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ORIGINAL PAPER

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Social anxiety spectrum

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Abstract The aim of this paper is to provide the prevalence rates of mild, moderate and severe symptoms of social anxiety in a sample of high school students and to analyze gender differences and associated impairment levels within these three levels of severity. Five hundred and twenty students were assessed with the Social Anxiety Spectrum Self-Report (SHY-SR), a questionnaire that explores social anxiety spectrum. By applying two cut-off scores determined on a separate sample by using ROC analysis, the large majority (73.3 %) of subjects were classified as low scorers, 9 % as medium scorers and 17.7 % as high scorers. Fears related to social situations were reported both by high and medium scorers. Functional impairment defined by avoidance and school difficulties was more common among high scorers, but it was also reported to a significant extent by medium scorers. Compared to low and medium scorers, high scorers showed a higher F/M ratio (about 4:1) and a more homogeneous symptomatological profile in the two genders. In conclusion, our report confirms, in line with the literature, that even moderate levels of social anxiety are associated with significant functional impairment and distress for the individuals.

Key words social anxiety · interpersonal sensitivity · gender · subthreshold · self-rating · spectrum

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Introduction

Experiencing embarrassment in social situations is very common, and usually anxiety is not severe enough to interfere with the psychosocial functioning and sometimes it may even enhance performance. Individuals suffering from Social Anxiety Disorder (SAD) are characterized by the intensity of the anxiety experienced and by their distress or interference in functioning. However, the diagnostic threshold of SAD is still controversial. Davidson et al. (1994) argue that social anxiety may be better described as a continuum of severity rather than a discrete disorder based on an arbitrarily derived threshold. Moreover, the results of other community studies (Furmark 2000; Kessler et al. 1998) support the theory that the boundary of SAD should be determined by its severity rather than by qualitative distinctions.

We have recently developed a structured clinical interview (SCI-SHY) and the corresponding self-report questionnaire (SHY-SR) for the assessment of social anxiety spectrum (Dell'Osso et al. 2002a). These instruments reflect a conceptualization of social anxiety spectrum that spans shyness to severe Social Anxiety Disorder and includes full-blown and typical as well as subclinical and atypical presentations, isolated signs and symptoms as well as avoidant personality traits. The interview proved to have excellent test-retest and inter-rater reliability, discriminant and convergent validity properties in a large Italian multicenter study (Dell'Osso et al. 2000). The agreement between the interview and the self-report format was substantive (intraclass correlation coefficient > 0.74) in a sample of 50 subjects including psychiatric patients with different disorders and non-psychiatric controls (Dell'Osso et al. 2000).

We have subsequently undertaken an epidemiological study aimed to explore gender differences in social anxiety symptoms among young adults and analyze the correlation of these symptoms with mood, anxiety, and eating behavior spectrum symptomatology (Dell'Osso

et al. 2002b). This study proved that females differ from males on the higher burden of social anxiety symptomatology and that this symptomatology is frequently associated with depressive, obsessive-compulsive, panic-agoraphobic and anorexic-bulimic symptoms.

The secondary aims of the epidemiological study, which are the object of the present paper, are to provide the prevalence rates of mild, moderate and severe symptoms of social anxiety and to analyze gender differences and associated impairment levels within these three levels of severity.

Our hypotheses were that the female/male ratio is increased in the severe forms of social anxiety, as previously found by Merikangas et al. (2002), and that functional impairment is associated with both moderate and severe social anxiety.

Method

The study design and the characteristics of the sample have been described in detail elsewhere (Dell'Osso et al. 2002b). In short, data were collected on an index day at six high schools located in the area of Pisa (Italy) in December 2000. These schools, including one liceum and 5 technical or vocational institutes, were selected in order to be representative of the whole range of studies available in Italy. Students aged 18 years or more (mean age 18.6), attending the last (fifth) year, were eligible for the study.

The Ethical Committee of the University of Pisa approved the study protocol and all subjects signed a written informed consent.

