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ORIGINAL PAPER

Evaluating Psychological Distress in adolescence: The Italian Validation of the Social Emotional Distress Scale-Secondary Level

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Abstract
Social-emotional distress during school years is associated with negative effects on mental health. Schools are an important context for screening social and emotional problems. Therefore, there is a need for a brief, valid and reliable assessment tool that can be used in the school setting to detect social-emotional problems at an early stage. The aim of the present study was to validate the Social Emotional Distress Scale - Secondary Level (SEDS-S) and to examine its psychometric properties and invariance across sex and time in an Italian sample of adolescents. Participants were 1210 (57.7% female) high school students aged 15–18 years (M = 16.40, SD = 1.12) who gave valid responses on the SEDS-S at baseline (T0), 858 of whom completed the questionnaire after an interval of 5 months (T1). The results confirmed the one-factor structure of the SEDS-S, which also showed good reliability and stability over time as well as invariance by sex and across time points. When examining between-sex differences, we found that girls exhibited higher social-emotional distress than boys. A strong correlation with emotional problems provided support for convergent validity, while discriminant validity resulted from the modest and weak correlations with externalising symptoms as well as the negative association with well-being. Overall, the results support the validity of the Italian version of the SEDS-S as a suitable school-based assessment tool for measuring social-emotional problems for screening purposes during school years.

Keywords Social-emotional distress · School-based assessment · Factor analysis · Adolescence

Introduction

Adolescence is a sensitive period during which individuals undergo biological and physiological changes related to the timing of puberty. These changes affect social and emotional processes, peer relationships, and academic performance, and contribute to the development of adolescents' beliefs and self-assessments (Harter, 2012; Jones et al., 2014). Social-emotional distress is defined as a state of discomfort caused by difficulties in coping with emotions, understanding social situations, and establishing or maintaining healthy relationships. These difficulties also include feelings of rejection, exclusion, and problems with regulating emotions (Rapee et al., 2019; Williams, 2009). Studies have shown that social-emotional distress negatively impacts mental health by predicting anxiety, depression, and behavioural problems such as hyperactivity, attention issues, or antisocial behaviour, as well as the co-occurrence of mental disorders at both subclinical and clinical levels in adolescence (Rapee et al., 2019; Speyer et al., 2022). However, adolescents can develop and improve their social-emotional skills and well-being through interaction with important environments such as school. Recently, increasing attention has been directed to school age as a particularly vulnerable period for students, marked by significant developmental changes across multiple domains. During this phase, the risk of developing psychological issues peaks, especially for adolescents exposed to stressful life events within and

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outside school environments. This evidence highlights the urgent need for a school-based screening plan and targeted psychological support in educational settings for these at-risk population (Matucci, 2021; Sisk & Gee, 2022). Indeed, it is increasingly recognised that school is an important place where screening can be carried out to immediately identify emotional problems that often go unrecognised and have a negative impact on mental health (Lyon et al., 2024; Moksnes et al., 2016; Weist et al., 2007). Given the importance of social-emotional skill development during the school years and its role in predicting various mental health and educational outcomes (De Fruyt et al., 2015; De la Barrera et al., 2019; Speyer et al., 2022), early detection of social-emotional problems using a meaningful and brief tool for school administration could positively impact reducing adolescent stress and increasing well-being.

Following the COVID-19 pandemic, which has greatly contributed to an increase in mental distress among adolescents with negative consequences for their mental health, life satisfaction and well-being, recent studies have focused on mental health in schools, particularly emphasizing the need to introduce early mental health screening in schools based on meaningful self-report, i.e. questions about distress and well-being (Dowdy et al., 2018; Furlong et al., 2022).

Therefore, brief and quick school-based assessment tools are needed for early detection of social-emotional problems in the school context (Moffa et al., 2018; Spence & Rapee, 2022). Considering that Italy, as well as other European countries, has been severely affected by the pandemic and, as a consequence, the number of mental disorders among young people is increasing, and that, to our knowledge, no previous studies have validated school-based screening instruments for adolescent mental health, the current study aims to validate the Social Emotional Distress Scale-Secondary (SEDS-S; Dowdy et al., 2018), a brief (10 items) and school-based assessment tool for social-emotional problems in Italian adolescents.

Adolescent's Mental Health: The Role of Social-Emotional Distress and Sex Differences

