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DEVELOPMENT AND VALIDATION OF THE PSYCHOMETRIC PROPERTIES OF THE SCHOOL LEADERSHIP PRACTICES SCALE (SLPS)

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Abstract

Before designing professional development programs aimed at improving the leadership practices of school principals, it is necessary to determine which leadership practices school principals need to improve. However, it can be said that the literature contains a limited number of measurement tools that allow for the evaluation of school principals' leadership practices, and that these tools address leadership practices within a narrow scope. For this reason, the purpose of the research conducted is to present the development process of the School Leadership Practices Scale (SLPS), which function of making sense of school principals' leadership practices based on teachers' perceptions. The measurement tool was developed in four stages: generation of the item pool; ensuring content validity; conducting a pilot study; and verifying the structure of the vehicle with the actual application. The sample of the study consisted of teachers working at the secondary school level. Exploratory factor analysis reveals that the total variance explained is 65.06%. When the absolute fit indices are evaluated as a whole, it is concluded that the developed measurement model provides a high level of fit to the data. CR values (.90-.93) indicate that all dimensions exhibit high levels of reliability. Upon the confirmation of the instrument's structure, a multidimensional model is identified, which measures school principals' leadership practices through 35 items under five factors: (a) professional ethics; (b) strategic management; (c) personal leadership resources; (d) change and data-based school development; and (e) a safe and supportive school climate.

Keywords: school leadership practices, scale development, factor analysis

Introduction

In our current era, change and innovation are accelerating, and societies wishing to adapt to this flow are increasingly demanding effective educational services from schools that can keep pace with change and innovation. In this context, school leaders are regarded as a significant driving force in enabling schools to provide effective educational services that respond to the demands of their surrounding communities (Bush, 2008; Daniëls et al., 2019; Dennett, 2018). Recent research has identified school leadership practices as one of the key catalysts influencing student success (Leithwood et al., 2008, 2020; Özdemir et al., 2024; Robinson et al., 2008), positively influence teacher motivation (Levin et al., 2020), and enhance school effectiveness by serving as a source of inspiration for their staff in the face of challenges (Afsouran et al., 2022; Thorn, 2012). Therefore, the success of school leaders' practices is considered a prerequisite for achieving school effectiveness, and consequently, how leadership practices can be improved has become a focal point for researchers and policymakers aiming to enhance school effectiveness.

Trends aimed at improving school leaders' practices have increased the emphasis placed on professional development efforts targeting leadership enhancement (Day & Sin, 2011), and significant budgets are allocated accordingly (Afsouran et al., 2022). In many countries, particularly the United States (US), professional development programs are being designed

to enhance school leaders' capacities across all areas of responsibility. These programs aim to bridge theory and practice and provide learning opportunities within the framework of technical, conceptual, and interpersonal skills (Australian Institute for Teaching and School Leadership [AITSL], 2018; British Council, 2021). These initiatives are shaped around the question, "What behaviors and skills should school leaders exhibit?" and are developed in accordance with standards that outline the expected practices of school principals within the context of each country's educational system and cultural structure. These standards serve as guiding frameworks for professional development programs focused on improving school leadership practices.

Similar to countries such as the USA, Canada, and Australia, research on the development of school leadership practices is becoming increasingly important in Turkey. It has been documented that the knowledge and skills related to school management that school principals acquired from their teaching backgrounds are inadequate (Recepoğlu & Kılınç, 2014), and thus they require professional development to effectively lead the organizations they are part of (Gümüş & Bellibaş, 2020; Polat et al., 2018). The 20th National Education Council held in 2021 emphasized the need to enhance school principals' instructional leadership skills within the framework of professional development efforts (Ministry of National Education [MoNE], 2022), while the Teacher Strategy Document published in 2017 highlighted the importance of leadership skills within the framework of professional development (MoNE, 2017, p.5). In summary, over the last decade, the need for professional development programs aimed at improving the daily practices of school leaders within the Turkish National Education system has become a prominent topic in both research and policy documents (Bellibaş & Kılınç, 2022).

A review of the literature reveals that a needs analysis must be conducted prior to the design of the required professional development program (Lacerenza et al., 2017), and indeed, professional development programs developed by taking into account the findings of needs analysis are more efficient, and therefore, greater learning is observed in the participants of these programs (Salas et al., 2012; Tannenbaum, 2002). Moreover, considering that individuals begin their development as leaders from different starting points and progress along varying trajectories over time (Day & Sin, 2011), it becomes evident that a measurement tool is needed to identify which leadership practices school leaders need to improve before designing a professional development program tailored to their needs. However, the literature indicates that measurement tools addressing leadership practices in the national literature do not adequately consider the international literature and are based on a single conceptual framework or developed as adaptations (Beycioğlu et al., 2018; Kılınç et al., 2014; Yalçın & Atasoy, 2021; Yılmaz & Börü, 2021). Therefore, the main objective of this study is to develop a comprehensive measurement tool that evaluates the leadership practices of school principals and to shed light on professional development studies related to the leadership practices of school principals.