Instruments

The SHY-SR is an instrument designed to explore the lifetime spectrum of social anxiety with established psychometric properties (Dell'Osso et al. 2002a). It consists of 164 items grouped into the following domains: "childhood and adolescence social anxiety features" (CA), "interpersonal sensitivity" (IPS), "behavioral inhibition and somatic symptoms" (BI) and "specific phobias" (SP). The questionnaire also includes an appendix on substance abuse that is frequently associated with social anxiety (Merikangas et al. 1998). The SHY-SR was derived from the Structured Clinical Interview for Social Anxiety Spectrum by modifying the format and the instructions to make the instrument suitable for self-administration. The SHY-SR is comprised of dichotomous (yes/no) items; thus, the total score and the domain scores are obtained by counting the number of items endorsed. The instrument is designed for administration to adults because it includes social and work situations that are rarely experienced by younger people.

Statistical analyses

Mean domain scores were compared between genders by using the t-test and across groups by using the one-way analysis of variance. Response rates to individual items were compared between males and females and across the three groups by using the chi-square test. Bonferroni correction to the alpha level (0.05/3 = 0.016) was used for post hoc pairwise comparisons between low, medium and high scorers.

Results

Identification of thresholds

Two cut-offs of the SHY-SR total score were determined by using the receiver operating characteristic curve (ROC) analysis in order to characterize individuals with low, medium and high levels of social anxiety. This was done by reanalyzing data collected in an Italian multicenter study aimed to investigate the validity and reliability of the interview version of the SHY-SR (SCI-SHY) was administered (Dell'Osso et al. 2000). Subjects recruited for this multicenter study included 46 patients with social anxiety, 50 with obsessive-compulsive disorder, 39 with major depression or bipolar disorder, 62 ophthalmological patients and 57 university students. The overall sample was classified according to the presence/absence of social anxiety and the total score of the SCI-SHY, which defines the number of items endorsed, was used as the test variable. An optimal diagnostic threshold of 68 was determined by balancing sensitivity and specificity with respect to DSM-IV diagnosis of SAD. Sensitivity and specificity for this threshold were, respectively, 84.8 % and 85.6 %. Then a second threshold of 59 was obtained by maximizing the sensitivity (87 %), while keeping the specificity at a high level (80.8 %). This was done in the attempt to identify subjects who have high scores on the social anxiety spectrum but do not meet the diagnostic criteria for the SAD. Applying these two cut-off scores to the present study sample, we classified students into three groups: low scorers (less than 59 items endorsed), medium scorers (between 59 and 67 items) and high scorers (68 items or more).

Study sample

Five hundred and thirty-eight students were asked to participate; 15 refused and 523 filled out the SHY-SR. Three subjects failed to answer at least 80 % of the items and were excluded from the analyses. Overall, 520 students, 209 (40.2 %) females and 311 (59.8 %) males provided the data used in the present report.

Prevalence of mild, moderate and severe levels of social anxiety spectrum

By using the cut-off scores described above, the large majority (73.3 %) of subjects were classified as low scorers, 9 % as medium scorers and 17.7 % as high scorers. One-way ANOVA, followed by post hoc Sheffe' pairwise comparisons, indicated that the mean scores on each of the four domains of SHY-SR increased significantly across the three groups (Table 1).

Table 1 Mean SHY-SR domains scores in low, medium and high scorers

	Low scorers N = 381 (a)	Medium scorers N = 47 (b)	High scorers N = 92 (c)	ANOVA F (df = 2, 517, p < 0.001)	Post hoc Sheffe' pairwise comparisons (p < 0.01)
CA	2.1±1.9	3.9±2.0	5.2±2.1	102.0	c > b > a
IPS	7.7±4.4	14.3±2.4	17.5±3.8	226.586	c > b > a
BI	4.2±2.7	8.5±2.3	10.5±3.4	203.453	c > b > a
SP	16.0±9.7	34.3±4.1	50.6±10.2	520.164	c > b > a

CA Childhood and adolescence social anxiety features; *IPS* Inter-personal sensitivity; *BI* Behavioral inhibition and somatic symptoms; *SP* Specific phobias

Gender differences across the three levels of severity of social anxiety spectrum

The gender distribution within the three categories was significantly different: women were significantly more likely to be high scorers (31.6 % versus 8.4 %) and less likely to be low scorers (59.3 % females and 82.6 % males), while the distribution in the medium scorers group was the same (9 % males and 9.1 % females).

