Mental health and rural communities: prevalence of psychopathology among children and preadolescents in a mountainous area of Italy

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SUMMARY

Objective

There is substantial evidence of an increase in depression and other psychopathological aspects during adolescence, and this phenomenon is even more evident in rural contexts. Considering the predictive role that emotional disorders in youth could have on future mental health, this study aims to investigate differences in psychopathology between a group of children and pre-adolescent resident in a rural context (Amiata, Italy) and a homogeneous group by age of non-resident in a mountainous area.

Methods

This study involved teachers and parents for the assessment of 510 children and preadolescents (49.8% male, 50.2% female; Mean age = 8.44; SD = 1.44) from the rural context, and a normative sample of 1201 urban youth. Regarding the latter, the Child Behavior Checklist (CBCL) scores reported in the Achenbach manual in its Italian edition were considered, while for the "rural" sample, a group of parents and teachers children living in Amiata (Italy) completed respectively the Child Behavior Checklist (CBCL) and Teacher's Report-Form (TRF) scales.

Results

Firstly, results showed a good correlation between CBCL and TRF scales, indicating consistency in the parents' and teachers' detection of rural youth problems. Compared to the normative sample the group of residents in the mountainous area got higher scores on some of the CBCL scales, especially with regards to Social Problems, Cognitive Problems and Somatic Complaints. Finally, the Amiata girls obtained a lower total score on TRF and CBCL syndrome scales, and, in parallel, better academic competence that could be considered as a protective factor.

Conclusions

The comparisons of parents' reports with reports by others, such as teachers, seemed to be helpful for assessing the consistency of problems on syndromes such as anxiety/depression, somatic complaints, and attention problems to document the need for medical assessment or referral for mental health services. Specifically, the findings of this study suggest that subjects residing in the mountainous area tended to adopt fewer externalizing behaviors and they had more inner-directed disorders, especially somatic complaints: some aspects of youth psychopathological features can be influenced by a rural context of life. Therefore, the research analyzes the psychopathological features of children and pre-adolescents living in a rural environment (Amiata, Italy), highlighting important elements on which it may be important to intervene therapeutically to prevent the rural adolescent disorders, well documented by the Scientific literature.

Key words: emotional disorders, depression, adolescence, assessment, rural contexts

Introduction

Increases in prevalence rates of depression in adolescence have been found in clinical [1] and in community [2] samples, across different cultural settings [3]. Furthermore, more and more studies have identified depressive symptoms even in childhood, a condition that could be predictive of the subsequent depressive disorder (*e.g.,* Mazza and colleagues [4]). These increases have been found independent of gender, although girls have proven more likely to develop depression than boys [5]. The causes of emotional disorders and depression in childhood and adolescence are still not clear. Genetic [6], personality [7], hormonal [8], as well as cognitive [9] and interpersonal [10] factors have shown to be non-negligible predictors of these disorders. Besides, youth depression was found to be impacted by parenting style and parental mental health [11]. Specifically, paternal depression is associated with cognitive vulnerability to depression during middle childhood, a link that was also found with maternal criticism [12], closely related to psychopathological states: depressed mothers, in fact, perceive the behavior of their children more negatively than those who are not depressed [13]. Several studies indicate that stressful life events may have both short-term and long-term effects on the onset as well as on the course of depression [14]. There are also indications that stressful life events interact with gender and timing of pubertal transition [15], and that it may be more significant on the first onset than in the relapse of depressive episodes [16]. Thus, data from cross-sectional and longitudinal studies have documented a clear association between depression and recent stressful life events in adolescents, but also the predictive force of childhood symptoms on subsequent depressive disease [17,18]. However, prevention of depression in these life periods has received little attention in spite of the considerable evidence that depression symptomatology is not simply a transitory condition, but a pernicious form of the disorder that severely impacts with long-term consequences [19,20]. The prevalence of major depression disorders is of 1.9% in childhood and increases to 11.0-7.5% in adolescence (with rates of 3.0-2.3% for more severe conditions), depending on the age of the subjects and the instrument used for the assessment [21-23]. The implications of adolescent depression include developmental lags, suicidality, non-suicidal self-injury, and possible sensitization to recurrent depression [24,25]. Only a few longitudinal studies have nevertheless identified risk factors for emotional distress in adolescents [26] and none addressed screening for risk factors of depression or depressive symptoms. The risk factors for emotional distress in adolescents include environmental factors of school and other demographics, familial factors, and individual characteristics. More specifically, living in a rural as opposed to urban or suburban area, being female, and to have parents receiving welfare were demographic risk factors for emotional distress. Furthermore, feeling disconnected from school and family, combined with low self-esteem and lack of strong religious or spiritual beliefs were also risk factors [27]. Whereas demographic factors are easily identified, feelings of connectedness, spirituality and self-esteem are rather difficult to observe without formal testing. Study of rural adolescents has much to contribute to the field of adolescence and to social policy; recently, in fact, a lot of research about rural youth, within the sociological and psychological literature, has increased. In sociology, there is a long and distinguished tradition of research on rural-urban differences [28], but typically these studies have focused on adults or on the rural population as a whole, with little attention to adolescents as an important subgroup. Conversely, within psychology, adolescents are recognized as a distinct developmental subgroup, but there has been little attempt to determine how and to what extent rural youth differ from their urban and suburban counterparts. From an ecological perspective [29,30], differences would be expected, because rural settings differ from metropolitan settings in important ways, creating distinct contexts for development. Comparisons between rural and non-rural adolescents to date have pointed to several differences that have implications for the development of rural youth. Some of these represent a rural advantage (e.g., in terms of social capital), whereas others suggest that rural youth are at risk. Rural/non-rural comparisons of specific psychological dimensions yield somewhat equivocal findings. Several studies have examined differences in self-image, producing mixed results. Some research [31] found that rural adolescents have lower self-image than do their non-rural counterparts, while previous results did not find any differences [32] or at the opposite end, they found greater self-esteem in rural youth [33]. However, in more recent studies, there are also some suggestions that rural adolescents have more psychological symptoms than non-rural youth, such as depression and anxiety [34]. Indeed, as with metropolitan areas, depression in rural children and adolescents is related to family financial stress and low socioeconomic status [34]. Given that poverty rates are higher in rural areas than in non-rural areas, depression may be of particular concern for rural youth. Thus, based on the scientific literature proposed above, this study aims to investigate psychopathology in children and pre-adolescents resident in a rural context and comparing them to a group of children non-resident in a mountainous area.

