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Dyslexia and psychopathological symptoms in Italian university students: a higher risk for anxiety disorders in male population?

Summary

Objectives

Although socio-emotional problems are well documented in children and adolescents with dyslexia, little is known about the psychopathological consequences that the dyslexia may have in university students. It is possible to hypothesize a significant discouragement in dyslexics enrolled at university, as a result of their learning difficulties, which may result in psychopathological disorders secondary to these difficulties. This study, for the first time, administered the Self Administered Psychiatric Scales for Children and Adolescents (SAFA) test to university students and investigated whether male and female university students with dyslexia demonstrated more psychopathological symptoms than males and females without dyslexia.

Methods

This study involved a total of 80 monolingual Italian university students: 27 students with dyslexia (16 males and 11 females) and 53 non-dyslexic students (21 males and 32 females). The mean age of the dyslexic group was 19.87 (SD = 1.21) and that of the control group was 21.51 (SD = 1.27). Psychiatric symptoms were examined with the standardized SAFA test. We administered to our groups the Anxiety, Depression, Obsessive-compulsive disorders, Psychogenic eating disorders, Somatic symptoms and hypochondria scales and subscales. Mann-Whitney tests were conducted to assess potential differences in the SAFA scales and subscales both between male university students with dyslexia and without dyslexia and between females with dyslexia and without dyslexia.

Results

Relative to males without dyslexia, the male students with dyslexia obtained significantly higher scores on SAFA Total Anxiety scale and on Social Anxiety, School/university Anxiety and Insecurity subscales. No significant differences were found on the SAFA scales and subscales between the two groups of female university students. Examining the number of university students who fell within pathological range we found a higher number of male students with dyslexia that appeared to show psychopathological disorders on almost all the SAFA scales and subscales, relative to the control group.

Conclusions

Despite our findings should be considered as preliminary results, our study provides evidence that the psychopathological consequences of the dyslexia appear to be life-long. The present work had the strength of focusing on university students with dyslexia, that have been under-investigated to date, and of examining male and female university students with dyslexia separately. The males appear at higher risk for anxiety disorders than females with dyslexia. Thus, our results call attention to the importance of separately considering male and female university students with dyslexia when their psychiatric symptoms are investigated. Finally, our preliminary data seem to provide support to the effectiveness of the SAFA test for the identification of psychopathological conditions and for suggesting deeper examination and specific interventions in young adults.

Key words

Dyslexia • Italian university students • psychopathological symptoms • male and female

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Introduction

Although socio-emotional problems are well documented in reading disabilities in children and adolescents, little is known about the psychological features of young adults with dyslexia, especially in Italy. Thus, in the present study we focused on young adults enrolled at university. Here, we decided to use the Self Administrated Psychiatric Scales for Children and Adolescents (SAFA) test¹. SAFA test is a standardized measure widely-used in the Italian clinical contexts for evaluating children and adolescent aged 8 to 18. This study, for the first time, adapted and administered the SAFA test to university students aged 18 to 25 and investigated whether Italian university students with dyslexia demonstrated more psychopathological symptoms than students without dyslexia.

Dyslexia is a specific learning disorder, classified among the neurodevelopmental disorders in the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5)². Dyslexic individuals generally demonstrate slow and/or inaccurate reading, with weaknesses in decoding and spelling. Recent evidence shows improvements in phonological awareness and partial compensation of the reading difficulties occurring in adolescence and early adulthood^{3,4}; nevertheless, dyslexic individuals continue to take longer to complete reading and writing tasks in academic or professional situations⁵. In today's society, fluent reading is a necessary skill for academic success and for solving various problems of everyday life⁶. Thus, individuals with dyslexia face various difficulties during their schooling and life and also typically manifest lower educational attainment and earnings in adulthood⁷. In light of these persistent reading and writing difficulties that seem to characterize the young adults with dyslexia, it is possible to hypothesize a significant discouragement in dyslexics enrolled at university, as a result of their learning difficulties, which may result in heightened anxiety and depressive symptomatology secondary to these difficulties.

Surprisingly, little research has focused on the psychological features in university students with dyslexia. Thus, in the present study we focused on this specific population. Most of the studies focused on children and adolescents, providing evidence that the reading disorder was often associated with multiple dimensions of psychopathology, such as attention deficit, anxious and depressive symptoms, psychosocial problems and externalizing behaviors⁸⁻¹¹. For example, Mammarella and colleagues¹² compared Italian children with nonverbal learning disabilities (NLD), with reading disabilities (RD) and typically developing children (TD) and found that the NLD children reported more severe anxiety about school and separation than TD, and children with RD had worse depressive symptoms than those with NLD

or TD. Some authors found that Italian children with Specific Learning Disorder (SLD)¹³ and with dyslexia^{12,14} more often had a clinically significant level of anxiety using SAFA test, with respect to TD peers. Bonifacci and colleagues¹⁵ evaluating the psychological profiles of Italian children with SLD, found that these children had lower self-esteem than TD children; the parents of the SLD group also rated their children as more anxious and depressed, relative to parents of control group. In a study by Scorza and colleagues¹⁶ children and adolescents with SLD, aged between 9 and 14, obtained significantly higher internalizing and externalizing scores, relative to their peers without SLD.

