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Psychometric Evaluation of the Social-Emotional Learning Scale (SELS): Evidence for Unidimensionality and Associations With Indicators of Subjective Well-Being in Portuguese Youth

Pedro J. C. Costa[1,2], Richard A. Inman[3], and Paulo A. S. Moreira[4,5]

Abstract

Understanding the dimensionality of social-emotional learning is critical for valid assessment in youth. This study examined the psychometric properties of the Social-Emotional Learning Scale (SELS), and its associations with subjective well-being in a sample of 711 Portuguese students (50.6% girls; M_{age} = 11.01, *sd* = .81). Structural equation modeling indicated that a bifactor structure (one general and two specific factors: Peer Relationships and Self-regulation) provided the best fit (CFI_{robust} = .966, $RMSEA_{robust}$ = .031, *SRMR* = .032). The bifactor indices supported unidimensionality (*ECV* = .896, *PUC* = 0.78, *Omega G* = 0.88), but not the interpretation of subscale scores. Metric and scalar invariance across gender was supported. An Item Response Theory analysis indicated the SELS is most informative at lower levels of the latent trait. Higher SEL was related to greater positive affect, lower negative affect, and greater life satisfaction. Our findings support unidimensionality and the usefulness of the SELS for identifying youth with lower social-emotional competence.

[1]Centro de Investigação em Psicologia para o Desenvolvimento (CIPD), Universidade Lusíada, Porto, Portugal
[2]Lab for Biopsychosocial Personality Research (BPS-PR), International Network for Well-Being, Stavanger, Norway
[3]CPUP, Faculdade de Psicologia e de Ciências da Educação, Universidade do Porto, Porto, Portugal
[4]Departamento de Educação e Psicologia, Escola de Ciências Humanas e Sociais, University of Trás-os-Montes and Alto Douro, Vila Real, Portugal
[5]RISE – Health Research and Innovation – UTAD, Vila Real, Portugal

Corresponding Author:
Paulo A. S. Moreira, Escola de Ciências Humanas e Sociais, Universidade de Trás-os-Montes e Alto Douro, Quinta de Prados 5000-801, Vila Real, Portugal.
Emails: pmoreira@utad.pt; paulomoreira976@gmail.com

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Introduction

The educational system is responsible for cultivating aspects of human experience that promote holistic and harmonious development. In recent decades, researchers have made strides in showing that emotional and social maturation is as important as cognitive development (Ashdown & Bernard, 2012; Coryn et al., 2009; Durlak et al., 2010; Elias et al., 1997; Gardner, 1983; Moreira, Inman, et al., 2021; Salovey & Mayer, 1990; Schmeck et al., 2001; Taylor et al., 2017; Zimmerman et al., 1992). A balanced educational paradigm must, therefore, include social-emotional learning (SEL) and not simply logical-propositional dimensions (Costa et al., 2022; Moreira & Garcia, 2019). SEL can be defined as the process through which people acquire and apply the competencies necessary to "recognize and manage emotions, develop caring and concern for others, establish positive relationships, make responsible decisions, and handle challenging situations constructively" (Collaborative for Academic, Social, and Emotional Learning [CASEL], 2008, p. 1). In this way, SEL skills are conceptualized as capabilities an individual has that can be applied to specific contexts (Soto et al., 2024).

Over the past few years, a consensus has emerged within the literature, deeming the CASEL social-emotional skills framework as the most comprehensive (Martinez-Yarza et al., 2023). This is because, for the most part, all components proposed by different models fall within CASEL's five interrelated skills: self-awareness, self-management, social awareness, relationship skills, and responsible decision-making. Self-awareness reflects the capacity to assess our strengths and weaknesses and the ability to successfully recognize what we are feeling, thinking, and valuing and how these relate to our actions. Self-management is the ability to regulate emotions, thoughts, and behaviors according to the situation and the desired goal. Social awareness is the ability to empathize with others and behave and interact properly within communities and society at large, in accordance with social and ethical norms. Relationship skills refer to the ability to develop and cultivate positive and meaningful relationships, communicate, listen, and cooperate with others. Lastly, responsible decision-making is the ability to evaluate the possible consequences of our actions and make choices that can have a positive outcome on us and those around us, simultaneously promoting individual and collective well-being.

Because of its wide coverage, CASEL's framework has been widely adopted, with hundreds of school-based intervention programs significantly improving students' academic outcomes (Durlak et al., 2011). CASEL's popularity has highlighted the need to develop psychological instruments capable of assessing students' levels of SEL. While many instruments measuring socio-emotional components exist (Bru-Luna et al., 2021), most measure narrow aspects of SEL. While useful in specific contexts, these are lacking in generalizability. To surpass these limitations, Coryn et al. (2009) developed the Social-Emotional Learning Scale (SELS), a 20-item inventory, designed to be in line with CASEL's framework.