Method

Participants and procedure

This study involved the evaluation of 510 children and preadolescents from a rural context, also comparing them with a normative sample of 1201 ones from an urban environment. The first ones (49.8% males, 50.2%

females) attended elementary and middle schools (M_{age} = 8.44; SD = 1.44; ranging 6-11 years) and were recruited from the rural context of Amiata area in Tuscany, while the others were a group of non-residents in a mountainous area, homogeneous by age to the first [35]. Regarding the latter, the Child Behavior Checklist (CBCL) scores reported in the Achenbach manual in its Italian edition were considered [35]. Concerning the "rural" sample, parents and teachers of these children completed, respectively, the Child Behavior Checklist (CBCL) and Teacher's Report-Form (TRF) scales. Each scale requires ten/fifteen minutes to be completed. The teachers completed 502 reports about their students (M_{age} = 8.46; SD = 1.45; age range 6-11), for a total of 255 females (M_{age} = 8.35; SD = 1.43; age range 6-11) and 247 males (M_{age} = 8.57; SD = 1.46; age range 6-11). The parents completed 446 reports about their children (M_{age} = 8.46; SD = 1.46; age range 6-11), for a total of 230 females (M_{age} = 8.37; SD = 1.44; age range 6-11) and 216 males (M_{age} = 8.56; SD = 1.47; age range 6-11): of these, 232 are among those who were also evaluated by a teacher.

Participants were recruited in the schools where data were collected: all the teachers and parents present at the time of administration joined. All participants provided information about age, sex and gender of the youth and completed an informed consent form after the intake assessment.

Measures

The *Achenbach System of Empirically Based Assessment* (ASEBA) [35-37] for school-age children is a standardized instrument including three measures for assessing emotional and behavioral problems: the Child Behavior Checklist (CBCL), Youth Self-Report (YSR), and Teacher's Report Form (TRF).

Specifically, in this study two of these questionnaires were used: the *Teacher's Report Form,* which evaluates behavioral problems that a child may display in school, and the *Child Behavior Checklist*, *i.e.* a parent measure that also evaluates behavioral problems a child may display and was collected at the same time as the TRF, which measures the same constructs. Both are considered to be extremely reliable measures of behavioral problems. Multi- axial system of CBCL and TRF includes a lot of information coming from different sources and it aims to give a complete description of competence and problems of each subject. This multi-axial assessment makes use also of additional instruments such as: neurological test, medical test, cognitive assessment, psychometric assessment and much more. Besides it includes different observers. So, it permits a five-axis evaluation: Axis 1) Parents' information; Axis 2) Teachers' information; Axis 3) Cognitive assessment; Axis 4) Physical conditions; Axis 5) Direct evaluation of subject.

