33.6	33	41.5	197	35.9	176	30.4	1.33	0.77	2.29	1.33	1.00	0.310	1.72	1.00	2.99	0.052	1.27	0.97	1.66	0.085
Good	532	45.8	28	31.1	234	44.1	270	49.5	Ref.			Ref.			Ref.				Ref.			
Very good	144	12.5	13	16.0	63	11.3	68	13.0	1.76	0.85	3.64	1.76	0.83	0.125	1.72	0.83	3.56	0.142	1.06	0.72	1.57	0.752
Living Situation																						
With parents	881	65.1	53	56.6	410	65.5	418	65.8	Ref.			Ref.			Ref.				Ref.			
Alone	109	12.5	7	10.7	53	14.2	49	11.2	0.68	0.26	1.79	0.68	0.24	0.431	0.64	0.24	1.67	0.359	1.04	0.64	1.68	0.887
With partner	50	5.4	8	11.8	25	5.7	17	4.2	1.48	0.57	3.85	1.48	0.71	0.417	2.02	0.71	5.73	0.186	1.34	0.67	2.65	0.408
Other	140	17.1	14	20.9	54	14.7	72	18.8	1.45	0.65	3.24	1.45	0.48	0.361	1.07	0.48	2.39	0.864	0.76	0.48	1.20	0.245

Note. Lifetime SAD, met the criteria for DSM5 lifetime social anxiety disorder; Lifetime Symptomatic SA only, symptomatic social anxiety; affirmed the CIDI stem question for lifetime social anxiety, but did not meet the criteria of lifetime SAD; No Lifetime Social Anxiety: negated the CIDI stem question for lifetime social anxiety; OR, odds ratio from logistic regressions, controlled for age and sex; Ref., dummy reference; CI, confidence interval. Due to missing values, the *n* is reduced at social class (total sample, *n* = 1,155; lifetime SAD, *n* = 81; symptomatic SA, *n* = 530, no social anxiety, *n* = 544) and financial situation (total sample, *n* = 1,162, symptomatic SA, *n* = 533; no social anxiety, *n* = 547); *p* = .05, bold prints indicate statistical significance

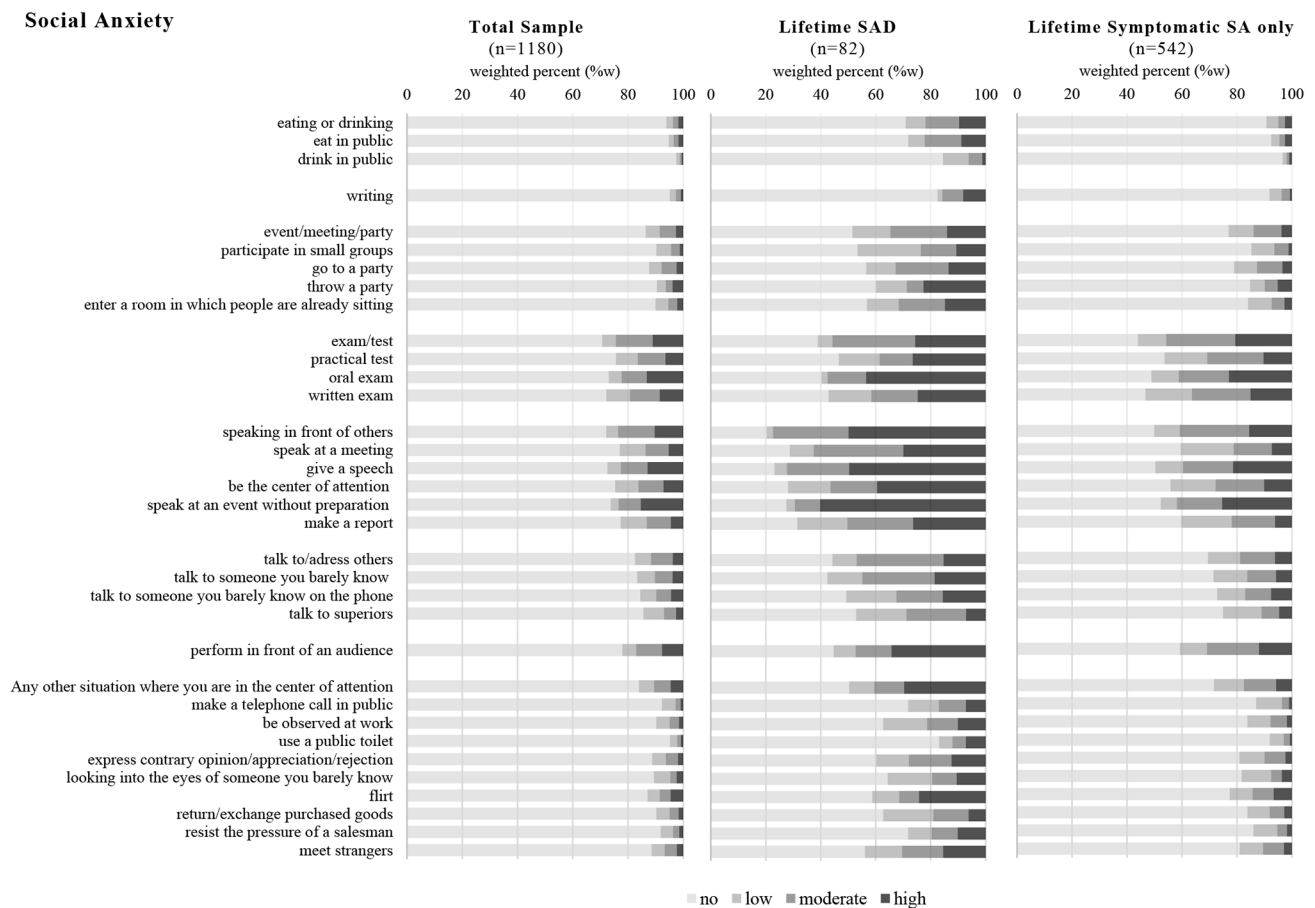


Fig. 1 Relative frequencies of different anxiety intensities in various social situations in the total sample, the subsample of those fulfilling the criteria for lifetime social anxiety disorder (SAD) and those with lifetime symptomatic social anxiety only (affirmed the CIDI stem question for lifetime social anxiety but did not meet the criteria of lifetime SAD). The presented relative frequencies are weighted percent,