The Current Study

The first psychometric investigation of the SELS (Coryn et al., 2009) indicated that three interrelated factors could be extracted: *task articulation*, *peer relationships*, and *self-regulation*. Task articulation captures CASEL's responsible decision-making; the peer relationships dimension captures social awareness and relationship skills; and self-regulation captures self-awareness and self-management. The three-factor solution showed acceptable fit in a U.S. sample ($\chi^2 = 520.58$,

CFI = .908; RMSEA = .058; Coryn et al., 2009) and good fit in a Turkish sample (χ^2 = 264.67; RMSEA = .049, CFI = .980; Arslan & Akın, 2013). More recently, however, Thomas et al. (2022) found evidence for a unidimensional structure, reflecting what the authors tentatively label "emotional self-efficacy." Emotional self-efficacy reflects an individual's belief in their capacity to successfully employ social-emotional competences to attain desired outcomes. Despite the need for psychological instruments capable of assessing students' levels of SEL, the dimensionality of the SELS is unclear, and therefore its usage can be questioned. Using an SEM approach, our first objective was to test the psychometric properties of the SELS in Portuguese children.

Beyond testing its factorial structure, we also sought to test construct validity by analyzing associations between the SELS and the three components of subjective well-being (SWB; positive affect, negative affect, and life satisfaction) (Diener, 1984). Evidence suggests that children and adolescents with higher social-emotional functioning are more likely to experience increased well-being and various positive outcomes (Ashdown & Bernard, 2012; Chernyshenko et al., 2018). Multiple meta-analyses (e.g., Corcoran et al., 2018; Durlak et al., 2010; Durlak et al., 2011; Murano et al., 2020) have indicated a reduction in conduct problems and higher academic achievement and school engagement. In addition to engagement, a study by Salmela-Aro and Upadyaya (2022) found that students high on SEL tended to be less stressed and burned out. Taylor et al. (2017) found that SEL interventions improved positive attitudes, prosocial behavior, safe sexual behaviors, and worked as a protective factor against conduct problems, emotional distress, and drug use.

Method

Participants

Children enrolled in schools from the North of Portugal participated in this study. After excluding six duplicate cases (using the SPSS function: Identify Duplicate Cases), and participants with >25% missing data across all measures, this study analyzes data from 711 (50.6% girls, 49.4% boys) students, mostly aged between 10 (1st quartile) and 12 (3rd quartile) (M = 11.01, sd = .81).

Missing Data Treatment

After exclusions, participants with missing data were distributed as follows across the instruments used: SELS = 0.5%; ETS-Y = 0.9%; BMSLSS = 0.1%. Little's MCAR test, to determine the mechanism of missing data indicated data was not missing completely at random (MCAR) for the SELS (χ^2 = 571.425, df = 480, p < .001) and ETS-Y (χ^2 = 531.956, df = 344, p < .0001). However, given the very low proportion of missing data across instruments, the impact of non-MCAR missingness is likely minimal. On the other hand, Little's MCAR test was not significant for the BMSLSS (χ^2 = 8.470, df = 15, p > .05) indicating that the data is MCAR. Given these results, we used predictive mean matching (PMM) imputation, an approach to replace missing values that performs well under MAR (Lee & Shi, 2021; Lim & Cheung, 2022). While full information maximum likelihood (FIML) is commonly used in SEM, as it integrates missing data handling directly within model estimation, we chose PMM since it is robust to potential distributional non-normality and allows us to preserve observed data distributions. Importantly, because the proportion of missing data was very low (<1% across all instruments), the choice of imputation method most likely did not influence parameter estimates or standard errors.

Ethics and Procedures

Ethical approval was granted by the Ethics Committee of Lusíada University, Porto, Portugal, ensuring full adherence to the Helsinki Declaration. Personal informed consent and written consent from a parent/legal guardian was a requirement for participation in the study.

Measures

Social-Emotional Learning. The SELS was used to measure the extent to which children have the knowledge and skills for adaptive social-emotional functioning. The instrument was developed to be in line with CASEL categories, and items were chosen by an advisory group including educators, human service professionals, parents, students, and researchers. SELS item content taps into task articulation (e.g., "Keep track of my progress toward a goal"), peer relationships (e.g., "Work positively in groups with people who are different from me"), and self-regulation (e.g., "Understand that I am responsible for my own actions"). All 20 items of this scale are rated on a five-point Likert scale from 1 (*strongly disagree*) to 5 (*strongly agree*). As will be shown, the SELS is a unidimensional measure; thus, we averaged together responses to the 20 items. Higher scores reflect greater social-emotional competence, consistent with the CASEL framework of adaptive social-emotional functioning.

