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The contemporary leadership behavior of school principals scale according to teacher's perceptions: Validity and reliability study

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Abstract: School principals are expected to possess modern leadership abilities that place an emphasis on ideas like collaboration, innovation, technological advancement, and egalitarianism. The objective of this study was to establish the psychometric features of the scale of current leadership behaviors of school principals (SCLBSP) developed in accordance with teacher perspectives. For the scale's content validity, eight experts were contacted, and for each item, the content validity ratio (CVR) and content validity index (CVI) were computed. Two different samples served as the basis for the scale development investigation. 253 teachers' worth of data were utilized in the exploratory factor analysis (EFA), whereas 215 teachers' worth of data were used in the confirmatory factor analysis (CFA) and measurement invariance studies. Cronbach's alpha, McDonald's omega, Split-Half method coefficients, composite reliability (CR), and average variance extracted (AVE) values were determined to determine the scale's reliability. The studies produced a single-factor structure with 34 items that explained 74.4% of the total variation. All SCLBSP items were found to have high levels of discrimination, and the reliability and validity of the entire scale were also found to be high.

1. INTRODUCTION

According to Werner (1993), a leader is someone who supports a group's efforts to accomplish organizational goals, and according to Northouse (2007) and Yukl (2010), leadership is the process of motivating others to work toward an organization's objectives. The modern leader is development- and learning-focused, inventive, egalitarian, and collaborative. Only modern leaders who are flexible will survive in today's world of fast change, according to Drucker (2000). When we examine leadership theories from the past and now, we can find that they always follow the same procedure: The earliest trait theories (Bass, 1990; Stogdill, 1948), behavioral techniques (Bakan et al., 2010; Hemphill & Coons, 1957; Stogdill, 1963), and situational leadership approaches (Catano & Stronge, 2007; Fairholm, 2002; Klingborg et al., 2006) have all since supplanted the original trait theories. Eventually, leadership was divided into two categories: traditional leadership and transformative leadership (Bass, 1990; Conger, 1999; Silver, 1990). The concept of servant leadership was first articulated in the 2000s (Stone & Pattarson, 2005). Researchers (Northouse, 2007; Sharma & Shilpa, 2013; Werner, 1993; Yukl, 2010) concentrated on how a group may accomplish organizational goals more

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successfully despite the ongoing development of new leadership theories. As a result, modern leadership strategies were established. In contrast to traditional leadership styles, contemporary leadership emphasizes modern traits including cooperation, collaboration, communication, innovation, and digital technologies (Day & Antonakis, 2012; Erer & Demirel, 2018; Gronn, 2002; Northouse, 2007).

Based on the Social Exchange Theory, transformational leadership is considered among contemporary approaches (Burns, 1978). Transformational leaders are extroverted, adaptable, emotionally balanced, responsible and open to experiences (Judge & Bono, 2000). Many theories present different dimensions and values while presenting the detailed characteristics of leadership, but never provide a coherent definition of the structure itself. Contemporary leadership theory and leadership, especially in the last decade, are characterized by a number of critical themes, and the common elements in these themes are not always conceptualized in a similar way by researchers (Komuves & Dugan, 2010).

Seeing school administrators not only as administrators but also as leaders is an important factor in the development and success of schools. For this reason, today, the concept of school administrator has been replaced by educational leadership (Bennis, 2009; Bhattacharyya, 2018; Froiland, 2019). As leaders of educational institutions, school principals are expected to have contemporary leadership skills that emphasize concepts such as collaborative, innovative, technology-following, and egalitarian in a rapidly changing world in recent years to effectively manage their schools and increase student development (Department of Basic Education [DBE], 2019; Hargreaves & Fink, 2019; Leithwood et al., 2004, Liu et al., 2016; National Association of Elementary School Principals [NAESP], 2001; Pont et al., 2008). The contemporary school leader, who plays a key role in increasing student achievement and quality of education, should have different leadership approaches such as educational, instructional, strategic, visionary, transformational, charismatic, servant, social, authentic, spiritual, organizational, ethical and cultural leadership (Campbell, 2012; Fry, 2003; Hırlak & Taşlıyan 2018; Ireland & Hitt, 2005; John & Cole, 1999; Stodd, 2022; Sutherland & Gosling, 2010; Taylor et al., 2014; Wart, 2013; Wildavsky 2006). The contemporary leader works in close relationships with teachers, students, and parents. By consulting and supporting teachers, he or she helps them develop innovative strategies to improve students' learning experiences (Council of Chief State School Officers [CCSSO], 1996; Delaware Department of Education [DDE], 1998; Interstate School Leaders Licensure Consortium [ISLLC], 2008). They encourage teachers and students to understand the diverse cultural and socioeconomic backgrounds of teachers and students and to ensure that all students have equal opportunities to learn. Contemporary school leaders create opportunities to continuously develop themselves and their teachers. The basis of contemporary school leadership is student achievement and its effective maintenance (Jones & Harris, 2014; Leithwood et al., 2004; Sezer, 2018). By developing these contemporary leadership skills, school principals can help students and staff realize their full potential. In other words, there are increasing expectations for schools to be managed by principals with contemporary leadership behaviors, and therefore, the interest in the contemporary leadership behaviors of school principals is also increasing.

1.1. Professional Standards for Educational Leaders

The global economy, global jobs, and 21st-century skills that schools need to prepare students for necessitate a change in schools and education, and thus a change in school leaders (National Policy Board for Educational Administration [NPBEA], 2015). In 2015, the National Policy Board for Educational Administration (NPBEA) updated the professional standards for educational leadership to help ensure that every student is well-educated and prepared for the 21st century. As educational leaders, principals' achievement of the standards described below will strengthen the belief that every student will succeed academically and personally.

1.1.1. *Mission, vision, and core values*

The contemporary school principal attaches importance to values, that is, he/she determines the basic goals to guide decisions (Hodgkinson, 2008; Sabuncuoğlu & Tüz, 2001). They create a vision and mission for the school based on the core values of the organization (Chopra & Sehgal, 2019). Vision is the goal that set the direction for the future success of the school, which reveals what the school will do and where it will go (Lissack & Roos, 2001). Mission, on the other hand, is a general statement of the school's purpose, outlines the boundaries of the organization (Cornelissen, 2004), and includes the norms that hold the school together (Campbell & Yeung, 1991).

1.1.2. *Ethical and professional norms*

The contemporary school principal takes ethical and professional norms into account. They define ethical standards, professional responsibilities, and ethical issues related to the profession (Mantiri, 2011). Ethical behavior helps everyone to do their job with honesty and integrity (Freeman & Stewart, 2006; Menbarrow, 2021; Yukl, 2010). The ethical values of the organization support the mission and vision (Bowen, 2016), but some leaders with ethical values may cause unethical outcomes due to their incompetence (Ciulla, 2005).