In order to analyze in more detail which domains accounted for these gender differences, we compared the SHY-SR symptomatological profile of males and females across the three groups (Table 2). Among low scorers, females reported higher levels of interpersonal sensitivity (t-test = 4.5, df = 379, p < 0.001) and specific phobias (t-test = 5.0, df = 379, p < 0.001) than males. Among intermediate and high scorers, there were no gender differences on domain scores.

Prevalence of social fears across the three levels of severity of social anxiety spectrum

In the overall sample, the most common fears about social situations and performances experienced were the following: fear of a blackout while performing or taking an oral examination (66.3 %), feeling embarrassed or uncomfortable when taking an oral examination (64.3 %), when performing in front of an audience (60 %), when expressing romantic feelings (58.9 %), when speaking, singing or dancing in front of others (53.7 %). Differences among the three groups for these social situations are summarized in Table 3. Both medium and high scorers had significantly higher frequency of endorsement than low scorers.

Table 2 Mean SHY-SR domain scores in females and males

	Low scorers		Medium scorers		High scorers	
	F (N = 124)	M (N = 257)	F (N = 19)	M (N = 28)	F (N = 66)	M (N = 26)
CA	2.3±1.8	2.0±1.9	3.6±2.2	4.1±1.7	5.2±2.1	5.3±2.1
IPS	9.1±4.1*	7.0±4.4	15.1±1.7	13.7±2.7	17.6±3.7	17.2±4.0
BI	4.4±2.6	4.1±2.7	9.1±2.4	8.1±2.2	10.4±3.4	10.7±3.6
SP	19.6±8.9*	14.3±9.7	33.2±4.6	35.1±3.7	50.7±10.3	50.1±10.2

* p < 0.001
CA Childhood and adolescence social anxiety features; *IPS* Inter-personal sensitivity; *BI* Behavioral inhibition and somatic symptoms; *SP* Specific phobias

Table 3 Most common social situations and performances feared in the three groups of students

	low scorers (N = 381) %	medium scorers (N = 47) %	high scorers (N = 92) %	χ^2	df	p <
110. Have you often felt embarrassed or uncomfortable that you might blackout while performing or taking an oral examination?	58.2	89.4	88.0	41.918	2	0.0001
107. Have you often felt embarrassed or uncomfortable when taking an oral examination?	55.3	85.1	91.2	50.959	2	0.0001
106. Have you often felt embarrassed or uncomfortable when performing in front of an audience?	52.1	76.1	84.4	37.064	2	0.0001
152. Have you often felt embarrassed or uncomfortable when you had to express romantic feelings to someone you liked?	49.6	80.9	85.9	50.466	2	0.0001
105. Have you often felt embarrassed or uncomfortable when speaking, singing or dancing in front of others	45.6	72.3	77.2	36.841	2	0.0001

Functional impairment

To investigate on functional impairment associated with social anxiety symptoms, we selected the items of the SHY-SR exploring school impairment and avoidant behavior.

The two questions exploring school impairment are item 5: "When you were a child or an adolescent, do you remember (or have you ever been told) that you did poorly at school because of shyness?" and item 114: "Did you ever drop out of school or interrupt your education, for these reasons?"); 1.3 % of low scorers, 2.1 % of medium scorers and 13 % of high scorers gave positive answers to item 5 ($\chi^2 = 30.5$, df = 2, $p < 0.0001$, high, medium scorers > low), and for item 114 the percentages were respectively 1.3 %, 4.3 % and 9.9 % ($\chi^2 = 18.2$, df = 2, $p < 0.0001$; high, medium scorers > low).