Few recent studies investigated cognitive, reading and psychological features of university students with dyslexia. Hatcher and colleagues⁵ found no differences on cognitive skills and significant differences in reading and writing skills between a group of university students with dyslexia and control group, with the dyslexics performing more poorly than control group. These students, relative to their peers without disabilities, have also demonstrated academic-related problems beyond their reading difficulties, including study skills¹⁷ and note-taking skills¹⁸. A study conducted by Re and colleagues¹⁹ reported significantly poorer performances in words, non-words and text reading task in Italian university students with dyslexia relative to normal reading students; despite their reading difficulties the students with dyslexia did not demonstrate difficulties in text comprehension.

Relatively little is known about anxiety and depressive symptoms specifically in young adults with dyslexia and the few studies concerning this topic show mixed results. Some studies found in adults with dyslexia elevated anxious and/or depressive symptoms relative to control groups without dyslexia^{20,8,21}. Results of a recent meta-analysis by Klassen and colleagues²² indicated that adults with dyslexia and other SLDs demonstrated higher rates of internalizing symptoms than controls, with no differences between dyslexics who were enrolled in university and who were employed and between males and females. Raised levels of apprehension and reduced levels of self-confidence, self-esteem and stability have been reported among adults with SLD²³. The comorbidity between dyslexia and other disorders, such as dyscalculia, dysorthography, and attention deficit/hyperactivity disorder (ADHD), correlated with more severe psychological impairments⁸, and a study reported that the more severe the dyslexia was, the higher the levels of obsessive-compulsive symptoms, somatization and anxiety were²⁴. By contrast, some authors found equivalent psychological features between adults with and without dyslexia^{23,25}. One follow-up study of children with SLD²⁶ found that 42% had psychological

difficulties classifiable under the Diagnostic and Statistical Manual of Mental Disorders, but those difficulties did not present until adulthood. Bruck²⁷ found that children with learning disabilities longitudinally followed to adulthood demonstrated improved socioemotional adjustment. As suggested by Nelson and Liebel²¹, adulthood may be a time of improved emotional functioning for individuals with dyslexia.

To our knowledge, only two studies^{28,29} have investigated psychopathological problems in Italian university students with dyslexia, founding lower level of self-esteem and more depressive symptoms, somatic complaints, social difficulties²⁸ and attentional problems^{28,29} in these students, relative to controls; by contrast, no differences emerged between students with dyslexia and control group in terms of anxious features^{28,29}.

Mixed results from a small number of empirical studies on university students with dyslexia indicate the need for further research on this topic. The present study aimed to gain more in-depth knowledge about the presence of psychiatric symptoms (i.e., anxious, depressive, obsessive-compulsive, psychogenic, and somatic symptoms) in Italian university students with dyslexia, using SAFA test. We compared these students with a control group, separating males and females. We expected that both males and females with dyslexics would exhibit significantly higher scores on the SAFA scales (on scales of anxiety, depression and somatic symptoms in particular), relative to males and females without dyslexia. We also expected that a higher number of students with dyslexia would show pathological scores on one or more SAFA scales and subscales.

Materials and methods

Participants

This study involved a total of 80 monolingual Italian university students: 27 students with dyslexia and 53 non-dyslexic students.

The group of students with dyslexia was recruited at the university center for the students with learning disabilities (Accoglienza Studenti Disabili –ASD–) of the Modena and Reggio Emilia University. These students voluntarily contacted the center to receive specific information and services that the center provides to students with learning disorders. The control group was composed of students of the Modena and Reggio Emilia University who voluntarily participated in the study.

The mean age of the dyslexic group was 19.87 (SD = 1.21; range 18.75-22.42) and the group included 16 males and 11 females. The mean age of the control group was 21.51 (SD = 1.27; range 18.92-25.08) and included 21 males and 32 females. The two groups did not differ significantly on gender [$\chi^2(1, n = 80) = 2.78,$

$p = .096$]. The two groups differed in age [$t(78) = -5.56; p = < .001$]. All students had no history of major cerebral damage, congenital malformations, visual and hearing impairments, or educational deficits. All of these students had never been seen by a neuropsychiatrist or psychologist on suspect of any neuropsychiatric disorder.

Dyslexia diagnosis met the requirements of the DSM-5 2 complied with the guidelines typically adopted by Italian clinical services³⁰, namely: they had normal level of general intelligence (IQ above 85), but reading performance at a clinical level. The diagnoses were distributed as follows: two (13%) males and four (36%) females had only dyslexia, and fourteen (87%) males and seven (64%) females had dyslexia combined with dysorthography and/or dyscalculia. With regard to severity of the dyslexia, five (31%) males and six (55%) females had a mild/middle dyslexia, and eleven (69%) males and five (45%) females had severe dyslexia. Severe dyslexia was defined as standardized score > 4 SD below the mean on reading tasks, which is a clinical cut-off³¹.