Cultural Adaptation and Translation. Following standard translation and back-translation procedures (Mallinckrodt & Wang, 2004), the original English items of the SELS were translated into European Portuguese by two Portuguese researchers, and then back-translated into English by a third native English speaker (proficient in Portuguese). The back-translated items were then examined and compared to the originals, thus ensuring accuracy and cultural sensitivity.

Positive and Negative Affect. The Emotional Tonality Scale-Youth (ETS-Y) was used to measure children's affective experience. The ETS-Y is an adaptation of the Positive and Negative Affect scale (Watson et al., 1988) which incorporates emotions and feelings with varying degrees of arousal/activation (Russell, 1980). The scale comprises eight positive (e.g., "happy") and eight negative (e.g., "depressed") adjectives. Participants are asked to report how much they have experienced these emotions in the past weeks from 1 (very slightly or not at all) to 5 (extremely). In this sample, using Exploratory Structural Equation Modelling [following the procedure illustrated by Tóth-Király et al. (2017) and Asparouhov and Muthén (2009)], a two-factor model showed good fit ($\chi^2 = 287.129$, $df = 117$; $CFI = 0.927$, $RMSEA = 0.065$ [0.057, 0.073], $SRMR = 0.055$). Latent factor correlations revealed a negative relationship between the two factors ($r = -0.33$). We averaged participants' positive emotions (higher scores reflect higher levels of positive affect) and negative emotions (higher scores reflect higher levels of negative affect). Additionally, we subtracted mean negative from mean positive to create an affective well-being composite. Although prior research (e.g., Cloninger & Zohar, 2011; Costa et al., 2022; Costa et al., 2025; Moreira et al., 2015; Moreira, Pedras, et al., 2021) supports difference scores as an index of affective balance, it should be noted that in isolation they may introduce interpretational limitations and obscure the unique contributions of positive and negative affect.

Satisfaction With Life. We used the Portuguese version (Costa et al., 2022) of the Brief Multidimensional Student's Life Satisfaction Scale (BMSLSS; Huebner et al., 2006). The BMSLSS measures the degree of satisfaction across five domains of life (e.g., "I would describe my satisfaction with my family life as…") and satisfaction in general. These items are rated on a seven-point scale from 0 (*terrible*) to 6 (*fantastic*). Previous research (e.g., Abubakar et al., 2016;

Costa et al., 2022; Fang et al., 2021; Hashim & Areepattamannil, 2017; Huebner et al., 2006; Siyez & Kaya, 2008) indicates that the BMSLSS is a unidimensional measure. In this sample, the one-factor model had an excellent fit ($\chi^2 = 17.842$, $df = 9$; $CFI = .982$, $RMSEA = .055$ [.000, .095], $SRMR = .030$); thus, we averaged together responses to the six items. This composite reflects a global evaluation of life satisfaction, with higher scores reflecting greater satisfaction with life.

Statistical Analysis

All statistical analyses were performed using the statistical software R (R Core Team, 2025) with the following exceptions: Bifactor indices were estimated using Dueber's (2017) Bifactor Indices Calculator; Dynamic Model Fit Indices were implemented through Wolf and McNeish (2020) app (https://dynamicfit.app/connect/#/welcome).

Factor Analysis. Based on prior research, we started by testing one- and three-factor structures. Hierarchical and bifactor (two models, the first with a general factor and three specific factors, and a second with a general factor and two specific factors) structures were also tested. The robust maximum likelihood estimator (MLR) method, through the CFA function of the lavaan package (Rosseel, 2012) was used, as it provides corrected standard errors and fit indices that are robust to non-normality (Li, 2016; Yuan & Bentler, 2000). To compare the competing models in terms of likelihood of replication (smaller values indicate better fit), two predictive fit indices were selected, namely, the Akaike Information Criteria (AIC) and the sample-size adjusted Bayesian Information Criterion (saBIC) (Kline, 2011; Vrieze, 2012). We assessed the goodness of fit by referring to the commonly accepted approximate fit indices, namely, SRMR <0.05, and the new robust versions (Savalei, 2018) of CFI ≥.95 and RMSEA <.08, and (Browne & Cudeck, 1992; Cangur & Ercan, 2015; Hu & Bentler, 1999). To complement these commonly accepted rules-of-thumb, we use the simulation-based Dynamic Fit Index (DFI) framework, which produces model- and data-specific CFI and RMSEA cutoffs.

Measurement Invariance. We tested whether the SELS is invariant between boys and girls using a multigroup CFA (MGCFA) approach. This entails testing configural, metric (equivalence of item loadings), and scalar (equivalence of item loadings and intercepts) models. If CFI ≥0.010 and changes in RMSEA ≥0.015 and SRMR ≥0.030 (metric model) and ≥0.015 (scalar model), the scale is non-invariant (Chen, 2007).