Sixteen questions explore the avoidant behavior. All of these items were most frequently endorsed by high scorers, but even a large percentage of medium scorers reported avoiding a variety of situations. Comparing medium and high scorers, we found that no significant differences in the frequency of endorsement of these 16 items at $p = 0.016$ except for items 78 (speaking up at a meeting), 99 (eating or drinking in front of others), 120 (walking or driving in front of others). Fig. 1 shows the frequency of endorsement of the 16 avoidance and the two school impairment items, arranged by decreasing frequency among high scorers. For instance, avoiding entering a room full of people was the most common among high scorers and avoiding going shopping the least common.

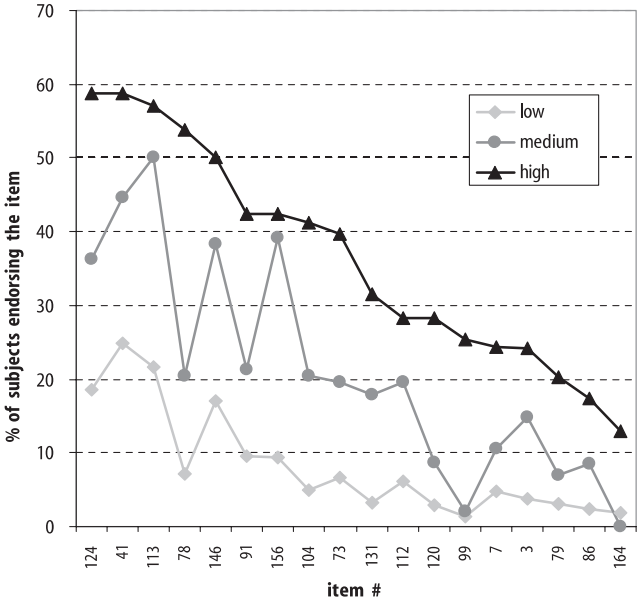

Fig. 1 Percentage of endorsement of the SHY-SR items related to avoidant behavior arranged by decreasing frequency among high scorers (68+) as compared to medium (59–67) and low (0–58) scorers

items 124: entering a crowded room, 41: expressing disagreement, 113: oral examinations, 78: speaking at a meeting, 146: organizing parties, 91: using a public restroom, 156: dating, 104: working in front of other people, 73: using the telephone in the presence of other people, 131: meeting strangers, 112: preparing for a performance, 120: walking/driving, 99: eating in public, 7: sport activities and parties with school mates, 3: social life at school, 79: promotions, 86: signing official documents or writing in front of other people, 104: shopping

Relationship between physical symptoms during childhood/adolescence and during young adulthood when exposed to social situations

Secondary analyses were conducted to clarify whether subjects reporting that they had physical symptoms during childhood/adolescence when exposed to social situations were more prone to react in the same way in young adulthood than those not having these symptoms. Inspection of the odds ratios for each of the 8 physical symptoms explored by the SHY-SR indicated that subjects somatizing their social anxiety during childhood/adolescence were between 1.6 to 6.3 times more likely than non-somatizers to display physical symptoms later in their life (Table 4). All the odds ratios were significant at $p = 0.05$, with the exception of the symptom 'excessive sweating', which was however in the same direction of the other 7.

Discussion

In this paper, using two cut-offs of SHY-SR total score, we identified three groups of students characterized respectively by low, medium and high level of social phobic symptomatology.