The study was conducted in accordance with the Declaration of Helsinki. Students were informed in detail about the aims of the study, the voluntary nature of their participation, their right to withdraw from the study at any time and provided their informed written consent for participation in the study, data analysis, and data publication. According to the above-mentioned conditions, this project was not submitted to an ethical committee for approval.

Procedure

Psychiatric symptoms were examined with the standardized self-report questionnaire *Self-Administered Psychiatric Scales for Children and Adolescents* (SAFA)¹. The SAFA test, produced and validated in Italy, is commonly used in Italian clinical contexts to assess psychopathological symptoms in subjects from 8 to 18 years, and the structure and the content of the items are very strictly related to the culture of the country³². This test allows a preliminary but sufficiently broad assessment of psychiatric conditions. It includes scales for Anxiety (A), Depression (D), Obsessive-compulsive disorders (O), Psychogenic eating disorders (P), Somatic symptoms and hypochondria (S), and Phobias (F). Each scale consists of different versions calibrated according to the age. In the present study, we used the version for individuals aged 11-18 years. To adapt the test to university students, we only modified the structure of the items that referred to the school, changing the word “school” with “university” (e.g., the item “When I have to go to school I often feel very nervous” was changed to “When I have to go to university I often feel very nervous”). We did not administer the Phobias scale because we were not interested in this topic.

The Anxiety Scale (SAFA-A) is composed by 50 items and it allows to assess four components of anxiety (subscales), i.e. generalized anxiety, social anxiety, separation anxiety, and school anxiety (called “school/university anxiety” in our study). The Depressive Scale (SAFA-D) is composed by 56 items and consists of seven subscales, i.e. depressed mood, anhedonia and disinterest, touchy mood, sense of inadequacy and low self-esteem, insecurity, guilt, and hopelessness. The Obsessive-compulsive symptoms scale (SAFA-O) is composed by 38 items and consists of five subscales, i.e. obsessive thoughts, compulsions and rituals, rupo-phobia and contamination, order and control, and doubt and indecision. The Psychogenic eating disorders scale (SAFA-P) is constituted by 30 items and four subscales, i.e. bulimic behavior, anorexic behavior, acceptance and evaluation of one’s own body, and other psychological aspects (perfectionism and inadequacy). The Somatic symptoms and hypochondria scale (SAFA-S) is composed by 25 items and it allows to assess somatic symptoms (i.e. symptoms related with cardiac, gastrointestinal and respiratory systems, asthenia, sleep, general cenesthesia, and memory/concentration) and hypochondria. With regard to the psychometric properties of the battery, internal consistence and stability are respected, as SAFA shows a Cronbach’s α coefficient and a split half > 0.80 , while indices of each scale at the one week test–retest procedure showed a $p < .01$. Convergent validity and discriminatory validity were respected ($p < .001$).

Participant is asked to tick one among the possible answers on a 3-point scale (true, false, and partly true). The raw scores of each scale and subscale can be converted into T scores according to normative tables for age and sex. A SAFA score is considered borderline if the T score ranges between 60 and 69, while T score > 70 highlights pathological condition.

Statistical analyses

All statistical analyses were carried out using SPSS 21.0 for Windows with an alpha level of 0.05. Prior to conducting analyses, data were checked for violation of assumptions using the Kolmogorov-Smirnov test. Because distributions for some of the dependent variables were not normal, Mann-Whitney tests were conducted to assess potential differences in the SAFA scales and subscales both between male university students with dyslexia and without dyslexia and between females with dyslexia and without dyslexia. Effect sizes (r) for Mann-Whitney U tests were calculated using the formula

$$r = \frac{Z}{\sqrt{N}}$$

where N is the total number of participants in the whole sample; the standard values of r for small, medium, and large effect sizes are 0.1, 0.3, and 0.5 respectively.

We also conducted a descriptive analysis of the number of university students who fell within pathological range (defined as T score > 70) on SAFA scales and subscales. Since the normative data used to convert the raw scores into T scores referred to a lower age than that of the sample considered in the present study (i.e. age 17-18 for each SAFA scale, age 14-18 for each SAFA subscale), it is important to consider this analysis as explorative.

Results

Descriptive data on all of the SAFA scales and subscales and results of statistical comparisons using Mann-Whitney tests for male university students are presented in Tables I and II.

Relative to control group, the male students with dyslexia obtained significantly higher Anxiety Total scores. Analyses of the SAFA-A subscales revealed that the scores on the Social Anxiety and School/university Anxiety were significantly higher for male students with dyslexia compared to non-dyslexic males (see Table I). No significant differences were found between the two groups on Depression Total score. Analyses of the SAFA-D subscales revealed significantly higher scores on Insecurity subscale in male students with dyslexia relative to control group (see Table I). No significant differences were found between the two groups of male students on the Obsessive-compulsive symptoms scale and subscales, on Psychogenic eating disorders scale and subscales, and on Somatic symptoms and hypochondria scale and subscales (see Table II).

Descriptive data on all of the SAFA scales and subscales and results of statistical comparisons using Mann-Whitney tests for female university students are presented in Tables III and IV.