School Leadership Practices

School leadership practices refer to the behaviors school principals exhibit in determining the steps they need to take to ensure school effectiveness (Leithwood et al., 2020) and are regarded as a fundamental professional responsibility they are expected to fulfil (Institute for Education Leadership [IEL], 2013). These practices are updated in alignment with changing demands to maximize efficiency and benefit for students. Indeed, in ensuring school effectiveness, school principals are expected not only to be instructional leaders but also to act as leaders capable of managing many dynamics that affect the educational environment. Examples include the opportunities offered by artificial intelligence in teaching and learning processes (Pradana et al., 2023) or the disadvantages of global refugee crises on schools (Türkoğlu Özdemir & Sincar, 2025). In the face of these dynamics, school leaders who can effectively demonstrate

leadership behaviors play a driving role in ensuring school effectiveness and increasing student achievement (Leithwood et al., 2008). The behaviors expected from school leaders are categorized under common themes, forming what are referred to as leadership practices. These practices are outlined within various leadership standards (Alberta Education, 2023; AITSL, 2014; NPBEA, 2015) and frameworks (Gurr, 2015; Gurr et al., 2021; IEL, 2013; Leithwood, 2017).

The literature review shows that the first national set of standards for school leadership practices was developed in the United States in 1996 under the name ISSLC, and was subsequently updated in 2008 and 2015 to meet evolving needs (NPBEA, 2015). The standards consist of leadership practices organized under ten themes, which are defined as follows: School leaders (1) under “Mission, Vision, and Core Values,” act with a student-centered approach and organize systems to realize a shared vision. (2) Under “Ethics and Professional Norms,” they prioritize ethical and professional conduct and strive to ensure social justice within the school environment. (3) In the theme of “Equity and Cultural Responsiveness,” they develop practices that respect cultural differences. (4) Regarding “Curriculum, Instruction, and Assessment,” they take steps to increase academic achievement across classrooms in a coordinated manner. (5) In creating a “Supportive and Caring School Community for Students,” they develop practices to ensure that students are educated in an environment where they are academically, socially, and emotionally supported. (6) In “Professional Capacity of School Personnel,” they promote continuous development and collective learning among school staff. (7) The “Professional Community for Teachers and Staff” theme emphasizes creating embedded professional development opportunities for teachers. (8) In “Meaningful Engagement of Families and External Community,” they act collaboratively, considering the needs of the school community and families. (9) Under the heading “Operations and Management,” they develop strategies to manage processes for the development of students’ academic and social achievement. (10) In “Continuous School Improvement,” they ensure sustainability in school development and promote change, innovation, and data-driven practices. The ISSLC standards, in their updated versions, have become a seminal reference in the literature, guiding professional development and scale development efforts related to leadership practices in various countries (Choi et al., 2024; Hammad et al., 2021; Sezer, 2018).

Another significant study on school leadership practices was conducted by Leithwood (2017), who, as a result of a comprehensive research effort, proposed a framework that forms the foundation of the Ontario Leadership Framework. This framework consists of two main components: five themes outlining effective school leadership practices, and three themes describing personal leadership resources identified as the driving force behind the implementation of these practices. The leadership practices focus on: (1) Setting Directions, (2) Building Relationships and Developing People, (3) Developing the Organization to Support Desired Practices, (4) Improving the Instructional Program, (5) Securing Accountability (Leithwood, 2017, p.35). Leithwood described these practices in the following order: Establishing a shared vision for the school with high expectations; fostering communication within the school community and promoting professional development; encouraging collaboration in school improvement and creating a safe environment; implementing practices aimed at improving students’ academic achievement; and ensuring both internal and external accountability among school staff. The personal leadership resources are categorized into cognitive, social, and psychological.

School Leadership Practices Scale

Although school leadership practices are framed within widely accepted models, considering the context-sensitivity of these practices, each country defines which behaviors

leadership practices should encompass within the framework of its own education system (Gurr et al., 2007; Yasser, 2023). The behaviors associated with the identified leadership practices shed light on professional development efforts aimed at improving these practices. Before designing such professional development programs, it is essential to determine the specific needs they aim to address, which is identified by revealing the leadership practices school leaders need to improve (Schleicher, 2012). Therefore, this study aims to develop the School Leadership Practices Scale (SLPS), which serves to describe the leadership practices that school leaders in Türkiye need to develop, based on internationally recognized school leadership practices.

The foundation of this study lies in evaluating the behaviors that school leaders need to demonstrate in their practices based on teachers' perceptions, which led to adopting the "Behavioural Leadership Approach" as the theoretical basis for the scale development process. At the core of the behavioral approach is the belief that what makes leaders effective are the behaviors they exhibit (Bolden et al., 2003). Advocates of this approach identify observable actions of leader behavior and associate them with effective leadership (Yukl, 2012). It is further argued that anyone who can learn and apply these actions can become an effective leader (Koç & Topaloğlu, 2012). According to the theory, with practice-based training, individuals' behaviors can be changed to align with expectations, and they can be trained to become leaders (Gibson et al., 1996). Based on the observability of leadership behaviors, Yukl emphasized the importance of practice-based research conducted through behavior description questionnaires in identifying effective leadership behaviors. Therefore, the Behavioral Approach perspective forms the theoretical framework of this study, which aims to determine which behaviors school leaders need to improve before designing a professional development program to enhance their leadership practices, using the School Leadership Practices Scale (SLPS).