%w, adjusted for sex and age. Data were obtained from the adapted version of the Liebowitz Social Anxiety Scale (LSAS). The extent of anxiety was measured on a scale ranging from 0 (no) to 100 (high) and divided in four categories: no (0 – 10), low (11 – 40), moderate (41 – 70), high (71 – 100). Participants only filled the categories that were affirmed in the stem question of the standardized diagnostic interview (DIA-X-5/D-CIDI). Not filled categories were set to 0

from other domains exclusively or additionally. In the total sample, 45.0% (n=542, thereof 51.2% female, n=335) reported lifetime symptomatic social anxiety only, i.e., lifetime social anxiety but never meeting criteria for a DSM-5 lifetime SAD diagnosis, and 48.4% (n=556, thereof 42.3% female, n=285) reported no lifetime social fears.

Types of feared or avoided social situations

Relative frequencies of different intensities of fear and avoidance behavior in different social situations are illustrated in Figs. 1 and 2, respectively.

Regarding the total sample, there are two situational clusters, where social anxiety predominantly occurs: taking tests and speaking in front of others, whereby oral exams (high anxiety reported by 13.2%), giving a speech (high anxiety reported by 12.9%) and speaking without preparation (high

anxiety reported by 15.4%) are most often highly feared. With regard to avoidance behavior, the pattern is slightly different, so that the cluster of speaking in front of others, especially speaking without preparation (usual avoidance reported by 14.1%), continues to be the most pronounced, but avoidance of exams hardly occurs (usual avoidance reported by 1.5%). The least feared and avoided social situations in the total sample were eating (high anxiety reported by 1.7%, usual avoidance reported by 3.5%) or drinking in public (high anxiety reported by 0.5%, usual avoidance reported by 0.3%), writing while being observed (high anxiety reported by 0.9%, usual avoidance reported by 1.2%), and using a public restroom (high anxiety reported by 0.9%, usual avoidance reported by 2.9%).

When comparing lifetime SAD and symptomatic SA only, it is notable that the patterns are overall very similar, albeit more pronounced in SAD. Again, the situations

Avoidance of Social Situations

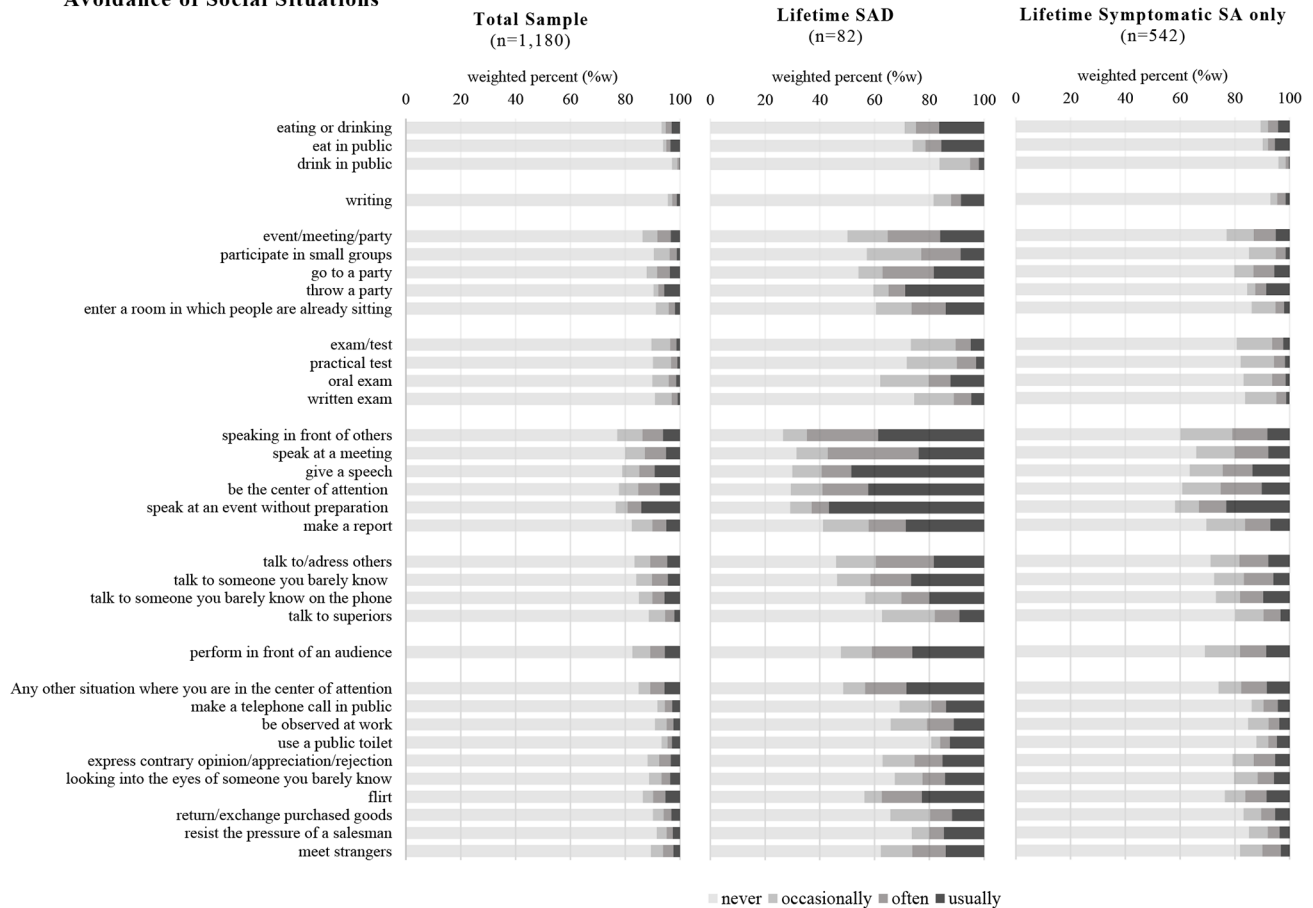


Fig. 2 Relative frequencies of different intensities of avoiding various social situations in the total sample, the subsample of those fulfilling the criteria for lifetime social anxiety disorder (SAD) and those with lifetime symptomatic social anxiety only (affirmed the CIDI stem question for lifetime social anxiety but did not meet the criteria of lifetime SAD). The presented relative frequencies are weighted percent, %w, adjusted for sex and age. Data were obtained from the adapted

