

Depressive symptoms in adolescence: the role of gender and personality traits

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Abstract

Introduction: aim of this study was to investigate the relationship among alexithymic traits, depressive symptoms, and temperament and character in adolescence, focusing on gender differences.

Methods: 546 high school Italian students, mean age 14.2 years, completed the following self-rating questionnaires in an anonymous way: Toronto Alexithymia Scale (TAS-20), Beck Depression Inventory (BDI) and Temperament and Character Inventory (TCI).

Results: the prevalence of alexithymia was 5.2% in total sample and did not significantly vary between sexes. Female scored significantly higher than males in Difficulty in Identifying Feelings (DIF) TAS-20 subscale, BDI total score, and four out of seven TCI subscales: Harm Avoidance (HA), Reward Dependence (RD), Cooperativeness (C) and Self-Transcendence (ST). Correlation

analysis showed that in both sexes BDI correlated positively with DIF and HA, negatively with C and Self Directedness (SD), whereas a positive correlation between BDI and ST was observed in females only.

Conclusions: our results suggest that during adolescence females experience a higher rate of depressive symptoms, with respect to age-matched males. Gender-specific alexithymic, character and temperamental traits were also found and their role in the development of depressive symptoms was discussed.

KEY WORDS: adolescence, depression, alexithymia, personality, temperament, character.

Introduction

Scientific literature has so far evaluate the relationship among depressive symptoms, alexithymia, temperament and character in both clinical and non clinical samples, but, currently, data relating to teenage subjects appears to be non exhaustive and somehow contradictory.

During adulthood depressive symptoms are usually characterized by persisting feeling of sadness associated to reduced social functioning, anhedonia, cognitive, emotional and sleep disturbances. Adolescence phases influence both phenotypic expression and gender distribution of depressive symptoms. In non clinical samples, teenagers do not appear to show the same depressive symptoms as adults, presenting instead an elevated prevalence of somatic complaints (1, 2). As regards gender differences, a meta-analysis by Twenge & Nolen-Hoeksema (3), including over 61000 Canadian and American children aged 8-16 years old, has evidenced that depressive symptoms in childhood, assessed with Children's Depression Inventory (CDI) (4, 5) are lower in females than in males. The ratio changes when entering adolescence: at 13 years old females already show significantly higher scores than males.

Alexithymia (literally meaning "no words for mood"), is a psychological construct characterized by difficulties in recognizing and communicating feelings, poor fantasy life, concrete speech and external oriented though, with a prevalence in general population ranging from 10 to 13% (6, 7). In adulthood alexithymia is more frequent in males, in subjects with

low socioeconomic status and seems to increase with age (8). As for adolescent population, alexithymia prevalence looks similar to what already evidenced in adults, but differs in gender distribution. A study conducted on non clinical late adolescent subjects (17 to 21-years-old) highlighted an 8.3% alexithymia prevalence, without significant differences between males and females (9). In non clinical middle adolescent samples (15 to 16 years-old) gender distribution has turned out to be even inverted with respect to what observed in adult samples. In fact, female participants obtain higher scores in Toronto Alexithymia Scale (TAS-20) (10) than same age males (6, 11).

A worldwide used instrument to assess personality dimensions is the Temperament and Character Inventory (TCI) (12, 13). The integrative biopsychosocial model theorized by Cloninger (14, 15) posits the existence of seven dimensions, four for Temperament and three for Character, which merge neurobiological and psychological aspects. Temperament dimensions (Novelty Seeking- NS; Harm Avoidance- HA; Reward Dependence- RD; Persistence-P) represent automatic emotional responses to stimuli; they are moderately inheritable and quite stable through life. Novelty seeking (NS) is formulated as the activation of behavior by desire to explore novelty and reduce boredom and frustration, Harm avoidance (HA) involves the inhibition of behavior in case of anxiety-provoking stimuli, Reward Dependence (RD) measures the need for social approval and Persistence (P) involves perseverance of behavior despite fatigue and frustration.

Character dimensions (Self Directedness- SD; Cooperativeness- C; Self Transcendence- ST) play instead a role in modulating temperament's automatic responses, by the ability to understand the relations between life events through socio-cultural learning and Self and others experiences. Self-directedness (SD) expresses the individual's level of autonomy and maturity, Cooperativeness (C) is the ability to collaborate with other people by being helpful and tolerant, Self-transcendence (ST) is a person's ability to sublimate and go beyond the individual human existence, feeling a whole with nature and other living creatures. The predominance of one or more temperament and character dimensions seems to vary according to both age and sex: in samples aged 18-59 years old (16), younger subjects (18 to 25-years-old) show higher scores for NS and lower for SD and C when compared with other age ranges. In regard to gender differences, females score higher than males in HA and RD, independently of age.