1.1.3. *Cultural sensitivity*

The contemporary school principal should have the competence to explore cultural differences and promote equity (Rengi, 2014). They should understand the different cultural, linguistic, and socio-economic backgrounds of teachers and students and work to ensure that all students have equal learning opportunities. In a culturally responsive school, there is collaboration and competence (Bennett & Bennett, 2004). With cultural sensitivity, employees develop positive feelings towards each other (Chen & Starosta, 2000). In a way, it is the ability to understand and interpret others (Moran et al., 2007).

1.1.4. *Curriculum, instruction, and assessment*

The contemporary school principal is responsible for the effective implementation and supervision of the curriculum that shows what students will be taught, fulfills instructional leadership roles (McDonald et al., 2013; Murphy, 2005) and provides feedback to teachers as an instructional leader (Gülbahar, 2014). They support the development of coherent curricula, instruction, and assessment systems to improve the academic achievement and well-being of every student (NPBEA, 2015).

1.1.5. *Building student communities*

Creating a learning community at school is critical to students' learning and development (Verbiest et al., 2005). A professional learning community helps build the pedagogical content knowledge necessary for effective learning (Cheng, 2009). Research highlights the importance of student communities in increasing achievement, equity, and social inclusion in schools (Maier et al., 2017). The role of the contemporary school principal as an organizational leader is limited by the characteristics and dynamics of the system (Zaccaro & Klimoski, 2001). The contemporary school principal should use a combination of contemporary leadership practices to improve the quality of education and student achievement. On the other hand, he/she should involve teachers, parents, and other stakeholders in the decision-making processes.

1.1.6. *Professional development of school staff*

Learning and development play an important role in contemporary leadership. The contemporary school principal leads the learning-teaching process by giving importance to the professional development of teachers (Şişman, 2009). At the same time, he/she creates a qualified school environment (Hess & Kelly, 2005). They see schools as "learning

organizations" (Okutan, 2003). The contemporary school principal should create opportunities for teachers and themselves to continuously improve. They should also ensure that students and staff have opportunities for learning and development.

1.1.7. *Creating unity among employees*

The contemporary school principal should be a team leader to increase cooperation among the staff and teachers working in the school. In such a situation, the principal should create an environment of participation and trust among teachers and manage relationships well (Manzoor et al., 2011; NPBEA, 2015). Thus, people who assume different roles in the school serve a common purpose (Elma, 2004; Merriam-Webster, 2023).

1.1.8. *Total participation in school*

Although education services are usually provided by the state, the school is not an institution detached from society (Adams, 1998). Community and family support are needed to provide resources to the school and to solve some problems (Kurt, 2005). The school interacts with its environment and this interaction necessitates cooperation with the community. The contemporary school principal creates a culture of cooperation and shared responsibility by involving teachers, parents, and other stakeholders in decision-making processes (Spillane et al., 2007). Thus, the educational leader can improve teacher collaboration and teaching practices and increase student achievement (Leithwood et al., 2002).

1.1.9. *School business and management*

Since the school is a bureaucratic institution, it has a business aspect (Taymaz, 2021). School management improves the quality of other services in the school. Effective execution of the school's services in this area helps to increase student achievement (Hoy & Miskel, 2012). Effectiveness in educational institutions is understood as the successful operation of administrators, teachers, and other employees in terms of awareness of organizational missions (Jacob & Shari, 2013). Effectiveness and efficiency in schools are complementary phenomena and can be increased through technological and scientific developments (Antonijević, 2018).

1.1.10. *School improvement*

Success in school improvement depends on the correct management of change (Heck & Hallinger, 2010; Penlington et al., 2008). School improvement is the use of various strategies and techniques to improve the quality of education in schools, increase students' academic achievement and improve communication between students, teachers, and school management (Leithwood et al., 2020). In the process of school improvement, it is necessary to get the opinions of different segments for a comprehensive situation analysis (Ministry of Education, 2007). This requires the contemporary school principal to be a transformational leader (Sun & Leithwood, 2012; Leithwood et al., 2004).

School administrators play a key role in improving student achievement and the quality of education. However, in today's rapidly changing world, the leadership approaches of school administrators also need to change. For this reason, contemporary leadership approaches that emphasize the importance of collaboration, innovation, and development are receiving increasing attention and research (Hargreaves & Fink, 2006). As leaders of educational institutions, school principals are expected to possess these contemporary leadership skills to effectively manage their schools and ensure student.

1.2. Measurement Tools to Determine the Leadership of School Principals in Türkiye

The extent to which school principals exhibit leadership behaviors is a critical issue that is frequently researched in national and international literature. In Türkiye, some scale development and adaptation studies have been conducted to determine the different leadership

approaches of school principals. Scale development studies on various leadership approaches of school principals have been carried out by different people in different years or scales developed by others have been adapted into Turkish. Summary information about these scales developed in Türkiye or adapted into Turkish is given in Table 1 with their various characteristics.

Table 1. *Scale development and adaptation studies on leadership in Türkiye.*

Scale Developer	Yılmaz (2006)	Durnalı (2018)	Sezer (2018)	Dursun et al. (2019)	İlğan & Ekiz (2020)	Akyürek & Karabay (2022)
Scale Dimensions	-Communicative ethics -Climatic ethics -Ethics in decision making -Behavioral ethics.	-Motivation -Referral -Law -Infrastructure	-School development -Ensuring professional commitment -Administrative practices -Vision and mission -School-family	-Political Leadership -Human-Based Leadership -Charismatic Leadership -Structural Leadership	-Respect for private life -Professional management ethics -Creating a democratically based working environment -Role model behavior display	-One dimensional
Scale Name and Number of Items	Ethical Leadership Scale 44 items	School Principals Technological Leadership Scale 30 items	Educational Leadership Standards Scale 53 items	Multifaceted Leadership Orientations Scale 19 items	School Principals' Display of Ethical Leadership Behaviors Scale 51 items	Innovative School Leadership Scale 28 items
Scale Adaptation	Turan & Ebiçoğlu (2002)	Doğan-Kılıç et al., (2011)	Bellibaş et al., (2016)	Cerit et al., (2018)	Zorlu & Korkmaz (2020)	Yalçın & Atasoy (2021)
Scale Dimensions	-Excitement -Communication -Having a vision -To be trustworthy, to trust -Setting an example -Being democratic and tolerant -Being positive -Consistency	-Vision development -Creating an audience -Sharing vision -Monitoring the process -Conclusion -Teamwork	-Determining the Mission of the school -Training Program Management -Developing a Positive Learning Climate	-Self-management -Manage time -Effect -Comfort -Decision making -Commitment Communication -Empathy	-One dimensional	-Direction -Human development -Organizational development -Curriculum development
Scale Name, From Whom it was adapted, and Number of Items	Effective Leadership Scale Burwash (1997) Key to Leadership 40 items	Effective Leadership Scale in Learning Organizations Kabacoff (1998) 36 items	Principal Instructional Management Rating Scale Hallinger and Murphy (1985) 44 items	Effective Leadership Qualities Scale, Sun, Wang, and Sharma (2014) 16 items	Sustainable Leadership Scale Dalati et al (2017) 10 items	School Leadership Scale Leithwood and McCullough (2017) 22 items