Research Aim and Research Questions

As stated before, it can be said that scale development studies that have the function of evaluating the leadership practices of school principals in the literature regarding the Türkiye context are limited. Moreover, considering the dynamic nature of the required leadership practices (AITSL, 2018), it can be stated that there is a need for an up-to-date and comprehensive scale in the field. Therefore, the purpose of this study was to develop the School Leadership Practices Scale (SLPS) in order to evaluate the behaviors of school principals during their leadership practices. In line with this purpose, it is expected that by identifying, from the perspective of teachers working at the secondary level, the leadership behaviors school principals need to improve, the findings obtained will guide professional development efforts. Based on all this data, it is aimed to answer the following questions:

1. Is the scale developed to evaluate school leadership practices valid?
2. Is the scale developed to evaluate school leadership practices reliable?
3. What are the dimensions and items of the scale developed to evaluate school leadership practices?

Research Methodology

General Background

This study was a quantitative research conducted with the aim of developing a scale. The scale development process consisted of four stages: Generation of the item pool, ensuring content validity, conducting the pilot study, and confirming the structure of the instrument through the main study (Hinkin, 1998).

Study Groups and Data Collection

The studies regarding the steps expressed in the research process were carried out with a sample formed from teachers working in secondary public schools in the center of Gaziantep province during the 2024-2025 academic year. To obtain a rich data set from the sample, the snowball sampling method, one of the purposive sampling techniques, was adopted (Merriam, 2018). Many researchers have made different suggestions regarding how large the sample size should be in the scale development process. Hair et al. (2018) suggested that the sample size should be ten times the number of items in the item pool, Bryman and Cramer (2001) suggested five times, and Kline (2016) suggested two times. In this research, the aim was to reach a sample of 800 participants, taking into account the recommendation of Hair et al., in order to apply the draft scale form with 80 items in the item pool.

In order to administer the School Leadership Practices Scale (SLPS) to the study group, ethical approval was first obtained from the Ethics Committee for Social and Human Sciences at Gaziantep University, in accordance with the committee's decision dated 26.08.2024 and numbered 536232. The draft scale form was transferred to a Google Form, which was then administered to the study group via WhatsApp by the researchers using the Google Form application. In the process of reaching the study group, the Google form link containing the scale items was sent to the other participants via WhatsApp, based on the participants' voluntary participation and their recommendations.

In the Pilot Study (Exploratory Factor Analysis [EFA]-I) phase of the research, data were collected from 417 participants. 59.5% of the participants were female, and the mean age was 41.12 ± 8.49 years (ranging from 22 to 65). 76% of the participants had a bachelor's degree and 24% had a master's degree. The average teaching experience among participants was 14.90 ± 9.15 years (range 1 to 44).

A total of 798 valid participant responses were obtained for the main study. To enable a more robust and consistent testing of the measurement tool's factor structure through cross-validation (Tabachnick & Fidell, 2015), the sample was randomly divided into two equal parts. Accordingly, Exploratory Factor Analysis II (EFA-II) was conducted with the first subsample of 398 participants, while Confirmatory Factor Analysis (CFA) was carried out with the second subsample of 398 participants. In the EFA-II sample group, 62.1% of participants were female, and the mean age was calculated as 36.93 ± 7.89 years (22-62). Of the participants, 74.1% held a bachelor's degree and 25.9% held a graduate degree; the average teaching experience was found to be 10.92 ± 7.73 years (1-35). In the CFA sample, the female proportion of the participants was 65.6%, and the average age of the women was 36.97 ± 9.22 (22-65). Of this group, 78.9% had a bachelor's degree and 21.1% had a master's degree. The average teaching experience was 11.12 ± 8.53 years (1-40).

The sample selected for the test-retest application consisted of 30 participants. The gender distribution within this sample was balanced, with equal representation of male and female participants. The mean age of the sample was calculated as 30.47 ± 4.51 years (ranging from 22 to 39). Among the participants, 70% held a bachelor's degree and 30% held a graduate degree. The average teaching experience was found to be 7.1 ± 4.56 years (ranging from 1 to 17).

Item Pool

The development process of the School Leadership Practices Scale (SLPS) began with the creation of an item pool. This pool resulted in 80 items categorized under 11 headings created by combining the ten dimensions of leadership standards outlined in the Professional Standards

for Educational Leaders (NPBEA, 2015) and the common aspects of the five-dimensional framework for Successful School Leadership and Personal Leadership Resources proposed by Leithwood (2017). Additionally, during the item writing process, findings from face-to-face focus group interviews conducted by the researchers with school principals—highlighting the leadership practices they perceive as necessary to improve (Türkoğlu Özdemir & Şahin, 2025)—were taken into account, along with statements from nationally published leadership scales (Beycioğlu et al., 2018; Kılınç et al., 2014; Sezer, 2018; Yalçın & Atasoy, 2021; Yılmaz & Börü, 2021). The draft scale was designed as a 5-point Likert-type instrument, with items rated as: “Never (1),” “Very Rarely (2),” “Sometimes (3),” “Most of the Time (4),” and “Always (5).” During the creation of the item pool, no reverse items were added because, as stated by DeVellis (2017), it might cause confusion for the participants.