Aim of this study was to analyze the link among depressive symptoms, alexithymia and personality traits in a sample of Italian teenagers, selected among student population. We particularly focused on males-females differences for scores in psychometric scales and associations between variables, in order to evidence the impact of personality traits on the development of depressive symptoms.

Methods

Participants

Students attending the first two classes of two public high schools in Pescara (east-central Italy) were invited to participate in the study. The two schools were randomly chosen among all the 14 public high schools of Pescara and they were located one in the center of the city, the other in the outskirts. All participants received a detailed explanation of study design and gave their informed consent according to the World Medical Association Declaration of Helsinki (17). For those who were under 18, consent was also given by parents. The Scholastic Ethics Committees of the two schools approved the general procedures of the study. The questionnaires were distributed in classrooms during lesson time by four Psychiatrists (MF, RiS, RoS and SM) during the first three months of the scholastic year. Participants were reminded that all the information given were confidential and anonymous. 563 students (282 females) were asked to participate, 546 students (273 females), mean age 14.2 (± 0.41), accepted and were enrolled in the study.

Measures

The Beck Depression Inventory (BDI) is a well validated 21-items self-report inventory (18), measuring changes in cognition, behavior, feelings, and physical symptoms in depression. In its current version the questionnaire is designed for individuals aged 13 and over (7). BDI is a 4-point Likert response scale, in which each answer is given a score between 0 and 3. BDI results may be used either as a continuous variable (BDI total score, ranging 0-63) or divided into 2, 3 or 4 subgroups (19-21). In the present study, the following cut-offs were used: 0-13 absent/minimal depression, 14-19 mild depression, 20-28 moderate depression and 29-63 severe depression.

The Toronto Alexithymia Scale (TAS-20) is the most widely used instrument to measure alexithymia levels (22). It is a 20-items, 5-point Likert scale, with the total score ranging from 20 to 100. The TAS-20 has a three-factor structure: Factor 1 assesses the capacity to identify feelings and to distinguish between feelings and bodily sensations of emotional arousal (Difficulty in Identifying Feelings, DIF); Factor 2 reflects the inability to communicate feelings to other people (Difficulty in Describing Feelings, DDF); Factor 3 assesses Externally Oriented Thinking (EOT). A score of at least 61 is the most used cut-off to distinguish alexithymic adolescents from non alexithymic ones (7, 23). In the present study the Italian validated version of the TAS-20 was used (24). TAS-20 results were reported as both continuous variables and percentages based on the above mentioned cutoff.

Temperament and Character Inventory (TCI) – version 9 is a 240-items self-report questionnaire based on a “true/false” response format (12). It has been developed and used by Cloninger to evaluate the 7 dimensions of his biopsychosocial personality model,

in which are distinguished and investigated four Temperament (Novelty Seeking, Harm Avoidance, Reward Dependence, Persistence) and three Character dimensions (Self-Directedness, Cooperativeness, Self-Transcendence) (25).

Statistical analysis

Statistical analysis was performed using Statistica 6.1 software (Statsoft Italia srl., Vigonza, Italy, 2003). Categorical variables were presented as frequencies and percentages and analyzed using the Chi-square test. Continuous variables were presented as mean and standard deviation, and comparisons drawn between groups using Analysis of Variance (ANOVA). Homogeneity of variance was assessed by means of Brown-Forsythe test. Significant effects were dissected using Duncan Post-hoc test. Spearman rank order coefficients were computed to examine the association among the psychometric measures, first in the whole sample and then for each gender separately. Statistical significance was accepted at $p < 0.05$, corrected for multiple comparisons using a Bonferroni correction (p corrected = $0.05/\text{number of comparisons}$).

Results

Psychometric results (Tab. 1, Fig. 1).

Participants' age range was 13-15; the mean age was 14.2 (0.41) years and did not significantly differ between genders: ANOVA one-way results $F=0.27$, $p=0.60$.

BDI results were available for 544 subjects (271 females). The BDI total scores were significantly higher in females, compared to males: 10.0 *versus* 7.6 (one-way ANOVA results: $F=13.71$, $p=0.0002$). A significant "gender effect" was observed even when BDI scores were analyzed in a categorical way, using the above mentioned cutoffs for absent/minimal, mild, moderate and severe depression: mild and moderate depression were more frequent in female participants (15.0% *versus* 7.0% and 9.2% *versus* 4.4%), absent/minimal depression in boys (85.7% *versus* 72.5%) (Expected *versus* observed frequencies Chi square= 33.1; $p=0.00025$).