When Table 1 is examined, it is seen that some of the scales that can be used to determine the leadership of school principals in Türkiye focus on the behaviors of school principals regarding a single leadership aspect, i.e., instructional, ethical, technological leadership, etc. (Akyürek &

Karabay, 2022; Bellibaş et al., 2016; Durnalı, 2018; Yılmaz, 2005). Although some scales are multidimensional, it is understood that they do not reveal the all-round and inclusive contemporary educational leadership behaviors of the school principal (Bellibaş et al., 2016; Cerit et al., 2018; Doğan-Kılıç et al., 2011; Dursun et al., 2019; Turan & Ebiçoğlu, 2002; Yalçın & Atasoy, 2021). Although the behaviors exhibited by the school principal are expressed in different ways, they complement each other, that is, they aim to increase the success of the students and have a homogeneous feature. In other words, a person's leadership is revealed by the combination of various aspects of her and her evaluation as a whole. Homogeneity and unidimensionality are synonymous concepts and can be seen as a feature that item groups have or do not have (Mcdonald, 1981). Unidimensionality is that the feature/ability to be measured shows a single structure in a measurement process. In other words, it means that the items measure a single dimension, a single feature (Hambleton et al., 1991). In this respect, it seems possible to evaluate the leadership behaviors of the school principal, which are defined by using different names, in a one-dimensional structure.

Research on leadership necessitates the need for contemporary and holistic school leadership. Therefore, there is a need for an up-to-date and useful measurement tool that addresses the extent to which school principals exhibit contemporary leadership behaviors as a whole and covers all aspects of contemporary leadership. The inclusion of such an up-to-date measurement tool in the Turkish literature is important in terms of determining the extent to which school principals in Türkiye demonstrate contemporary leadership behaviors and examining the relationships between contemporary leadership and various variables.

In light of this information, this study aims to develop a scale of contemporary leadership behaviors of school principals (SCLBSP), whose theoretical structure is conceptualized based on NPBEA's (2015) professional standards of educational leadership, and to determine its psychometric properties.

2. METHOD

2.1. Study Group

This section should indicate the study’s design, the sampling, the data collection tools, and the data analysis.

Two different study groups were chosen online from teachers working in the Samsun province during the 2022–2023 academic year in order to conduct exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) in the process of developing the scale of contemporary leadership behaviors of school principals. According to Erkuş (2012), the study group in scale development studies should be as diverse as feasible in terms of the trait being measured. It was requested that the convenience sampled data include teachers with a range of seniorities, school kinds, and levels. EFA was conducted using the data gathered from 253 teachers in the first stage, while CFA and measurement invariance analyses were conducted using the data gathered from 215 teachers in the second stage. Since one person's data was found to be a univariate outlier in the data gathered for CFA, 214 people were analyzed, and information about the research's study groups is included in Table 2.

When Table 2 is examined, it can be observed that the majority of the collected data for both EFA and CFA consists of female teachers, the number of teachers with 1-5 years of professional experience is smaller compared to other categories, the vast majority of teachers in both study groups work in middle schools, and they are graduates with an undergraduate's degree.

Table 2. *EFA and CFA study group.*

Data from the sample for EFA N_1 = 253			Data from the sample for CFA N_2 =214		
Gender	*f*	*%*	Gender	*f*	*%*
Female	167	66	Female	158	74
Male	86	34	Male	56	26
Professional Experience	*f*	*%*	Professional Experience	*f*	*%*
1 – 5 Year	17	7	1 – 5 Year	11	5
6 – 10 Year	69	27	6 – 10 Year	49	23
11 – 15 Year	72	28	11 – 15 Year	37	17
16 – 20 Year	37	15	16 – 20 Year	37	17
21+ Year	58	23	21+ Year	80	38
Institution of Duty	*f*	*%*	Institution of Duty	*f*	*%*
Preschool	8	3	Preschool	5	2
Primary School	58	23	Primary School	55	26
Middle School	123	49	Middle School	118	55
High School	45	18	High School	30	14
Other	19	7	Other	6	3
Education Status	*f*	*%*	Education Status	*f*	*%*
Undergraduate	215	85	Undergraduate	184	86
Master's Degree	38	15	Master's Degree	30	14

2.2. Scale Development Process

A literature research was done first in this scale development project, which was carried out to ascertain teachers' perceptions of school principals' levels of exhibiting current leadership behaviors. The scale's items were developed after research on leadership theories, professional standards for educational leaders updated by NPBEA in 2015, and measurement tools created for leadership (Bellibaş et al., 2016; Cerit et al., 2018; Doğan-Kılıç et al., 2011; Dursun et al., 2019; Turan & Ebiçoğlu, 2002; Yalçın & Atasoy, 2021). The prospective dimensions of leadership as well as the scale response categories were examined while studying the leadership literature. Although there are one-dimensional and multi-dimensional scales in the literature, as explained above, although the behaviors of the school principal are expressed in different ways, they complement each other and can be considered as a basic dimensional feature. Unidimensionality is defined as the presence of a dominant dimension in the presence of one or more small dimensions, and the estimations based on the dominant dimension being strong enough not to be affected by the presence of small dimensions (Stout, 1987). Thurstone (1931) put forward the idea that the most useful measurements are situations where only one thing is measured. Thurstone (1931, s.259) states that "The measurement of any object or entity describes only one characteristic of the measured object. This is a universal characteristic of measurement". This view was also supported by McNemar (1946) and Stout (1987) (as cited in Barış Pekmezci, 2022). Erkuş (2022) stated that most psychological variables are multidimensional/component in nature and it is difficult to obtain a pure one-dimensional structure due to other difficulties. However, the author emphasized that unidimensionality for the relevant feature is a goal that should be attempted to be established. The closer we get to unidimensionality, the more meaningful the total score will be and the more accurate, reliable and valid our measurements will be (Erkuş, 2022).

In line with the examinations and explanations made, an item pool was created by writing one-dimensional items to cover the professional standards of education leaders announced by NPBEA (2015). A pool of 69 items was developed considering these reviews. While creating the item pool, attention was paid to write as many items as possible in a way that would reflect the conceptual structure of the variable to be measured, but not exceed the conceptual framework, as stated by Erkuş (2012).