The incidence of the most common diagnosable mental health problems during adolescence—such as anxiety, depression, eating disorders, addictions, suicide attempts, and self-harm—is around 20%, with half of all mental health disorders occurring by age 14 (Burstein et al., 2019; Costello et al., 2006; Twenge et al., 2019; WHO, 2020). Furthermore, unrecognized or subclinical mental health problems are estimated to have the highest prevalence among adolescents, and only a third of adolescents receive the necessary psychological support (Merikangas, 2018; Deighton et al., 2019). Recently, the prevalence of psychosocial problems during adolescence has become concerning (Daniunaite et al., 2021) because it has increased after the COVID-19 pandemic and because emotional issues—such as feelings of loneliness and problems with peer relationships—and behavioural problems are strongly associated with later negative outcomes, including suicide attempts, antisocial behaviour, and addictive behaviours (Fegert et al., 2020; Martinsone et al., 2022; Pedrini et al., 2022; Viner et al., 2020). Studies have shown that Italian adolescents with high levels of social-emotional distress during the pandemic were more prone to significant mental health problems, including internalizing and externalizing symptoms (Grazzani et al., 2022; Martinsone et al., 2022). However, empirical studies have mostly focused on psychopathological symptoms and not on their precursors, such as social-emotional distress, which has been insufficiently investigated. In addition, the assessment of social-emotional distress is derived from the clinical domains of internalizing and externalizing syndromes (Furlong et al., 2014) and not based on meaningful high-school students' self-report, such as questions about distress and well-being (Dowdy et al., 2018; Furlong et al., 2022).

While sex differences in internalizing and externalizing symptoms have been demonstrated, with girls showing higher levels of internalizing symptoms such as anxiety and depression and boys reporting more externalizing behaviours (Achenbach, 2019; WHO, 2020), the evidence for sex differences in the social-emotional aspects of stress is even more mixed (Martin-Ruiz et al., 2023). Some studies have shown that female adolescents have more difficulty communicating and expressing their feelings, while others have found no differences between the sexes. Nevertheless, studies indicate that, compared to males, female adolescents are more likely to be aware of their emotional problems and to perceive and understand the problems of others (Martin-Ruiz et al., 2023; Portela-Pino et al., 2021), which may be associated with a higher risk of developing emotional problems (Martin-Ruiz et al., 2023; Schoeps et al., 2019). Such conflicting results depend primarily on how social-emotional distress is assessed in adolescence (Abrahams et al., 2019; Halle & Darling-Churchill, 2016).

Assessment of Social-Emotional Distress

In a post-pandemic context, a systematic assessment of social-emotional distress is needed to enable its early detection, which is an important precursor to mental health during school years. However, previous studies have used measures derived from clinical domains of psychopathology to assess social-emotional functioning (Abrahams et al., 2019; Halle & Darling-Churchill, 2016) in children and adolescents (Furlong et al., 2014), such as internalizing

and externalizing domains. Examples include the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997), the Revised Child Anxiety and Depression Scale (RCADS; Chorpita et al., 2005), and the Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977). Although these tools are widely used in clinical and research settings for both screening and diagnosis, they were not developed for use in schools to assess internal emotional distress based on how high school students perceive their internal states.

Since school is the primary environment in which adolescents can express and develop their social-emotional skills (Furlong et al., 2022), the assessment of social-emotional disorders should take place at school. Recently, despite the implementation of a school-based universal mental health program in six European countries, including Italy, to improve social-emotional skills and prevent distress (Cefai et al., 2022), the prior assessment of social-emotional distress and skills for identifying adolescents at different risk levels and systematically monitoring the program's effectiveness is not school-based but relies on measures that do not originate from school environments (Dowdy et al., 2018; Furlong et al., 2022). In the school setting, short and quick measures should be favoured for easy screening. Dowdy et al. (2018) developed and validated the Social Emotional Distress Scale-Secondary (SEDS-S; Dowdy et al., 2018), a 10-item instrument designed to assess social-emotional distress specifically in secondary school students. This instrument contributed to the two-factor model of mental health in relation to the distress-related construct, alongside validated measures of life satisfaction and well-being. The two-factor model of mental health includes, indeed, a balance between well-being and health and distress and illness, both of which need to be considered for universal school-based mental health screening. The authors demonstrated its good psychometric properties. In addition, the SEDS-S is based on a non-pathological approach that helps to investigate the antecedents of psychopathological syndromes.

Recently, the SEDS-S was also validated by Rodriguez-Jimenez et al. (2024) in Spanish adolescents, demonstrating its one-factor structure with good reliability and providing evidence of its invariance across both sex and time. Moreover, the authors demonstrated convergent validity with internalizing and externalizing symptoms, and discriminant validity with variables related to well-being and life satisfaction which are measured as separate constructs related to distress according to the two-factor model of mental health. In addition, the authors presented normative data for Spanish populations, which aligns with Furlong et al. (2022) for United States adolescents. Furlong et al. (2022) originally indicated the use of 50-25-25 percentile cut-scores to identify adolescents at low, middle, and high risk of social and emotional distress based on SEDS-S scores. Specifically, they identified adolescents with scores between 10 and 19 (within the 50th percentile) as being at low risk, those with scores between 20 and 26 (within the next 25th percentile, corresponding to the 75th percentile) as at middle risk, and those with scores between 27 and 40 (within the next 25th percentile, corresponding to above the 90th percentile) as at highest risk.

Since the normative data distribution of the Spanish adolescent sample was similar to the US sample (Furlong et al., 2022) Rodriguez-Jimenez et al. (2024) applied the same logic in using SEDS-S normative data for screening purposes.

To our knowledge, there are no other studies that have validated the SEDS-S in European countries, including Italy.