Teacher's Report Form (TRF)

The TRF [36,37] is a behavioral assessment scale which is completed by teachers to obtain his/her perception of child's academic performance, adaptive functioning, and behavioral problems over the past two months in a standardized format. Time required to complete this scale is about ten minutes. The first section of the Teacher Report Form (TRF) requests background information about the student and the respondent's role at the school, and permit to explore the child's adaptive functioning, by asking to rate academic performance and four adaptive characteristics (Working Hard, Behaving, Learning and Happy). The remaining items comprise a behavioral problem checklist. These items consisted of three broad-band scales (Internalizing, Externalizing, and Total Problems) and eight syndrome scales (Withdrawal, Somatic Complaints, Anxious/Depressed, Social Problems, Thought Problems, Attention Problems, Rule-Breaking Behavior, and Aggressive Behavior) [35].

Child Behavior Checklist (CBCL)

The CBCL [35-37] is a standardized form that parents fill out to describe their children's behavioral and emotional problems. The version for ages 4 to 18 years (CBCL/4 to 18) includes competence and problems items. The problem items can be completed by most parents in about 10 minutes, and the (optional) competence items require an additional 5 to 10 minutes. Problem items on the CBCL/ 4 to 18 resemble those on the CBCL/2 to 3, except that parents rate the CBCL/4 to 18 problem items for the preceding 6 months instead of the 2 months specified on the CBCL/2 to 3. Competence items on the CBCL/4 to 18 assess the child's activities, social relations, and school functioning. The data obtained with the CBCL are summarized on a profile that displays the parent's ratings of each item. The profile also displays the child's standing on syndromes of problems that were derived from statistical analyses of CBCL's filled out for large numbers of clinically referred children. Each syndrome consists of problems that were found to occur concomitantly.

Data analysis

The statistical analyses were performed using the SPSS for Windows version 15.0. First, correlations between CBCL scales and TRF scales were calculated using the Pearson's *r* coefficient. Descriptive statistics, including means and standard deviations, were calculated to characterize the total sample and subsamples based on gender variable. Therefore, a One-Sample T-Test statistical analysis was used to compare the CBCL scores between the "rural" youth and the "urban" ones of the normative sample [35]. Moreover, to explore the differences in the CBCL and TRF scores based on gender, an Independent

Samples T-Test was carried out. Results were regarded as statistically significant for p-values < 0.05.

Results

To verify correlation between CBCL and TRF scales we used the Pearson's *r* coefficient. Table I indicates that Total Capacity scale of TRF correlates with Total Competence of CBCL ($r = .24$, $p < 0.01$). TRF's Internalizing scale and CBCL's Internalizing scale demonstrate a sufficient correlation ($r = .16$, $p < 0.01$), instead there is a good correlation among Externalizing scale of each questionnaires ($r = .39$, $p < 0.01$); Total Score of TRF demonstrates a high correlation with Total score of CBCL ($r = .33$, $p < 0.01$). Furthermore, there are negative correlations between Attention Problems scale of CBCL and Working Hard of TRF ($r = -.43$, $p < 0.01$), and between CBCL's Attention Problems and Scholastic Behavior of TRF ($r = -.41$, $p < 0.01$). Finally, the two scales Attention Problem of each questionnaire show a strong correlation ($r = .47$, $p < 0.01$).

In Table II were reported Means and Standard Deviations for the CBCL scores concerning the total sample, while in Table III and IV were showed those of the CBCL and TRF scores regarding the "rural" sub-samples based on gender. Concerning the differences between the rural and normative samples in CBCL scales, the first ($M = 20.83$, $SD = 15.92$) showed significantly lower Total