version of the Liebowitz Social Anxiety Scale (LSAS). The extent of avoidance was measured on a scale ranging from 0 (never) to 100 (usually) and divided in four categories: never (0 – 10), occasionally (11 – 40), often (41 – 70), usually (71 – 100). Participants only filled the categories that were affirmed in the stem question of the standardized diagnostic interview (DIA-X-5/D-CIDI). Not filled categories were set to 0

speaking without preparation (SAD: high anxiety reported by 60.2%, usual avoidance reported by 56.7%; symptomatic SA: high anxiety reported by 25.4% usual avoidance reported by 23.1%) and giving a speech (SAD: high anxiety reported by 49.7%, usual avoidance reported by 48.5%; symptomatic SA: high anxiety reported by 21.5%, usual avoidance reported by 13.5%) were most often highly feared and avoided. As well, oral exams were highly feared but rather rarely avoided (SAD: high anxiety reported by 43.5%, usual avoidance reported by 12.3%; symptomatic SA: high anxiety reported by 22.9%, usual avoidance reported by 1.5%), although the avoidance tendency in SAD is nevertheless striking in comparison. Other situations that are notable for severe anxiety and avoidance, especially in SAD, include performing in front of an audience, flirting, and throwing a party.

Situations that are least likely to evoke fear and avoidance are drinking in public (SAD: high anxiety reported by 1.2%, usual avoidance reported by 1.9%; symptomatic SA: high anxiety reported by 1.0%, usual avoidance reported by 0.3%), writing while being observed (SAD: high anxiety reported by 8.2%, usual avoidance reported by 8.5%; symptomatic SA: high anxiety reported by 0.8%, usual avoidance reported by 1.5%) and using a public restroom (SAD: high anxiety reported by 7.2%, usual avoidance reported by 12.5%; symptomatic SA: high anxiety reported by 0.7%, usual avoidance reported by 4.6%).

Onset of social anxiety and avoidance behavior

The mean age of onset of social anxiety was $M=10.9$ ($SD=3.4$; $Mdn=11$; $Range: 2-21$) for those with lifetime

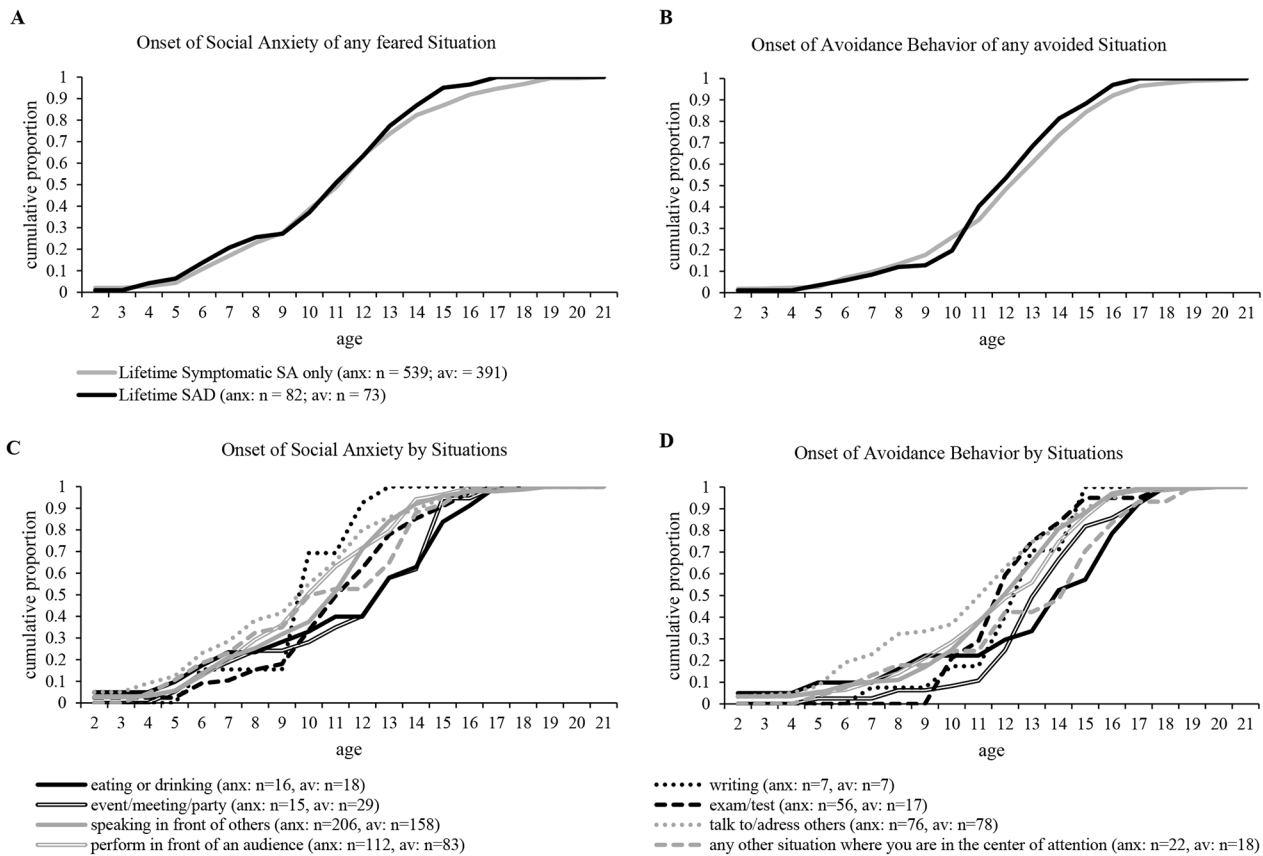


Fig. 3 Cumulative proportions of the ages of onset of fear (parts A and C) and avoidance behavior (parts B and D). Part A and B show the cumulative proportions across all social situations separately for those with lifetime social anxiety disorder (SAD) and lifetime symptomatic social anxiety (SA) only. In parts C and D, the cumulative proportions are presented for different social situations, but without distinguishing

the groups mentioned. The plotted data show all observed cases, including multiple answers. Age of onset was set at 2 years if the participant indicated that the situation has always been feared respectively avoided. In parts C and D, the number of cases (n; anx: anxiety; av: avoidance) differs strongly between the situations since situations were differently often feared or avoided first