Content Validity

To determine whether the items in the scale accurately represent the construct intended to be measured, expert opinions were obtained from a measurement and evaluation specialist and a Turkish language specialist. Based on their feedback, the language and wording of several items were checked and revised. Additionally, in order to ensure the content validity of the 80 items included in the initial draft, the opinions of eight experts in educational administration and leadership were gathered. The evaluation form presented to the experts included a four-point rating scale for each item: “not appropriate,” “requires major revision,” “may be appropriate with minor revision,” and “completely appropriate,” corresponding to scores from 1 to 4. For each item, the Item-Level Content Validity Index (I-CVI) was calculated, and for the overall scale, the Scale-Level Content Validity Index using the average method (S-CVI/Ave) was computed. Values of .78 and above are considered valid I-CVI values if reviewed by eight experts (Polit & Beck, 2006). The I-CVI for each item was calculated by dividing the number of experts who rated the item as 3 or 4 by the total number of experts. As a result of these calculations, 24 items with I-CVI values below .78 were deemed insufficient in terms of content representation and were removed from the item pool. The revised draft scale was thus updated to include 56 items. The overall S-CVI, calculated as the average of all item-level CVIs, was found to be .86, indicating that the scale possesses adequate content validity.

Pilot Study

Prior to the pilot study, a preliminary application was conducted with 10 participants. These participants were asked to identify potential item-level issues such as conceptual confusion, semantic ambiguity, handling similar behaviors, or cultural incongruity (Willis, 2015). Based on the feedback received, 8 items dealing with similar behaviors and cultural incongruity were removed from the scale. Consequently, this scale consisting of 48 items was administered.

Confirming the Structure of the Scale Through the Main Study

Confirmatory Factor Analysis (CFA) tests the theoretical accuracy of the structure obtained from EFA and evaluates how well the measurement model fits the data (Brown, 2015). In the pilot study (EFA-I), data obtained from the 48-item draft scale form were used. At the end of the sequential analysis process, a total of 12 items were removed due to not meeting the minimum factor loading threshold or due to cross-loading, and subsequent analyses continued with the remaining 36 items. In the EFA II phase, one item from the 36-item scale form was determined to lack discriminant validity and was removed. The theoretical accuracy

and fit indices of the 35-item measurement instrument, validated in the main study, were also confirmed by Confirmatory Factor Analysis (CFA), and detailed information regarding the process is included in the findings.

Test-Retest Reliability

The aim of this method was to determine whether the measurement tool gives consistent results over time and its stability over time. It evaluates the instrument's resistance to temporal variability by examining the relationship between two sets of data collected from the same individuals at different points in time (DeVellis, 2017). This type of reliability is particularly important for constructs where individual variability is expected to be low, and it plays a critical role in determining whether the measurement tool is stable (Kline, 2016). The test-retest reliability of the instrument, confirmed through the main study, was analyzed using the finalized 35-item version of the scale. The correlation between the two datasets was assessed using the Pearson product-moment correlation coefficient (r) and the Intraclass Correlation Coefficient (ICC).

Research Results

Step I-Pilot study (EFA-I)

Within the scope of the pilot study, the EFA-I analyses were conducted using data obtained from the 48-item draft scale form. Analyses were carried out in SPSS 30 software using the Maximum Likelihood extraction method and Promax rotation technique. During the data collection process for the pilot study, a total of 450 participants were reached; following the data screening procedures, the final sample size was reduced to 417. Initially, no item exhibited a deviation from normal distribution, nor did any item exceed the skewness and kurtosis thresholds of ± 1.5 or show excessively symmetric or dominant response tendencies (Kline, 2016). Subsequently, the Cronbach's Alpha coefficient for the 48-item scale was calculated as .97, indicating a high level of internal consistency (George & Mallery, 2016). A detailed item-level analysis revealed that item-total correlation values ranged between .40 and .77, demonstrating that all items exceeded the critical threshold of .30 (Nunnally & Bernstein, 1994).

During the sequential analysis process, items with factor loadings below .32 were systematically excluded from the model. Additionally, to prevent cross-loading issues, any item with a loading above .30 on more than one factor and a difference of less than .15 between its two highest factor loadings was considered non-discriminative between constructs and was thus removed from the scale. After each item removal, the analysis was rerun, and the resulting factor structure was re-evaluated. By the end of the process, a total of 12 items were excluded either for not meeting the minimum factor loading threshold or due to cross-loading, and the subsequent analyses continued with the remaining 36 items.