We found that 26.7 % (medium plus high scorers) of the students reported 59 or more lifetime symptoms of social anxiety spectrum. This wide spread of social anxiety phenomenology in young adulthood is described in previous studies. Merikangas et al. (2002), in a sample of 4547 young adults, found that symptoms of social anxiety spectrum were present in 42 % of their sample; in particular 6 % of these subjects reached a diagnostic level (defined as = 2 social phobia symptoms plus avoidance and significant subjective distress), 12 % showed a

Table 4 Odds ratios and 95 % CI of endorsing 8 physical symptoms in social situations for subjects who reported experiencing physical symptoms during childhood/adolescence

Physical symptoms	OR	95 % CI
blushing	3.58*	2.03–6.31
trembling	3.48*	1.99–6.11
heart pounding	3.44*	1.85–6.39
excessive sweating	1.60	0.90–2.34
feeling confused or numb	5.14*	2.91–9.08
feeling dizzy	4.42*	2.01–9.72
nausea, diarrhea or stomach ache	6.36*	3.45–11.73
urge to urinate	2.63*	1.29–5.36

* $p < 0.05$

subthreshold level (defined as = 1 social phobia symptoms plus avoidance) and 24 % reached a symptoms level (defined as = 1 social phobia symptoms). Essau et al. (1999) found that 47.2 % of their sample reported "social fears" and Wittchen et al. (1999) referred that a strong fear of at least one social situation was acknowledged in their survey by 22.3 % of males and 32 % of females. In a French probing about common fears, 51 % of interviewed was afraid of being observed by others or speaking in public and the 60 % described themselves as shy (Andrè and Lègeron 1995).

In our sample the most common social fears reported by students (fears related to oral examination, performing in front of an audience, expressing romantic feelings and speaking, singing, dancing in front of others) confirm previous reports by Beidel (1991) and Strauss and Last (1993). It is worthy of note that these specific social fears were significantly more represented among high and medium scorers than low scorers.

We pointed out that high scorers feared and/or avoided a wide range of social situations, as previously found by Lang and Stain (2001) in subjects with Social Anxiety Disorder. Still, most avoidance behaviors were also reported by a large percentage of subjects with moderate levels of social anxiety, including poor school performance and interrupting school and only three avoidance behaviors discriminated severe social anxiety, i. e., walking/driving in front of others, eating/drinking in front of others and speaking up at a meeting. Overall our data show the presence of psychosocial impairment to a significant extent also in the moderate forms of social anxiety, as previously found by Davidson et al. (1994) and Essau et al. (1999).

In the present study, the female/male ratio was increased among high scorers (31.6 % vs 8.4 %), in line with the findings of Merikangas et al. (2002), while among medium scorers it was close to unity. The higher rate of social anxiety symptomatology in females compared to males is consistent with previous findings on clinical and subclinical forms of social anxiety (Davidson et al. 1993; Essau et al. 1999; Kessler et al. 1994; Schneier et al. 1992; Stein and Walker 1994; Wittchen et al. 1999). Moreover, comparing the symptom profile of the SHY-SR domains in the two genders, we found that among high scorers there were no gender differences in any domain scores, while among low scorers women reached higher scores in the Interpersonal Sensitivity and Specific Phobia domains. Overall, our data suggest that when the level of social anxiety increases, gender differences become quantitatively more pronounced while the symptom profile becomes qualitatively more homogeneous in the two genders.

Of note we found that subjects reporting the experience of physical symptoms in social situations during childhood/adolescence were more likely to have the same symptoms during young adulthood. This result suggests that subjects somatizing their social anxiety may identify a homogeneous subgroup of individuals suffering from social anxiety.

Two limitations of this study should be acknowledged: the sampling of a single age cohort and the selection bias due to the possible exclusion from the study of those subjects who left school because of severe social anxiety symptoms.

In conclusion, our study confirms the wide spread of social anxiety symptoms in young adulthood and the presence of functional impairment defined by avoidance and school difficulties also in moderate social anxiety. Lastly, in severe social anxiety, we found a female preponderance and an overlapping symptom profile in the two genders. Further studies are warranted to explain why the influence of sex in shaping social anxiety phenomenology weakens as the level of psychopathology increases.

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