Item Response Theory (IRT). The Multidimensional Item Response Theory (MIRT) package (Chalmers, 2012) allowed us to use a Graded Response Model to test two item properties of the SELS: discriminability (α) which is an item's ability to distinguish between individuals that vary on the latent trait—α between 0.01 and 0.34 (very low), 0.34–0.64 (low), 0.65–1.34 (moderate), 1.35–1.69 (high), and >1.7 (very high) (Baker, 2001); and difficulty (β) which pertains to the level of the latent construct at which the next response category has 50% chance of being endorsed. Items should neither be too hard nor too easy (mean beta >|1.5|) (Rauthmann, 2013).

Construct Validity. Associations between SELS and theoretically related (convergent validity) and unrelated constructs (divergent validity) were assessed. An SEM approach, to reduce measurement error, was used to evaluate latent factor correlations. Specifically, correlated-traits models were estimated and associations between SEL and positive affect, negative affect, and life satisfaction were examined. These three components are widely recognized as the core elements of SWB (Diener, 1984). Importantly, research suggests positive affect, negative affect, and life satisfaction are dependent on distinct organizations of psychobiological systems (Moreira et al.,

2023) associated with developmentally and functionally dissociable brain networks (Zwir et al., 2021). Because of this, it is important to examine them independently. Simultaneously, various authors have also found evidence of an underlying general SWB factor that captures shared variance (e.g., Al Nima et al., 2020; Kaufman et al., 2022). Based on this, we adopted a dual analytical strategy, by first examining correlations with each SWB component separately and then by evaluating theoretically grounded composite indices, consistent with prior research (Cloninger & Zohar, 2011; Costa et al., 2022, 2025; Josefsson et al., 2011; Moreira et al., 2015). SEM models were therefore estimated in which SEL was related to well-being composites specified as observed variables. An affective well-being index was computed as the difference between mean positive affect and mean negative affect. This operationalization is consistent with both classic (Bradburn, 1969; Diener, 1984) and more contemporary models (Diener, Oishi, & Tay, 2018) that conceptualize affective well-being as the preponderance of positive over negative affect. An SWB index was then computed by combining affective well-being and cognitive well-being (global life satisfaction). SWB is commonly conceptualized as the person's perceived quality of life, integrating cognitive evaluations and affective experiences (Busseri & Sadava, 2011; Davern et al., 2007; Diener, 1984; Diener, Lucas, et al., 2018; Luhmann et al., 2012; Schimmack et al., 2008).

Results

Descriptive Statistics, Reliability, and Correlations

Table 1 presents the descriptive statistics, internal consistency, and Pearson correlations for all variables in this study. Scales demonstrated adequate to excellent internal consistency, with McDonald's ω ranging from .75 to .93, indicating that they reliably measure a coherent construct. Associations between Task articulation (TA), Peer relationships (PR), and Self-regulation (SR) (r = .68–.70) indicate poor discriminant validity. All three are very strongly associated with SEL (total score; TA: r = .88; PR: r = .89; SR: r = .90), thus indicating substantial shared variance. While SELS and its subscales are associated with positive (r = .36–.43) and negative affect (r = −.24 to −.28), they are particularly highly associated with life satisfaction (r = .49–.61). Lastly, positive and negative affect were negatively associated (r = −.28), and life satisfaction is negatively associated with negative affect (r = −.37) and positively with positive affect (r = .63). The pattern of intercorrelations among SWB indicators supports shared variance, consistent with a higher-order well-being construct, while retaining sufficient distinctiveness to justify their inclusion as non-redundant components.

Table 1. Descriptives, internal consistency, and correlations amongst study variables

Scale	*M*	*SD*	Min	Max	Skew	Kurtosis	0ω	SEL	TA	PR	SR	PA	NA	LS
SEL	4.05	0.50	2.05	4.95	-0.71	0.89	.89	1						
TA	4.00	0.55	2.00	5.00	-0.66	0.94	.79	.88	1					
PR	4.06	0.56	2.00	5.00	-0.63	0.44	.75	.89	.67	1				
SR	4.09	0.58	1.86	5.00	-0.75	0.58	.80	.90	.70	.68	1			
PA	3.85	0.62	1.31	5.00	-0.89	1.23	.90	.46	.41	.38	.44	1		
NA	1.91	0.86	1.00	5.00	1.25	1.55	.93	-.27	-.25	-.24	-.23	-.25	1	
LS	5.67	0.74	2.50	6.83	-1.29	2.53	.80	.61	.52	.49	.61	.65	-.35	1

Note. SELS = Social-emotional learning (total score); TA = Task articulation; PR = Peer relationships; SR = Self-regulation; PA = Positive Affect; NA = Negative Affect; LS = Life Satisfaction; ω = McDonald's Omega.