TABLE I. *Correlations between CBCL scales and TRF scales in the rural sample.*

	CBCL-A	CBCL-SO	CBCL-SC	CBCL-TOT	CBCL-A/D	CBCL-W	CBCL-S/C	CBCL-S/P	CBCL-T/P	CBCL-A/P	CBCL-R/B	CBCL-A/B	INT	EXT	TOT
TRF-Acc/P	.095	.231**	.339**	.205**	-.170**	-.036	-.136**	-.236**	-.169**	-.307**	-.237**	-.116*	-.166**	-.160**	-.233**
TRF-W/H	.056	.204**	.346**	.168**	-.115*	-.060	-.225**	-.190**	-.170**	-.433**	-.313**	-.291**	-.177**	-.325**	-.330**
TRF-B	.023	.156*	.232**	.113*	-.078	-.056	-.106*	-.152**	-.089	-.413**	-.269**	-.293**	-.105*	-.314**	-.276**
TRF-L	.088	.205**	.341**	.200**	-.197**	-.091	-.166**	-.252**	-.197**	-.374**	-.316**	-.205**	-.210**	-.255**	-.311**
TRF-H	-.055	.101	.140**	.034	-.073	-.097	-.079	-.137**	-.064	-.125*	-.097	-.017	-.107*	-.040	-.097
TRF-TOT	.096	.272**	.313**	.236**	-.088	-.049	-.165**	-.195**	-.081	-.405**	-.269**	-.225**	-.137**	-.260**	-.277**
TRF-A/D	-.047	-.121*	-.249**	-.109*	.071	.062	.186**	.164**	.015	.108*	.117	.115	.137**	.127*	.146**
TRF-W	-.085	-.193**	-.269**	-.179**	.054	.075	.219**	.142**	.028	.079	.084	.072	.145**	.083	.115*
TFR-S/C	-.017	-.056	-.177**	-.052	.045	.031	.159**	.121*	.040	.181**	.104*	.083	.102*	.097	.135**
TRF-S/P	-.075	-.177**	-.345**	-.159**	.101*	.079	.139**	.268**	.061	.259**	.194**	.174**	.142**	.196**	.221**
TRF-T/P	-.061	-.148**	-.229**	-.130*	.134**	.107*	.220**	.241**	.116*	.337**	.310**	.320**	.201**	.349**	.331**
TRF-Att/P	-.023	-.184**	-.384**	-.133*	.105*	.027	.168**	.245**	.125**	.472**	.300**	.327**	.139**	.352**	.326**
TRF-R/B	.066	-.132*	-.272**	-.038	.127**	.044	.217**	.188**	.173**	.371**	.295**	.339**	.178**	.361**	.317**
TRF-A/B	.011	-.142*	-.278**	-.081	.090	.027	.169**	.259**	.107*	.365**	.299**	.361**	.130**	.379**	.310**
INT	-.067	-.166**	-.297**	-.151**	.071	.079	.235**	.178**	.026	.128**	.122*	.111*	.162**	.125**	.158**
EXT	.029	-.145**	-.289**	-.071	.106*	.034	.192**	.250**	.132**	.384**	.312**	.371**	.152**	.391**	.327**
TOT	-.028	-.194**	-.384**	-.141**	.115*	.055	.223**	.276**	.116*	.406**	.299**	.324**	.176**	.349**	.329**

*p < .05 **p < .01

TRF-Acc/P: Academic Performance; TRF-W/H: Working Hard; TRF-B: Behaving; TRF-L: Learning; TRF-H: Happy; TRF-TOT: Total of Competence; TRF-A/D: Anxious/Depressed; TRF-W: Withdrawal; TRF-S/C: Somatic Complaints; TRF-S/P: Social Problems; TRF-T/P: Thought Problems; TRF-Att/P: Attention Problems; TRF-R/B: Rule-Breaking Behavior; TRF-A/B: Aggressive Behavior; INT: Internalizing; EXT: Externalizing; TOT: Total of Competence; CBCL-A/D: Anxious/Depressed; CBCL-W: Withdrawal; CBCL-S/C: Somatic Complaints; CBCL-S/P: Social Problems; CBCL-T/P: Thought Problems; CBCL-A/P: Attention Problems; CBCL-R/B: Rule-Breaking Behavior; CBCL-A/B: Aggressive Behavior; INT: Internalizing; EXT: Externalizing; TOT: Total Problems; CBCL-A: Activities; CBCL-SO: Social; CBCL-SC: School; CBCL-TOT: Total of Competence; CBCL-A/P: Attention Problems; CBCL-R/B: Rule-Breaking Behavior; CBCL-A/B: Aggressive Behavior; INT: Internalizing; EXT: Externalizing; TOT: Total Problems