The Current Study

The present study aims to investigate the psychometric properties of the SEDS-S in a large sample of Italian adolescents. First, we expected to replicate the one-factor structure of the SEDS-S found in previous studies (Dowdy et al., 2018; Furlong et al., 2022; Rodriguez-Jimenez et al., 2024). Second, we wanted to test measurement invariance between sexes and over time and to compare results between sexes, expecting female participants to score higher on general psychological stress compared to male participants, in line with previous studies (Martin-Ruiz et al., 2023; Portela-Pino et al., 2021; Schoeps et al., 2019). Third, consistent with the theoretical framework of the two-factor model of mental health, we aimed to demonstrate convergent validity by expecting significant associations between SEDS-S scores and established measures of psychopathological vulnerability factors, i.e., specific subscales of the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997) and Difficulties in Emotion Regulation Scale-Short Form (DERS-SF; Kaufman et al., 2016; Rossi et al., 2023), as well as divergent validity with measures of well-being and life satisfaction. Finally, we expected that the normative data for Italian adolescents would be consistent with previous studies (Furlong et al., 2022; Rodriguez-Jimenez et al., 2024), further supporting the SEDS-S as a valuable tool for screening and prevention purposes.

Method

Participant and Procedure

An initial cohort of high school students (N = 1368; 56.9% females) was included and enrolled in a longitudinal project (Donisi et al., 2024). The schools were selected from

northern Italy (Lombardy and Veneto Region), central Italy (Umbria and Marche Region) and southern Italy (Sicily Region) on a voluntary basis and/or based on previous collaborations. Different type of schools (i.e., lyceums, vocational and technical college) were involved. The data analysed for the present study came from participants who provided valid data at the first measurement (T0, i.e., baseline; N = 1210; 57.7% female) and were between 15 and 18 years old (M = 16.40, SD = 1.12). Participation was voluntary and participants or parents (for minors) were asked for written informed consent. All students gave their verbal consent. Participants provided data also for a second measurement occasion. Data were collected between November 2023 and May 2024, with around 5 months (Donisi et al., 2024) between the first (T0) and second (T1) measurement time points. At T1, 858 adolescents provided valid data from T0 to T1. Due to the dropout rate at T1, we checked the mean values of the SEDS-S between the participants who also provided data for T1 and those who dropped out of the study and found no significant differences ($F_{(1, 1207)} = 0.09$, $\eta^2 = 0.00$, $p > 0.05$. We also examined the differences in all design variables and in the available sociodemographic information (see Table S1 in the supplementary material). No significant differences were found.

Ethical Approval

The study was conducted in accordance with the guidelines of the Declaration of Helsinki and was approved by the Regional Ethical Committee of Umbria, Italy (Prot. N. 27844/23/AV, November, 28, 2023). Participation was voluntary, and participants or parents (for minors) were asked for written informed consent. All students gave their verbal consent.

Measures

The Social Emotional Distress Scale-Secondary (SEDS-S)

The SEDS-S (Dowdy et al., 2018) is a 10-item instrument for internalising distress, i.e., anxiety-related (e.g., item 2: "I worried that I would embarrass myself in front of others") or depression-related dimensions (e.g., item 5: "I felt sad and down") on a 5-point Likert scale. Previous studies found SEDS-S to be highly reliable with internal consistency values, both Cronbach's alpha and Omega, above 0.85.

With the copyright holder's permission, the questionnaire was translated into Italian by following back-translation procedures, in accordance with the guidelines suggested by the International Test Commission (2017). In particular, the SEDS-S was translated into Italian separately by a native English speaker and a native Italian speaker. These two versions were independently back-translated into English by two Italian experts in English language and psychology. Discussion of the differences between these four versions did not lead to any changes. The Italian version was then pilot tested with. with 28 adolescents aged 14–18 years old. The adolescents reported that they had no difficulty in understanding the items of the scale. There were no specific problems with the wording of the items.

To better highlight the differences between SEDS-S and other instruments commonly used to assess social-emotional disorders such as SDQ, CES-D, or RCADS a supplementary table has been included in the appendix, reporting their scope, administration time, and clinical relevance (Table S3).

The Difficulties in Emotion Regulation Scale-Short Form (DERS-SF)

The Italian-adapted version of DERS-SF (Kaufman et al., 2016; Mancinelli et al., 2024; Rossi et al., 2023) is an 18-item self-report scale that measures six emotion dysregulation-related dimensions: awareness, non-acceptance, goal, strategy and impulse. Items are rated on a 5-point Likert scale (from 1 = "almost never", to 5 = "almost always"). The total score captures the overall level of emotion dysregulation. Omega values were between 0.76 and 0.91 for the subscales and 0.95 for the total score (Mancinelli et al., 2024). The instrument has generally shown good psychometric properties in Italian samples (Mancinelli et al., 2024; Rossi et al., 2023). We found a good internal consistency (Omega = 0.87).