SAD and $M = 11.3$ ($SD = 3.7$; $Mdn = 11$; $Range: 2-21$) for those with symptomatic SA only, differing not significantly ($F(1, 620) = 0.96$; $p = .328$). About 90.1% ($n = 73$) of those with SAD and 77.8% ($n = 421$) of those with symptomatic SA only reported having avoided social situations at least rarely. When avoidance behaviors were reported, the onset of avoidance was $M = 12.1$ ($SD = 2.9$; $Mdn = 12$; $Range: 2-17$) for those with lifetime SAD and $M = 12.3$ ($SD = 3.4$; $Mdn = 12$; $Range: 2-21$) for those with symptomatic SA only, differing not significantly from each other ($F(1, 463) = 0.47$; $p = .495$). Avoidance behavior occurred significantly later than anxiety in both groups (SAD: $F(1, 72) = 18.55$; $p < .001$; symptomatic SA only: $F(1, 388) = 67.20$; $p < .001$). Looking more closely at the sequence of onset, also considering those who reported the onset of anxiety but not avoidance, the following pattern was observed:

Most participants reported the same age of first onset of anxiety and avoidance (lifetime SAD: $n = 39$, 50.7%; symptomatic SA only: $n = 195$, 37.7%). The onset of anxiety

before avoidance of at least one year was reported by 34.6% ($n = 31$) of those with lifetime SAD and by 34.0% ($n = 170$) of those with symptomatic SA only. The onset of avoidance before anxiety of at least one year was reported by 4.8% ($n = 3$) of those with lifetime SAD and by 4.4% ($n = 24$) of those with symptomatic SA. Anxiety but no onset of avoidance was reported by 9.9% ($n = 9$) of those with SAD and by 23.8% ($n = 121$) of those with symptomatic SA.

Figure 3 shows the cumulated proportions of the ages of onset of anxiety and avoidance. In Part A and B, the onset is shown across all situations separately for those with lifetime SAD and symptomatic SA only. Part C and D display the onset curves for each situation, but for both groups together. In all curves, a slight delay is observable for avoidance compared to anxiety. The onset of anxiety increases moderately between the ages of 5 and 9 years and more markedly between the ages of 10 and 16 years, with the slope decreasing earlier among those with symptomatic SA only compared with lifetime SAD. Regarding the onset of

avoidance, there is a slight increase from the age of 6 years that becomes steeper from the ages of 11 to 16 years with a small delay from the age of 12 years of symptomatic SA only versus lifetime SAD. Referring to the different situations, the primary observation is that the curves for fear and avoidance of talking to others rise earlier in childhood than the curves for other situations. In contrast, onset curves for fear and avoidance of eating or drinking in public and participating an event, meeting, or party increase most during early adolescence. Regarding the first occurrence of anxiety and avoidance of exams or tests, a sharp increase in onset can be observed at the age of 9 years.

Social anxiety and other mental disorders

Data on comorbidity are shown in Table 2. About 90% of those with lifetime SAD met the criteria of at least one other lifetime DSM-5 disorder which is significantly more than the 58% of those reporting symptomatic SA only (OR = 6.67; 95%CI: 3.13–14.21; $p < .001$) and, than the 42% of those reporting no social anxiety (OR = 13.82; 95%CI: 6.42–29.72; $p < .001$). Comparing lifetime SAD to symptomatic SA only, significantly elevated odds ratios were found for other anxiety, obsessive-compulsive, trauma-related, depressive, bipolar, eating and attention deficit hyperactivity disorders with the highest odds for the last two. When comparing lifetime SAD to no lifetime SA, there were significantly increased odds for all disorders studied except disruptive, impulse-control or conduct disorder. Lifetime symptomatic SA only compared to no lifetime SA showed elevated odd ratios for any anxiety, depressive, psychotic, and substance use disorder.

The proportion of any other lifetime mental disorder increases the more at least one social situation is feared or avoided (Table 3). This dose-response pattern is predominantly evident for anxiety disorders but when comparing severe and less severe social anxiety/avoidance behavior a marked increase in lifetime prevalence is also found for other disorders except for disruptive, impulse-control or conduct disorder and, concerning only social avoidance behavior, substance use disorder.

Furthermore, when looking separately at performance-only SAD compared to SAD, it is noticeable that performance-only SAD is less often associated with severe anxiety and avoidance behavior.

Discussion

This cross-sectional epidemiologic study confirms a high prevalence for SAD according to DSM-5 criteria in adolescents and young adults and provides data on the occurrence

and onset of social fears and avoidance behaviors as well as on comorbidity rates in youth in the general population, thus adding current basic epidemiological data to the literature.