Assessment of Multivariate Normality

Multivariate normality of the SELS was assessed using Mardia's tests. Both skewness (4750.06) and kurtosis (58.08) were high ($p < .001$), with univariate Anderson-Darling tests confirming non-normality across all 20 items. Item 15 showed the highest deviations (skew = −1.745, kurtosis = 6.277), likely due to ceiling effects ($M = 4.54$, median = 5). Given these results, we opt to use MLR for the proceeding SEM Models, as this method is robust to non-normality.

Confirmatory Factor Analysis

Predictive fit indices (AIC and saBIC) indicated that the three-factor and hierarchical models were the most likely to replicate. Absolute fit indices suggested both models had excellent fit (*CFI* = .952, *RMSEA* = .036, *SRMR* = .035). Despite this, the three-factor model had extremely high latent factor correlations (ranging from .94 to .96), low average variance extracted (AVE) (TA = .27, PR = .27, SR = .30), and very high Heterotrait-Monotrait ratio (HTMT) values (TA-PR = .98; TA-SR = .99; PR-SR = .91). This indicates a clear lack of discriminant validity among the three factors. Similarly, in the hierarchical model, very strong standardized loadings on the higher-order factor (.96–.99) indicate limited unique variance attributable to the lower-order constructs. Subsequently, we tested a bifactor structure, with a general and three specific factors; however, this model was inadmissible as all variance within the Task Articulation specific factor was accounted for by the general factor. A modified bifactor, where Task Articulation was dropped as a specific factor, was then tested. As can be seen in Table 2, this model had the best fit to the data (*CFI* = .966, *RMSEA* = .031, *SRMR* = .032).

These results are further supported by the Dynamic Fit Index framework with equivalence testing, with the bifactor edging out other competing models. Indeed, the *T-size RMSEA* indicated "Close" fit for the one-factor/hierarchical/three-factor (.038) and bifactor models (.036). Additionally, *T-size CFI* for the one-factor (.917), hierarchical/three-factor (.918), and bifactor models (.933) fell in the "Fair" category.

Assessment of Unidimensionality: Analysis of Bifactor Indices

The previous results indicated that the SELS is better modeled as a bifactor with a general factor and two specific factors (peer relationships and self-regulation). To better understand the dimensionality of the SELS, including the adequacy of using global scores and subscale scores, we turn to bifactor indices (Table 3). Model level indices indicated that the SELS is essentially a

Table 2. Model fit indices for the SELS factor structures tested via Confirmatory Factor Analysis

Model	χ^2	*df*	AIC	SABIC	CFI_{robust}	TLI_{robust}	$RMSEA_{robust}$	SRMR
One-factor	292.812	170	31,921.371	32,004.856	0.951	0.945	0.036 90% CI [0.029, 0.043]	0.035
Three-factor	286.257	167	31,918.106	32,005.765	0.952	0.946	0.036 90% CI [0.028, 0.043]	0.035
Hierarchical	286.258	167	31,918.106	32,005.765	0.952	0.946	0.036 90% CI [0.029, 0.043]	0.035
Bifactor (2-SF)	248.632	156	31,883.075	31,986.040	0.966	0.958	0.031 90% CI [0.023, 0.039]	0.032
Bifactor (3-SF)	Model does not converge. Fit measures not available.							

unidimensional measure (*ECV* = .896, *PUC* = 0.78, *Omega G* = 0.88), with the general factor accounting for the vast majority of shared variance among items. At the factor level, a global score explains the vast majority of variance (Omega H = 0.88) and can be confidently interpreted (*H* = 0.89, *FD* = 0.94). On the other hand, peer relationships (*Omega H* = 0.05, *H* = 0.29, *FD* = 0.58) and self-regulation (*Omega H* = 0.01, *H* = 0.23, *FD* = 0.55) are not well-defined latent variables after accounting for the general factor. Both show low reliability and construct clarity; therefore, these dimensions capture very little variance beyond the general factor. Lastly, at the item level, only four items (7, 12, 15, and 16) had an *IECV* < 0.80, once again supporting the predominance of the general factor. Overall, the results indicate that the subscale scores should not be used, as the SELS is primarily unidimensional.