The Strength and Difficulties Questionnaires (SDQ)

The Italian-adapted version of the SDQ (Di Riso et al., 2010) comprises 25- items, which are measured on a three-point Likert scale (0 = "Not True," 1 = "Somewhat True," and 2 = "Certainly True"). The SDQ contains five subscales that measure emotional problems, behavioural problems, hyperactivity, peer relationship problems and pro-social behaviour. Previous studies have confirmed good psychometric properties (Essau et al., 2012) in Italian youth samples, with an overall satisfactory internal consistency for the self-reported version (Capron et al., 2007; Di Riso et al., 2010) with Cronbach's alphas ranging from 0.54 (i.e., peer problems) to 0.72 (i.e., hyperactivity/attention). For the current study we considered subscales of emotional problems (SDQ-Emo), behavioural problems (SDQ-Con), hyperactivity (SDQ-Hyp), peer relationship (SDQ-Peer) that reached acceptable Omega coefficients ranging from 0.54 (SDQ-Con) and 0.75 (SDQ-Emo).

The Satisfaction with Life Scale (SWLS)

The Italian-adapted version of SWLS (Di Fabio & Busoni, 2009; Di Fabio & Gori, 2016; Diener et al., 1985) is a 5-item instrument for measuring global subjective well-being and life satisfaction on a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). It has shown good psychometric proprieties with good Cronbach's alpha of 0.85 (Di Fabio & Gori, 2016; Mirandi et al., 2024; Valenti & Faraci, 2024). For the present study, the Omega was 0.85.

Statistical Analysis

The data were analysed with IBM SPSS version 25 (IBM Corp Released, 2017) and the statistical framework R (R Core Team, 2019) within the software JASP Team (2024). The data were normally distributed (Skew values $\leq |2|$ and Kurtosis $\leq |7|$; Kim, 2013; West, 1995); further, no univariate outliers were found.

First, a confirmatory factor analysis (CFA) was performed to test the one-factor structure of the SEDS-S items using the Lavaan package (Rosseel, 2012) for R. We used a robust estimator suitable for modelling ordinal data (WLSMV; Li, 2021). Several goodness-of-fit indices were used (Hu & Bentler, 1999): Chi-square statistic (χ^2), Comparative Fit Index (CFI; >0.95), Tucker–Lewis Index (TLI; >95), Root Mean Square Error of Approximation (RMSE; <0.08), and Standardized Root Mean Square Residual (SRMR; <0.08). Hair et al. (2013) recommended that the factor loading indices should be higher than 0.50 (ideally $\geq$0.70). Structural equation modelling was used to assess measurement invariance across sex and time.

Second, we compared successive levels of measurement invariance with additional and more progressive equality constraints across sex and the two measurement time points (T0-T1), respectively: configural, metric, scalar and strict invariance (Putnick & Bornstein, 2016; Tse et al., 2024; Wu & Estebrook, 2016). The criteria for determining measurement invariance are as follows (Bikos, 2022; Chen, 2007; Putnick & Bornstein, 2016): $\Delta\chi 2$ $p>0.05$, ΔCFI ≤ 0.01, ΔTLI ≤ 0.01, ΔRMSEA ≤ 0.015, and ΔSRMR ≤ 0.03 (for metric invariance) or ΔSRMR ≤ 0.015 (for scalar and strict invariance). Changes in fit indices above these values were indicative of non-invariance. Missing data across the two measurement occasions were handled using the default pairwise approach when the WLSMV estimation method was implemented. The pairwise approach enables the use of all available complete data for each specific analysis. (Asparouhov & Muthén, 2010).

Then, the mean differences across sexes and the test–retest correlations between the two time points were examined. The McDonald omega coefficient (ω) was preferred over Cronbach's alpha and used to test the internal consistency of the SEDS-S factor, as it allows for different loadings. Both convergent and divergent validity were examined within the CFA measurement model (Devlieger & Rosseel, 2017) by regressing the other variables on the factor, i.e., emotion dysregulation and internalizing symptoms for convergent validity and externalizing symptoms, life satisfaction, and well-being for divergent validity. Finally, the normative data for SEDS-S were calculated by age and sex and presented in percentiles.

Results

Confirmatory Factor Analysis (CFA) of SEDS-S

The results of the CFA confirmed the one-factor structure of the SEDS-S items (Fig. 1), and acceptable fit indices were observed ($\chi^2=253.28$, df=35, $p<0.001$; CFI=0.98; TLI=0.98; RMSEA=0.07; 95% CI [0.06–0.08]; SRMR=0.05). Table 1 shows descriptive statistics for SEDS-S items and factor loadings, all of which are above 0.50 (Fig. 1). Before testing for measurement invariance, we performed the CFA separately by sex and time points (see Table S2 in the supplementary material).

Measurement Invariance and Mean Differences Across Sex and Time

The measurement invariance of the one-factor structure of the SEDS-S was tested both between sex and longitudinally between the two measurement time points. In both cases, full configural, metric, scalar and strict invariance were confirmed (Table 2).