The inspection of these data reveals that in the group of female students with dyslexia the scores on all of the SAFA scales and subscales were higher than those of females without dyslexia. Nevertheless, no significant differences were found on the SAFA scales and subscales between the two group of female students (see Tables III and IV).

The explorative examination of the number of university students who fell within pathological range (defined as T score > 70) on SAFA scales and subscales is presented in Tables V and VI. The raw scores of each scale were converted into T scores according to normative tables for 17-18 years of age; the raw scores of each subscale were converted into T scores according to normative tables for 14-18 years of age. A higher number of male students with dyslexia fell within pathological range on almost all the SAFA scales and subscales, relative to the control group. Since the normative data used to convert the raw scores into T scores referred to

TABLE I. SAFA results (raw scores) for Anxiety (SAFA-A) and Depression (SAFA-D) Scales of male university students with dyslexia and without dyslexia.

SAFA scales and subscales		Dyslexic group (n = 16)			Control group (n = 21)			Mann-Whitney test		
		M	SD	range	M	SD	range	U	p	r
Anxiety (SAFA-A)	Anxiety total score	14.63	12.39	0-46	6.67	6.85	0-20	95	.024	.37
	Generalized anxiety	3.38	4.66	1-16	1.81	2.52	0-8	131	.225	.20
	Social anxiety	5.63	4.96	0-16	1.81	2.18	0-8	88.5	.012	.41
	Separation anxiety	1.25	2.41	0-8	1.62	2.58	0-10	149	.501	.11
	School/university anxiety	4.38	4.69	0-14	1.43	2.77	0-10	89	.009	.43
Depression (SAFA-D)	Depression total score	14.00	15.85	0-50	8.10	7.71	0-24	136	.322	.16
	Depressed mood	1.75	3.26	0-12	0.67	1.46	0-6	140.5	.294	.17
	Anhedonia and dis-interest	1.00	1.79	0-6	0.67	1.32	0-4	154.5	.595	.09
	Touchy mood	1.88	2.25	0-8	2.67	2.99	0-10	149	.537	.10
	Sense of inadequacy and low self esteem	2.00	4.00	0-14	0.38	1.02	0-4	136	.173	.22
	Insecurity	5.00	4.56	0-14	2.10	3.00	0-12	99.5	.029	.36
	Guilt	1.25	2.52	0-8	1.05	1.75	0-4	166	.937	.01
	Hopelessness	1.13	2.83	0-10	0.57	1.12	0-4	164	.864	.03

Significant results are in bold.

a lower age than that of the sample considered in the present study, we underline the only descriptive value of these data.

Discussion

The novel contribution of the present study was to administer SAFA test to university students aged 18-25 and to compare male and female dyslexic students with control males and females respectively, on this self-report measure.

With respect to SAFA normative data available for 14-18 years of age, our males and females of the control group showed generally lower raw scores in the SAFA scales and subscales. This result is in line with the literature that shows psychological adjustments in adult age³³. Moreover, descriptive examination of the raw scores obtained by males and females of the control group indicated that the female students showed higher scores than male students in all of the SAFA scales. These preliminary data are consistent with the SAFA normative data available for 14-18 years of age and with the literature that reports health adult females showing generally higher scores in multiple psychological dimensions (e.g., anxious features) than adult males³⁴.

The major finding of this study has to do with the differences between university students with dyslexia and control group observed in male population. Male university students with dyslexia showed significantly higher levels of total anxiety, relative to controls; this high score on the SAFA anxiety scale in male dyslexics appeared to be due to social and school/university anxiety problems. In effect, the examination of SAFA anxiety subscales indicated that the male students with dyslexia reported significantly higher levels of social anxiety, relative to males without dyslexia. This result is in line with other reports of young adults with dyslexia^{20,21} and Italian university dyslexics²⁸ having social problems, including difficult relationships with peers, such as fear of being unappreciated by others. This is the first study that seems to show that social problems might affect more males than females with dyslexia enrolled at university.

The male university students with dyslexia showed significantly higher levels of school/university anxiety, relative to males without dyslexia. This result seems to suggest that male university students with dyslexia may encounter several difficulties when their academic work demands good reading and writing skills, and this can

TABLE II. SAFA results (raw scores) for Obsessive-compulsive symptoms (SAFA-O), Psychogenic eating disorders (SAFA-P) and Somatic symptoms and hypochondria (SAFA-S) Scales of male university students with dyslexia and without dyslexia.