TAS-20 results were available for 543 subjects (271 females). A "gender" x "subscale" ANOVA design was used, entering TAS-20 scores as a continuous variable. TAS-20 total score did not significantly differ between genders ($F=2.637$ $p=0.10$). A significant "gender x subscale" interaction was found ($F=13.76$, $p < 0.0001$). Duncan post-hoc test revealed that DIF scores were significantly higher in females, with respect to males, whereas no significant differences were observed in terms of DDF and EOT scores. When TAS-20 total scores were categorized into 2 groups (a score of at least 61 indicated alexithymia and less than 61 without alexithymia), we found that the prevalence of alexithymia was 5.2% in total sample and did not significantly vary between sexes (fe-

males=5.9%, males=4.4%: Chi-square=0.66 $p=0.43$). TCI data were available for 538 subjects (270 females). We found a significant "gender" x "subscale" ANOVA interaction ($F=14.81$ $p < 0.0001$): females scored higher than males in HA, RD, C and ST subscales, whereas NS, P and SD did not statistically differ between sexes.

Correlation results (Tab.2).

Complete data were available for 537 subjects. Spearman's rank correlation coefficients among BDI, TAS-20 and TCI subscales were calculated in all subjects ($n=537$) and in the two genders separately ($F=$ females $n=270$; $M=$ males $n=267$). Statistical significance was first put at $p < 0.05$, uncorrected, and then corrected for multiple comparisons using a Bonferroni correction. In the whole sample and in each gender separately, we found the following significant correlations:

- BDI correlated positively with DIF, DDF and HA, negatively with SD and C
- DIF correlated positively with BDI, HA, ST, negatively with SD
- DDF correlated positively with BDI, HA, ST, negatively with SD.

In the whole sample we also observed a negative correlation between EOT and P that did not reach the statistical significance in the two separate gender groups. Moreover, in both female group and whole sample we found a positive correlation between BDI and ST that was not observed in the male group.

Discussion

Aim of this study was to investigate the relationship among alexithymic traits, depressive symptoms, temperament and character in adolescence, focusing on gender differences. Alexithymia prevalence in our healthy teenagers sample was 5.2% and, in agreement with previous literature data, boys did not show a higher prevalence of alexithymia, unlike what has been evidenced for adult subjects (9). On the contrary, we highlighted that, being equal total TAS-20, DDF and EOT scores, females displayed significantly higher scores than same age males in DIF subscale. High DIF scores have been reported in patients affected by psychiatric conditions (26) and somatic functional pathologies (27), and they are associated with worse quality of life in general population (28). Our result of higher DIF scores in female adolescents confirms a recent study conducted by Pascual et al. (29) on a wide sample of high school students, and overturns, at least for this age segment, the stereotype according which males have more difficulties in describing their emotions. Pascual et al. suggest that adolescence, being itself a complex period of life, could be even harder for females, as a consequence of stronger social pressure for the achievement of good results in various areas (physical appearance, study, work) or as a consequence of the tendency to

Table 1 - Psychometric results. BDI, TAS-20 and TCI between genders significant effects.