Within the scope of the pilot study, the suitability of the 36-item final scale for factor analysis was first assessed using the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's Test of Sphericity. The KMO value obtained was .969, which indicates excellent sampling adequacy, as values above .90 are considered outstanding (Tabachnick & Fidell, 2015). The result of Bartlett's Test of Sphericity yielded a chi-square value of 11,454.192 with 630 degrees of freedom, which was found to be statistically significant at the $p < .001$ level. Additionally, the first five factors with eigenvalues greater than 1.00 explained a total of 65.321% of the variance. These findings, particularly the results of Bartlett's Test, demonstrate

that the 36-item dataset possesses a structure suitable for factor analysis (Hair et al., 2018; Worthington & Whittaker, 2006).

Step II- EFA II

The 36-item scale was administered to a sample of 850 participants within the scope of the main study. A preliminary data screening was conducted, and the responses of 54 participants were found unsuitable for analysis and subsequently excluded. The remaining sample of 796 participants was randomly divided into two equal subgroups ($n = 398$ each) to allow for a more robust and consistent testing of the factor structure through cross-validation (Hair et al., 2018; Tabachnick & Fidell, 2015). EFA-II was performed on the first subsample, while CFA was conducted on the second. Descriptive statistics indicated that all 36 items had similar means and standard deviations, and their skewness and kurtosis values were within the acceptable ± 1.5 range (Kline, 2016), indicating normal distribution. Thus, no item was removed at this stage. In the subsequent analyses, the Cronbach's Alpha coefficient was calculated as .96, indicating a very high level of internal consistency (George & Mallery, 2016). Moreover, it was found that the removal of any individual item did not alter the Cronbach's Alpha value, which remained stable at .96, confirming that each item contributed significantly to the reliability of the scale (DeVellis, 2017). Additionally, item-total correlations ranged from .42 to .68, indicating that each item made a substantial contribution to the overall structure of the scale (Nunnally & Bernstein, 1994).

Following this stage, EFA was conducted, and this process was conducted using the Maximum Likelihood extraction method and Promax rotation technique. During the analysis, it was found that one item had loadings greater than .30 on two separate factors, with a difference of only .06 between the two highest loadings. Based on this, the item was determined to lack discriminant validity and was removed from the scale. A final EFA was then performed on the remaining 35 items. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was calculated as .966, indicating that the sample was suitable for factor analysis (Tabachnick & Fidell, 2015). Bartlett's Test of Sphericity was found to be significant ($\chi^2 (595) = 8699.195; p < .001$), suggesting that the variables were sufficiently interrelated to justify the application of factor analysis (Hair et al., 2018).

Reliability analyses conducted separately for the five factors revealed that the Cronbach's Alpha coefficients ranged between .89 and .92, indicating that all factors possess very high reliability (Nunnally & Bernstein, 1994). Additionally, the five factors with eigenvalues greater than 1 explained 65.06% of the total variance, which demonstrates that the explained variance is at an acceptable level (Özdamar, 2016). Findings related to the Rotated Factor Loadings and Reliability Values from EFA-II are presented in Table 1.

Table 1
Rotated Factor Loadings and Reliability Values from EFA-II

Items	F1	F2	F3	F4	F5
I1	.82				
I3	.82				
I7	.81				
I4	.77				
I2	.75				
I5	.73				
I6	.73				
I8	.70				
I14		.83			
I10		.78			
I11		.78			
I15		.74			
I13		.72			
I9		.71			
I12		.70			
I32			.76		
I36			.76		
I31			.74		
I34			.74		
I30			.73		
I33			.73		
I35			.71		
I22				.80	
I26				.79	
I28				.79	
I29				.73	
I27				.70	
I24				.65	
I23				.62	
I16					.80
I20					.73
I18					.72
I17					.72
I19					.72
I21					.71
Eigenvalue	14.51	2.63	2.46	1.88	1.30
Explained Variance	41.45	7.52	7.01	5.36	3.71
Cumulative Explained Variance	41.45	48.97	55.98	61.35	65.06
Cronbach's Alpha	.92	.91	.89	.91	.91

According to the factor correlation matrix obtained after rotation, positive and moderate correlations were observed among the five dimensions of the scale. The fact that all correlation values fell within the range of .30 to .70 indicates that there are meaningful relationships between the factors, yet each dimension is sufficiently distinct from the others in terms of structure (Brown, 2015).