Descriptive Statistics, Internal Consistency, Test–Retest Stability and Construct Validity

The mean and standard deviation of the SEDS-S factor were determined for the entire sample, by sex and time (Table 3). We found both a significant difference in SEDS-S total scores by sex, with girls having higher mean scores than boys ($F=183.49$, $\eta^2=0.13$, $p<0.001$), and between the two time points ($F=14.19$, $\eta^2=0.02$, $p<0.001$), with slightly higher mean scores at 5 months. Omega coefficients were good ranging from 0.89 (T0) and 0.91 (T1) and from 0.86 (males) to 0.89 (females), with values above 0.85. We found an adequate test–retest correlation.

As to construct validity we found strong positive associations between SEDS-S, DERS-SF and the SDQ Emotional Problems subscale, but low to-moderate positive associations with the SDQ Peer Problems and Externalizing

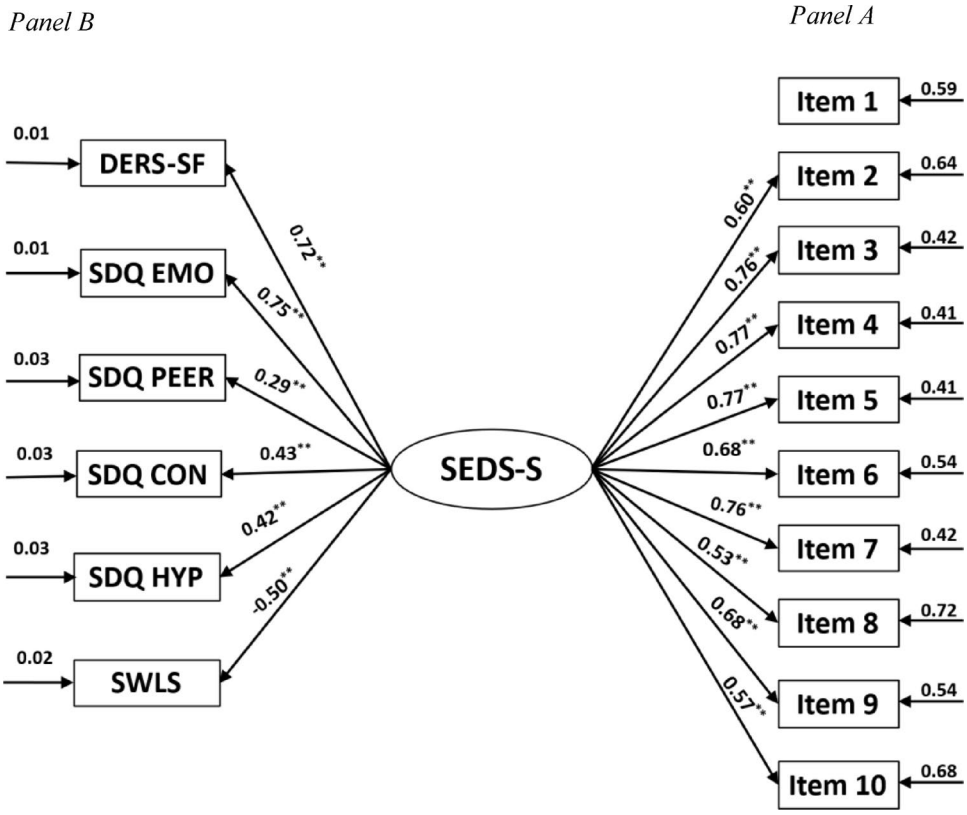

Fig. 1 Structural model of SEDS-S related items (Panel A) and path diagram of standardized regression coefficients of SEDS-S predicting SDQ subscales, DERS-SF and SWLS (Panel B). *Note:* SEDS-S, Social Emotional Distress Scale; DERS-SF, Difficulties in Emotion Regulation Scale-Short Form; SDQ, Strength and Difficulties Questionnaires; SWLS, Satisfaction with Life Scale; EMO, emotional problems; PEER, peer relationship problems; CON, Conduct problems; HYP, Hyperactivity; *$p<0.05$, **$p<0.01$

Table 1 Descriptive statistics of SEDS-S items and standardized factor loadings

Items	Mean (SD)	Skew	Kurtosis	Standardized factor loadings
1. I had a hard time breathing because I was anxious	1.83 (1.01)	0.94	−0.36	0.64
2. I worried that I would embarrass myself in front of others	2.48 (1.06)	0.09	−1.22	0.60
3. I was tense and uptight	2.74 (1.02)	−0.19	−1.14	0.77
4. I had a hard time relaxing	2.42 (1.06)	0.12	−1.21	0.77
5. I felt sad and down	2.53 (1.08)	0.01	−1.27	0.77
6. I was easily irritated	2.55 (1.07)	−0.01	−1.26	0.68
7. It was hard for me to cope, and I thought I would panic	2.16 (1.06)	0.46	−1.04	0.76
8. It was hard for me to get excited about anything	1.80 (0.93)	0.92	−0.14	0.53
9. I was easily annoyed and sensitive	2.59 (1.06)	0.06	−1.21	0.67
10. I was scared for no good reason	1.86 (1.00)	0.88	−0.43	0.56

All factor loadings are significant at $p<0.001$

Symptoms. Finally, a moderate negative association was found with the SWLS (Fig. 1).

