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The psychometric properties of school belonging scale for primary school students: a validity and reliability study[1]

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Abstract. This study aims at developing a valid and reliable scale to determine primary school students' sense of school belonging. In this respect, the relevant literature on the concept of belonging was reviewed; interviews were conducted with field experts and primary school students to determine items to be included in the scale. An item pool was created based on the findings of these processes. Later, a pilot form was prepared by taking the opinions of 2 field and 2 measurement and evaluation experts to ensure that the scale items represent the structure measured. This form was administered to 254 primary school students studying in the 2018-2019 academic year, and the final scale was obtained as a result of exploratory factor analysis was applied to 287 primary school students in a different school. For validity evidence, exploratory factor analysis (EFA), confirmatory factor analysis (CFA), convergent and discriminant analysis and item analysis; for reliability, findings of Cronbach Alpha and composite reliability coefficients were used. According to the exploratory factor analysis, the scale consisted of 3 factors with 13 items, and the total variance explained was 52.57%. As a result of the second-order confirmatory factor analysis of the obtained structure, the fit indices of the model showed that it was verified. The internal consistency coefficient of the developed model was α = .92 and the composite reliability coefficient was .93. These findings showed that the scale had psychometric properties to be used in future research.

Keywords: School belonging, primary school students, scale development, construct validity

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INTRODUCTION

The educational system is one of the greatest indicators regarding the development levels' of the countries and it embodies a systematic process coordinated by the Ministry of Education and its affiliated institutions. Thanks to proper and regular coordination of this process containing several shareholders such as students, teachers, parents, school administrations and so on and sub-elements such as course materials, school infrastructure, budget, etc., the children as the future of countries can undergo a modern educational process. Despite the partial differences among the academic calendars across countries, this process is maintained similarly in every country. As in many countries, the children in Turkey start school to practise educational activities from the early ages. The children undergo training in many various disciplines regarding their age and developmental characteristics during the 12-year compulsory educational process planned as 4+4+4. Currently, this process continues in two forms, normal (full day) and half-day (dual) education and it is planned to move full education in all the school soon. The full-day education is conducted in all OECD countries with an average 7-8 hours of schooling. This time may get longer together with other activities or services so that the time some students spend with their schoolmates and teachers can even exceed the

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time they spend with their parents (Cemalcılar, 2010). Considering this situation, it is important for social, academic and cognitive development of children to feel happy during their time at school and to regard the school as a second home. The fact that the children embrace the school, feel themselves belonging to the school, and have a positive attitude towards the school influence positively on achieving the goals stated in educational programs and increasing academic success. Studies on this specific subject (Adelabu, 2007; Goodenow, 1993; Goodenow & Grady, 1993; Sarı, 2013) also revealed that students with a high sense of belonging demonstrate higher academic achievement and motivation levels and self-efficacy beliefs compared to other students. This critical relationship between belonging and school made it necessary to examine the concept of belonging in more detail.

The belonging, a sociological and psychological concept, is discussed in the literature with different types and many dimensions. It might be in forms like an institution like family and school, an individual or a society, a common structure like religious and ethnic identity or an area or a place for the need of an origin (Sarı, 2013). In other words, an individual may have a sense of belonging to a person, an institution, a group, a society, a culture, an identity, and space or place. Since the school is naturally identified as a society in itself, it is important to discuss and analyse the concepts belonging to the society at school. Just as an individual's sense of belonging to social group and society leads to emerging the sense of preserving and developing that structure, it is crucial for a student to feel himself/herself as a part of the school in terms of protecting and developing it (Akar Vural, Özelçi, Çengel & Gömleksiz, 2013). The concept of belonging, which