TABLE II. *Comparison of CBCL scores between rural sample and normative sample.*

Variable	mean ± SD		T	P
	Rural sample (N$_{total}$ = 510)*	Normative sample N$_{total}$ = 1201		
CBCL-A	6.14 ± 3.32	6.40 ± 1.75	-1.52	ns
CBCL-SO	6.87 ± 2.24	6.90 ± 2.05	-0.30	ns
CBCL-SC	5.14 ± 0.64	5.20 ± 5.78	-1.88	ns
CBCL-TOT	18.20 ± 5.03	18.60 ± 3.46	-1.56	ns
CBCL-A/D	2.81 ± 2.97	3.25 ± 3.21	-3.11	.01
CBCL-W	1.16 ± 1.59	1.90 ± 1.95	-9.71	.001
CBCL-S/C	1.75 ± 2.13	0.90 ± 1.47	8.37	.001
CBCL-S/P	2.39 ± 2.31	1.95 ± 1.80	3.97	.001
CBCL-T/P	1.00 ± 1.53	0.50 ± 0.95	6.92	.001
CBCL-A/P	3.09 ± 2.98	2.89 ± 3.22	1.40	ns
CBCL-R/B	1.19 ± 1.49	1.39 ± 1.57	-2.88	.01
CBCL-A/B	4.32 ± 4.42	7.58 ± 5.53	-15.53	.001
INT	5.71 ± 5.16	5.91 ± 5.14	-0.80	ns
EXT	5.50 ± 5.38	8.97 ± 6.60	-13.56	.001
TOT	20.83 ± 15.92	23.63 ± 15.56	-3.70	.001

* N$_{range}$: 379-446; Missing responses: N = 46 for the scale CBCL-A; N = 28 for the scale CBCL-SO; N = 18 for the scale CBCL-SC; N = 67 for the scale CBCL-TOT; N = 3 for the scale CBCL-A/D; N = 4 for the scale CBCL-W; N = 4 for the scale CBCL-S/C; N = 3 for the scale CBCL-S/P; N = 3 for the scale CBCL-T/P; N = 3 for the scale CBCL-A/P; N = 4 for the scale CBCL-R/B; N = 4 for the scale CBCL-A/B; N = 4 for the scale INT; N = 4 for the scale EXT; N = 4 for the scale TOT.
CBCL-A: Activities; CBCL-SO: Social; CBCL-SC: School; CBCL-TOT: Total of Competence; CBCL-A/D: Anxious/Depressed; CBCL-W: Withdrawal; CBCL-S/C: Somatic Complaints; CBCL-S/P: Social Problems; CBCL-T/P: Thought Problems; CBCL-A/P: Attention Problems; CBCL-R/B: Rule-Breaking Behavior; CBCL-A/B: Aggressive Behavior; INT: Internalizing; EXT: Externalizing; TOT: Total Problems.

scores than the urban sample (*M* = 23.63, *SD* = 15.56): *t*(442) = -3.70, *p* > 0.001 (see Table II).
Rule-Breaking Behavior scale (t_{441} = -2.88, *p* < 0.01), Aggressive behaviour scale (t_{442} = -15.53, *p* < 0.001), and Externalizing scale (t_{442} = -13.56, *p* < 0.001) were found significantly lower in rural sample (*M* = 1.19, *SD* = 1.49; *M* = 4.32, *SD* = 4.42; *M* = 5.50, *SD* = 5.38, respectively), than in the normative one (*M* = 1.39, *SD* = 1.57; *M* = 7.58, *SD* = 5.53, *M* = 8.97, *SD* = 6.60, respectively). Contrary, significantly higher scores on Somatic Complains scale (t_{441} = 8.37, *p* < 0.001), Social Problems scale (t_{442} = 3.97, *p* < 0.001) and Cognitive Problems scale (t_{442} = 6.92, *p* < 0.001) were shown in the rural sample (*M* = 1.75, *SD* = 2.13; *M* = 2.39, *SD* = 2.31; *M* = 1.00, *SD* = 1.53, respectively), compared whit the normative one (*M* = 0.90, *SD* = 1.47; *M* = 1.95, *SD* = 1.80; *M* = 0.50, *SD* = 0.95, respectively). Finally, in the Anxious/Depressed (t_{442} = -3.11, *p* < 0.01) and Withdrawal (t_{442} = -9.71, *p* < 0.001) scales the rural sample (*M* = 2.81, *SD* = 2.97; *M* = 1.16, *SD* = 1.59, respectively) obtained higher scores than the normative one (*M* = 3.25, *SD* = 3.21; *M* = 1.90, *SD* = 1.95, respectively).