The weighted lifetime prevalence of DSM-5 SAD in this sample was 6.6% with almost three quarters being female (72.1%). These rates are in line with previous findings (Avenevoli, 2012; Beesdo-Baum et al., 2012; Fehm et al., 2005; Kessler et al., 2005; Knappe et al., 2015; Merikangas et al., 2010; Ruscio et al., 2008) and corroborate that especially girls and young women are affected. Furthermore, 45% of the sample reported ever having had social anxiety or avoidance behaviors, yet not fulfilling diagnostic criteria for a full blown / threshold SAD diagnosis. This emphasizes the extent of subclinical social anxiety among adolescents and young adults in the general population. Regarding the performance-only subtype of social anxiety specified in DSM-5, a minority of 13.2% of those with lifetime SAD apply to the criteria, which lies in the middle of the relatively wide range of previous findings (Boyers et al., 2017; Burstein et al., 2011; Crome et al., 2015; Fuentes-Rodriguez et al., 2018; Garcia-Lopez et al., 2018; Kerns et al., 2013). Our findings suggest that the vast majority of youth with DSM-5 SAD, and also independent of SAD diagnosis, are not or not only affected by fear and avoidance of performance situations. Furthermore, with regard to severity, individuals with performance-only SAD more often reported milder forms of anxiety and, in particular, less avoidance behavior compared to SAD, which is consistent with previous findings (Fuentes-Rodriguez et al., 2018; Peyre et al., 2016). Overall, it can be assumed that this specifier may be rarely applied in clinical practice and therefore be of limited use for treatment planning purposes.

Concerning the prevalence and severity of anxiety and avoidance of social situations in a general population sample of adolescents and young adults, there are predominantly two situational clusters where anxiety occurs most frequently: test situations, especially oral exams, and speaking and performing in front of others. As expected, these are performance-related situations. That is, almost a quarter of adolescents and young adults seem to perceive at least moderate fear in these areas, which corresponds to the results of other large-scale studies with adults (Ruscio et al., 2008; Stein et al., 2010; Tillfors & Furmark, 2007) and adolescents (Gren-Landell et al., 2009; Knappe et al., 2011). As might be expected, overt avoidance behavior is less prevalent than anxiety (Kodal et al., 2017; Wong & Rapee, 2016), yet about one-sixth of participants reported at least often avoiding situations involving speaking in front of others, especially without preparation. Exams, however, seem to be endured despite fear, as the negative consequences of avoiding would likely be too serious (Sunderland et al., 2016). Similar patterns are found in young people who met DSM-5

Table 2 Comorbid DSM-5 lifetime diagnoses

	Lifetime SAD		Lifetime Symptomatic SA only		Lifetime SAD vs. Lifetime Symptomatic SA only		Lifetime SAD vs. No Lifetime Social Anxiety		Lifetime Symptomatic SA only vs. No Lifetime Social Anxiety									
	n	%w	n	%w	OR	95%CI	OR	95%CI	OR	95%CI								
At least one of the below disorders	74	90.0	299	57.7	216	41.8	6.67	3.13	14.21	< .001	13.82	6.42	29.72	< 0.001	1.98	1.54	2.54	< 0.001
Any (other) Anxiety Disorder	47	56.4	135	24.9	62	11.4	3.61	2.22	5.86	< 0.001	9.21	5.46	15.54	< 0.001	2.54	1.82	3.54	< 0.001
Obsessive-Compulsive Disorder	17	20.4	29	5.1	20	3.8	4.33	2.22	8.41	< 0.001	6.68	3.21	13.89	< 0.001	1.48	0.82	2.65	0.192
Any Trauma-related disorder	14	16.1	23	4.7	13	2.5	3.86	1.86	8.01	< 0.001	5.76	2.54	13.09	< 0.001	1.75	0.87	3.50	0.117
Any Somatic Symptom or related disorder	10	11.4	27	5.2	22	4.6	2.12	0.97	4.64	0.061	2.49	1.10	5.64	0.028	1.19	0.66	2.13	0.561
Any Depressive disorder	42	47.6	92	16.9	56	11.2	4.52	2.75	7.43	< 0.001	7.50	4.39	12.82	< 0.001	1.73	1.21	2.49	0.003
Any Bipolar disorder	5	5.6	9	1.7	2	0.7	3.91	1.24	12.38	0.020	11.51	2.75	48.22	0.001	2.46	0.75	8.09	0.138
Psychotic Disorder	10	11.7	37	6.5	20	3.8	1.89	0.89	4.03	0.097	4.29	1.86	9.93	0.001	2.00	1.14	3.50	0.016
Any Eating Disorder	11	14.0	11	1.6	11	1.7	5.57	2.28	13.61	< 0.001	4.75	1.95	11.59	0.001	0.85	0.36	1.98	0.701
Any Substance Use Disorder	26	32.7	132	28.4	108	22.6	1.21	0.71	2.06	0.478	1.79	1.04	3.08	0.036	1.40	1.04	1.90	0.028
Attention Deficit Hyperactivity Disorder	6	8.6	6	1.3	4	0.8	6.83	2.09	22.27	0.001	16.81	4.14	68.29	< 0.001	1.67	0.47	6.00	0.431
Any Disruptive, Impulse-Control or Conduct Disorder	9	14.0	57	11.9	44	10.2	1.17	0.54	2.51	0.696	1.41	0.63	3.14	0.399	1.47	0.97	2.24	0.072

Note. Lifetime SAD, met the criteria for DSM5 lifetime social anxiety disorder; Lifetime Symptomatic SA only, symptomatic social anxiety only; affirmed the CIDI stem question for lifetime social anxiety, but did not meet the criteria of lifetime SAD; No Lifetime Social Anxiety: negated the CIDI stem question for lifetime social anxiety; *M*, mean; standard deviation; OR, odds ratio from logistic regressions, adjusted for age and sex; CI, confidence interval. *p* = .05, bold prints indicate statistical significance

Table 3 Social anxiety and avoidance behavior in the context of DSM-5 lifetime diagnoses