SAFA scales and subscales		Dyslexic group (n = 16)			Control group (n = 21)			Mann-Whitney test		
		M	SD	range	M	SD	range	U	p	r
Obsessive-compulsive symptoms (SAFA-O)	Obsessive-compulsive symptoms total score	9.38	9.51	0-30	6.57	8.25	0-28	134	.290	.17
	Obsessive thoughts	2.75	5.05	1-18	0.95	2.42	0-8	135	.195	.21
	Compulsions and rituals	2.25	2.72	0-8	1.81	2.52	0-8	149.5	.542	.10
	Rupophobia and contamination	0.38	1.50	0-6	1.05	1.75	0-6	125.5	.070	.30
	Order and control	1.00	1.79	0-6	1.05	1.96	0-6	165.5	.924	.02
	Doubt and indecision	3.00	2.83	0-10	1.71	2.85	0-8	116.5	.088	.28
Psychogenic eating disorders (SAFA-P)	Psychogenic eating disorders total score	7.13	8.79	0-36	5.05	4.22	0-14	154.5	.675	.07
	Bulimic behavior	1.13	2.53	0-10	1.90	2.05	0-6	118.5	.094	.28
	Anorexic behavior	1.25	2.62	0-10	0.48	1.08	0-4	145.5	.358	.15
	Acceptance/evaluation of the body	1.00	2.42	0-8	0.57	1.43	0-4	159	.667	.07
	Other psychological aspects	3.75	3.64	0-14	2.10	2.49	0-8	113	.078	.29
Somatic symptoms and hypochondria (SAFA-S)	Somatic symptoms and hypochondria total score	4.50	5.49	0-20	1.90	3.32	0-14	118	.102	.27
	Somatic symptoms	4.50	5.49	0-20	1.71	2.85	0-12	117	.095	.27
	Hypochondria	0.00	0.00	0-0	0.19	0.60	0-2	152	.211	.21

generate fear and worry concerning academic activities and achievement when they compare their university performance with that of their peers without dyslexia. The female university students with dyslexia did not significantly differ by the female students without dyslexia on this subscale; thus, as for the social anxiety, the university performance anxiety appears to affect the male university population with dyslexia. Furthermore, the percentages of male students who fell within pathological range in the SAFA anxiety scale and subscales appeared somewhat higher in the dyslexic group than those seen in male control group. The most frequent psychiatric disorders among male students with dyslexia appeared to be social and school/university anxiety. Despite this descriptive analysis seems to yield suggestive results of the presence of more psychiatric disorders among male university students with dyslexia with respect to controls, these results should

be interpreted carefully. In effect, the classification of the participants in a pathological category on the basis of normative data that refer to a lower age group may be risky. Nevertheless, it remains interesting the relative comparison between male dyslexic students and male non-dyslexic students: in relative terms, a higher number of males with dyslexia appears to show a more severe symptomatology in the SAFA test, relative to males without dyslexia. Considering also the psychological adjustments that characterize the adult age ³², it is possible to hypothesize that the male dyslexic students falling within clinical range in the SAFA scales and subscales (on the basis of normative data available for 14-18 years of age) would fall within clinical category if their T scores were calculated on the basis of normative data referred to adult age group. With regard to the SAFA depressive scale and subscales, we found that the male university students with

TABLE III. SAFA results (raw scores) for Anxiety (SAFA-A) and Depression (SAFA-D) Scales of female university students with dyslexia and without dyslexia.

SAFA scales and subscales		Dyslexic group (n = 11)			Control group (n = 32)			Mann-Whitney test		
		M	SD	range	M	SD	range	U	p	r
Anxiety (SAFA-A)	Anxiety total score	18.36	19.41	0-56	14.36	11.92	2-42	164	.737	.05
	Generalized anxiety	5.27	7.66	0-20	5.81	6.63	0-20	152.5	.502	.10
	Social anxiety	6.18	5.33	0-14	3.88	3.48	0-12	136	.257	.17
	Separation anxiety	1.82	3.16	0-8	2.25	2.58	0-10	133.5	.208	.19
	School/university anxiety	5.09	5.01	0-14	2.44	3.76	0-14	118	.089	.26
Depression (SAFA-D)	Depression total score	12.18	12.70	0-38	9.06	7.57	0-28	169.5	.855	.03
	Depressed mood	1.82	3.74	0-12	0.63	1.39	0-4	156	.433	.12
	Anhedonia and disinterest	0.91	1.64	0-4	0.25	0.67	0-2	146	.193	.20
	Touchy mood	2.18	1.89	0-6	2.38	2.56	0-10	172.5	.919	.02
	Sense of inadequacy and low self esteem	0.91	2.07	0-6	0.50	1.83	0-10	164	.579	.08
	Insecurity	5.64	6.38	0-14	4.75	3.62	0-14	162.5	.702	.06
	Guilt	0.55	0.93	0-2	0.13	0.49	0-2	139	.064	.28
Hopelessness	0.18	0.60	0-2	0.38	0.94	0-4	164	.579	.08	

dyslexia showed significantly higher levels of insecurity, relative to the males without dyslexia. This finding is consistent with other authors' reports of Italian university students with dyslexia having depressive symptoms²⁸ and stress again the need to separate male and female university students with dyslexia when their psychological features and psychiatric symptoms are investigated. In contrast with other studies that found low levels of self-esteem and high levels of depressive mood in young adults with dyslexia^{22,23} and university dyslexic students²⁸, we did not find differences between our groups in these emotional features. It is worth noting that a pathological level of depression was reported by higher number of males with dyslexia with respect to control group; among male students with dyslexia, the most frequent psychiatric disorders detected on the SAFA depressive scale and subscales appeared to be sense of inadequacy/low self-esteem and insecurity. However, this classification of our participants in clinical range has only a descriptive value and should be treated with caution, because it was performed on the basis of normative data that referred to a lower age group. The discrepancy that we highlighted between the males and females with dyslexia may be due to differences in the severity of their reading disability²⁴. In effect, among the male dyslexics only five students had a mild/middle dyslexia (vs six females), while eleven male students had a severe dyslexia (vs five females). The higher percentage of male dyslexics showing comorbidity

