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Social - Emotional Learning Skills Scale (SELSS): Development, Validity and Reliability Study

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Abstract

Social Emotional Learning (SEL) is a fundamental process that encompasses individuals' abilities to manage their emotions, establish empathy with others, develop positive social relationships, and make responsible decisions. The primary purpose of this study is to develop a valid and reliable scale to measure the social emotional learning skills of primary school students. The draft measurement instrument was designed to encompass the five core dimensions of social emotional learning accepted in the literature: self-awareness, self-management, social awareness, relationship skills, and responsible decision-making. To test the psychometric properties and construct validity of the developed scale, statistical analyses were conducted on the dataset. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was calculated to test the suitability of the data for factor analysis. Exploratory factor analysis (EFA) was applied to determine the factor structure of the scale. Confirmatory factor analysis (CFA) was subsequently conducted to verify the accuracy of the obtained structure and to test the model fit. Within the scope of reliability studies, internal consistency coefficients were examined for the whole scale and its sub-dimensions. The findings obtained from the analyses indicate that the developed scale has adequate psychometric properties. In conclusion, it was determined that the Social Emotional Learning Scale is a valid and reliable measurement instrument that can be utilized to assess the social emotional learning skills of primary school students.

Keywords: Scale development, social emotional learning skills, social, emotional

Introduction

Human is a physically, cognitively and emotionally improving entity and in mutual interaction with the environment throughout the process from birth to death. Today, rapidly changing life conditions through technological advancements and increasing environmental stimulants have brought about the need for accommodation in line with the new order. A prosperous adaptation process requires a set of skills allowing the individual to show flexibility and make true choices. Harmonious life is based on the individual's ability to manage human relations and control emotional reactions, which increases the significance of social and affective development (Elçik & Bayındır, 2015; MEB, 2024).

Social and affective development skills have been as significant as students' academic development along with technology's effect in every field. Changing educational and instructional needs has made it mandatory for educational objectives, implementations and learning environments to be diversified. Thus, the significance of learning approaches related to skill development has increased. People need several skills throughout their lives such as



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recognizing strengths and weaknesses, communication, regulating feelings, solving conflicts, determining objectives and planning, understanding others, stress management and respect for differences. These social and affective skills altogether are the initial entailment for life and play a supportive role in learning. Social and emotional learning (SEL) process includes improving skills such as recognizing and managing feelings, setting favorable goals and achieving them, respecting others' perspectives, building positive relationships, making responsible decisions, coping with interpersonal issues in a constructive way (Elias et al., 1997; Neeru, 2020).

Many improvements in 21st century have brought out novice approaches by affecting education system. Since 1980's, it has been accepted that academic intelligence is not enough on its own and concepts such as multiple intelligences, emotional intelligence, character education and moral education have gained prominence. The studies on emotional intelligence by researchers such as Salovey and Mayer (1990), Goleman (1996) had a great part in dissemination of social and emotional learning (SEL). Emotional intelligence approach has shaped the development of social and emotional learning methods both theoretically and practically. Social and emotional learning skills (SELS) can be examined under the following titles: "self-awareness, self-management, social awareness, responsible decision making and relationship skills". Although named differently, these categories refer to the same essential meaning. The aim is to enable individuals to be aware of their emotions and responsibilities; thereby, allowing them to build healthy relationships with their surroundings. These skills are also significant in order to understand the reasons for conflicts in relationships and answer questions like why some students exhibit procrastination more compared to others. The aim of society is to raise a productive and contributing generation to society. Learning of these skills at home, in schools and in social environments has enhanced the role of schools especially in primary education (Goleman, 2003; Gürek & Kıran Akça, 2022)

Socio emotional learning is identified by the Collaborative for Social, Emotional, and Academic Learning (CASEL, 2020) as the process of all adolescents and adults' acquiring knowledge, skills, attitude and implementing them with the aim of developing healthy identities, managing emotions, achieving personal and collective goals, showing empathy for others, building and maintaining supportive relationships and making responsible and compassionate decisions. Researchers and practitioners have concentrated on "emotional intelligence", "social skills" and "socio-emotional competency" concepts in ongoing studies for about three decades. These studies underline the importance of utilizing learning in social and emotional fields since these skills are qualities which can be learned and taught (CASEL, 2020; Turkish Industry and Business Association [TUSİAD], 2019).