	Social Anxiety												Avoidance of Social Situations																																			
	total sample (n = 1,180)						low (n = 52)						moderate (n = 160)						high (n = 407)						never (n = 639)						occasionally (n = 79)						often (n = 131)						usually (n = 331)					
	n	%row	%col	n	%row	%col	n	%row	%col	n	%row	%col	n	%row	%col	n	%row	%col	n	%row	%col	n	%row	%col	n	%row	%col	n	%row	%col	n	%row	%col	n	%row	%col												
None of the below Disorders	345	60.7	58.7	28	3.8	43.2	74	11.9	43.1	136	23.5	32.8	387	66.9	57.2	38	6.3	45.7	56	9.0	40.6	102	17.9	30.3	216	38.2	41.3	24	4.5	56.8	86	14.1	57.0	271	43.1	67.2	252	44.7	42.8	41	6.7	54.3	75	11.8	59.4	229	36.9	69.7
Any of the below Disorders	63	24.0	11.5	7	3.1	17.4	41	14.7	26.2	168	58.2	40.1	80	30.2	12.8	12	4.2	15.1	33	11.3	25.2	154	54.3	45.4	63	24.0	11.5	7	3.1	17.4	41	14.7	26.2	168	58.2	40.1	80	30.2	12.8	12	4.2	15.1	33	11.3	25.2	154	54.3	45.4
Panic disorder	12	24.5	2.3	1	1.4	1.5	6	10.0	3.5	39	64.2	8.7	16	31.5	2.6	5	8.9	6.3	6	7.7	3.4	31	51.9	8.6	12	24.5	2.3	1	1.4	1.5	6	10.0	3.5	39	64.2	8.7	16	31.5	2.6	5	8.9	6.3	6	7.7	3.4	31	51.9	8.6
Generalized Anxiety Disorder	7	19.1	1.7	0	0.0	0.0	4	6.0	2.0	39	74.9	9.4	8	21.0	1.6	1	1.1	0.7	5	8.7	3.5	36	69.2	10.6	7	19.1	1.7	0	0.0	0.0	4	6.0	2.0	39	74.9	9.4	8	21.0	1.6	1	1.1	0.7	5	8.7	3.5	36	69.2	10.6
Social Anxiety Disorder	0	0.0	0.0	2	4.0	6.3	10	11.8	6.0	70	84.2	16.5	3	3.4	0.4	2	2.7	2.8	8	11.2	7.1	69	82.7	19.6	0	0.0	0.0	2	4.0	6.3	10	11.8	6.0	70	84.2	16.5	3	3.4	0.4	2	2.7	2.8	8	11.2	7.1	69	82.7	19.6
Social Anxiety Disorder - Performance Only	0	0.0	0.0	0	0.0	0.0	3	34.2	2.3	7	65.8	1.7	2	20.4	0.3	2	20.5	2.8	2	27.0	2.3	4	32.1	1.0	0	0.0	0.0	0	0.0	0.0	3	34.2	2.3	7	65.8	1.7	2	20.4	0.3	2	20.5	2.8	2	27.0	2.3	4	32.1	1.0
Agoraphobia	0	0.0	0.0	0	0.0	0.0	1	5.3	0.5	13	94.7	3.3	0	0.0	0.0	2	10.6	1.9	0	0.0	0.0	12	89.4	3.8	0	0.0	0.0	0	0.0	0.0	1	5.3	0.5	13	94.7	3.3	0	0.0	0.0	2	10.6	1.9	0	0.0	0.0	12	89.4	3.8
Separation Anxiety Disorder	4	16.1	0.6	0	0.0	0.0	4	13.9	2.0	18	70.0	3.9	5	19.5	0.7	1	3.3	1.0	5	24.5	4.5	15	52.7	3.6	4	16.1	0.6	0	0.0	0.0	4	13.9	2.0	18	70.0	3.9	5	19.5	0.7	1	3.3	1.0	5	24.5	4.5	15	52.7	3.6
Any Specific Phobia or other Phobic Anxiety Disorder	45	28.6	7.9	5	4.2	13.6	23	14.9	15.3	86	52.4	20.9	57	36.7	9.0	6	3.9	8.1	16	8.7	11.2	80	50.7	24.5	45	28.6	7.9	5	4.2	13.6	23	14.9	15.3	86	52.4	20.9	57	36.7	9.0	6	3.9	8.1	16	8.7	11.2	80	50.7	24.5
Obsessive-Compulsive Disorder	20	33.3	3.7	1	1.2	1.5	12	17.5	7.3	33	48.1	7.7	25	43.0	4.3	3	3.5	2.9	7	9.3	4.9	31	44.2	8.6	20	33.3	3.7	1	1.2	1.5	12	17.5	7.3	33	48.1	7.7	25	43.0	4.3	3	3.5	2.9	7	9.3	4.9	31	44.2	8.6
Any Trauma-related Disorder	12	25.1	2.2	2	3.2	3.3	7	14.6	4.8	29	57.2	7.4	16	34.1	2.7	2	3.3	2.2	4	6.9	2.9	28	55.7	8.7	12	25.1	2.2	2	3.2	3.3	7	14.6	4.8	29	57.2	7.4	16	34.1	2.7	2	3.3	2.2	4	6.9	2.9	28	55.7	8.7
Any Somatic Symptom or related Disorder	21	40.3	4.4	1	1.9	2.3	3	3.9	1.6	34	54.0	8.5	24	44.5	4.3	1	1.2	1.0	4	6.7	3.4	30	47.6	9.1	21	40.3	4.4	1	1.9	2.3	3	3.9	1.6	34	54.0	8.5	24	44.5	4.3	1	1.2	1.0	4	6.7	3.4	30	47.6	9.1
Any Depressive Disorder	56	33.3	11.0	4	3.6	13.8	17	7.9	9.7	113	55.3	26.4	61	36.2	10.6	11	5.8	14.4	18	8.6	13.3	100	49.4	28.6	56	33.3	11.0	4	3.6	13.8	17	7.9	9.7	113	55.3	26.4	61	36.2	10.6	11	5.8	14.4	18	8.6	13.3	100	49.4	28.6
Any Bipolar Disorder	4	23.8	0.7	0	0.0	0.0	2	11.2	1.3	12	65.0	2.8	4	23.8	0.6	1	6.1	1.4	0	0.0	0.0	13	70.1	3.7	4	23.8	0.7	0	0.0	0.0	2	11.2	1.3	12	65.0	2.8	4	23.8	0.6	1	6.1	1.4	0	0.0	0.0	13	70.1	3.7
Psychotic Disorder	20	33.0	3.7	2	2.5	3.3	9	12.4	5.2	36	52.0	8.5	22	35.8	3.6	3	3.2	2.7	13	16.0	8.5	29	45.0	8.9	20	33.0	3.7	2	2.5	3.3	9	12.4	5.2	36	52.0	8.5	22	35.8	3.6	3	3.2	2.7	13	16.0	8.5	29	45.0	8.9
Any Eating Disorder	11	33.1	1.7	1	3.9	2.3	2	5.0	1.0	19	57.9	4.3	12	35.6	1.6	1	2.0	0.8	3	8.4	2.0	17	54.0	4.8	11	33.1	1.7	1	3.9	2.3	2	5.0	1.0	19	57.9	4.3	12	35.6	1.6	1	2.0	0.8	3	8.4	2.0	17	54.0	4.8
Any Substance Use Disorder	108	42.2	22.4	8	3.6	22.4	45	17.3	34.2	105	36.9	28.2	126	49.9	23.4	22	8.4	33.6	27	9.5	23.5	91	32.2	29.9	108	42.2	22.4	8	3.6	22.4	45	17.3	34.2	105	36.9	28.2	126	49.9	23.4	22	8.4	33.6	27	9.5	23.5	91	32.2	29.9
Attention Deficit Hyperactivity Disorder	4	24.1	0.8	0	0.0	0.0	1	12.1	1.4	11	63.8	2.9	4	24.1	0.7	1	12.1	2.8	0	0.0	0.0	11	63.8	3.5	4	24.1	0.8	0	0.0	0.0	1	12.1	1.4	11	63.8	2.9	4	24.1	0.7	1	12.1	2.8	0	0.0	0.0	11	63.8	3.5
Any Disruptive, Impulsive-Control or Conduct Disorder	44	44.0	10.1	7	5.4	14.4	13	12.5	10.7	46	38.1	12.6	48	48.5	9.9	8	6.1	10.5	9	7.8	8.4	45	37.6	15.1	44	44.0	10.1	7	5.4	14.4	13	12.5	10.7	46	38.1	12.6	48	48.5	9.9	8	6.1	10.5	9	7.8	8.4	45	37.6	15.1