The 69-item draft form was sent via email in Excel format to five faculty members in the field of educational administration and three faculty members in the field of measurement and evaluation at the stage of seeking expert opinion to ensure the content validity of the scale. The experts were asked to evaluate the items in terms of suitability for the purpose, suitability in terms of language and expression, comprehensibility, suitability for the sub-dimension to be measured, and whether the items have similar meanings when the item evaluation Excel form was being created for them. The experts were asked to rate each item on a three-point scale as "appropriate," "should be improved," and "unnecessary." They were also asked to explain any reasons why an item was deemed unnecessary or should be improved, as well as to suggest any corrections that should be made. According to the experts' recommendations, the content validity ratio (CVR) for each item and the scale's content validity index (CVI) were computed using Excel and Lawshe's (1975) analysis approach. The acceptable critical value for an item to be included in the scale in this study was based on the CVR critical values from Ayre and Scally's (2014) study. According to the linked study, the CVR critical value for eight experts was 0.75 at a significance level of .05. 33 items that showed similarity-overlap with the expert opinion, were not appropriate for the structure, and had a CVR value below 0.75 were eliminated because of the analysis, and the remaining 36 items' CVI value was calculated to be 0.88.

The items that were decided to be included in the scale were examined for the last time by a faculty member who is an expert in the field of Turkish teaching in terms of item comprehensibility and compliance with Turkish grammar rules. At the end of these stages, the 36-item draft form was made ready for the pretest application. Teachers were asked to rate the extent to which the items in the scale reflect their school principals on a scale of 1-5, and the response categories of the items were formed as “1-Not at all”, “2-Reflects a little”, “3-Reflects moderately”, “4-Reflects a lot”, “5-Reflects completely”. A face-to-face pretest was conducted with 8 teachers to check whether the items were comprehensible, clear, and precise for the target group. The teachers found the trial form mostly clear and understandable. However, one participant stated that item 3 was difficult to understand and that he had to read it several times to understand it. This item was then transformed into a simpler version. After the pre-testing, the CFA was conducted by first collecting data from 253 teachers in December 2022 for the EFA and then from 215 teachers in March 2023 to test the accuracy of the construct obtained. The data were obtained through Google Forms, which provided the consent of the teachers.

2.3. Data Analysis

Firstly, EFA was conducted on the data collected from the first study group. For the suitability of the data for factor analysis, the assumptions of extreme value, missing value, normality, multicollinearity, and adequacy of sample size were reviewed. SPSS and Jamovi programs were used to test the assumptions. No missing values were found in the data set. To identify outliers, z scores of all individuals were calculated, and values ranging between -2.87 and +1.11 were obtained. No data was found to fall outside the -3 to +3 limits. The assumption of normality in each item score (univariate) was examined with skewness and kurtosis coefficients and a P-P graph. Tabachnick and Fidell (2009) state that the normality assumption is met when the kurtosis and skewness values are between -1.5 and +1.5. In the examinations, it was determined that the item scores met the normal distribution property. The collinearity problem was

examined by Pearson Product Moment Correlation between the items; it was determined that there was a multicollinearity problem (r>0.90) between item 9-item 10, item 23-item 21, and item 23-item 25. These items were analyzed and it was decided to remove items 10 and 23 from the scale. To determine the multivariate outliers, the Mahalanobis distance was calculated for each subject and it was seen that the Mahalanobis value of 41 subjects exceeded the critical chi-square value at a .001 significance level. Although multivariate outliers are generally recommended to be excluded from the data set, it is also recommended to compare the results of the analyses without and with the exclusion of these values (Finch, 2012; Leys et al., 2018). For this reason, firstly, the analysis was performed without removing the multivariate outliers, and then the analysis was performed by removing the multivariate outliers. Since similar results were obtained in the analyses, the results were reported without excluding multivariate outliers. In addition, Kaiser-Meyer-Olkin (KMO) and Bartlett Sphericity Test were used for the suitability of the data for factor analysis and the suitability of the sample size. The fact that the KMO value is close to 1 and the Barlett Sphericity Test is significant indicates that the data are suitable for factor analysis. It is stated that if the multiple normality assumption is violated in the Likert scales, the Principal Axis Factors (PAF) calculation method should be preferred among the factor extraction methods. It is stated that the PAF method is a powerful enough method for factor extraction and is widely used in many cases (Costello & Osborne, 2005; Phakiti, Costa, Plonsky, & Starfield, 2018; as cited in Şencan & Fidan, 2020). Also, Grieder and Steiner (2022) listed various advantages of PAF in their articles comparing ML and PAF, which is a frequently used and recommended method. First, it has no distributional assumptions, whereas ML requires the data to follow a multivariate normal distribution (e.g., Fabrigar et al., 1999). Second, it is more robust in the case of unequal factor loadings, few indicators per factor, and small sample sizes (De Winter & Dodou, 2012; Briggs & MacCallum, 2003). Finally, it is better able to recover weak factors (Briggs & MacCallum, 2003; De Winter & Dodou, 2012). Since the multivariate normality assumption was not met in the data set, the PAF extraction technique was selected from the factor extraction methods. In deciding the number of factors of the scale, the parallel analysis method was taken as a basis, and the slope accumulation graph, eigenvalues, and explained variance ratios were taken into consideration. Since a single-factor structure was determined, no rotation technique was used.

To determine whether the one-factor structure of the scale determined as a result of EFA was confirmed or not on the data collected from 215 participants. As in EFA, assumptions were first tested to determine the suitability of the data for factor analysis. There were no missing values in the data set. The z scores of all individuals were calculated and it was determined that the z score of one individual was outside the range of -3 to +3 and that individual was excluded from the analysis. It was determined that the kurtosis and skewness values of the item scores were between -1.50 and +1.50 and the Pearson Product Moment Correlation calculated between the items was less than 0.90. Therefore, it can be stated that univariate outlier, normality, and multicollinearity assumptions are met in the data set. For multivariate outliers, Mahalanobis distance values of individual scores were examined and 18 multivariate outliers were found. As in the EFA, the analysis was first performed without removing the multivariate outliers, and then the analysis was repeated by removing the multivariate outliers. Since similar results were obtained in the analyses, the results were reported without excluding the multivariate outliers. As a result of the Henze-Zirkler multivariate normality test performed in R Shiny (Korkmaz et al., 2014), it was determined that this assumption was not met (p<.01). Therefore, Unweighted Least Squares (ULS), one of the estimation methods that does not require multivariate normality assumption, was used for parameter estimation of the CFA model. Following the CFA analysis, the item-total test correlations of the 34 items and the item discriminations of the 27% lower and upper groups were examined by t-test comparisons. A high item-total test score correlation

indicates that the items measure a similar characteristic, that is, the internal consistency of the test is high.