CASEL has been leading the social-emotional learning field since 1994. They created a systematic SEL model and highlighted how important this issue is at all educational levels. CASEL accepts social-emotional learning as a necessary part of education and human development. According to the updated SEL model from 2020, social-emotional learning has five basic skills (Yaman & Yalçıntaş, 2024; Doğan, 2021; Weisberg et. al. 2021). There are some earlier scales in the literature to measure these skills (Kabakçı & Korkut Owen, 2010). However, since they were developed before the 2020 update, they do not fully cover the current five-dimensional structure. Therefore, the main difference of this study is that it is directly based on the updated 2020 CASEL model. Because of this, it provides a more up-to-date measurement tool that fits the new theory better than the older ones. According to the CASEL model designed in 2020, social-emotional learning consists of five basic skills: (Doğan, 2021; Weisberg et al., 2021; Yaman & Yalçıntaş, 2024).

1. Self-Awareness: It is the ability of an individual to be aware of his/her own emotions, ideas and values and be able to define them. This skill helps individual recognize his/her strengths and

weaknesses. Self-awareness includes self-understanding and being aware of internal processes (CASEL, 2020; Zins & Elias, 2007).

2. Self Management: It is the capability of an individual to be able to manage emotions, ideas and behaviors effectively in various situations and achieve goals and wishes. It includes the capability of delayed gratification, stress management, motivation and willpower to reach personal and collective goals (CASEL, 2025).

3. Social Awareness: It is the capability of understanding others' perspectives and empathizing with them including the ones from different cultures, backgrounds and contexts (CASEL, 2025).

4. Relationship Skills: It includes such skills as cultivating healthy and nourishing relations, active listening, cooperation and requesting for a favor, building good relationships, initiating and maintaining the relationship (Doğan, 2021; Weisberg, 2021).

5. Responsible Decision-making: Being able to make responsible and constructive decisions on personal behaviors and interactions occurring in different social environments is directly associated with an individual's level of knowledge, skills and attitudes. Ethical principles, safety priorities and social norms of behavior need to be critically evaluated, especially in regard to behaviors involving potential risks. This process includes objectively analyzing the possible consequences of interpersonal and institutional actions and responsibility of considering both individual and social health and wealth (Demirci & Bıçakçı, 2022).

Social emotional learning is a fundamental component of individuals' personal and social development. These skills have a great impact especially on academic success, social adaptation and emotional health of children and adolescents. However, there has been an important gap in the field due to the lack of a valid and reliable scale regarding the measurement of these skills. This research aims to develop a new scale to measure primary school students' social and emotional learning skills.

Method

In this section, the research procedures followed in the study are described. The first step was creating an item pool with an intensive literature review. After that, data were collected from the participants using the draft form of the scale. Finally, statistical analyses were done to test the construct validity and reliability of the scale.

Scale Development Process

Scale development process was structured based on intensive literature review and expert consultation. Generating items started regarding the five core domains of the scale which are self-awareness, self-management, social awareness, relationship skills and responsible decision-making within the scope of theoretical framework. Highly representative and comprehensive item pool was generated, and 250 items were constructed in total. The scale consists of 23 items rated on a 3-point Likert-type scale.

Generating item pool was concluded upon reaching theoretical saturation and the emergence of semantic redundancies. Afterwards, three separate sessions on different dates were arranged by the researchers to evaluate comprehensibility, appropriateness, and potential redundancy of the items. Before the pilot study, the number of items gradually reduced first to 138, then 73 and finally 50 at the end of the systematic eliminating and refining. A total of 1200 participants were reached out in the pilot study of the research, and 1,200 questionnaires were distributed. One hundred questionnaires identified as incomplete, erroneous, or not completed in accordance with the instructions were excluded from the data set in the preliminary examination

phase. Validity and reliability analysis assessing the psychometric properties of the scale were conducted based on the remaining 1,100 questionnaires.