	Subjects						Statistic		
	All (n= 544)		Females (n=271)		Males (n=273)				
VARIABLES	Mean	SD	Mean	SD	Mean	SD	ANOVA		
							F	p	Post-hoc effects
Age	14.22	0.41	14.21	0.41	14.23	0.42	0.27	0.60	ns
BDI									
TOTAL SCORE	8.8	7.6	10.0	7.5	7.6	7.4	13.71	0.0002	Females > Males
CUTOFFS	All		Females		Males		Expected versus observed frequencies		
	n	%	n	%	n	%	X ²	p	Significant effects
							33.10	0.00025	
0-13: absent/minimal depression	432	79.1	198	72.5	234	85.7			Males > Females
14-19: mild depression	60	11.0	41	15.0	19	7.0			Females > Males
20-28: moderate depression	37	6.8	25	9.2	12	4.4			Females > Males
29-63: severe depression	15	2.7	7	2.6	8	2.9			ns
TAS-20	All (n= 543)		Females (n=271)		Males (n=272)		ANOVA		
	Mean	SD	Mean	SD	Mean	SD	F	p	Post-hoc effects
Main effect gender							2.64	0.10	
TOTAL SCORE	42.4	10.1	43.1	10.3	41.6	9.7			ns
Gender x subscale interaction							13.76	<0.0001	
DIF	18.1	5.0	19.0	4.9	17.2	4.9			Females > Males
DDF	11.2	3.4	11.3	3.5	11.1	3.4			ns
EOT	13.1	5.4	12.8	5.8	13.4	5.1			ns
TAS-20 CUT OFFS	All		Females		Males		Expected versus observed frequencies		
	n	%	n	%	n	%	X ²	p	Significant effects
							0.66	0.43	
<61: non alexithymic	515	94.8	255	94.1	260	95.6			ns
≥61: alexithymic	28	5.2	16	5.9	12	4.4			ns
TCI	All (n= 538)		Females (n=270)		Males (n=268)		ANOVA		
	Mean	SD	Mean	SD	Mean	SD	F	p	Post-hoc effects
Gender x subscale interaction							14.81	<0.0001	
NS	10.8	3.2	10.7	3.2	11.0	3.2			ns
HA	8.0	3.7	8.9	3.7	7.2	3.6			Females > Males
RD	8.7	2.6	9.8	2.3	7.6	2.3			Females > Males
P	2.7	1.4	2.8	1.3	2.5	1.4			ns
SD	15.1	4.6	15.1	4.6	15.1	4.6			ns
C	18.2	4.6	19.5	4.3	16.8	4.5			Females > Males
ST	9.7	3.7	10.1	3.5	9.2	3.8			Females > Males
ns= not significant									

experiment negative emotions more frequently and more intensely than males. Moreover, the pubertal body modifications are more intense and premature

in females than in males, determining feelings of un-comfortableness, vulnerability and depression (30). In our sample, females showed indeed higher BDI

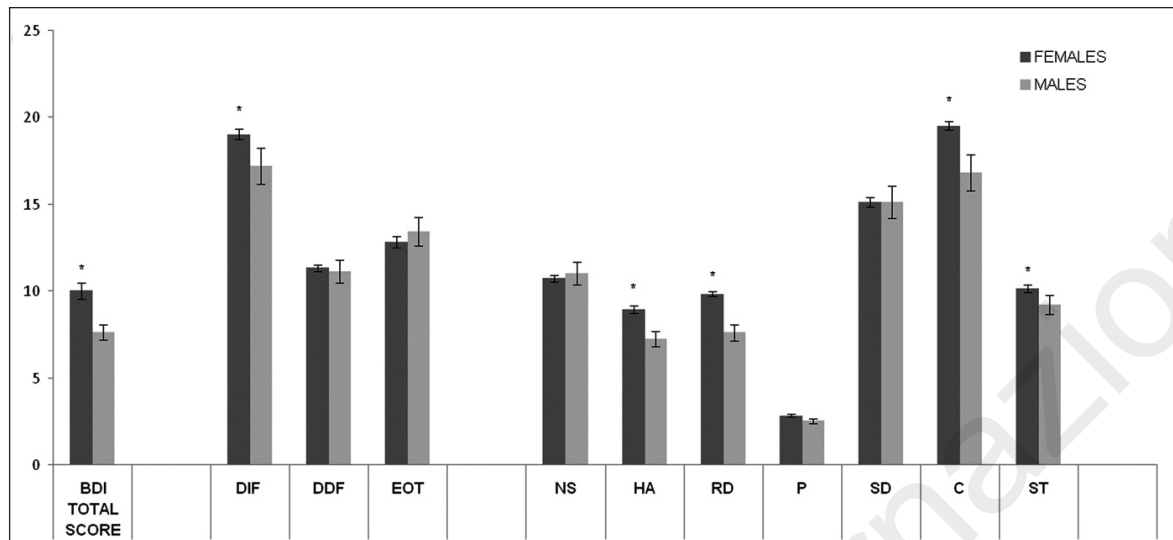


Figure 1 - BDI, TAS-20 and TCI ANOVA results. * = between genders significant differences: Duncan Post-hoc test $p < 0.001$. Vertical bars denote the standard errors.

scores compared to males, and we observed that the more elevated BDI scores are, the more difficult was to identify and describe emotions. This positive correlation between alexithymic traits and depressive symptoms has been previously reported, in both adults (31) and adolescents (2), and supports the assumption of a connection among alexithymia, affective regulation and complex emotional experiences (10). As far as the depressive aspects are concerned, our study confirms current literature acquisitions which highlight that the distribution pattern typical in adulthood (females > males) begins to emerge around 13-14 years old (32, 33) and reaches its maximum increase among 15 and 18 years old (34). Depressive symptoms showed in teenage years have a high likelihood to perpetuate in adult life (7, 35), or at least to negatively influence future lifestyle (36). Therefore, they should be monitored in order to make an early diagnosis and, if needed, to promptly start a treatment.