After the scale structure was validated, a multiple-group confirmatory factor analysis (MGCFA) was conducted to determine whether the scale has measurement invariance in different groups. Measurement invariance of a scale in different groups means that the factor loadings, inter-factor correlations, and error variances of the items of the relevant scale are the same (Byrne, 1998; Jöreskog & Sörbom, 1993). In this study, four different models commonly used in the literature, namely configural invariance, metric invariance, scalar invariance, and strict invariance, were tested to test measurement invariance. It was determined that the distribution of individuals was not similar according to the variables of gender, level of education, and educational status. Therefore, the measurement invariance of the scale was tested in terms of the categorical variable of professional experience. The professional experience variable was analyzed by forming two groups above 15 years and below 15 years. Before analyzing the data for measurement invariance, assumptions were tested as in CFA, and ULS was used as a parameter estimation method since the multiple normality assumption was not met. For the reliability of the scale, Cronbach's Alpha and McDonald's Omega coefficients and the coefficients obtained from the Split-Half method were calculated. Since Cronbach's Alpha tends to give high values when there are many variables, it is also recommended to calculate composite reliability (CR) and average variance extracted (AVE) (Hair et al., 2010). Jamovi 2.3.21, IBM SPSS Statistic 22, and LISREL.8.51 package programs were used to analyze the data. The significance level was set as .05 in statistical analysis.

3. FINDINGS

In this section, the content validity findings, EFA, and CFA results conducted to test the construct validity, followed by reliability analyses and scale item statistics are presented respectively.

3.1. Exploratory Factor Analysis (EFA) Results

The results of the Barlett and Kaiser-Meyer-Olkin (KMO) analyses conducted to check the suitability of the data for factor analysis after it was seen that the assumptions required for conducting EFA were met are given in Table 3 below.

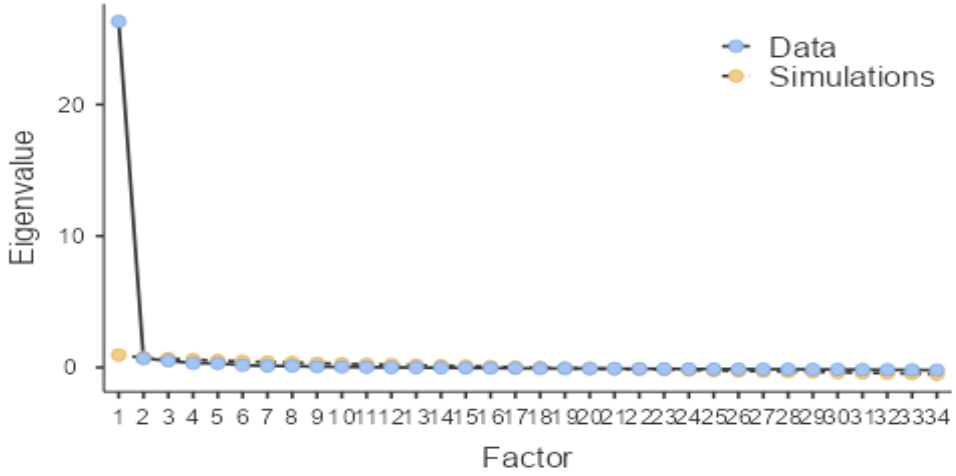
Table 3. *Kaiser-Meyer-Olkin (KMO) test and Bartlett's sphericity test results.*

Statistic		Value
Kaiser-Meyer-Olkin (KMO)		0.98
Bartlett's sphericity	χ^2	13535
	df	561
	p	<.001

When the suitability of the data for EFA was examined, it was determined that the KMO value was 0.98 and the Barlett Sphericity test result (χ^2= 13535, *df*=561, *p*<.001) was significant. Thus, the data were found to be suitable for factor analysis. To explore the factor structure of the scale, EFA was conducted without limiting the dimensions and it was seen that there was only one factor with an eigenvalue above 1. Oblique factor rotation was applied without any limitations and the eigenvalues were re-examined. As a result, a single factor structure was observed again. Tabachnick and Fidell (2001) stated that if the structure is very stable and consistent, the result will not change no matter which rotation method is used. The slope accumulation graph also indicates that the scale has a single factor. The slope accumulation graph obtained according to the parallel analysis method is given in Figure 1. The parallel analysis method also reveals that the scale shows a single-factor structure. The variance

explained by the single factor is 74.4% of the total variance. Although Stevens (1996) suggested that the variance explained by the total scale should be 75%, there are also researchers who state that it is very difficult to meet this target in social sciences (Gorsuch, 1983; Henson & Roberts, 2006; as cited in Erkuş, 2012).

Figure 1. *Scree plot.*



After it was decided that the scale showed a single-factor structure, the factor loadings of the items were analyzed. Table 4 shows the factor loadings of the remaining 34 items in the scale after items 10 and 23 were removed from the scale due to the multicollinearity problem.

Table 4. *Factor loadings of the items.*

Item No	Item	Factor Loadings
M1	Involves the school community in the vision-mission development	0.753
M2	Open to new ideas for the development of the school.	0.832
M3	Implements its mission by transforming it into strategic goals.	0.861
M4	Updates the vision-mission according to changing needs.	0.892
M5	Acts under ethical principles concerning the school community.	0.848
M6	Communicates effectively with school stakeholders.	0.890
M7	Encourages ethical behavior among school stakeholders.	0.853
M8	Considering the benefit of the students in every practice in the school.	0.839
M9	Encourages fair treatment of all students.	0.872
M11	Strives to change prejudices in the school community.	0.893
M12	Supports inclusive education practices.	0.907
M13	Supports the use of technology in education.	0.890
M14	Encourages the effective implementation of curricula.	0.908
M15	Provides feedback to teachers on teaching practices.	0.918
M16	Encourages increased academic achievement.	0.922
M17	Takes measures to create a safe school environment.	0.854
M18	Supports the effective implementation of extracurricular activities.	0.864
M19	Encourages students to participate in in-school group activities.	0.873
M20	Supports students' relations with non-governmental organizations.	0.893
M21	Supports the professional development of teachers.	0.922
M22	Takes care to protect the work-life balance of teachers.	0.891
M24	Plans in-service training for teachers' professional development.	0.896
M25	Creates a culture of professional cooperation among teachers.	0.923

M26	Treats families and other visitors to the school in a hospitable.	0.819
M27	Maintains open two-way communication with families to increase	0.909
M28	Supports the use of school resources for the benefit of the	0.876
M29	Organizes parent education programs for the school environment.	0.848
M30	Cooperates with various organizations for the development of the	0.890
M31	Takes into account everyone's area of expertise in the distribution of	0.890
M32	Takes necessary measures to ensure that teaching is not interrupted.	0.889
M33	Utilizes technology to increase efficiency and quality.	0.925
M34	Follows good practices in other schools.	0.884
M35	Manages conflicts in the school effectively.	0.875
M36	Ensures effective use of school resources.	0.892

Table 4 shows that the factor loadings of the items vary between .753 - .925. Comrey and Lee (1992) state that factor loadings of .71 and above are excellent. The factor loadings of the items in Table 4 were examined and no item was removed from the scale. A high factor loading means that the item shows a high level of relationship with its factor. Therefore, high factor loadings are desirable.