Sample

The target population for this research comprised 4th-grade students enrolled in public schools across the central districts of Diyarbakır (Kayapınar, Bağlar, Yenişehir, and Sur). A simple random sampling method yielded a total of 1,100 participants. To ensure the robustness of the construct validity for the social-emotional learning skills scale being developed, the analytical framework required distinct datasets for exploration and confirmation. Rather than gathering data in two separate phases, a comprehensive dataset can be collected simultaneously and randomly halved—a methodological strategy strongly endorsed in the literature (Orçan, 2018). Adopting this procedure, the initial sample was randomized into two independent subsets of 550 cases each; the first subset was subjected to Exploratory Factor Analysis (EFA), while the remaining subset was reserved strictly for Confirmatory Factor Analysis (CFA).

Data Analysis

In the analysis of the data obtained from the pilot study, Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis techniques were used to test the construct validity of the scale. In the analysis process, initially factorability of the data set was examined through Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's Test of Sphericity. In the EFA step conducted based on factorability results, principal component analysis technique and varimax rotation were employed to explore factor structure. Components with eigenvalues greater than 1, the total variance explained ratios, and the scree plot were evaluated together in determining the number of factors. Low factor or cross loading items were excluded from the analysis based on the examination of loading values.

Goodness-of-fit of the factor model determined at the end of EFA was tested through CFA. Validity of the model was established by calculating χ^2/df , RMSEA, CFI, GFI, IFI and SRMR fit indices and creating path diagram. In the final step, the reliability of the overall scale and its sub-dimensions was calculated using the Cronbach's Alpha (α) internal consistency coefficient.

Research Ethics and Ethics Committee Approval Information: Prior to the data collection process, all research procedures were conducted with the approval of the Dicle University Social and Human Sciences Ethics Committee, dated May 17, 2024, and numbered E-685 08712-100-706595.

Findings

It was stated in the literature that Kaiser- Meyer Olkin (KMO) and Bartlett's Test of Sphericity need to be examined to determine factorability of the scale and sample size (Çokluk et al., 2012; Sürücü et al., 2023).

Table 1

KMO Test and bartlett's test of sphericity

Test	Value
Kaiser-Meyer-Olkin (KMO) Sample Adequacy	.833
χ^2	15,458.321
Bartlett's Test of Sphericity	df 253
p	<.001

KMO test fundamentally presents a standard regarding whether data could be modeled with factor analysis. KMO values ranges between 0 and 1. However, Kaiser (1974) stated that the data set with $KMO \leq 0.50$ is not factorable (unfactorability). Kaiser's (1974) criterion values for KMO are presented in the following table.

Table 2

KMO Thresholds

KMO Values	Evaluation
$1.00 \leq KMO \leq 0.90$	Marvellous
$0.90 < KMO \leq 0.80$	Meritorious
$0.80 < KMO \leq 0.70$	Middling
$0.70 < KMO \leq 0.60$	Mediocre
$0.60 < KMO \leq 0.50$	Terrible
$0.50 < KMO$	Unacceptable

According to the data in Table 1, KMO value of the data in this research was calculated .833. It corresponds to “meritorious” based on the KMO thresholds in Table 2. This shows that the data is appropriate for factor analysis.

Homogeneity of factors and consistency of variables are assessed via Bartlett's Test of Sphericity in factor analysis process. This test is fundamentally based on χ^2 chi-square approach suggested by Bartlett (1951) with the aim of testing whether the correlation matrix is an identity matrix (the assumption of independence among variables). As in other chi-square tests, significance value needs attention. Obtaining significant values such as $<.05$ as a result of the test strongly suggests that correlation matrix significantly differs from identity matrix, and thus factors can be extracted from the data set (Çokluk et al., 2012).

After the sample size in the pilot study was determined to be adequate as a result of KMO and Bartlett's Test of Sphericity, Exploratory Factor Analysis phase started. With this regard, firstly items loadings were examined. The minimum value for the factor loading has been a controversial issue in literature. While Howard (2016) argues that it must be above 0.40, Tabachnick and Fidell (2019) suggest it needs to be 0.32. In this research, factor loadings were descended and ensured to be at least 0.45. The threshold for factor loading was determined as 0.45 and the ones above were accepted significant.