Item Response Theory

Given the support for the unidimensionality of the SELS, we performed an IRT analysis. Item discrimination (alphas) and difficulty (betas) are presented in Table 4. The unidimensional IRT model fits well to the data (χ^2 = 196.485, *df* = 111, *CFI* = .898, *RMSEA* = .033 90% CI [.025, .04], *SRMR* = .040). The latent variable explained 33.7% of the variance. At the item level, all RMSEA values were below 0.05, and factor loadings were above 0.40. This indicates the items fit the

Table 3. Standardized factor loadings and IECV for the SELS bifactor model

	General factor	Specific factors			
Items	Social-emotional learning	Peer relationships	Self-regulation	Standardized residual variance	IECV
TA1	.45			.80	1.00
TA2	.41			.83	1.00
TA3	.57			.67	1.00
TA4	.45			.79	1.00
TA5	.58			.67	1.00
TA6	.55			.70	1.00
PR1	.43	.47		.59	.46
PR2	.52	.18		.70	.89
PR3	.51	.06		.73	.99
PR4	.48	.00		.77	1.00
PR5	.58	−.11		.65	.97
PR6	.43	.24		.76	.76
PR7	.53	.13		.70	.94
SR1	.53		.08	.71	.98
SR2	.42		.30	.73	.67
SR3	.58		.30	.58	.78
SR4	.45		−.04	.80	.99
SR5	.67		−.20	.51	.92
SR6	.61		−.18	.59	.92
SR7	.53		.13	.71	.94

Note: SELS = Social-emotional learning Scale; TA = Task articulation; PR = Peer relationships; SR = Self-regulation; IECV = Item Explained Common Variance.
IECV values ≥ .80 suggest strong representation of the general factor.

Table 4. Item Parameter Estimates from Graded Response Model (GRM) for SELS Items

Item	*a*	Descriptor	≥*b1*	≥*b2*	≥*b3*	= *b4*	Mean threshold ($\bar{b}$)
TA1	1.05	Moderate	−4.48	−1.65	1.00	—	−1.28
TA2	0.88	Moderate	−5.19	−3.15	−0.60	2.01	−2.16
TA3	1.36	High	−4.03	−2.45	−1.13	0.59	−1.76
TA4	1.00	Moderate	−5.75	−4.68	−2.22	0.35	−3.08
TA5	1.36	High	−4.37	−2.91	−1.14	0.89	−1.88
TA6	1.37	High	−4.38	−3.19	−0.94	1.31	−1.80
PR1	0.97	Moderate	−6.61	−4.45	−1.71	0.69	−3.02
PR2	1.25	Moderate	−4.47	−2.98	−1.13	0.66	−2.64
PR3	1.21	Moderate	−4.15	−2.92	−1.17	0.68	−1.89
PR4	1.07	Moderate	−5.41	−4.23	−2.07	0.36	−2.84
PR5	1.45	High	−4.35	−3.16	−1.29	1.06	−1.94
PR6	0.97	Moderate	−5.61	−3.78	−1.29	0.94	−2.41
PR7	1.25	Moderate	−4.03	−3.11	−0.98	1.02	−1.78
SR1	1.28	Moderate	−5.00	−3.55	−1.43	0.34	−2.50
SR2	1.01	Moderate	−5.99	−4.37	−2.67	−0.74	−3.44
SR3	1.41	High	−3.92	−2.79	−0.74	1.25	−1.55
SR4	0.99	Moderate	−4.91	−3.48	−1.41	0.45	−2.34
SR5	1.83	Very high	−3.35	−2.41	−0.79	1.01	−1.39
SR6	1.57	High	−3.60	−2.86	−1.19	0.53	−1.78
SR7	1.16	Moderate	−4.58	−3.20	−0.86	1.12	−1.80

Note. SELS = Social-Emotional Learning Scale; *a* = discrimination parameter; b_1–b_4 = threshold (difficulty) parameters; Thresholds (b_1–b_4) indicate the level of the latent trait required to endorse higher response categories; Mean threshold ($\bar{b}$) = average of non-missing *b* parameters per item. TA = Task articulation; PR = Peer relationships; SR = Self-regulation.

model well. Additionally, item two has the least (21.0%) while item 18 has the most variance accounted for by the latent variable (53.5%), as indicated by the communalities.

In terms of item discrimination, the parameters indicated 11 items were moderate, eight were highly, and one was very highly discriminative. Regarding item difficulty, we found that only two items (items 1 and 18) had a mean beta value that fell within the recommended 0 and |1.5|. The test-information curve (see in Figure 1) shows the SEL scale is most informative between theta levels of around −4 to 2.

Measurement Invariance

Given the evidence for the unidimensional model, we tested the invariance of the one-factor structure across gender. Table 5 shows the output of the three models tested with MGCFA. The configural model had good fit (*CFI* = .938, *RMSEA* = .040, *SRMR* = .045). Small changes to *CFI*, *RMSEA*, and *SRMR* suggested there were no significant changes in model fit with the addition of constraints to factor loadings (ΔCFI = .000, $\Delta RMSEA$ = .001 and $\Delta RMSEA$ = .008) or intercepts (ΔCFI = .007, $\Delta RMSEA$ = .001 and $\Delta RMSEA$ = .002). The results fully support metric and scalar invariance for gender.