3.2. Confirmatory Factor Analysis (CFA) Results

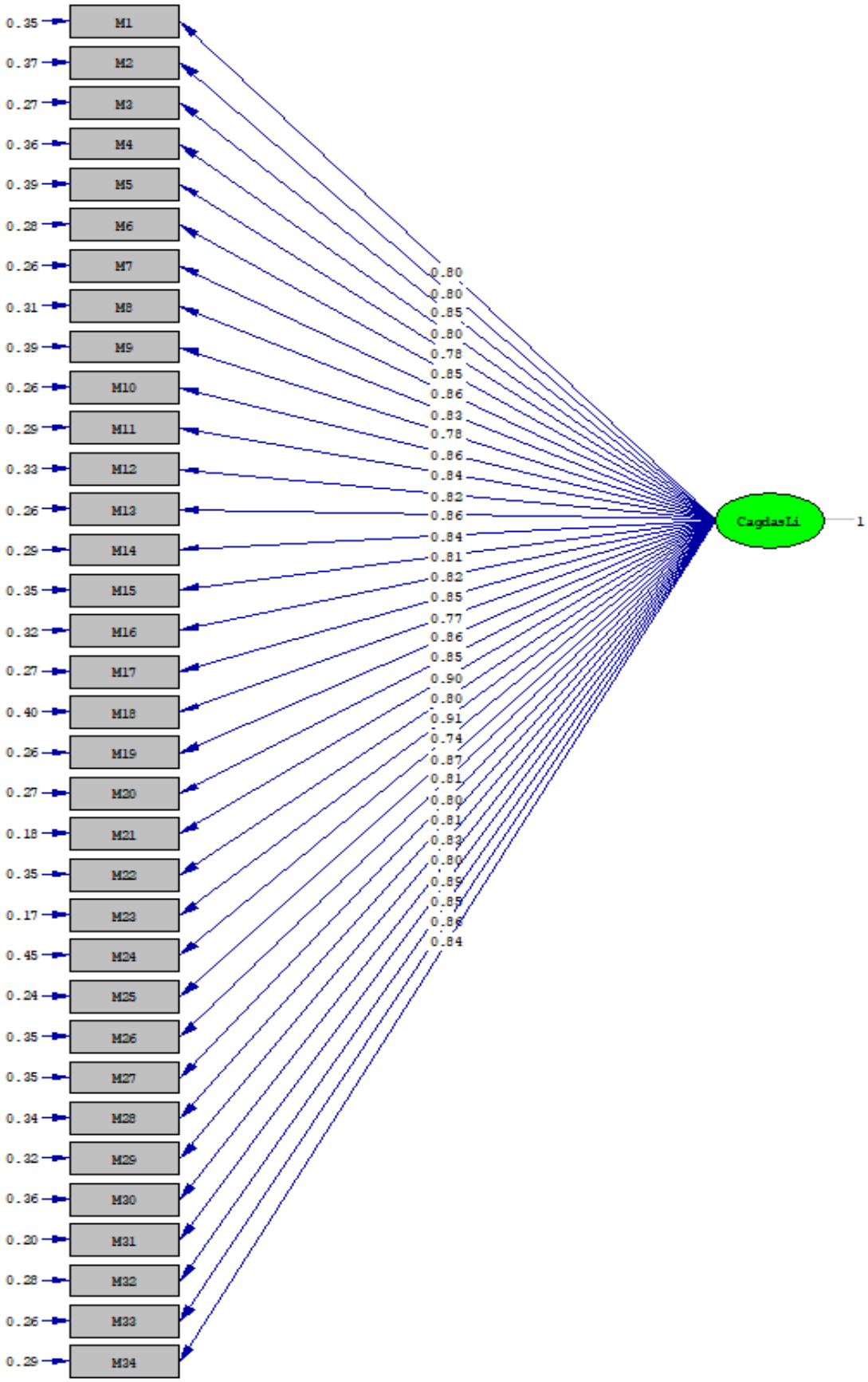
The findings of the CFA conducted to confirm the structure of the single-factor scale that emerged as a result of EFA are presented in Table 5 and Figure 2 below.

Table 5. *Standardized factor loadings and SH of the items.*

Item No	Standardized Factor Loadings	SH	Item No	Standardized Factor Loadings	SH
M1	0.80	0.35	M18	0.77	0.40
M2	0.80	0.37	M19	0.86	0.26
M3	0.85	0.27	M20	0.85	0.27
M4	0.80	0.36	M21	0.90	0.18
M5	0.78	0.39	M22	0.80	0.35
M6	0.85	0.28	M23	0.91	0.17
M7	0.86	0.26	M24	0.74	0.45
M8	0.83	0.31	M25	0.87	0.24
M9	0.78	0.39	M26	0.81	0.35
M10	0.86	0.26	M27	0.80	0.35
M11	0.84	0.29	M28	0.81	0.34
M12	0.82	0.33	M29	0.83	0.32
M13	0.86	0.26	M30	0.80	0.36
M14	0.84	0.29	M31	0.89	0.20
M15	0.81	0.35	M32	0.85	0.28
M16	0.82	0.32	M33	0.86	0.26
M17	0.85	0.27	M34	0.84	0.29

Table 5 and Figure 2 show the standardized factor loadings of the items on the relevant factor and the error variances of the items. As a result of the analysis, the significance of the factor loading values of the items should be checked first. It was determined that the *t* values of all items were greater than 2.56, that is, they were significant at a .01 significance level. It is seen that the standardized factor loading values of all items are between 0.77 and 0.91 and the error variances are considerably smaller than 0.90.

Figure 2. *Factor loadings of the items revealed by CFA results.*



After examining the coefficients obtained as a result of CFA, the goodness-of-fit indices produced to evaluate the model as a whole were examined. Goodness-of-fit index values for model-data fit are given in Table 6.

Table 6. *Goodness of fit index values for the model.*

χ^2	*sd*	χ^2/sd	AGFI	GFI	CFI	NFI	NNFI	PNFI	PGFI
1939.20	527	3.67	1.00	1.00	1.00	0.99	1.00	0.94	0.88
			RMSEA	SRMR	RMR				
			0.11	0.039	0.044				

When Table 6 is examined, a value between 3 and 5 obtained by dividing the χ^2 value by the degrees of freedom indicates a moderate fit (Kline, 2011). In confirmatory factor analysis, it is recommended that the evaluation of the model should be based on more than one fit index. When the fit indices related to the scale are examined, AGFI, GFI, CFI, NFI, and NNFI values above 0.95 are indicators of excellent fit. RMSEA and SRMR values between 0.05 and 0.08 indicate good fit, and values between 0.80 and 0.10 indicate acceptable fit. It is seen that the RMSEA value obtained is close to 0.10 acceptable fit and the SRMR value is below 0.05. When all the analysis results and goodness of fit values obtained with CFA are evaluated together, it can be said that the single-factor structure of the scale consisting of 34 items generally fit the data well and the scale structure is confirmed.