EFA was repeated dozens of times until the following criteria were matched:

- Factor loadings above 0.45
- Eigenvalue is greater than 1
- At least three items under each factor
- Excluding cross loading items
- The difference between the items' factor loadings is above .10
- Explaining at least 50% of the total variance, (Büyüköztürk, 2020; Howard, 2016; Kılıç, 2022; Sürücü et al., 2023).

The analysis with a start of 50 items by adding and excluding items continued until the criteria above were ensured. Consequently, a structure with 23 items and 5 factors was formed.

Table 3
Items factor loadings

Items	Factor Loading
socaw7	.726
socaw8	.714
socaw9	.711
socaw10	.707
rel_sk6	.727
rel_sk9	.599
rel_sk10	.778
rel_sk11	.709
slf_mng1	.703
slf_mng3	.655
slf_mng5	.794
slf_mng6	.717
slf_mng7	.776
slf_mng8	.732
res_dm5	.528
res_dm6	.775
res_dm7	.530
res_dm8	.636
res_dm9	.791
slf_aw3	.649
slf_aw 4	.611
slf_aw 5	.734
slf_aw 6	.783

As can be seen in the Table 3 that the items below .45 were deleted. Items factor loading range from .528 to .794. All the items with factor loadings below .45 were excluded from the scale.

Scree Plot

The scree plot analysis is presented in Figure1.

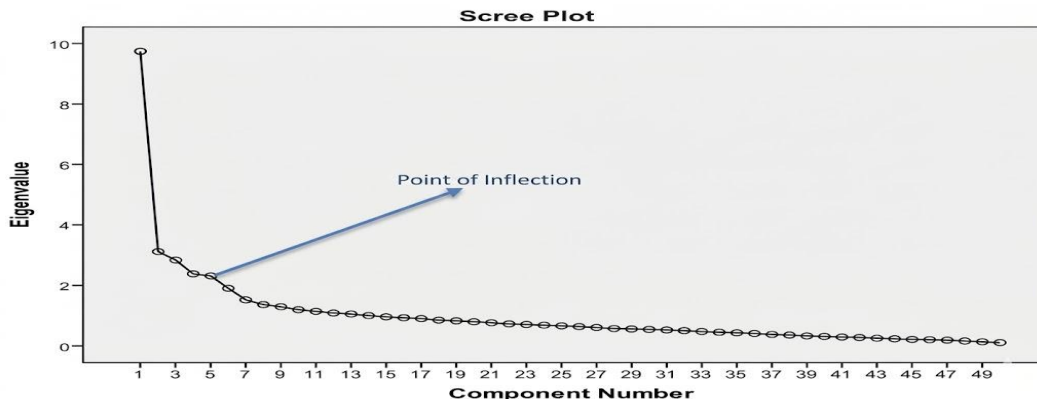


Figure 1
Scree plot

As can be seen in the Figure 1 , the point of inflexion is 5 and compatible with the number of factors.

Table 4
Component matrix (total matrix)

Items	Factors				
	1	2	3	4	5
socaw7			.838		
socaw8			.811		
socaw9			.798		
socaw10			.834		
rel_sk6					.833
rel_sk9					.724
rel_sk10					.825
rel_sk11					.820
slf_mng1	.800				
slf_mng 3	.793				
slf_mng 5	.867				
slf_mng 6	.805				
slf_mng 7	.852				
slf_mng 8	.817				
res_dm5		.678			
res_dm 6		.844			
res_dm 7		.673			
res_dm 8		.796			
res_dm 9		.841			
slf_aw3	.300			.743	
slf_aw 4				.768	
slf_aw 5				.848	
slf_aw 6				.880	

The factor loadings of the items range from .798 to .838 for Factor 3; from .724 to .833 for the Factor 5; from .793 to .867 for Factor 1, from .673 to .844 for Factor 2, from .743 to .880 for Factor 4. In this step, cross loading items cannot be seen, and all the items are above .50.