Comparing scores by gender, we found that boys (*M* = 7.10, *SD* = 2.28) obtained higher scores than girls (*M* = 6.66, *SD* = 2.19) on CBCL's Social scale: *t*(416) = 2.02, *p* < 0.05, see Table III). Furthermore, the CBCL's total scores of competence where significantly higher in males (*M* = 18.72, *SD* = 5.07) than in females (*M* = 17.71, *SD* = 4.96): *t*(377) = 1.95, *p* < 0.05. Besides, boys (*M* = 3.59, *SD* = 3.19) showed significantly higher scores in Attention Problems than girls (*M* = 2.62, *SD* = 2.69): *t*(441) = 3.47, *p* < 0.001.
Regarding TRF scales (see Table IV), significant lower scores on Working hard scale (t_{496} = - 2.96, *p* < 0.01), Behaving scale (t_{493} = - 6.71, *p* < 0.001) and Total Competence scale (t_{425} = -3.15, *p* < 0.01) were found in male subsample (*M* = 3.90, *SD* = 1.32; *M* = 3.77, *SD* = 1.24; *M* = 15.76, *SD* = 3.54, respectively), compared with the female one (*M* = 4.24, *SD* = 1.26; *M* = 4.50, *SD* = 1.18; *M* = 16.87, *SD* = 3.71, respectively). Male subsample got mean scores significantly higher on all of TRF syndrome scales, except for Withdrawal. Consistently, no significant gender differences were found in Internalizing scores: *t*(499) = 1.59, *p* = .112.

TABLE III. *Comparison of CBCL scores between male and female youth belonging to the rural sample.*

Variable	Gender		T	P
	Male (N$_{total}$ = 216)*	Female (N$_{total}$ = 230)°		
CBCL-A	6.40 ± 3.38	5.92 ± 3.26	1.45	ns
CBCL-SO	7.10 ± 2.28	6.66 ± 2.19	2.02	.05
CBCL-SC	5.11 ± 0.69	5.17 ± 0.60	-0.91	ns
CBCL-TOT	18.72 ± 5.07	17.71 ± 4.96	1.95	.05
CBCL-A/D	2.77 ± 3.05	2.85 ± 2.92	-0.27	ns
CBCL-W	1.19 ± 1.57	1.14 ± 1.62	0.28	ns
CBCL-S/C	1.68 ± 2.02	1.82 ± 2.23	-0.69	ns
CBCL-S/P	2.48 ± 2.43	2.30 ± 2.20	0.80	ns
CBCL-T/P	1.09 ± 1.53	0.92 ± 1.53	1.21	ns
CBCL-A/P	3.59 ± 3.19	2.62 ± 2.69	3.47	.001
CBCL-R/B	1.30 ± 1.59	1.07 ± 1.38	1.62	ns
CBCL-A/B	4.69 ± 4.53	3.98 ± 4.30	1.69	ns
INT	5.61 ± 4.93	5.81 ± 5.37	-0.40	ns
EXT	5.99 ± 5.58	5.05 ± 5.16	1.85	ns
TOT	21.72 ± 15.75	19.99 ± 16.07	1.15	ns

* N$_{range}$: 183-214; Missing responses: N = 23 for the scale CBCL-A; N = 16 for the scale CBCL-SO; N = 7 for the scale CBCL-SC; N = 33 for the scale CBCL-TOT; N = 2 for the scale CBCL-A/D; N = 2 for the scale CBCL-W; N = 3 for the scale CBCL-S/C; N = 2 for the scale CBCL-S/P; N = 2 for the scale CBCL-T/P; N = 2 for the scale CBCL-A/P; N = 2 for the scale CBCL-R/B; N = 2 for the scale CBCL-A/B; N = 2 for the scale INT; N = 2 for the scale EXT; N = 2 for the scale TOT.

° N$_{range}$: 196-229; Missing responses: N = 23 for the scale CBCL-A; N = 12 for the scale CBCL-SO; N = 11 for the scale CBCL-SC; N = 34 for the scale CBCL-TOT; N = 1 for the scale CBCL-A/D; N = 1 for the scale CBCL-W; N = 1 for the scale CBCL-S/C; N = 1 for the scale CBCL-S/P; N = 1 for the scale CBCL-T/P; N = 1 for the scale CBCL-A/P; N = 2 for the scale CBCL-R/B; N = 1 for the scale CBCL-A/B; N = 1 for the scale INT; N = 1 for the scale EXT; N = 1 for the scale TOT.

CBCL-A: Activities; CBCL-SO: Social; CBCL-SC: School; CBCL-TOT: Total of Competence; CBCL-A/D: Anxious/Depressed; CBCL-W: Withdrawal; CBCL-S/C: Somatic Complaints; CBCL-S/P: Social Problems; CBCL-T/P: Thought Problems; CBCL-A/P: Attention Problems; CBCL-R/B: Rule-Breaking Behavior; CBCL-A/B: Aggressive Behavior; INT: Internalizing; EXT: Externalizing; TOT: Total Problems.