As regards temperament and character dimensions investigated by TCI, in our sample we noticed significantly higher scores in females than in same age males for temperament areas RD (Reward dependence) and HA (Harm avoidance) and for character areas C (Cooperativeness) and ST (Self-Transcendence). Our results look similar but not completely overlap the ones obtained by Snopek et al. (37), who evidenced, in a sample composed by 171 15 year-old subjects, significantly higher scores in females for HA, RD, C, ST and NS and significantly higher scores in males for P. However, in our study we used the true/false version of the TCI, whereas Snopek et al. used the Likert version, so the discordant results may be partially due to the instruments used. In our study, HA and ST scores appeared to be positively correlated in females to both BDI and DIF scores, suggesting that females with stronger depressive symptoms and greater difficulties in identifying feelings could tend to refuge in avoidance and self-trans-

scendence. High RD scores in teenage females underline the key role played in this life phase by external environment. Adjustment to social and peer pressure and dependence from others' approval can drive young women to assume or modify behavior, values and standards to better fit the group. High C scores and negative correlation between C and BDI underline, on the other hand, how greater cooperativeness abilities could determine a protective element from depressive symptoms. A recent Portuguese study (38) has evidenced the relationship between some peculiar personality traits and academic achievements. Temperament and character dimensions evaluation in student populations could therefore have relevant implications for school dropout prevention, allowing early identification of high risk teens and timely preventive strategies.

Conclusions

Our results suggest that during adolescence females experience a higher rate of depressive symptoms, as measured by BDI, with respect to age-matched males. They also score higher than boys in terms of TAS-20 DIF subscale and four out of seven TCI components (HA, RD, ST, C). Moreover, depressive symptoms and several personality components seem to be significantly correlated, and results may be interpreted in two different way: 1) mood influences TCI and TAS-20 scores or 2) a more complex association exists between mood and personality (39), as expression of gender-different biological and heritable traits (37). Further studies, with a longitudinal design, are needed to better clarify this point.

Limits of the study

An important limitation of our study is the lack of data about familiar indicators, such as parents' education,

Table 2 - BDI, TAS-20 and TCI correlation results. Spearman's rank correlation coefficients in all subjects and in the two genders separately.