Upon examining the items in the scale separately, the items with a cross-loading difference of less than .10 between multiple factors were excluded from the scale. The same process was repeated on the condition that the difference was no less than .10 slf_aw3 item placed in the 1st and 4th factors; however, it was not excluded from the scale as the difference was higher than (>.10). After the first factor analysis, items with insufficient factor loadings and cross loading ones were respectively excluded and the analysis was repeated.

Table 5
Explained total variance

Items	Total	% Variance	% Cumulative
1	6.531	28.395	28.395
2	2.827	12.289	40.684
3	2.659	11.561	52.245
4	2.149	9.343	61.589
5	1.921	8.353	69.942

According to the Table 5, five factors emerged. (Only the values corresponding to the number of identified factors are presented in the table) since there are 5 factors in the scale with eigenvalue greater than 1. It is stated in Table 5 that the variance explained by each factor is as follows: Factor 1 accounts for 28.39%, followed by Factor 2 at 12.28%, Factor 3 at 11.56%, Factor 4 at 9.34%, and finally Factor 5 at 8.35% of the total variance. Total Explained Variance of this five-factor scale is 69.94% and it is an acceptable value as it is higher than 50%.

Confirmatory Factor Analysis

Confirmatory Factor Analysis (CFA) is a multidimensional technique and used to extract factors or components from a set of related variables. This technique specifies and combines Exploratory Factor Analysis (EFA) methods and multiple regression techniques; allowing factors to be identified based on covariance and correlations (Demir, 2024).

CFA was conducted in order to determine construct validity of SELS Scale. “IBM SPSS AMOS” program was used for CFA. CFA goodness-of-fit indices of the scale are presented in the table below.

Tablo 6
CFA Goodness-of-fit indices

Parameters	Indices	Acceptable Threshold	Conclusion	References
CMIN/df	4.614	≤ 5	Acceptable	Schermelleh-Engel-Moosbrugger (2003);Wheaton et al. (1977);
CFI	.944	$\geq .90$	High	Bentler & Bonnet (1980) ; Hu& Bentler (1999)
GFI	.924	$\geq .80$	High	Forza& Filippini (1998); Schermelleh-Engel-Moosbrugger (2003)
AGFI	.904	$\geq .80$	High	Schermelleh-Engel-Moosbrugger (2003)
NFI	.930	$\geq .90$	Acceptable	Bentler and Bonnet (1980); Schumacker &Lomax (2010)
RMSEA	.058	$\leq .08$	Good fit	MacCallum et al. (1996); Schermelleh-Engel-Moosbrugger (2003)
RFI	.919	$\geq .90$	Acceptable	Schermelleh-Engel-Moosbrugger (2003)
SRMR	.019	$\leq .05$	High	Byrne (1998); Hu& Bentler (1999)

References: (Bentler & Bonett, 1980; Byrne, 1998; Forza & Filippini, 1998; Hu & Bentler, 1999; MacCallum et al., 1996; Shevlin & Miles, 1998; Schermelleh-Engel et al., 2003; Schumacker & Lomax, 2010; Tabachnick & Fidell, 2019; Wheaton et al., 1977).

Goodness-of-fit indices obtained as a result of Confirmatory Factor Analysis (CFA) conducted with the aim of testing construct validity strongly supports hypothesized multidimensional structure of the scale. Examining fit indices respectively, CMIN/df value of the model which is the ratio of chi-square to degrees of freedom was calculated 4.614 and this value remaining under the acceptable limit 5.00 supports the fundamental model fit (Wheaton et. al., 1977; Schermelleh-Engel-Moosbrugger, 2003). Comparative Fit Index (CFI) and Normed Fit Index (NFI) values were respectively calculated .944 and .930. Exceeding .90 limit, which refers to high fit, both values show that the model perfectly demonstrates a good fit with data set (Hu & Bentler, 1999; Bentler & Bonnet, 1980; Schermelleh-Engel-Moosbrugger, 2003). Similarly, that Goodness Fit index (GFI) is .924 and Adjusted Goodness Fit index (AGFI) is .904, which are above the accepted limit .80, confirms that the model adequately fits (Forza & Filippini, 1998; Schermelleh-Engel-Moosbrugger, 2003). Root Mean Square Error of Approximation (RMSEA)

value, one of the residuals based fit indices, is .058 and it refers to good fit remaining below .08 (MacCallum et. al., 1996; Schermelleh-Engel-Moosbrugger, 2003). Finally, Standardized Root Mean Square Residual (SRMR) value is 0.019. Remaining quite below the limit .05 and corresponding to “marvelous” level, this value confirms high model fit, too (Byrne, 1998; Hu & Bentler, 1999). In conclusion, these fit indices ensure that the developed scale model is in line with the collected data and construct validity of the scale was established.