Normative Data and Relative Cut-Scores

Table 4 presents centiles and standardized T scores for the total sample, as well as by age and sex. Since the distribution of normative data is similar to those reported by Furlong et al. (2022) and Rodriguez-Jimenez et al. (2024), we identified the three-risk cut-scores using the same 50-25-25 percentile logic. Specifically, adolescents are classified as low risk with scores between 10 and 21 (within the 50th percentile), as middle risk with scores between 22 and 27 (within the next 25th percentile, i.e., up to the 75th percentile), and as highest risk with scores between 28 and 40 (within the next 25th percentile, i.e., above the 90th percentile).

Discussion

In the post-pandemic era, as youth mental distress increases, it is urgent to have valid, brief, school-based tools capable of early identification of distress symptoms for referral to support and assistance services. The current longitudinal study contributed to demonstrate the psychometric properties of the SEDS-S (Dowdy et al., 2018) a brief and school-based tool for mental health screening in a large sample of

Table 2 Measurement invariance across sex and time: Multigroup structural equation model

Model	$\chi^2(df)$	CFI	TL1	RMSEA [90% CI]	SRMR	$\Delta\chi^2_{(DF)}$	ΔCFI	ΔRMSEA	ΔSRMR
Sex									
Config. invariance	280.10 (70)	0.97	0.97	0.07 [0.06–0.08]	0.06				
Metric invariance	291.77 (79)	0.97	0.97	0.06 [0.06–0.07]	0.06	11.67 (9)	0.00	0.03	0.00
Scalar invariance	291.77 (88)	0.98	0.97	0.06 [0.05–0.07]	0.06	0.00 (9)	−0.00	0.05	0.00
Strict invariance	406.60 (108)	0.97	0.97	0.06 [0.06–0.07]	0.07	114.83 (20)	0.01	0.01	0.01
T0-T1									
Config. invariance	338.83 (70)	0.98	0.98	0.06 [0.06–0.07]	0.05				
Metric invariance	348.43(79)	0.98	0.98	0.06 [0.06–0.07]	0.05	9.59 (9)	0.00	0.00	0.00
Scalar invariance	348.43(88)	0.98	0.98	0.06 [0.05–0.06]	0.05	0.00 (9)	0.00	−0.00	0.00
Strict invariance	352.98(98)	0.98	0.98	0.05 [0.05–0.06]	0.05	4.56 (10)	0.00	−0.01	0.01

Girls = 698, Boys = 512; T0-T1 = 858; p > .05 for all values

Table 3 Mean and standard deviations of SEDS-S in total sample and by sex and time

Sample	Mean (SD)
Total sample (T0 + T1)	22.87 (7.43)
Girls	25.16 (7.40)
Boys	19.73 (6.24)
T0	22.92 (7.43)
T1	23.65 (7.65)

Italian high school students. First, results demonstrate the one-factor structure of the SEDS-S and support its configural, metric, scalar, and strict invariance across sex and time points, indicating its suitability for a systematic investigation of the similarities and differences of the latent construct both across sexes and time points. Measurement invariance refers to item score distributions, given the level of an underlying latent construct, being independent of time points for longitudinal invariance or sex (Millsap, 2012). That is, after accounting for changes in latent trait levels across time or sex, an individual's scores should not depend on the time point or whether they are male or female (Kim & Willson, 2014; Murray et al., 2019). This is especially important when considering developmental periods such as adolescence (Murray et al., 2019). Thus, our results supporting measurement invariance across time and sex allow clinicians and researchers to implement the SEDS-S to effectively detect social emotional distress among adolescents aged 15 to 18 years, as well as among males and females independently, to examine specific manifestations of mental health and use normative data aligned by age and sex.

In line with previous studies (Martin-Ruiz et al., 2023; Portela-Pino et al., 2021; Schoeps et al., 2019) we found that female adolescents reported higher social-emotional distress compared to males. These results seem to confirm that female adolescents are more aware of their emotional problems and are more likely to express them compared to male adolescents and are also more sensitive to distress and rejection by other peers (Morken et al., 2023; Yoon et al., 2023).

Our results confirmed an overall adequate temporal stability of SEDS-S scores over a 5-month period, with slightly higher scores after five months (Demkowicz et al., 2024). Consistently with previous studies, social-emotional distress remains stable overall over short time intervals (Danneel et al., 2019; Demkowicz et al., 2024).

In line with previous studies (Dowdy et al., 2018; Furlong et al., 2022; Rodriguez-Jimenez et al., 2024), we found convergent validity of the SEDS-S with the scales for emotional disorders and discriminant validity with behavioural problems and well-being. These findings emphasise the negative impact of social-emotional distress on the process of emotion regulation, as it is likely to impair the emotional coping strategies that develop in early adolescence (Rapee et al., 2019). In addition, the results contribute to extending the vulnerability model of the development of internalizing symptoms by suggesting that social-emotional distress should be considered a potential predictor of internalizing symptoms, given their strong association measured within the structural model through regressions: the higher the social-emotional distress, the higher the internalizing symptoms (Grazzani et al., 2022; Martinsone et al., 2022).