Construct Validity With SWB

Latent factor correlations revealed a pattern of associations between SEL and SWB that supported convergent validity. SELS was positively associated with positive affect (*r* = .52), negatively with

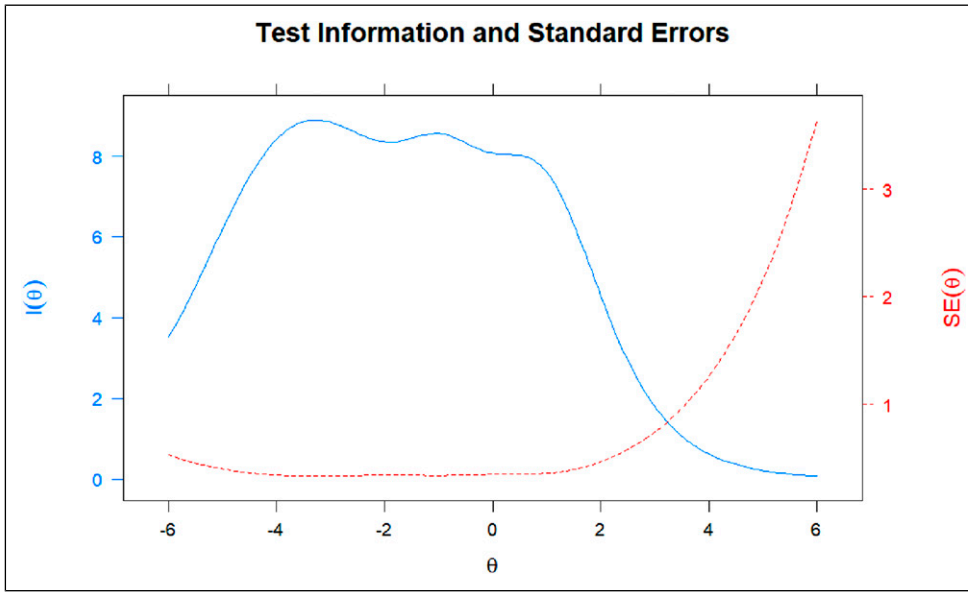


Figure 1. Test-information curve and Standardized Errors for the Social-emotional Learning Scale items

negative affect (r = -.31) and positively associated with affective well-being (r = .46). SELS is also associated with satisfaction with life (r = .62), and every domain of life satisfaction: "myself" (r = .47), "school" (r = .44), "in general" (r = .43), "friends" (r = .41), "family" (r = .38), "where I live" (r = .29). Lastly, higher levels of SEL are associated with higher levels of SWB (r = .59).

Discussion

A consensus has emerged over the last decades about the importance of emotional and social maturation in children and adolescents' lives, in addition to cognitive development. The educational paradigm is shifting, and SEL is becoming increasingly prominent, driven by the efforts of educators, researchers, and parents pushing for the implementation of SEL programs in schools. One crucial aspect of intervention is the assessment process, which relies on psychological instruments capable of adequately capturing the constructs of interest. As the implementation of SEL programs increases, so does the significance of reliable measurement tools.

Using CASEL's well established framework, Coryn et al. (2009) developed the SELS, an instrument designed to capture individual differences in five interrelated socio-emotional skills: *self-awareness, self-management, social awareness, relationship skills,* and *responsible*

Table 5. Gender invariance for the SELS unidimensional factor structure

	χ^2	*df*	Comparison	CFI	ΔCFI	RMSEA	ΔRMSEA	SRMR	ΔSRMR
M1. Configural	494.804	340	-	.938	-	.040	-	.045	-
M2. Metric	513.996	359	M1	.938	.000	.039	−.001	.052	+.008
M3. Scalar	549.642	378	M2	.931	−.007	.040	+.001	.054	+.002

Note. SELS = Social-Emotional Learning Scale; ΔCFI ≤.01, ΔRMSEA ≤.015, and ΔSRMR ≤.030 (metric)/.015 (scale) indicate invariance.

decision-making. The dimensionality of the SELS has, however, been put into question, as there is evidence for both a three-factor structure (*task articulation, peer relationships, and self-regulation*) and a one-factor structure reflecting a broader construct of *emotional self-efficacy*.

Given the conflicting evidence regarding the structure of the SELS, our first objective was to test the psychometric properties of the SELS in a sample of Portuguese children. Using an SEM approach, we tested various theoretically driven competing structures, including the one-factor model, three-factor, and hierarchical models. Although all models demonstrated acceptable absolute fit, predictive fit indices, latent factor correlations, and discriminant validity diagnostics revealed important differences in model adequacy. Specifically, within the three-factor model, we found extremely high latent factor correlations, low average variance extracted, and very high Heterotrait-Monotrait ratio values, clearly indicating a clear lack of discriminant validity among the three factors. As for the hierarchical, very strong loadings on the higher-order factor indicated very limited unique variance attributable to the lower-order factors. This suggested that the vast majority of variance is most likely explained by a general factor.