between dyslexia and other disorders (i.e. dysorthography and/or dyscalculia), relative to females with dyslexia, also might explain the more severe psychopathological impairments that seem to characterize the male students⁸. Another possible explanation may have to do with differences in the way to express the emotional states^{35,36} and differences in the coping ability. Some studies have shown women to exhibit a wider repertoire of coping strategies than men³⁷ and more women than men to play multiple social roles³⁸. Cheng and colleagues³³ suggested that the positive association between coping flexibility and psychological adjustment was stronger for women (vs men). It is also possible to hypothesize that the males with dyslexia were more worried about their academic achievements and professional future than females, with negative consequences on their emotional functioning, being the professional realization an important life purpose in the male population in general. Thus, the question remains open and further research is needed to explain why more psychological problems could affect male university students with dyslexia with respect to female students. No differences emerged between our male and female university students with dyslexia and males and females without dyslexia respectively in terms of obsessive-compulsive, psychogenic and somatic symptoms. These data are in contrast with other studies that found higher levels of obsessive-compulsive symptoms and somatization in young adults with dyslexia²⁴

TABLE IV. SAFA results (raw scores) for Obsessive-compulsive symptoms (SAFA-O), Psychogenic eating disorders (SAFA-P) and Somatic symptoms and hypochondria (SAFA-S) Scales of female university students with dyslexia and without dyslexia.

SAFA scales and subscales		Dyslexic group (n = 11)			Control group (n = 32)			Mann-Whitney test		
		M	SD	range	M	SD	range	U	p	r
Obsessive-compulsive symptoms (SAFA-O)	Obsessive-compulsive symptoms total score	10.18	12.50	0-42	6.63	7.17	0-26	157.5	.599	.08
	Obsessive thoughts	1.82	3.16	1-10	0.56	1.16	0-4	143	.230	.18
	Compulsions and rituals	2.18	3.52	0-12	1.63	2.98	0-12	149	.397	.13
	Rupophobia and contamination	0.55	0.93	0-2	0.56	1.27	0-4	165.5	.680	.06
	Order and control	2.18	3.28	0-8	1.44	2.11	0-6	167.5	.788	.04
	Doubt and indecision	3.45	4.82	0-10	2.31	2.92	0-10	171.5	.891	.02
Psychogenic eating disorders (SAFA-P)	Psychogenic eating disorders total score	8.00	5.66	0-18	7.25	6.64	0-28	153	.518	.10
	Bulimic behavior	1.27	2.41	0-6	1.13	2.03	0-8	173.5	.932	.01
	Anorexic behavior	1.64	1.96	0-4	1.75	2.31	0-8	175.5	.988	.00
	Acceptance/evaluation of the body	0.91	1.38	0-4	2.00	2.87	0-8	148.5	.394	.13
	Other psychological aspects	4.18	2.60	0-8	2.38	2.98	0-10	109.5	.054	.29
Somatic symptoms and hypochondria (SAFA-S)	Somatic symptoms and hypochondria total score	4.73	6.47	0-22	3.63	4.35	0-16	160	.645	.07
	Somatic symptoms	4.00	5.93	0-20	3.38	3.98	0-14	175.5	.988	.00
	Hypochondria	0.73	1.01	0-2	0.25	0.67	0-2	134	.083	.26

or observed more somatic complaints in Italian university students with dyslexia²⁸ relative to controls. This discrepancy between the present results and findings reported elsewhere in the literature may be due to differences in sample size, sample criteria selection, or task used to assess psychopathological symptoms. Also the differences between our dyslexic and control groups in terms of age may have influenced these results. Our students with dyslexia were assessed at the start of their university careers, before taking any exams and experiencing academic failure, and they consequently could still show positive attitudes to their university courses²⁸, differently by the students without dyslexia that were assessed during the first years of university studies.

This heterogeneity in terms of age represents the first limitation of the present study; it may have impacted the

ability to detect differences on some SAFA scales and subscales between male and female students with dyslexia and control groups. There is a need for longitudinal studies aimed to understanding the extent to which the university career of dyslexic students may impact on their psychopathological outcomes. Second limitation of this work has to do with the sample size that was small; thus, the generalizability of our findings should be carefully considered. Replication of the present preliminary findings with larger samples is clearly needed in the future to test the presence of more psychiatric disorders in male university students with dyslexia, relative to the female students with dyslexia. Third, the classification of the participants in a pathological range was performed on the basis of normative data that referred to a lower age group and thus this classification may not represent a realistic description of the severity of the

TABLE V. Number of male and female university students with and without dyslexia showing T-scores > 70 (clinical range performed on the basis of normative data for 14-18 years of age) on the SAFA Anxiety and Depression scales and subscales.