Note. Degree of social anxiety and avoidance behavior in the context of DSM-5 lifetime mental disorders measured with the adapted version of the Liebowitz Scale (LSAS). For the classification of the severity, the highest rating of all situations was taken regardless of how many situations were rated in this category. All percent are weighted, i.e., adjusted for sex and age; %row, row percent (e.g., 24.5% of those with panic disorder reported having no fear); %col, column percent (e.g., 2.3% of those having reported no fear, met the criteria for panic disorder)

criteria for lifetime SAD, albeit these are much more pronounced, also compared with individuals who reported symptomatic social anxiety only. Some situations, however, seem to be strongly feared and avoided especially by those with SAD. So, apart from the aforementioned situational clusters, the largest discrepancies between individuals with SAD and symptomatic anxiety only were found for flirting and throwing a party and, in terms of avoidance behaviors, talking to a person who is barely known. These situations should therefore receive particular attention in the clinical context. Overall, these findings are not unexpected and correspond to the existing literature (Beidel et al., 2007; Heiser et al., 2009; Knappe et al., 2011; Kodak et al., 2017; Ruscio et al., 2008). Nonetheless, to our knowledge, there is not yet such a detailed overview that specifically presents avoidance behaviors separately from reported anxiety in a general population sample of adolescents and young adults. High levels of social anxiety and avoidance of social situations can have detrimental consequences for affected youth, particularly in the school context, starting with presentations, that might be perceived as very stressful, over difficulties to find friends up to bullying (Blöte et al., 2015). In view of the quite frequent occurrence of social fears and avoidance behavior among adolescents and young adults found in this study and usually waxing and waning course of SAD (Beesdo-Baum et al., 2012), it is therefore very important to raise awareness of this topic at an early stage, ideally in the school context, and to offer preventive, low-threshold support. Avoidance behaviors may thus serve as an additional diagnostic marker for social anxiety, when physical or cognitive symptoms of SAD are not prominent.

On average, social anxiety and avoidance behavior first occur in early adolescence, that is, at ages 11 and 12, respectively, in our sample of 14–21-year-olds. As expected, avoidance of social situations occurs in most cases either at about the same age as anxiety or slightly later. The transition from anxiety to avoidance seems thus to take place very quickly and often within the first year (Sunderland et al., 2016). In some cases, especially in milder forms of social anxiety, no overt avoidance behavior was reported, suggesting that situations might be endured despite fear or that covert avoidance or safety behaviors might be used. In few cases, avoidance was reported to occur before anxiety. Looking at the onset curves, it is also noticeable that there is an initial increase in anxiety between ages 5 and 10, which is much smaller for avoidance behavior. Then, from the age of 11, there is a marked increase in both anxiety and avoidance, making the period before, i.e., elementary school age, favorable for preventive measures. Avoidance behaviors may present an early behavioral symptom, timely close to SAD incidence. From a clinical perspective, however, it could be argued that children aged 5 to 10 years already have a

concept of fear, but not of avoidance. Even when children exhibit avoidance behavior from an adult perspective, they may not yet reliably associate it with fear. However, this reasoning and whether it can explain the delayed onset of avoidance behavior needs to be examined elsewhere.

A slight delay in the onset of fear and avoidance in symptomatic SA compared to SAD is observable, yet not clinically relevant due to the small difference. The comparison of the different situations revealed varying patterns of onset. Fear and avoidance of talking to or addressing other people seems to be often already prevalent at younger ages, while eating or drinking in public and participating or giving an event, meeting or party seems to be first feared and avoided only in early adolescence. Further, fear and avoidance of exams seems to occur rather seldom at primary school age, but increases rapidly at secondary schools, i.e., from about 10 years of age. This might be explained by an increased exam load and higher demands in educational and social life. Also, with increasing age, children learn better to judge their own performance and comparisons with peers become more important, which in turn might increase pressure and test anxiety (McDonald, 2001). Overall, it appears that social fears increasingly first occur in late childhood and early adolescence and that avoidance behavior often follows within a short time. It would therefore be very useful to implement preventive measures in this period to counteract avoidance behavior, the consolidation and generalization of social fears and the development of SAD at an early stage. For example, the Anxiety and Avoidance Scale for Children (AVAC) was developed to identify the most anxiety-eliciting situations in children aged 8 to 16 years and their parents, by taking into account ratings on both levels of fear and avoidance (Lippert et al., 2021).