Discussion

The rural environment exposes a series of risk factors for psychiatric disorders that endanger the mental health of its residents [38] and many stressors that are not present in urban areas: geographic isolation, for example, limits social networks and community resources, including healthcare [39]. In particular, the many barriers to obtaining essential mental-health services in rural further areas complicates the early identification and treatment of psychological symptoms. Several studies (see, for a review, Smalley and colleagues [40]) described how the unique characteristics of rural areas contribute to the difficulty in accessing care and services. Rural areas are often less affluent and are less populous: this limits the government allocations and, consequently, the service provisions in schools, which are a traditional avenue for families who would not otherwise receive assistance in mental health. In addition, there is a shortage of mental-health professionals, which tend to be concentrated in urban areas because of client availability and profes-

sional contacts, thereby limiting access of rural residents to needed services. Furthermore, there is often a difficulty in accessing these services both in terms of mobility and financial constraints. Finally, in addition to these "tangible" barriers, there are also the "perceived" ones, such as the limited insight into the usefulness of mental-health services and stigma [41]: the latter is more difficult to fight, because the prejudice towards mental health problems is internalized at such a level that people are convinced that they have to overcome their difficulties alone. This creates a vicious circle in which individuals feel isolated and powerless [42]. It is therefore clear that without better access to mental health care, mental health problems will worsen with negative consequences on the quality of life of patients, their families, and the community [40]. Thus, there is a strong case for the development of a method to identify rural children and adolescents at risk for depression. In an age of cost-effectiveness and time limitations, this article will provide a map to easily identify those adolescents who could benefit from an intervention to prevent depression

TABLE IV. *Comparison of TRF scores between male and female youth belonging to the rural sample.*

Variable	Gender		T	*P*
	Male (N$_{total}$ = 247)*	**Female (N$_{total}$ = 255)°**		
TRF-Acc/P	3.03 ± 0.74	3.07 ±.71	-0.50	ns
TRF-W/H	3.90 ± 1.32	4.24 ± 1.26	-2.96	.01
TRF-B	3.77 ± 1.24	4.50 ± 1.18	-6.71	.001
TRF-L	4.07 ± 1.24	4.15 ± 1.24	-0.65	ns
TRF-H	3.99 ± 0.78	4.10 ± 0.89	-1.32	ns
TRF-TOT	15.76 ± 3.54	16.87 ± 3.71	-3.16	.01
TRF-A/D	2.52 ± 3.32	1.95 ± 2.79	2.10	.05
TRF-W	1.16 ± 2.02	1.22 ± 2.19	-0.29	ns
TFR-S/C	0.53 ± 1.18	0.27 ± 0.71	3.03	.01
TRF-S/P	1.77 ± 2.58	1.31 ± 2.33	2.10	.05
TRF-T/P	0.52 ± 1.27	0.26 ± 1.02	2.50	.05
TRF-Att/P	8.92 ± 9.88	4.65 ± 7.69	5.39	.001
TRF-R/B	1.72 ± 2.47	0.76 ± 1.81	4.93	.001
TRF-A/B	4.02 ± 6.45	1.47 ± 3.54	5.50	.001
INT	4.19 ± 5.43	3.46 ± 4.74	1.59	ns
EXT	5.64 ± 8.36	2.24 ± 4.92	5.51	.001
TOT	21.45 ± 23.58	12.34 ± 18.17	4.83	.001

* N$_{range}$: 212-247; Missing responses: N = 3 for the scale TRF-Acc/P; N = 3 for the scale TRF-W/H; N = 4 for the scale TRF-B; N = 5 for the scale TRF-L; N = 35 for the scale TRF-H; N = 35 for the scale TRF-TOT; N = 1 for the scale INT; N = 1 for the scale EXT, N = 1 for the scale TOT;

° N$_{range}$: 214-255; Missing responses: N = 2 for the scale TRF-Acc/P; N = 1 for the scale TRF-W/H; N = 3 for the scale TRF-B; N = 5 for the scale TRF-L; N = 40 for the scale TRF-H; N = 41 for the scale TRF-TOT; N = 1 for the scale TOT.