Table 2
EFA-II Factor Correlations

	F1	F2	F3	F4	F5
F1	1.00				
F2	.55	1.00			
F3	.55	.59	1.00		
F4	.61	.68	.65	1.00	
F5	.50	.52	.62	.43	1.00

Step III-CFA

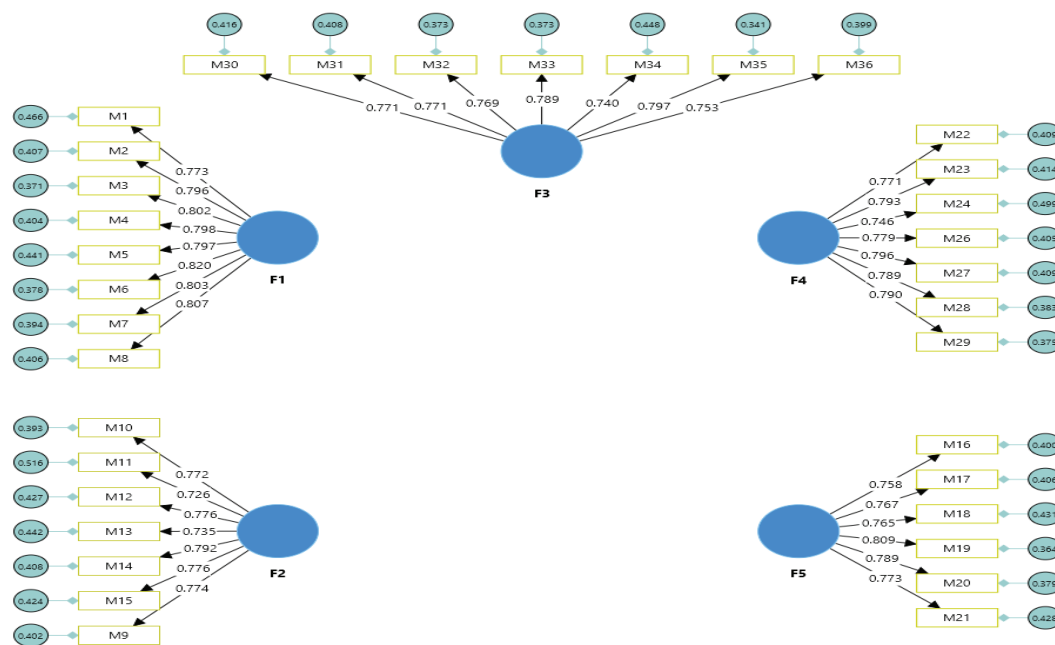
The model fit indices related to the Confirmatory Factor Analysis (CFA) were analyzed to evaluate how well the measurement model fits the data. The model fit indices obtained in the current study, along with the acceptable thresholds reported in the literature, are presented in Table 3.

Table 3
CFA Model Fit Indices

Fit Index	Obtained Value	Acceptable Range
Chi-square	592.544	Not sufficient alone; should be interpreted with other indices
Df	550	For informational purposes
p-value	.102	$p > .05$ indicates no significant difference between model and data → good fit
Chi-square/df	1.077	1–3: Excellent fit, 3–5: Acceptable fit
RMSEA	.014	.00–.05: Excellent, .06–.08: Good, >.10: Poor
RMSEA 90% CI (Low)	.000	< .08
RMSEA 90% CI (High)	.022	< .08
GFI	.923	≥ .90: Acceptable fit
AGFI	.912	≥ .90: Acceptable fit
PGFI	.806	≥ .50: Acceptable fit
SRMR	.028	≤ .08: Acceptable fit
NFI	.939	≥ .90: Acceptable fit
TLI	.995	≥ .95: Excellent fit
CFI	.995	≥ .95: Excellent fit

Upon evaluation of Table 3, it can be concluded that the developed measurement model demonstrates a high level of fit with the data (Tabachnick & Fidell, 2015), exhibits a very low error level, and can be considered valid both theoretically and statistically. The visual representation of the CFA model is shown in Figure 1.

Figure 1
Standardized Factor Loadings of Items in CFA



In confirmatory factor analysis, convergent validity, a key component of construct validity, assesses the extent to which the items in the scale represent their respective latent constructs (Tabachnick & Fidell, 2015). The high standardized factor loadings obtained in the previous analysis step (.726 - .820) indicate that the items strongly load onto their theoretically assigned dimensions. Convergent validity should be evaluated not only based on factor loadings but also through the values of Average Variance Extracted (AVE) and Composite Reliability (CR) (Hair et al., 2018). Table 4 presents the findings regarding construct validity and reliability obtained in this study.

Table 4
Construct Validity and Reliability Results

Factor	Cronbach's Alpha (Standardized)	Composite Reliability (CR)	Average Variance Extracted (AVE)
F1	.934	.934	.639
F2	.908	.908	.585
F3	.911	.911	.593
F4	.916	.916	.610
F5	.901	.902	.604

The fact that all obtained AVE values exceed the .50 threshold indicates that each dimension is meaningfully represented by its respective items and that the latent constructs are sufficiently explained (Fornell & Larcker, 1981). Additionally, the CR values obtained in the model demonstrate that all dimensions exhibit a high level of reliability (Hair et al., 2018). Furthermore, the Cronbach's Alpha values reveal that the sub-dimensions of the scale possess high internal consistency and that the relationships among the items are strong (George & Mallery, 2016).

Test-Retest Reliability

To observe whether the developed scale yielded stable results over time, test-retest reliability analyses were performed after three weeks (Nunnally & Bernstein, 1994). The application was carried out with 30 participants, meeting the minimum sample size criterion specified by Hair et al. (2018). The results obtained are given in Table 5.