		BDI	DIF	DDF	EOT	NS	HA	RD	P	SD	C	ST
BDI	F		*** 0.42	*** 0.28	0.02	-0.05	*** 0.42	-0.07	0.02	*** -0.51	*** -0.21	*** 0.21
	M		*** 0.40	*** 0.35	0.06	0.08	*** 0.41	-0.05	-0.06	*** -0.42	*** -0.28	ns * 0.14
	All		*** 0.42	*** 0.31	0.01	0.01	*** 0.44	0.04	0.00	*** -0.45	*** -0.17	*** 0.19
DIF	F	*** 0.42		*** 0.42	0.11	0.00	*** 0.38	0.03	-0.08	*** -0.35	-0.07	*** 0.24
	M	*** 0.40		*** 0.47	0.11	0.03	*** 0.24	0.07	0.03	*** -0.32	-0.09	*** 0.27
	All	*** 0.42		*** 0.44	0.08	0.01	*** 0.34	ns ** 0.13	0.00	*** -0.32	-0.01	*** 0.27
DDF	F	*** 0.28	*** 0.42		*** 0.35	-0.03	*** 0.34	-0.10	0.07	*** -0.34	0.00	0.09
	M	*** 0.35	*** 0.47		*** 0.27	0.00	*** 0.27	ns * -0.12	-0.06	*** -0.30	ns * -0.12	0.08
	All	*** 0.31	*** 0.44		*** 0.31	-0.01	*** 0.30	ns * -0.09	0.01	*** -0.32	-0.05	ns * 0.09
EOT	F	0.02	0.11	*** 0.35		ns ** 0.16	0.07	-0.06	ns * -0.13	-0.09	-0.07	0.02
	M	0.06	0.11	*** 0.27		0.06	0.02	ns * -0.13	ns ** -0.19	ns ** -0.18	ns * -0.14	-0.08
	All	0.01	0.08	*** 0.31		ns ** 0.12	0.01	ns ** -0.13	*** -0.16	ns ** -0.13	ns ** -0.14	-0.04
NS	F	-0.05	0.00	-0.03	ns ** 0.16		ns ** -0.19	-0.08	*** -0.36	ns * -0.15	*** -0.25	ns ** -0.17
	M	0.08	0.03	0.00	0.06		-0.09	-0.01	-0.07	*** -0.22	*** -0.23	-0.08
	All	0.01	0.01	-0.01	ns ** 0.12		*** -0.15	-0.07	*** -0.22	*** -0.19	*** -0.23	ns ** -0.13
HA	F	*** 0.42	*** 0.38	*** 0.34	0.07	ns ** -0.19		0.10	0.08	*** -0.37	0.02	ns ** 0.17
	M	*** 0.41	*** 0.24	*** 0.27	0.02	-0.09		0.06	-0.05	*** -0.31	ns * -0.15	ns * 0.15
	All	*** 0.44	*** 0.34	*** 0.30	0.01	*** -0.15		*** 0.17	0.04	*** -0.32	0.01	*** 0.18
RD	F	-0.07	0.03	-0.10	-0.06	-0.08	0.10		0.09	0.04	*** 0.33	ns * 0.13
	M	-0.05	0.07	ns * -0.12	ns * -0.13	-0.01	0.06		ns ** 0.16	ns * 0.14	*** 0.32	*** 0.25
	All	0.04	ns ** 0.13	ns * -0.09	ns ** -0.13	-0.07	*** 0.17		*** 0.17	ns * 0.10	*** 0.41	*** 0.22
P	F	0.02	-0.08	0.07	ns * -0.13	*** -0.36	0.08	0.09		ns * 0.15	*** 0.36	*** 0.24
	M	-0.06	0.03	-0.06	ns ** -0.19	*** -0.07	-0.05	ns ** 0.16		*** 0.28	*** 0.36	ns ** 0.19
	All	0.00	0.00	0.01	*** -0.16	*** -0.22	0.04	*** 0.17		*** 0.21	*** 0.38	*** 0.23
SD	F	*** -0.51	*** -0.35	*** -0.34	-0.09	ns * -0.15	*** -0.37	0.04	ns * 0.15		*** 0.37	ns * -0.13
	M	*** -0.42	*** -0.32	*** -0.30	ns ** -0.18	*** -0.22	*** -0.31	ns * 0.14	*** 0.28		*** 0.51	ns * -0.13
	All	*** -0.45	*** -0.32	*** -0.32	ns ** -0.13	*** -0.19	*** -0.32	ns * 0.10	*** 0.21		*** 0.43	ns ** -0.13
C	F	*** -0.21	-0.07	0.00	-0.07	*** -0.25	0.02	*** 0.33	*** 0.36	*** 0.37		*** 0.27
	M	*** -0.28	-0.09	ns * -0.12	ns * -0.14	*** -0.23	ns * -0.15	*** 0.32	*** 0.36	*** 0.51		ns * 0.16
	All	*** -0.17	-0.01	-0.05	ns ** -0.14	*** -0.23	0.01	*** 0.41	*** 0.38	*** 0.43		*** 0.25
ST	F	*** 0.21	*** 0.24	0.09	0.02	ns ** -0.17	ns ** 0.17	ns * 0.13	*** 0.24	ns * -0.13	*** 0.27	
	M	ns * 0.14	*** 0.27	0.08	-0.08	-0.08	ns * 0.15	*** 0.25	ns ** 0.19	ns * -0.13	ns * 0.16	
	All	*** 0.19	*** 0.27	ns * 0.09	-0.04	ns ** -0.13	*** 0.18	*** 0.22	*** 0.23	ns ** -0.13	*** 0.25	

F= females, n=270; M= males, n=267; All= all subjects (n=537)

* p<0.05; ** p<0.01; ***p<0.001; ns=not significant after Bonferroni correction for multiple comparisons.

income and psychiatric conditions. Limits of the study include the use of an adult personality test, due to the absence of a validated Italian version of the Junior-TCI at the moment of administration. The adult scale, nevertheless, has shown valid results when used in adolescent and young adult samples in different countries (i.e., Czech Republic and Japan) (37, 40).