When the goodness of fit indices in Table 6 are examined, it is noteworthy that the one-factor structure overfitting with the data set. These results may not be replicated in different samples from the same population (in other studies). In scale development studies, researchers expect not only the structure that is suitable for their own data set, but also the resulting structure to be similar in different samples from the same universe (Osborne &Fitzpatrick, 2012). Because when researchers choose an improved scale, they will need to obtain a similar structure in the sample they will work with. Osborne and Fitzpatrick (2012) emphasized that the reproducibility studies of EFA will provide important information for researchers who will use the scale. In order to examine the reproducibility in this study, EFA was also performed on the second data set of 214 people collected for CFA, and the results were compared with the first EFA results obtained from a sample of 253 people. The results obtained are given in the table in Appendix 1. It is expected that the difference between the factor loading values of each item obtained from the two applications will be small. If the absolute value of the difference between the two factor loads is greater than 0.20, it can be said that the item is not stable, and if it is around 0.10, it can be said to be acceptable (Osborne & Fitzpatrick, 2012). In the table in Appendix 1, it is seen that the difference between the item factor loading values obtained from the two applications is below 0.11 for all items. Accordingly, it can be stated that the items are stable, and that a similar structure can occur in different samples from the same universe.

3.3. Item Analysis and Validity Analysis Based on Group Differences

To determine the discrimination levels of the items in the scale, the total scores obtained from the scale were determined and 27% lower-upper group (Nalt:59 and Nüst:58) comparisons were made. Pearson Product Moment Correlation Coefficient was used to calculate the corrected item-total test correlation, and an unrelated sample t-test was used for 27% lower-upper group comparisons. The findings obtained as a result of the analysis are given in Table 7.

Table 7. *Item analysis results.*

Item No	Corrected Item-Total Correlation	Upper and lower 27% *t* value	Item No	Corrected Item-Total Correlation	Upper and lower 27% *t* value
M1	0.79	-17.20	M18	0.76	-16.99
M2	0.78	-18.53	M19	0.85	-17.94
M3	0.84	-18.47	M20	0.83	-16.93
M4	0.79	-15.89	M21	0.90	-20.20
M5	0.77	-15.10	M22	0.79	-17.41
M6	0.83	-19.48	M23	0.90	-21.56
M7	0.85	-17.63	M24	0.74	-12.86
M8	0.82	-15.30	M25	0.87	-19.21
M9	0.77	-13.93	M26	0.81	-16.32
M10	0.85	-18.46	M27	0.79	-15.99
M11	0.83	-17.61	M28	0.80	-16.08
M12	0.82	-15.33	M29	0.82	-17.29
M13	0.86	-16.57	M30	0.79	-14.79
M14	0.84	-16.84	M31	0.88	-20.87
M15	0.80	-15.88	M32	0.84	-19.38
M16	0.81	-16.44	M33	0.85	-21.14
M17	0.85	-15.99	M34	0.83	-16.65

According to Table 7, the corrected item-total test correlation values ranged between 0.74 and 0.90. When the difference between the item-total mean scores of the lower and upper groups of 27% was examined, it was determined that the difference between the lower and upper groups was significant at the 0.01 level for all items. Accordingly, all of the items in the scale significantly distinguish between individuals who have the measured trait and individuals who do not.

3.4. Measurement Invariance

Before testing the models related to measurement invariance, it is necessary to examine the fit of the model with the data in each group separately. For the purpose of the study, firstly, fit indices were obtained separately in two different groups determined according to the professional experience variable (Brown, 2006). The findings obtained as a result of the analyzes are presented in Table 8.

Table 8. *Measurement invariance fit indexes.*

Models	χ^2	*df*	χ^2/df	SRMR	NNFI	CFI	RMSEA	$\Delta\chi^2$	$\Delta\chi^2/\Delta df$	ΔCFI	ΔRMSEA
15 years and less	1313.40	527	2.49	0.046	1.00	1.00	0.12				
More than 15 years	1350.72	527	2.56	0.046	1.00	1.00	0.11				
Configural invariance	2790.00	1122	2.49	0.10	0.99	0.99	0.12	-	-	-	-
Metric invariance	2761.01	1088	2.54	0.047	1.00	1.00	0.12	28.99	0.85	-0.01	0
Scalar invariance	2664.12	1054	2.53	0.046	1.00	1.00	0.12	96.89	2.85	0	0
Strict invariance	3974.63	1088	3.65	0.11	0.99	0.99	0.16	-1.310	38.53	0.01	-0.04

When the fit indices of the groups with less than 15 years and more than 15 years of experience are examined in Table 8, it can be stated that the model was confirmed separately in both groups when the fit indices obtained from both groups are evaluated together. When the findings regarding the structural invariance of the measurement model of the scale developed to determine the contemporary leadership levels of school principals are examined, it is seen that the χ^2/df value is below 3, the NNFI and CFI values are very close to 1, and the RMSEA value is outside the acceptable limits (acceptable value 0.05<RMSEA≤0.08). When all values are taken together, it shows that the model meets structural invariance. Since the factor loadings, inter-factor correlations, and error variances parameters related to the model are released in subgroups in structural invariance, it can be said that the structure of the measurement model is similar in subgroups. After determining that structural invariance was achieved, the metric invariance model was tested. In metric invariance, factor loadings are restricted; if the values resulting from this restriction do not show a worse fit than the first model, it is concluded that metric invariance is achieved. Otherwise, it is concluded that metric invariance cannot be achieved and the analysis cannot proceed to the next stage. To test metric invariance, the difference between CFI and RMSEA values obtained in the structural invariance and metric invariance stages was examined. Since the χ^2 value is affected by the sample size, the results are interpreted by considering ΔCFI and ΔRMSEA values. When the ΔCFI and ΔRMSEA values between the two models are in the range of +0.01 and -0.01, it is interpreted that the restriction does not cause a significant change in the model and that measurement invariance is achieved at the relevant stage (Cheung & Resvold, 2002; Wu et al., 2007). For metric invariance, ΔCFI and ΔRMSEA values were found to be within acceptable limits (ΔCFI ≤0.01; ΔRMSEA ≤0.01). In other words, it can be said that the factor loadings of the groups are similar. Since the metric invariance stage was achieved, the next scale invariance stage was started. At the scale invariance stage, the fit indices were within acceptable limits, and scale invariance was achieved (ΔCFI ≤ 0.01; ΔRMSEA ≤ 0.01). It was confirmed that the constants in the regression equations for the items were invariant in their subgroups. Based on this finding, it can be said that there is no bias based on items. After the scale invariance stage was achieved, the strict invariance stage was started. It can be stated that the values obtained at the strict invariance stage were out of the acceptance limits and therefore, strict invariance was not achieved (ΔCFI ≤ 0.01; ΔRMSEA<0.01).