To further investigate the dimensionality of the SELS, we tested bifactor structures, starting with a general factor and three specific factors (*Task Articulation, Peer relationships*, and *Self-regulation*). The model indicated that all variance within the *Task Articulation* specific factor was accounted for by the general factor. Thus, a modified bifactor model, excluding *Task Articulation* as a specific factor, was tested. While this model had a superior fit relative to other competing models, a subsequent examination of bifactor indices indicated that the general factor accounted for the vast majority of shared variance among items. The specific factors, namely, *peer relationships* and *self-regulation*, were poorly defined and captured minimal reliable variance beyond the general factor. At both the factor and item levels, indices consistently supported the conclusion that the SELS is essentially unidimensional, and as such, while total scores are reliable, the interpretation of subscale scores are not supported.

Our findings are consistent with previous work, including Thomas et al. (2022), who championed the one-factor model, and tentatively argued that the dimension captured by SELS is "emotional self-efficacy." Interestingly, other instruments attempting to capture SEL competences have also either failed to replicate the five-factor model (Walton et al., 2023) or also found evidence for a higher-order factor (Ross & Tolan, 2018). Evidence for factor convergence is also common, as indicated by very high correlations between factors (e.g., Fernández-Martín et al., 2022).

Next, a test of measurement invariance across gender fully supported the metric and scalar invariance of the one-factor model. Based on the CFA, bifactor indices, and measurement invariance evidence for unidimensionality, we felt it appropriate to use IRT to test two item properties, discriminability and difficulty. It was generally too "difficult" for respondents to pick the lowest responses, as this implied a particularly low level of social and emotional functioning. Important practical implications can be surmised, as it seems the SELS is better suited for the detection of children with lower levels of social-emotional competences that may benefit from intervention.

Our second objective was to examine the association between the SELS and multiple components of SWB, including positive affect, negative affect, and life satisfaction. The results suggest that children with higher levels of SEL tend to experience fewer negative emotions, and more positive emotions. In addition, there is a preponderance of positive over negative affective experiences (affective well-being) for individuals with higher SEL. At the level of cognitive well-being, perceived socio-emotional competence is very highly associated with perceptions of higher quality of life. Interestingly, while perceived socio-emotional competence is associated with satisfaction in all domains of life tested, the highest effect was for the "myself" domain. The overwhelming majority of students in our study were in the late stage of childhood, on the cusp of

reaching adolescence. Erikson (1963) identifies this period as being part of the *Industry* vs. *Inferiority* stage of ego development. The child has incorporated certain aspects of the world, as the self-environment interactions - particularly the experiences with attachment figures - have provided a basis for the development of internal working models (Bowlby, 1982; Bretherton & Munholland, 2008). The increase in cognitive abilities, the desire for learning, and the desire for agency, together with an expansion of the social circle, now incorporating both peers as well as non-kin "respected" figures (e.g., teachers), creates an opportunity for growth (Costa et al., 2022, 2025; Inman et al., 2023). School can be seen as a "practice" stage where models of the work-world can be acted out (at a smaller but nonetheless complex scale) and incorporated (Erikson, 1982). Because of this, Erikson et al. (1986) identified "Competence" as the ego strength or virtue that could be gained with the successful resolution of the *Industry* vs. *Inferiority* stage. Having acquired a sense of Industry, the child realizes that perseverance and hard-work payoff, that being successful at valued tasks is possible, and that merit is rewarded both at a social (recognition) and a personal level (feelings of "competence") (Marcia, 2014). Our work supports these assumptions, as perceived social-emotional competence was highly associated with satisfaction with the social elements (friends and family), as well as the "self." In conclusion, we build upon previous research that has identified perceived social-emotional competence as an important tool facilitating adaptive and positive outcomes in children and adolescents.

ORCID iDs

Pedro J. C. Costa https://orcid.org/0000-0002-3726-5200
Richard A. Inman https://orcid.org/0000-0001-9384-3071
Paulo A. S. Moreira https://orcid.org/0000-0002-5454-7971

Authors Contribution

Pedro Costa: Writing—review and editing, Writing—original draft, Formal analysis, Visualization, and Data curation. *Richard Inman:* Writing—review and editing, Formal analysis, and Data curation. *Paulo Moreira:* Conceptualization, Writing—review and editing, Investigation, Funding acquisition, and Supervision.

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Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Data Availability Statement

The data that support the findings of this study are available on request from the corresponding author, P.A.S.M.

Use of Artificial Intelligence

No generative AI was used in the present paper.

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