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References

1. Sepede G, Gambi F, De Berardis D, Brocco C, Nacci M, Campanella D, Cicconetti A, Salini G, Cotellessa C, Salerno RM, Ferro FM. Somatic complaints and depressive symptoms in adolescence. *Ital J Psychopathol.* 2004; 10:343-348.
2. De Berardis D, Cicconetti A, Farano M, Campanella D, Carano A, Scali M, Serroni N, Di Giuseppe B, Caltabiano M, Pizzorno AM, Moschetta FS, Valchera A, Sepede G, Cotellessa C, Salerno RM, Ferro FM. Alessitimia, lamentele somatiche e sintomi depressivi in adolescenza: uno studio longitudinale a un anno. *Med Psicosom.* 2008; 53(1):135-142.
3. Twenge JM, Nolen-Hoeksema S. Age, gender, race, socioeconomic status, and birth cohort differences on the children's depression inventory: a meta-analysis. *J Abnorm Psychol.* 2002 Nov; 111(4):578-588.
4. Kovacs, M. The Children's Depression Inventory (CDI). *Psychopharmacology Bulletin.* 1985; 21, 995-998.
5. Kovacs M. Manual for the Children's Depression Inventory. North Tonawanda, NJ: Multi-Health Systems. 1992.
6. Kokkonen P, Karvonen JT, Veijola J, Läksy K, Jokelainen J, Järvelin MR, et al. Prevalence and sociodemographic correlates of alexithymia in a population sample of young adults. *Compr Psychiatry.* 2001; 42:471-476.
7. Honkalampi K, Tolmunen T, Hintikka J, Rissanen ML, Kylmä J, Laukkanen E. The prevalence of alexithymia and its relationship with Youth Self-Report problem scales among Finnish adolescents. *Compr Psychiatry.* 2009 May-Jun; 50(3):263-268.
8. Mattila AK, Salminen JK, Nummi T, Joukamaa M. Age is strongly associated with alexithymia in the general population. *J Psychosom Res.* 2006 Nov; 61(5):629-635.
9. Karukivi M, Hautala L, Kaleva O, Haapasalo-Pesu KM, Liuksila PR, Joukamaa M, Saarijärvi S. Alexithymia is associated with anxiety among adolescents. *J Affect Disord.* 2010 Sep; 125(1-3):383-387.
10. Caretti V, La Barbera D, Alessitimia. *Valutazione e trattamento.* Roma: Astrolabio, 2005.
11. Mason O, Tyson M, Jones C, Potts S. Alexithymia: its prevalence and correlates in a British undergraduate sample. *Psychol Psychother.* 2005 Mar; 78(Pt 1):113-125.
12. Cloninger CR, Przybeck TR, Svrakic DM, Wetzel RD. The temperament and character inventory (TCI): a guide to its development and use. Center for Psychobiology of Personality, Washington University, St. Louis (Missouri) 1994.
13. Cloninger CR, Przybeck TR, Svrakic DM, Wetzel RD. The temperament and character inventory (TCI). Traduzione italiana di Battaglia M e Bajo S. In: Conti L. Repertorio delle scale di valutazione in psichiatria, Società editrice Europea di Nicodemo Magiulli e C., 1999: pp.1375-1388.
14. Cloninger CR. A systematic method for clinical description and classification of personality variants. A proposal. *Arch Gen Psychiatry.* 1987 Jun; 44(6):573-588.
15. Cloninger CR. A unified biosocial theory of personality and its role in the development of anxiety states. *Psychiatr Dev.* 1986 Autumn; 4(3):167-226.
16. Fresán A, Robles-García R, López-Avila A, Cloninger CR. Personality differences according to age and sex in a Mexican sample using the Temperament and Character Inventory-Revised. *Compr Psychiatry.* 2011 Nov-Dec; 52(6):774-779.
17. World Medical Association Declaration of Helsinki. Recommendations guiding physicians in biomedical research involving human subjects. *J Am Med Assoc.* 1997; 277:925-926.
18. Beck AT, Steer RA, Brown GK. BDI-II. Beck Depression Inventory. San Antonio (Tex): Psychological Corporation; 1996.
19. Lasa L, Ayuso-Mateos JL, Vázquez-Barquero JL, Díez-Manrique FJ, Dowrick CF. The use of the Beck Depression Inventory to screen for depression in the general population: a preliminary analysis. *J Affect Disord.* 2000 Jan-Mar; 57(1-3):261-265.
20. Gorenstein C, Andrade L, Zanolo E, Artes R. Expression of depressive symptoms in a nonclinical Brazilian adolescent sample. *Can J Psychiatry.* 2005 Mar; 50(3):129-136.
21. Melo-Carrillo A, Van Oudenhove L, Lopez-Avila A. Depressive symptoms among Mexican medical students: high prevalence and the effect of a group psychoeducation intervention. *J Affect Disord.* 2012 Feb; 136(3):1098-1103.