Table 5
Test-Retest Reliability Findings

Factor	Pearson r (T1T2)	ICC Model	ICC Value	95% CI Lower	95% CI Upper	Interpretation
F1	.949	3.1	.937	.873	.970	High
F2	.927	3.1	.925	.848	.963	High
F3	.929	3.1	.928	.855	.965	High
F4	.927	3.1	.926	.850	.964	High
F5	.928	3.1	.919	.838	.961	High
Overall Scale	.967	3.1	.966	.931	.984	High

The Pearson correlation coefficients for all sub-factors of the scale range between .927 and .949. These values indicate a high level of stability over time for the scale. The resulting values show that the scale consistently provides accurate results and has stability over time. Furthermore, the Pearson r value for the entire scale was determined to be .967. As stated by DeVellis (2017), high test-retest correlation values indicate that the measurement tool is resistant to temporal change and maintains consistency over time. In this context, the findings show that the construct measured by the scale does not change significantly over time and that recall effects are limited. The ICC value for the overall scale was calculated as .966. Since all ICC values exceed .90, the results indicate “high reliability” (DeVellis, 2017). Each of the five factors, comprising the 35-item structure, was evaluated within its theoretical context and named accordingly. Detailed tables regarding the final structure of the scale are presented in Appendix 1.

Discussion

The School Leadership Practices Scale (SLPS) evaluates school principals’ leadership practices based on teachers’ perceptions across five dimensions: Professional Ethics, Strategic Management, Personal Leadership Resources, Change and Data-Based School Development, and Safe and Supportive School Climate. These practices describe the behaviors that school principals are expected to demonstrate for providing school effectiveness. Following the analyses conducted to test the scale—namely EFA-I (pilot study), EFA-II, and CFA—with the establishment of reliability through the test-retest method, the five-factor model of the SLPS has been shown to be psychometrically robust.

In constructing the item pool, a pool of 80 items was initially designed, taking into account two widely accepted conceptual frameworks that outline the leadership behaviors expected from school principals (Leithwood, 2017; NPBEA, 2015). Based on expert review ($n = 8$), 24 items were excluded due to insufficient content representation, and following cognitive interviews with participants ($n = 10$), 8 items were removed for causing conceptual confusion,

thereby enhancing content validity. The remaining 48-item scale was administered in the pilot study (EFA-I) ($n = 417$). As a result of the analysis, 12 items that exhibited cross-loadings were excluded, yielding a scale with 36 items across 5 factors. The Cronbach's Alpha coefficient (.97), KMO value (.969), and Bartlett's Test of Sphericity ($\chi^2 = 11454.192, p < .001$) confirmed the appropriateness of the dataset for factor analysis (Tabachnick & Fidell, 2015). The cumulative variance explained by factors with eigenvalues ≥ 1 was 65.321%, indicating that the factor structure accounted for a substantial portion of the variance and was statistically meaningful. The 36-item scale was then administered to a sample of 796 participants. To ensure a more robust and consistent testing of the factor structure via cross-validation (Hair et al., 2018), the sample was randomly divided into two equal parts. In the EFA-II ($n = 398$), The Cronbach's Alpha coefficient was determined to be .96, indicating very high internal consistency (Nunnally & Bernstein, 1994). One item was removed due to dual factor loading. For the remaining 35 items, the KMO value was .966, and Bartlett's Test of Sphericity ($\chi^2 = 8699.195, p < .001$) was significant (George & Mallery, 2016). The cumulative variance explained by the components with eigenvalues ≥ 1 was 65.056%. In the CFA phase ($n = 398$), the 35-item, 5-factor structure was tested. The model demonstrated high levels of fit across absolute fit indices ($\chi^2 = 592.544$, RMSEA = .014, SRMR = .028), incremental fit indices (CFI = .995, TLI = .995, NFI = .939), and explanatory indices (GFI = .923, AGFI = .912, PGFI = .806), indicating that the developed model fit the data very well, with low error, and could be accepted as both theoretically and statistically valid. To assess the temporal stability of the scale, a test-retest method was employed ($n = 30$). The resulting Person $r = .967$ for the entire scale, while ICC = .966. These results demonstrate that the measurement tool is not only resistant to temporal variation and stable over time but also highly reliable (DeVellis, 2017; Kline, 2016).

Studies conducted in many countries on both Eastern and Western axes have developed surveys and measurement tools that allow for the evaluation of leadership practices in the field, taking into account national professional standards (ISCLLS, etc.) or international projects (ISSPP, etc.) regarding the leadership practices of school principals (Awodiji & Naicker, 2024; Choi et al., 2022; Dellomas & Deri, 2022; Tobón et al., 2020). A common theme in these studies is the need for a multifaceted evaluation tool to improve the performance of school principals in their leadership practices in school settings and to ensure their continuous professional development. Therefore, it can be said that there is a need for a current and contemporary measurement tool that defines school leadership practices in every period. In this research, NPBEA (2015), which defines the leadership practices of school principals, and Leithwood (2017), which explains the practices of successful school leaders and the personal leadership resources that serve as the driving force behind these practices, are considered as conceptual frameworks that shed light on leadership practices. While the NPBEA sheds light on professional development studies and the development of assessment tools for school principals' leadership practices (Hammad & Al-Harathi, 2021; Sezer, 2018; Taylor, 2024; Zadorozhna-Knyagnitska et al., 2023), the framework put forward by Leithwood forms the conceptual framework of the Successful School Leadership Survey (SSLS), has been revised to date, and is considered the most comprehensive study in this field (Hitt & Tucker, 2016).