SAFA scales and subscales		Male dyslexic group (n = 16)	Male control group (n = 21)	Female dyslexic group (n = 11)	Female control group (n = 32)
		N	N	N	N
Anxiety (SAFA-A)	Anxiety total score	-	-	-	-
	Generalized anxiety	1	-	-	-
	Social anxiety	3	-	1	-
	Separation anxiety	-	1	-	-
	School/university anxiety	3	-	-	-
Depression (SAFA-D)	Depression total score	-	-	-	-
	Depressed mood	1	-	-	-
	Anhedonia and disinterest	1	-	-	-
	Touchy mood	-	-	-	-
	Sense of inadequacy and low self esteem	2	-	-	1
	Insecurity	2	1	-	-
	Guilt	1	-	-	-
	Hopelessness	1	-	-	-

psychopathology. Future research should provide SAFA standardized scores for young adults, since the SAFA test is a measure widely-used in Italian clinical contexts and to date its standardization is available only for children and adolescents up to 18 years of age. Four, the associations between the psychopathological symptoms that we found among male dyslexic students and the severity of their dyslexia was not examined. This issue merits further exploration in future research, as well as investigating other factors that could explain the higher risk for psychiatric disorders in male dyslexics or why female university students with dyslexia appear less affected by psychological distress.

Conclusions

Despite these limitations and our findings should be considered as preliminary results, our study provides

evidence that the psychopathological consequences of the dyslexia appear to be life-long. The present work had the strength of focusing on university students with dyslexia, that have been under-investigated to date, and it differed from previous studies because it examined separately male and female university students with dyslexia. Thus, our results call attention to the importance of separately considering male and female university students with dyslexia when their psychological features and psychiatric symptoms are investigated. Finally, our preliminary data seem to provide support to the effectiveness of the SAFA test as valuable method for the evaluation of psychopathological conditions and for suggesting referring points for further investigations not only in children and adolescents³² but also in university students with dyslexia.

TABLE VI. Number of male and female university students with and without dyslexia showing T-scores > 70 (clinical range performed on the basis of normative data for 14-18 years of age) on the SAFA Obsessive-compulsive symptoms, Psychogenic eating disorders and Somatic symptoms and hypochondria scales and subscales.

SAFA scales and subscales		Male dys-lexic group (n = 16)	Male control group (n = 21)	Female dys-lexic group (n = 11)	Female control group (n = 32)
		N	N	N	N
Obsessive-compulsive symptoms (SAFA-O)	Obsessive-compulsive symptoms total score	-	-	-	-
	Obsessive thoughts	1	-	-	-
	Compulsions and rituals	-	-	-	-
	Rupophobia and contamination	-	-	-	-
	Order and control	-	-	-	-
	Doubt and indecision	1	2	-	-
Psychogenic eating disorders (SAFA-P)	Psychogenic eating disorders total score	1	-	-	-
	Bulimic behavior	1	-	-	-
	Anorexic behavior	1	-	-	-
	Acceptance/evaluation of the body	1	-	-	5
	Other psychological aspects	1	-	-	-
Somatic symptoms and hypochondria (SAFA-S)	Somatic symptoms and hypochondria total score	-	-	-	-
	Somatic symptoms	1	-	-	-
	Hypochondria	-	-	-	-

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Conflict of Interest

None.

References

- Cianchetti C, Sannio Fancello G. *Scale psichiatriche di auto-somministrazione per fanciulli e adolescenti (SAFA)*. Florence, Italy: Giunti Organizzazioni Speciali 2001.
- American Psychiatric Association. *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: Author 2014.
- Campanini S, Battafarano R, Iozzino R. *Evoluzione naturale della lettura del brano, delle liste di parole e non parole e della comprensione del testo in dislessici mai trattati*. *Dislessia* 2010;7:165-79.
- Kemp N, Parrila RK, Kirby JR. *Phonological and orthographic spelling in high-functioning adult dyslexics*. *Dyslexia* 2009;15:105-28.
- Hatcher J, Snowling MJ, Griths YM. *Cognitive assessment of dyslexic students in higher education*. *Br J Educ Psychol* 2002;72:119-33.
- Zeffiro T, Eden G. *The neural basis of developmental dyslexia*. *Ann Dyslexia* 2000;3-30.
- Savolainen H, Ahonen T, Aro M, et al. *Reading comprehension, word reading and spelling as predictors of school achievement and choice of secondary education*. *Learn Instruct* 2008;18:201-10.
- Mugnaini D, Lassi S, La Malfa G, et al. *Internalizing correlates of dyslexia*. *World J Pediatrics* 2009;5:255-64.
- Willcutt EG, Pennington BF. *Psychiatric comorbidity in children and adolescents with reading disability*. *J Child Psychol Psychiatry* 2000;41:1039-48.
- Knivsberg AM, Andreassen AB. *Behaviour, attention and cognition in severe dyslexia*. *Nord J Psychiatry* 2008;62:59-65.
- Maneschi M.L., Bersani G. *Dyslexia and schizophrenia*. *J Psychopathol* 2003;1:93-109.
- Mammarella IC, Ghisi M, Bomba M, et al. *Anxiety and depression in children with nonverbal learning disabilities, reading disabilities, or typical development*. *J Learn Disabil* 2016;49:130-9.
- Chiappedi M, Baschenis IM. *Specific learning disorders and anxiety: a matter of school experience?* *Minerva Pediatrica* 2016;68:51-5.
- Gagliano A, Siracusano R, Boncoddo M, et al. *Personality profiles of dyslexic children: a study with the Big Five Questionnaire*. *Life Span Disabil* 2014;17:7-24.
- Bonifacci P, Storti M, Tobia V, et al. *Specific learning disorders: a look inside children's and parents' psychological well-being and relationships*. *J Learn Disabil* 2016;49:532-45.
- Scorza M, Benassi E, Gennaro A, et al.