22. Bagby RM, Parker JD, Taylor GJ. The twenty-item Toronto Alexithymia Scale-I. Item selection and cross-validation of the factor structure. *Journal of Psychosomatic Research.* 1994; 38:23-32.
23. Joukamaa M, Taanila A, Miettunen J, Karvonen JT, Koskinen M, Veijola J. Epidemiology of alexithymia among adolescents. *J Psychosom Res.* 2007 Oct; 63(4):373-376.
24. Bressi C, Taylor G, Parker J, Bressi S, Brambilla V, Aguglia E, et al. Cross validation of the factor structure of the 20-item Toronto alexithymia scale: An Italian multicenter study. *Journal of Psychosomatic Research.* 1996; 41:551-559.
25. Cloninger, CR. Biology of personality dimensions. *Current Opinions in Psychiatry.* 2000; 13, 611-616.
26. Marchesi C, Ossola P, Tonna M, De Panfilis C. The TAS-20 more likely measures negative affects rather than alexithymia itself in patients with major depression, panic disorder, eating disorders and substance use disorders. *Compr Psychiatry.* 2014 May; 55(4):972-978. doi: 10.1016/j.comppsy.2013.12.008.
27. Sepede G, Racciatti D, Gorgoretti V, Nacci M, Pizzigallo E, Onofri M, Di Giannantonio M, Niolu C, Salerno RM, Gambi F. Psychophysical distress and alexithymic traits in chronic fatigue syndrome with and without comorbid depression. *Int J Immunopathol Pharmacol.* 2011 Oct-Dec; 24(4):1017-1025.
28. Mattila AK, Saarni SI, Salminen JK, Huhtala H, Sintonen H, Joukamaa M. Alexithymia and health-related quality of life in a general population. *Psychosomatics.* 2009 Jan-Feb; 50(1):59-68.
29. Pascual A, Etxebarria I, Ortega I, Ripalda A. Gender Differences in Adolescence in Emotional Variables Relevant to Eating Disorders. *International Journal of Psychology and Psychological Therapy.* 2012; 12(1):59-68.
30. Carbone P. *Adolescenze. Percorsi di psicologia clinica.* 2005. Roma: Magi Edizioni, cap. 7, p.128; ISBN: 88-7487-155-4.
31. Honkalampi K, Hintikka J, Laukkanen E, Lehtonen J, Viinamäki H. Alexithymia and depression: a prospective study of patients with major depressive disorder. *Psychosomatics.* 2001 May-Jun; 42(3):229-234.
32. Wade TJ, Cairney J, Pevalin DJ. Emergence of gender differences in depression during adolescence: national panel results from three countries. *J Am Acad Child Adolesc Psychiatry.* 2002 Feb; 41(2):190-198.
33. Twenge JM, Nolen-Hoeksema S. Age, gender, race, socioeconomic status, and birth cohort differences on the children's depression inventory: a meta-analysis. *J Abnorm Psychol.* 2002 Nov; 111(4):578-588.
34. Hankin BL, Abramson LY, Moffitt TE, Silva PA, McGee R, Angell KE. Development of depression from preadolescence to young adulthood: emerging gender differences in a 10-year longitudinal study. *J Abnorm Psychol.* 1998 Feb; 107(1):128-140.
35. Portegijs PJ, Jeuken FM, van der Horst FG, Kraan HF, Knotterus JA. A troubled youth: relations with somatization, depression and anxiety in adulthood. *Fam Pract.* 1996 Feb; 13(1):1-11.
36. Wickrama T, Wickrama KA. Heterogeneity in adolescent depressive symptom trajectories: implications for young adults' risky lifestyle. *J Adolesc Health.* 2010 Oct; 47(4):407-413.
37. Snopce M, Hublova V, Porubanova M, Blatny M. Psychometric properties of the Temperament and Character Inventory-

- Revised (TCI-R) in Czech adolescent sample. *Comprehensive Psychiatry*. 2012; 53(1):71-80.
38. Moreira PA, Oliveira JT, Cloninger KM, Azevedo C, Sousa A, Castro J, Cloninger CR. The psychometrics and validity of the junior temperament and character inventory in Portuguese adolescents. *Compr Psychiatry*. 2012 Nov; 53(8):1227-1236.
39. Lu X, Chen Z, Cui X, Uji M, Miyazaki W, Oda M, Nagata T, Kitamura T, Katoh T. Effects of Temperament and Character Profiles on State and Trait Depression and Anxiety: A Prospective Study of a Japanese Youth Population. *Depress Res Treat*. 2012; 2012:604684. doi: 10.1155/2012/604684.
40. Takeuchi M, Miyaoka H, Tomoda A, Suzuki M, Lu X, Kitamura T. Validity and reliability of the Japanese version of the Temperament and Character Inventory: a study of university and college students. *Compr Psychiatry*. 2011 Jan-Feb; 52(1):109-117.