Confirmatory factor analysis (CFA) was carried out for the other phase of validity study. The scale was applied to 550 students to verify the structure with five domains emerged at the end of EFA. The diagram obtained as a result of CFA conducted to confirm the structure of the Social Emotional Learning Skills Scale with 23 items is presented in Figure 2.

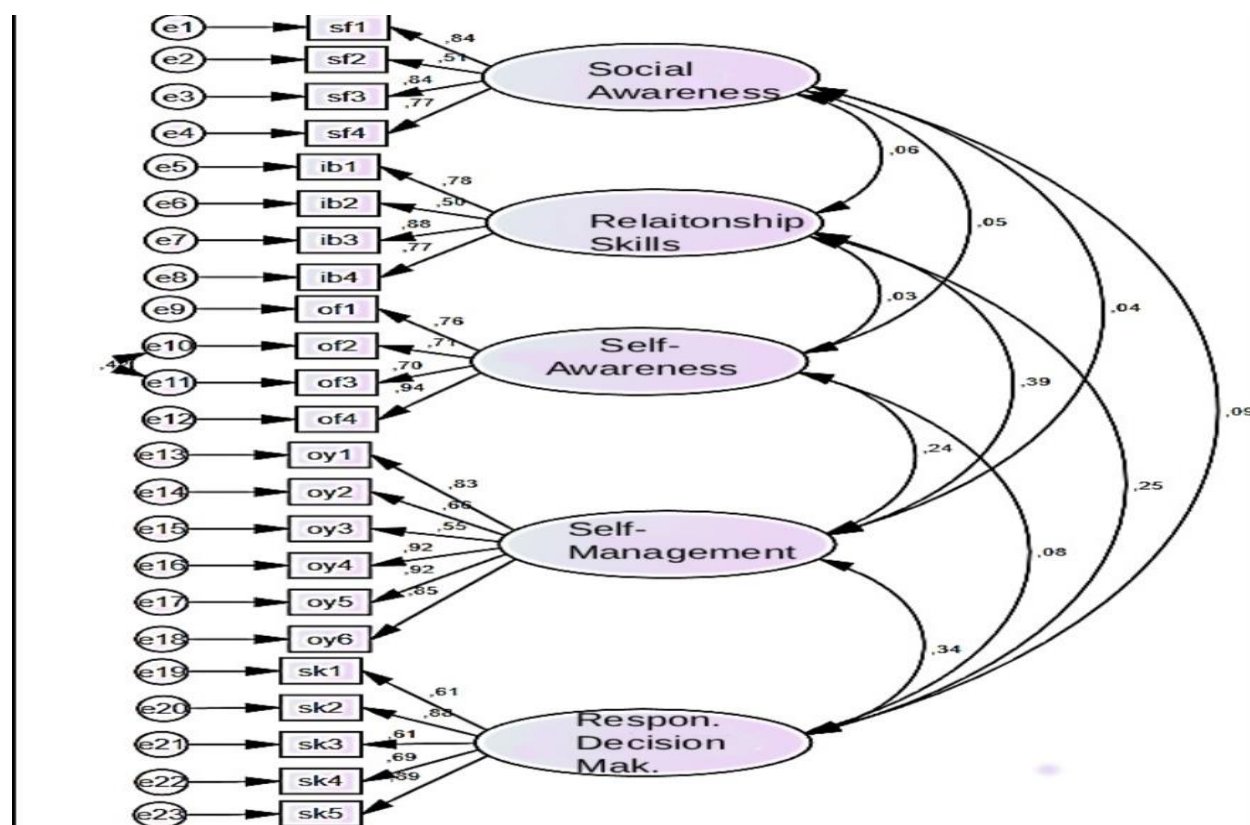


Figure 2
Social emotional learning skills scale path diagram

Reliability Study

Cronbach Alpha was calculated within the scope of reliability of the scale.