At last, social anxiety has been shown to play an important role in other mental disorders. The observed lifetime comorbidity rate of 90% in all SAD cases is within the range of findings from other studies (69–99%) (Knappe et al., 2015; Leichsenring et al., 2003; Wittchen et al., 1999), albeit they mostly involved adult samples. Data on comorbidities in adolescents are rare, yet Jystad and colleagues (2021) reported a rate of 72.8% and Garcia-Lopez and colleagues (2016) a rate of 33%, although the latter is lower than expected given the clinical sample. Trying to explain this difference, it is conspicuous that no comorbidity with substance use disorder was reported in the study by Garcia-Lopez and colleagues (2016), although high comorbidity was found in other literature (Knappe et al., 2015) and our study (33%). On the other hand, in the study by Jystad and colleagues (2021), comorbidity with substance abuse was rather low. Otherwise, it might be possible that comorbid disorders predominantly occur in early adulthood (rather than in late childhood). Although it has been shown that

SAD is a risk factor for other disorders, e.g., depressive (Beesdo et al., 2007) or substance use disorders (Buckner et al., 2008), literature on the age of onset of comorbid disorders in SAD is scarce (Beesdo et al., 2007). Corroborating previous findings (Beesdo-Baum et al., 2012; Fehm et al., 2008; Wittchen et al., 1999), highest comorbidity rates were found for other anxiety (56%), depressive (48%) and substance use disorders (33%). A dose-response pattern is generally observed in adults, with prevalence rates higher the more severe the social anxiety (Fehm et al., 2008; Ruscio et al., 2008), which is supported and extended by our data. Hence, this pattern seems to be also evident in adolescents and young adults for most mental disorders, not only in the level of social anxiety, but also in the level of avoidance of social situations. Exceptions to this appear to be disruptive, impulse-control or conduct disorder, and partly substance use disorder (Ruscio et al., 2008). Overall, prospective studies are needed to further investigate the sequence and onset of comorbid disorders in SAD, especially with regard to the dose-response-pattern.

There are some limitations to be mentioned. First, since the data were retrospective, they might be biased, especially concerning the age of onset. Some situations were only rarely reported to be the first feared or avoided social situation (e.g., writing), thus the graphs in Fig. 3 need to be interpreted with caution. Moreover, the onset of anxiety and avoidance was assessed only in years, so the exact temporal order of both is not clear when the same age of onset was reported for anxiety and avoidance. However, it is plausible to assume that in most cases anxiety occurred before avoidance, arguing for avoidance to contribute to SAD persistence, but not or rarely to SAD onset. Further, the sample was restricted to adolescents and young adults aged 14–21 years living in the city of Dresden, Germany, which limits the generalization of the results to other regions or ages. The overall response rate of the study (21.7%) was relatively low, which does not necessarily impair the validity of the findings but needs to be kept in mind when interpreting the results. Prevalence estimates and the extent of fear and avoidance of social situations might be underestimated in the current study since the in person participation in the BeMIND study itself is a social situation, which might have been avoided by particularly socially anxious young people. Last, the low kappa (0.29) of the SAD diagnosis found by Hoyer and colleagues (2020) needs to be discussed. A closer look showed that 9 of 12 discordant cases were due to discordance on only one criterion, predominantly on the avoidance or duration criterion (Hoyer et al., 2020). It can therefore be assumed that the DIA-X-5/D-CIDI might have difficulties with regard to these criteria to clearly separate subthreshold from suprathreshold SAD, yet the validity of the severity and situation data should be at an acceptable

level. In addition, it must be noted that the study sample size in this retest-reliability study was limited to 60 participants and included as well older adults, so that a further examination of the reliability and validity of the SAD diagnosis, especially for young adults, seems reasonable.

In comparison, there are also strengths to be highlighted. The study is based on a general population sample of adolescents and young adults, in which the diagnostic status was assessed in each case by means of a fully standardized computer-assisted personal interview. The diagnoses were based on current diagnostic criteria (DSM-5), giving the opportunity of reporting recent prevalence and comorbidity estimates of SAD and its performance-only specifier among adolescents and young adults. It was further used an adapted version of the Liebowitz Social Anxiety Scale, which was extended by 27 subcategories, so that the extent of fear and avoidance could be examined in a very detailed way and acknowledging social situations particularly salient in early adolescence. A particular strength here is the separate focus on avoidance behavior, which to our knowledge has not yet been reported in this detail in an epidemiologic context.

With those limitations and strengths in mind, the findings demonstrate that social anxiety disorder and social fears and avoidance of social situations are very prevalent in adolescence and young adulthood. When looking at different social situations, it was found that, in addition to oral exams, situations where to speak or perform in front of others were particularly considered very frightening. Feared situations of young people fulfilling the criteria of SAD were largely no different from those reporting symptomatic social anxiety only, although prevalence estimates were considerably higher. With regard to the onset, it seems that avoidance behavior often occurs within a short period of time after the onset of strong fear emphasizing the need for early prevention measures. Lastly, in terms of comorbidity in SAD, a dose-response-pattern similar to findings in adult samples was observed (Fehm et al., 2008; Ruscio et al., 2008). The prevalence of most mental disorders seems to increase with severity of social anxiety and avoidance behavior also independent of a SAD diagnosis. Overall, this leads to the conclusion that social anxiety and avoidance behavior should be identified at an early stage particularly because of the widespread prevalence and high comorbidity even at this young age. It could be helpful to sensitize not only parents and guardians but also teachers to this topic. Targeted prevention measures in early adolescence, e.g., in schools, could help to ameliorate the burden of social fears and avoidance and interrupt progression to SAD and comorbid conditions.

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Data Availability The data that support the findings of this study are available from the senior author upon reasonable request.

Declarations

Conflict of interest/Competing interests There is no conflict of interest.

Ethical standards The study protocol as well as its amendments were approved by the ethics committee of the Technische Universität Dresden (TUD: EK381102014).

Consent to participate After detailed study information, all participants gave written informed consent/assent and in minors, all legal guardians also provided written informed consent.

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