- Psychopathological symptoms in Italian children and adolescents with specific learning disorder: what do mothers and fathers report about?* Appl Psychol Bull 2018;281:2-14.
- ¹⁷ Kirby JR, Silvestri R, Allingham BH, et al. *Learning strategies and study approaches of postsecondary students with dyslexia.* J Learn Disabil 2008;41:85-96.
- ¹⁸ Hughes CA, Suritsky SK. *Note-taking skills of university students with and without learning disabilities.* J Learn Disabil 1994;27:20-4.
- ¹⁹ Re AM, Tressoldi PE, Cornoldi C, et al. *Which tasks best discriminate between dyslexic university students and controls in a transparent language?* Dyslexia 2011;17:227-41.
- ²⁰ Carroll JM, Iles JE. *An assessment of anxiety levels in dyslexic students in higher education.* Br J Educ Psychol 2006;76:651-62.
- ²¹ Nelson JM, Liebel SW. *Socially desirable responding and college students with dyslexia: implications for the assessment of anxiety and depression.* Dyslexia 2017;24:44-58.
- ²² Klassen RM, Tze VMC, Hannok W. *Internalizing problems of adults with learning disabilities: a meta-analysis.* J Learn Disabil 2013;46:317-27.
- ²³ Riddick B, Sterling C, Farmer M, et al. *Self-esteem and anxiety in the educational histories of adult dyslexic students.* Dyslexia 1999;5:227-48.
- ²⁴ Undheim AM. *Dyslexia and psychosocial factors. A follow-up study of young Norwegian adults with a history of dyslexia in childhood.* Nord J Psychiatry 2003;57:221-6.
- ²⁵ Tops W, Verguts E, Callens M, et al. *Do students with dyslexia have a different personality profile as measured with the big five?* PLoS One 2013;8:1-6.
- ²⁶ Raskind MH, Goldberg RJ, Higgins EL, et al. *Patterns of change and predictors of success in individuals with learning disabilities: Results from a twenty-year longitudinal study.* Learn Disabil Res Pract 1999;14:35-49.
- ²⁷ Bruck M. *The adult outcomes of children with learning disabilities.* Ann Dyslexia 1987;37:252-63.
- ²⁸ Ghisi M, Bottesi G, Re AM, et al. *Socioemotional features and resilience in Italian university students with and without dyslexia.* Front Psychol 2016;7:1-9.
- ²⁹ Re AM, Ghisi M, Guazzo E, et al. *Psychopathological problems in university students with dyslexia.* Psicologia clinica dello sviluppo 2014;18:279-90.
- ³⁰ PANEL, D.A.E.R.D. Consensus Conference DSA. *Raccomandazioni cliniche sui DSA: Risposte a quesiti 2011.*
- ³¹ Cornoldi C, Tressoldi P. *Linee guida per la diagnosi dei profili di dislessia e disortografia previsti dalla legge 170: invito a un dibattito.* Psicologia clinica dello sviluppo 2014;1:75-92.
- ³² Franzoni E, Monti M, Pellicciari A, et al. *SAFA: a new measure to evaluate psychiatric symptoms detected in a sample of children and adolescents affected by eating disorders. Correlations with risk factors.* Neuropsychiatr Dis Treat 2009;5:207-14.
- ³³ Cheng C, Lau HP, Chan MP. *Coping flexibility and psychological adjustment to stressful life changes: a meta-analytic review.* Psychol Bull 2014;140:1582-607.
- ³⁴ Altemus M, Sarvaiya N, Epperson CN. *Sex differences in anxiety and depression clinical perspectives.* Front Neuroendocr 2014;35:320-30.
- ³⁵ Lungu O, Potvin S, Tikász A, et al. *Sex differences in effective fronto-limbic connectivity during negative emotion processing.* Psychoneuroendocr 2015;62:180-8.
- ³⁶ Speca A, Pasquini M, Picardi A, et al. *Gender-related psychopathological differences in a general psychiatric population.* J Psychopathol 2001;1.
- ³⁷ Tamres LK, Janicki D, Helgeson VS. *Sex differences in coping behavior: a meta-analytic review and an examination of relative coping.* Pers Soc Psychol Review 2002;6:2-30.
- ³⁸ Nyman CS, Spak L, Hensing G. *Multiple social roles, health, and sickness absence – A five-year follow-up study of professional women in Sweden.* J Wom Health 2012;52:336-51.