Table 7
Cronbach's Alpha Values

Domains	Cronbach's Alpha
Social Awareness	.79
Relationship Skills	.89
Self-Awareness	.73
Self-Management	.91
Responsible Decision Making	.83
Total Scale	.87

According to Table 7, reliability results show high level of internal consistency both for the overall scale (Cronbach's Alpha coefficient .87) and all sub-dimensions (ranging from .73 to .91). All Cronbach's Alpha coefficients are above the acceptable threshold .70. It proves that the items of the developed scale strongly and consistently represent the construct of interest. These results support that the scale successfully fulfills the high level of reliability requirement.

▪ **Validity Analysis:** As a result of EFA, the structure with five domains of the scale was confirmed. It was observed that it explains 69% of the total variances. CFA results show that model fit indices are at acceptable levels.

▪ **Reliability Analysis:** Cronbach alfa coefficient was found to be between .79 and .90 for all domains. These results show high level of internal consistency reliability.

Discussion

In this research, it was aimed to develop Social Emotional Learning Skills Scale (SELSS) regarding fourth grade students and examine psychometric properties (validity and reliability). Item pool was created in the initial part of scale development process by comprehensively reviewing literature. DeVellis' (2022) principle was adopted stating that "the larger is the item pool, the better it is". Efforts were made to ensure item pool is large enough to cover the theoretical construct. The pool was evaluated in three separate sessions on different dates with the aim of establishing construct validity and applicability of the study. The scale was lastly reduced to 50 items before the actual implementation.

A draft questionnaire with 50 items was applied to the sample group consisting of 1,100 students to test construct validity of the scale. The appropriateness for factor analysis of the data set was tested through Kaiser-Meyer-Olkin (KMO) and Bartlett's Test of Sphericity. The results obtained showed that sample size is sufficient and suitable for factoring.

The following criteria were strictly employed for the items to be included in Exploratory Factor Analysis (EFA) process:

- Factor loadings are at least .45 or above.
- Eigenvalue is greater than 1.
- Each factor is represented by at least 3 items.
- The difference is less than .10 in elimination of cross-loading items.
- Total variance explained is above the accepted level in literature 50% (Büyüköztürk, 2020; Howard, 2016; Kılıç, 2022; Sürücü et al., 2023).

As a result of EFA and subsequent Confirmatory Factor Analysis (CFA), the items with weak psychometric properties were excluded from the scale and the final scale was confined to 23 items.

Cronbach Alpha internal consistency coefficient was calculated .87 within the scope of reliability study. This value proves the scale is a highly reliable measurement tool.

Conclusions and Recommendations

To conclude, reliability and validity analysis demonstrated that the Social Emotional Learning Skills Scale (SELSS) developed in this research is a psychometrically strong, valid, and reliable tool to assess the social and emotional skills of the target group. The 23-item instrument is structured on a 3-point Likert-type scale. Accordingly, the minimum attainable score on the scale is 23, while the maximum possible score is 69. There are no reversed items. The scale is considered a practical measurement tool for both educators in the field and psychologists. It is also expected to be a significant data collection tool for further studies. Covering five core

domains of SEL, the scale meets an important need in literature. It is suggested that the scale be tested in various cultures and on different sample groups.

Declarations

Acknowledgements: Not applicable

Authors' contributions: Conceptualization: [AA& İK]; Methodology: [AA]; Material preparation, data collection, formal analysis and investigation: [AA]; Writing - original draft preparation: [AA& İK]; Writing - review and editing: [AA& İK]; Resources: [AA]; Supervision: [İK]

Competing interests: The authors declare that they have no competing interest

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Ethics approval and consent to participate This research was conducted with the approval of the Dicle University Social and Human Sciences Ethics Committee, dated May 17, 2024, and numbered E-685 08712-100-706595.

Thesis and conference disclosure: This study is part of the ongoing doctoral dissertation conducted by the first author at Dicle University.

AI declaration: Not applicable

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