3.5. Reliability Analysis Results

The Cronbach's Alpha and McDonald's Omega coefficients calculated for the reliability of the contemporary leadership scale were both 0.987. The internal consistency reliability of the single-factor 34-item scale was also calculated with the Split-Half method. The Cronbach's Alpha coefficient of 17 items in the first half was 0.974 and the Cronbach's Alpha coefficient of 17 items in the second half was 0.975. It can be said that the internal consistency coefficient values of the two groups formed by the Split-Half method are close to each other and very good. With this method, Guttman and Spearman-Brown coefficients were found to be 0.977. In addition to these values, the CR value of the one-factor scale was calculated as 0.98, and the AVE value as 0.69. The fact that the CR value is greater than 0.70 and the AVE value is greater than 0.50 indicates that the scale as a whole has a high level of reliability in terms of internal consistency and that convergent validity is provided (Hair et al., 2010).

4. DISCUSSION and CONCLUSION

The type and caliber of the work performed by principals or other educational leaders are outlined in the Professional Standards for Educational Leaders, which were updated by the NPBEA in 2015. To assist guarantee that every student is well-educated and ready for the 21st century, these standards lay forth the fundamentals of leadership (NPBEA, 2015). As a result

of global advancements, organizations must be managed more effectively (Bhattacharyya, 2018; Froiland, 2019), and the manager concept is giving way to the leader concept. Studies have revealed that, despite the perception that school administrators are less concerned with students' learning and development, this is not the case (Gülbahar, 2014; Leithwood et al., 2022; Murphy, 2005; NAESP, 2001). According to the updated standards, it was deemed crucial to develop an inclusive scale with high validity and reliability to assess the extent to which school principals exhibit contemporary leadership behaviors based on teachers' perceptions (Blase & Blase, 2000; Liu et al., 2016; Taylor et al., 2014; Zaccaro & Klimonski, 2001).

First, an item pool was developed, the items were subjected to expert review, and a preliminary test of the 36-item draft form was carried out during the scale development phase. The scale items were subjected to exploratory factor analysis in the second step. The analysis produced a single-factor structure comprising 34 items and the exclusion of 2 items from the analysis. 74.4 percent of the total assumption is explained by the 34-item single-factor structure. The high overall score on the scale reveals that teachers have positive impressions of how well school principals exhibit modern leadership qualities. In the third stage, the unidimensional 34-item scale was reapplied to a different group for confirmatory factor analysis, and good fit values were estimated as a result of the analyses, and thus construct validity was ensured.

In addition to all these, it is not enough to state that the validity of the scale is high only by statistical analysis. Items should be related to the factors on which they are loaded with meaning and concept. When the items that make up the factor are examined, it should be understood that they measure the semantically similar feature. The information obtained as a result of factor analysis during the scale development process can provide a clue about the measured construct. The important thing is to understand what this information and values mean conceptually. Erkuş (2012) stated that when eigenvalues, explained variance, factor loads, item-total scale correlation, and internal consistency coefficient were examined in component type structures, the structure was predominantly single factored.

Following the EFA and CFA, the discrimination levels of the items were examined with the 27% sub-super group method and item-total test correlation, and the discrimination levels of all items were found to be high. Accordingly, all of the items in the scale significantly discriminate principals who have the measured trait from principals who do not.

For the reliability of the scale, Cronbach's alpha, McDonald's Omega coefficients, Guttman and Spearman-Brown coefficients were calculated by the Split-Half method, and the coefficients were found to be high. In addition to these values, the CR value and AVE value of the one-factor scale were calculated. The high coefficients obtained indicate that the scale has reliability in terms of internal consistency and convergent validity is provided.

Finally, to indicate whether the scale measures the same construct between the groups, CGFA was conducted according to the professional experience variable. Considering the changes in CFI and RMSEA, the scale met the structural, metric, and scalar invariance conditions for the professional experience variable. The fact that the first three invariance conditions were met shows that the scale can measure the same construct between groups that differ in terms of this variable. In this sense, it can be said that the scale can be used to compare teachers' perceptions of contemporary leadership behaviors of school principals among different groups.

The scores obtained from the devised scale were found to be valid and reliable in identifying the current leadership levels of school principals based on teachers' perspectives. This scale is believed to give researchers interested in school principal leadership, school growth, and school administration a thorough view on the modern leadership of school principals. The SCLBSP can be used to perform research on the links between modern leadership and other variables. The scale can be used to identify school principals who exhibit poor current leadership, and

applications can be made to improve their contemporary leadership. However, as the proposed measurement instrument bases its conclusions on teachers' perceptions, there may be subjectivity in the outcomes.

One of the disadvantages of this study is that it only collected information from teachers in one city. The validity and reliability studies can be repeated by doing the study with instructors in other cities in different areas of Türkiye to boost generalizability and external validity. Additionally, the scale's criterion-referenced validity was not examined in this study. In a subsequent investigation, criterion-referenced validity evidence may also be attained.

Declaration of Conflicting Interests and Ethics

The authors declare no conflict of interest. This research study complies with research publishing ethics. The scientific and legal responsibility for manuscripts published in IJATE belongs to the authors. **Ethics Committee Number:** Ondokuz Mayıs University, 2022-1154.

Authorship Contribution Statement

İbrahim Gül: Theoretical foundations of the research, related literature, discussion and conclusion **Selda Örs-Özdil**: Statistical analyses, literature, findings and interpretation

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APPENDIX

Appendix 1. *Repeatability result table of EFA.*

Item No	Factor loading values in the first sample	Factor loading values in the second sample	Absolute value of difference
M1	0.753	0.797	0.044
M2	0.832	0.788	0.044
M3	0.861	0.844	0.017
M4	0.892	0.791	0.101
M5	0.848	0.774	0.074
M6	0.890	0.839	0.051
M7	0.853	0.855	0.002
M8	0.839	0.829	0.010
M9	0.872	0.783	0.089
M11	0.893	0.856	0.037
M12	0.907	0.839	0.068
M13	0.890	0.827	0.063
M14	0.908	0.863	0.045
M15	0.918	0.842	0.076
M16	0.922	0.811	0.111
M17	0.854	0.819	0.035
M18	0.864	0.852	0.012
M19	0.873	0.764	0.109
M20	0.893	0.859	0.034
M21	0.922	0.838	0.084
M22	0.891	0.903	0.012
M24	0.896	0.796	0.100
M25	0.923	0.904	0.019
M26	0.819	0.749	0.070
M27	0.909	0.879	0.030
M28	0.876	0.815	0.061
M29	0.848	0.801	0.047
M30	0.890	0.808	0.082
M31	0.890	0.830	0.060
M32	0.889	0.801	0.088
M33	0.925	0.891	0.034
M34	0.884	0.846	0.038
M35	0.875	0.852	0.023
M36	0.892	0.840	0.052