This study, based on two internationally accepted frameworks, developed the SLPS (School Principals' Leadership Assessment System) to provide an opportunity to evaluate the leadership practices of school principals, thus adding depth to the international literature and contributing to the limited number of assessment tools in the national arena, most of which are adaptation studies (Beycioğlu et al., 2018; Kılınç et al., 2014; Sezer, 2018; Yalçın & Atasoy, 2021; Yılmaz & Börü, 2021). The most striking point in the findings is the absence of a separate factor corresponding to the "Curriculum, Instruction and Assessment" and "Curriculum Improvement" dimensions included in the conceptual frameworks used. The results show that in their current practices, school leaders provide processes for instructional activities

not directly through instructional leadership activities, but indirectly through steps aimed at improving them.

Conclusions and Implications

The results obtained from the study show that the 35-item, 5-factor School Leadership Practices Scale (SLPS) is a valid and reliable measurement tool. While the scale adds depth to the frameworks established internationally regarding leadership practices, it also emphasizes the context-specific nature of leadership behaviors and their constantly changing and transforming nature. Therefore, it is anticipated that the findings of the research can raise awareness among policy makers in order to strengthen the practices of school leaders. Furthermore, the results of this study, which examines the leadership practices of school principals during a typical school day, are likely to shed light on professional development programs designed to improve leadership practices.

One of the key limitations of this study is that the scale development process relied solely on teachers' perceptions. Future studies may expand the perspective by incorporating the views of school principals themselves as well as those of other school staff. Another limitation lies in the study's sample, which was formed using a purposive sampling method and included only teachers working at the secondary level in public schools. This non-random approach may introduce sampling bias. Therefore, future research should aim to validate the results using randomly selected samples from larger populations, including private schools and different educational levels, to enhance the generalizability of the findings. Furthermore, there is currently no evidence that SLPS scores are related to leadership effectiveness or student outcomes. The study addresses the rigorous development and validation process of the scale's internal structure (content, structure, reliability). It does not include criterion validity (e.g., linking SLPS scores to an external measure of school effectiveness or student achievement). Therefore, future research could deepen the literature by providing evidence for a relationship between SLPS scores and leadership effectiveness or student achievement

Declaration of Interest

The authors declare no competing interest

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Appendix 1

SLP Factors, Items, and Factor Loadings

School Leadership Practices Scale and items	Factor Loading
<i>F1. Professional Ethics</i>	.820
1. Promotes justice and equity among school stakeholders.	
2. Acts with a commitment to lifelong learning, valuing teacher and student development and the public good.	.807
3. Acts in accordance with legal frameworks that protect children's rights.	.803
4. Takes responsibility for ensuring students' academic and social well-being.	.802
5. Develops communication channels characterized by effectiveness and respect.	.798
6. Creates social awareness among school stakeholders.	.797
7. Promotes ethical and professional behavior among school staff.	.796
8. Shapes actions in accordance with legal frameworks.	.773
<i>F2. Strategic Management</i>	
9. Considers the needs of school stakeholders (students, teachers, parents, etc.) when developing practices to support school improvement.	.792
10. Assigns roles and responsibilities to teachers in developing practices that support school improvement.	.776
11. Considers teachers' opinions in the process of forming the school's vision.	.776
12. Takes into account community values and expectations in forming the school's vision.	.774
13. Uses resources (human, financial, physical, technological) efficiently and effectively to achieve the school's goals.	.772
14. Transforms school goals into a sustainable action plan.	.735
15. Monitors and evaluates the effectiveness of the action plan in achieving school goals.	.726
<i>F3. Personal Leadership Resources</i>	
16. Takes initiative in solving problems encountered.	.797
17. Acts based on pedagogical and expert knowledge in processes related to student learning.	.789
18. Thinks critically in analyzing and interpreting problems.	.771
19. Is a good listener and sensitive in giving feedback to understand stakeholders' emotions.	.771
20. Responds to challenges with psychological resilience.	.769
21. Demonstrates knowledge and understanding of effective leadership practices.	.753
22. Understands contemporary leadership theory and applies this knowledge to school development.	.740
<i>F4. Safe and Supportive School Climate</i>	
23. Collaborates with public and private institutions to utilize their resources in supporting school improvement.	.790
24. Eliminates internal and external risks to create a safe school environment.	.789
25. Provides mentoring support for newly appointed teachers.	.796
26. Ensures the necessary conditions (discipline, materials, classrooms, etc.) for a healthy teaching and learning process.	.779
27. Develops practices that support academic achievement without discriminating between disadvantaged and gifted students.	.746
28. Provides opportunities for teachers to develop their professional knowledge and skills.	.793
29. Supports active parental involvement in education both inside and outside the school.	.771
<i>F5. Change and Data-Based School Development</i>	
30. Facilitates discussions among teachers on updated teaching and learning practices.	.773

31. Participates in training related to school development and receives support from expert educators.	.789
32. Follows new trends along with national and global developments in school improvement processes.	.809
33. Sustains school improvement by encouraging change and innovation among teachers and students.	.765
34. Uses multiple data sources and types in school development processes.	.767
35. Institutionalizes data-based decision-making in school development processes.	.758

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