Our findings provide new insights into construct validity, with conduct problems showing a weak positive association with social-emotional stress, suggesting that behavioural or hyperactivity-related constructs underlie other dimensions such as cognitive impairment and neurobiological factors beyond those captured by the SEDS-S, which are mainly related to anxiety and emotional processes (Dowdy et al., 2018; Johnson & Wolke, 2013). Contrary to expectations, we found discriminant validity of the SEDS-S with the Peer relationship problems subscale of the SDQ, i.e., a small correlation, suggesting that the two measures might reflect distinct latent constructs Specifically, the SEDS-S appears to be more related to internal distress, such as anxiety, social anxiety, and emotional symptoms (Dowdy et al., 2018), i.e., I was tense and uptight, than to interpersonal distress, such as general peer relationship problems, i.e., Gets along better with adults than with other children/young

Table 4 Normative data for SEDS-S in non-clinical adolescents: Total sample and age by sex centiles scores and T scores (M = 50, SD = 10)

Raw scores	Total sample		15				16				17				18			
			Girls n = 224		Boys n = 166		Girls n = 206		Boys n = 168		Girls n = 184		Boys n = 139		Girls n = 190		Boys n = 133	
	Per-centiles	T	Per-centiles	T	Per-centiles	T	Per-centiles	T	Per-centiles	T	Per-centiles	T	Per-centiles	T	Per-centiles	T	Per-centiles	T
10	3	32	3	31	4	32	3	31	4	32	3	31	3	31	4	33	4	32
11	5	34	6	34	5	34	5	34	5	33	3	31	9	36	7	35	5	33
12	7	35	6	34	8	36	8	36	6	34	5	34	8	36	11	38	7	36
13	13	39	9	37	15	40	13	39	12	38	11	38	14	39	19	41	8	36
14	17	40	14	39	16	40	17	40	18	41	19	41	16	40	21	42	11	38
15	21	42	16	39	24	43	19	41	19	41	20	42	30	45	25	43	18	41
16	25	43	23	42	29	45	22	42	23	43	22	42	33	46	29	45	20	42
17	30	45	29	44	36	47	27	44	27	44	24	43	35	46	32	45	25	43
18	34	46	30	45	41	48	32	45	31	45	29	44	40	47	36	46	31	45
19	40	47	40	47	45	49	35	46	39	47	36	46	48	49	40	47	37	47
20	45	49	45	49	51	50	37	47	48	49	39	47	51	50	47	49	42	48
21	50	50	50	50	53	51	43	48	50	50	45	49	59	52	53	51	46	49
22	54	51	51	50	61	53	47	49	53	51	50	50	61	53	57	52	51	50
23	57	52	56	52	64	54	50	50	56	52	51	50	63	53	61	53	58	52
24	62	53	60	52	74	56	53	51	57	52	61	53	67	54	65	54	58	52
25	67	54	62	53	74	57	59	52	66	54	64	54	72	56	68	55	63	53
26	70	55	65	53	77	57	61	53	68	55	68	55	75	57	68	55	67	54
27	74	56	76	57	81	59	61	53	76	57	74	56	77	57	69	55	72	56
28	77	57	78	58	84	60	66	54	76	57	74	56	78	58	79	58	73	56
29	81	59	79	58	86	61	70	55	81	59	77	58	81	59	80	59	77	57
30	83	60	81	59	88	62	73	56	85	60	82	59	83	59	87	61	79	58
31	87	61	84	60	93	65	78	58	88	62	86	61	87	61	89	62	79	58
32	88	62	85	60	93	65	78	58	92	64	86	61	92	64	90	63	83	60
33	92	64	89	62	96	67	82	59	93	65	89	62	92	64	93	65	90	62
34	93	65	89	62	96	68	82	59	93	65	91	63	96	68	93	67	88	62
35	95	66	92	64	98	70	83	60	93	65	96	68	96	68	94	66	93	65
36	96	67	93	65	98	70	85	60	94	66	97	68	96	68	96	70	93	64
37	98	71	99	72	99	75	86	61	98	71	98	70	98	71	98	71	98	71
38	99	74	99	72	99	77	87	61	99	72	99	73	99	72	100	71	99	72
39	100	74	100	76	100	77	88	61	100	72	100	73	100	72	100	71	99	73
40	100	74	100	76	100	77	87	61	100	72	100	73	100	72	100	71	100	73