TRF-Acc/P: Academic Performance; TRF-W/H: Working Hard; TRF-B: Behaving; TRF-L: Learning; TRF-H: Happy; TRF-TOT: Total of Competence; TRF-A/D: Anxious/Depressed; TRF-W: Withdrawal; TRF-S/C: Somatic Complaints; TRF-S/P: Social Problems; TRF-T/P: Thought Problems; TRF-Att/P: Attention Problems; TRF-R/B: Rule-Breaking Behavior; TRF-A/B: Aggressive Behavior; INT: Internalizing; EXT: Externalizing; TOT: Total Problem.

and/or further monitor for depressive symptom development. Amiata, the location of this study, represents a large and important area characterized by a rural way of life, in a central region of Italy. This research provides that, in the rural sample, there are good correlations between CBCL and TRF scales, so information given by teachers and parents are in line with each other.

Compared to the normative sample, we found that CBCL's total scores indicates a lower level of psychological diseases among rural youth, although some scales are more problematic in this latter sample: more specifically, Amiata's sample got higher scores on Social Problems, Cognitive Problems and Somatic Complaints scales. These can be read as expression of a discomfort that could be lower or latent in rural childhood and may become relevant in adolescence. In other words, the myth that rural life is idyllic and stress-free has begun to be dispelled [43] or conceptualized as a protective factor only in very first years of a children life: stressful life events that are commonly experienced by rural families were positively associated with feelings of depression and worthlessness. Indeed, a previous study about rural way of life by Burgassi and colleagues [31] shows significant levels of depression in middle school students, specifically in scores of irritable mood, insecurity, low self-esteem and guilt. Furthermore, it also highlighted that parents reported a lower level of problems than their children, a result that could indicate a tendency to minimize and speak less about mental suffering in rural environments [44]. Consistently, scientific literature [45] reported higher levels of depressive symptoms in rural adolescents than urban peers, and this appears to be related to personal and interpersonal variables, such as gender, low family support, parent-child conflict, negative friend behaviors and negative peer relationships.

Furthermore, data showed that scores on Aggressive Behavior and Externalizing scales were inferior than in the normative sample; it demonstrates that our rural sample should be less action oriented, in accordance with previous research [31].

Comparing male and female subsample we have discovered that Amiata's girls obtained lower total score at TRF and CBCL syndrome scales. This is not in line with literature [5]: perhaps it demonstrates better girl's strategies to handle possible difficulties of rural environment. Furthermore, girls have demonstrated better academic competence that could be considered as protection factors for emotional and behavioral disorders [46].

This research has several limitations that should be considered. First, a unique and coherent definition of "rural" has not been established yet [47]: the present study determined rurality on the basis of geographical and social characteristics. However, this limit could hamper the generalizability of the results and future research could overcome this problem with more varied rural samples and cross-cultural analyses. Furthermore, the rural sample of this study was compared with a normative urban one. Future research could get two different samples (rural and urban) in a common period of time and longitudinally or cross-sectionally analyse them. Finally, in light of the stigma against mental health problems documented by the scientific literature in rural environment (*e.g.,* Parr and colleagues [44]), it is important to highlight that social desirability bias have not been controlled, so participants may have tried to give answers that would make them look good to the researcher. However, the results seem to show coherence between the different perspectives (*e.g.,* teachers and parents) and they underline several problem areas on which it may be important to intervene. Indeed, as discussed above, the adolescent period is a vulnerable to depression and this risk is exacerbated in rural environments [45]. Hence, early interventions focusing on the first symptoms that this study highlighted in the childhood and pre-adolescence phases could be fundamental to prevent subsequent more serious disorders.

Conclusions

In conclusion, the comparisons between parents' reports and the one given by others, such as teachers, seem to be helpful for assessing the consistency of problems on syndromes such as an anxiety/depression, somatic complaints, and attention problems to document the need for medical assessment or referral for mental health services. Specifically, in the present study, correlations between the CBCL and TRF scales have demonstrated the capability of the two forms to identify children's behavioral and emotional problems. Moreover, Amiata children have showed higher levels of somatic complaints, together with social and thought problems. This suggests that some aspects of adolescent depression may have origins in youth problems linked to a rural context of life.

Ethical consideration
The study was conducted in accordance with the recent and international ethical standards for research involving human subjects.

Conflict of interest
The Authors declare no conflict of interest

Author contributions
Conceptualization: AG and MG;
Methodology: AG, MG and ET;
Formal analysis: ET and AG;
Investigation: AG, MC, MG, YL, CB, CM, PG, GM and MC;
Data curation: CB, CM, PG, GM and MC;
Writing – original draft preparation: GP, EDS and ET;
Writing – review and editing: ET, AG and YL;
Supervision: AG, MG, GC and MC
All authors have read and agreed to the published version of the manuscript.

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