people, than to interpersonal distress, such as general peer problems. Furthermore, these findings suggest a broader interpretation: social-emotional distress does not necessarily impact peer relationships, highlighting the importance of qualitative aspects of relationship dynamics rather than peer problems themselves. Positive factors like a sense of connection or negative factors like co-rumination may be more strongly associated with emotional distress. In particular, the sense of being connected with peers has been shown to impact emotional distress and may shape social attitudes and behaviours despite experiencing social-emotional distress, thus helping to preserve peer relationships (Demkowicz et al., 2024; Schwartz-Mette et al., 2021). Such qualitative aspects of peer relationships may be culturally dependent. Therefore, future studies should consider culture-related characteristics of Italian adolescents when exploring the associations between emotional distress and peer relationship problems, as well as when addressing the validation of social-emotional distress for cross-cultural comparisons (Borsa et al., 2012) of the construct validity patterns of the SEDS-S. Finally, it is worth mentioning that previous studies have shown that peer conflict and problems tend to decrease over time, especially during adolescence, as emotion regulation strategies increased and suggesting that in this developmental phase, internal emotional distress does not necessarily reflect a worsening of peer relationship or general peer problems (Zimmer-Gembeck & Skinner, 2016).

Consistent with expectations and previous studies, we found higher divergent validity with life satisfaction, indicated by a significant negative correlation of medium effect size., providing support for the distinctiveness of life satisfaction as related but independent construct alongside distress, as postulated in the two-factor model of mental health (Furlong et al., 2022). The systematic inclusion of the life satisfaction factor in mental health screening to identify and distinguish, for example, adolescents who report higher life satisfaction even when distress is present.

Finally, our study provided normative data for the SEDS-S in Italian high-school students that allow for quick and easy interpretation of the screening data, with few cross-cultural differences that are essentially consistent with those available for the US and Hispanic sample of adolescents (Furlong et al., 2022; Rodriguez-Jimenez et al., 2024). Given these similarities, we also provided normative data consistent with both US and Spanish samples, establishing cut scores according to the approach and guidelines provided by Furlong et al. (2022), which can identify SEDS-S scores corresponding to low, middle, and high risk. These findings help extend the evidence for SEDS-S as an instrument able to capture the distress-related construct within the dual-factor model for universal school-based mental health screening by providing representative normative data for Italian adolescents, which were not previously available. This is important for comparing results with the general population and identifying those with elevated scores. Finally, these data add information for cross-cultural comparisons within and outside European countries (Furlong et al., 2022).

Limitations

Despite the strengths of the current study, there are also limitations. Firstly, the high dropout rate, which is probably due to the period in which the data was collected, i.e. just before the end of school. Therefore, more attention needs to be paid to the timing of data collection to allow for adjustment to the school environment.

Although the importance of providing initial normative values future studies should include adolescents at an early age, i.e., 11 years and older, to more comprehensive screening goals in the school context (Furlong et al., 2022; Rodriguez-Jimenez et al., 2024). Furthermore, including early adolescents (i.e., ages 11–14) is relevant for a better age-stratified validation study (Rodriguez-Jimenez et al., 2024).

Sociocultural factors, such as perceived minority status, should be considered in future studies to better understand differences in emotional distress (Graham et al., 2022), considering the impact of minority stress.

We considered gender as a binary variable by referring to biological sex, and therefore future studies should consider it as a relevant issue in the context of identity development during adolescence (Patterson & Vannoy, 2024).

Construct validity needs to be confirmed by including anxiety-, behaviour-, and well-being-related measures to expand knowledge of the latent construct of social-emotional distress by examining a second-order hierarchical structure onto which multiple assessment instruments are projected (Speyer et al., 2022).

Finally, despite our study contributes to the evidence of temporal invariance of the SEDS-S, the study results need to be cross-validated over longer time periods and at a within-person level to examine both stability and change in social-emotional distress (Demkowicz et al., 2024).

Conclusion

Overall, this study strengthens the empirical support for the one-factor structure of the SEDS-S by demonstrating its validity for school-based mental health assessment in Italian high school students and providing evidence of its reliability and standardization to improve the accuracy and effectiveness of screening and program evaluation in schools. Our

study also supports the value of using a universal dual-factor mental health screening and monitoring approach for practical early interventions in schools (Las Hayas et al., 2019), which are the optimal environment for developing competencies and well-being. Furthermore, practical efforts such as psychoeducational programs to improve social-emotional skills might benefit from screening practices based on brief and valid instruments and, consequently, rapidly improve the school climate in ways that benefit all high school students' well-being (Lustig et al., 2023). Finally, by providing normative data consistent with both US and Spanish samples, our study contributes to extending the approach and guidelines previously established by Furlong et al. (2022) to Italian schools, which can benefit from the available SEDS-S scores for practical screening of adolescents at high risk and for implementing and monitoring school-based psychoeducational programs (Cefai et al., 2022).

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

Declarations

Conflicts of interest The authors declare no conflict of interest.

Ethical Approval The study was conducted in accordance with the guidelines of the Declaration of Helsinki and was approved by the Regional Ethical Committee of Umbria Region (CER Umbria; Protocol ID: 4627/23).

Patient Consent Participation was voluntary, and participants or parents (for minors) were asked for written informed consent. All students gave their verbal consent.

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