İs one of the five dimensions in Maslow's hierarchy of needs and comes after physiological and security needs is a critical concept both for the society and the success in the curriculum of the school. Maslow (1962) stated that the individual cannot realize himself/herself and learning cannot occur without this dimension being fulfilled. In this study, the concept of belonging was contextualised in the context of the student-school relationship. This concept was examined by different researchers in literature and findings were put forth. The studies on the concept of school belonging generally revealed the certain effects of school belonging on various psychological, social and academic works (Ireson & Hallam, 2005; Osborne & Walker, 2006; Roeser, Midgley & Urdan, 1996). In the literature, the students with a high level of school belonging was found as less excited, less isolated, more autonomous and prosocial, more successful at courses and intrinsically motivated (Cemalcılar,2010; Finn,1989; Goodenow & Grady, 1993; Sarı, 2013; Van Ryzin, Gravely & Roseth, 2009; Voelkl, 1997). Moreover, those students attended to in-and-out-of-class activities more, had higher self-respect, attached more importance to training, developed better relations with their teachers and colleagues, had higher attendance rates, and were more satisfied with their current situations (Cemalcılar, 2010). The insufficiency in the sense of school belonging, on the other hand, refers to alienation and loneliness, low academic success, negative attitude towards school, behavioural problems, irregular attendance, social rejection, isolation and drop-out cases (Edwards & Mullis, 2001; Voelkl, 1997). Moreover, it was stated that the insufficiency in the sense of school belonging was a significant predictor of the sense of loneliness (Hagerty, Williams, Coyne & Early, 1996; Pretty, Andrewes & Collett, 1994).

Many studies in the literature, especially in the international area, examined the importance of the sense of school belonging, its development and its relationship with other outcomes of education. One of the most remarkable findings of those studies was about the effect of school belonging on the students' academic achievement. The researchers like Booker (2006), Cemalcılar (2010), Finn (1989), Goodenow (1992, 1993) and Osterman (2000) found that the sense of school belonging was positively correlated with high achievement, academic motivation and academic self-efficacy; but negatively correlated with drop-out rate. Similar findings were also put forward by Anderman (2002), Hagborg (1994), and Isakson and Jarvis (1999), high level of school belonging was associated with a high level of academic achievement. Besides, Bond and his colleagues (2007) found out that the school belonging levels of the students enhanced their academic success and the ratio of continuing further education levels.

In the studies conducted by Adelabu (2007) and Israelashvili (1997), the students' school belonging levels were correlated with their future expectations. In other words, according to the research findings, the students with a higher level of school belonging had greater and more positive expectations about the future or vice versa.

Pehlivan (2006), in his study that investigated the absence reasons of middle school students, sorted the reasons as boredom at school, dislike of school and courses, their colleagues' reinforcement and inexpectation about education. He put forward that there was a significant relationship between those reasons and the school belonging.

Booker (2006) asserted that since it affects students' attendance ratios, academic achievements and learning outcomes regarding the psychological well-being, the school belonging forms a significant part of the whole. Goodenow (1992), on the other hand, underlined that the insufficiency in the sense of school belonging can lead to decrease in academic achievement, not to attend school and classroom activities or even to drop out.

The OECD report of the PISA 2000 research underlined that there was a significant relationship between the sense of school belonging and students' motivation to participate in school activities (Willms, 2003). Another remarkable finding stated in the report was about the link between the school belonging and dropping out. As emphasised in the report, those who do not possess the sense of school belonging search for a different channel for belonging, which caused to the emergence of antisocial behaviour model or the outbreak of violent students groups like gangs.

Several scale development and adaptation studies have also been carried out in the related literature. When the relevant literature was examined, the first scale encountered is the School Behaviour Psychological Understanding Scale developed by Goodenow (1993). The 18-item scale consists of three sub-factors (belonging, rejection and acceptance). The internal consistency coefficient given by Goodenow (1993) as .80 varied between .72 (Stevens, Hamman & Olivarez, 2007) and .90 (Isakson & Jarvis, 1999) in various studies. Although the scale items were prepared for use at any academic level, they include items for the university level mostly. The scale was practised as a data collection tool in studies with students at secondary, high school and university levels. It was adapted to Turkish culture by Alkan (2015). In the adaptation study, the construct validity of the scale was confirmed and it was observed that it had acceptable internal consistency values.

Sarı (2013) tried to measure the sense of belonging of the high school students by conducting the validity and reliability study of the scale developed by Goodenow (1993). As a result of the study, the general belonging level of the students was not high, but above the average; although there was no statistically significant difference, she stated that female students' sense of belonging was higher. She stated that the scores that the students got from the school belonging scale differed significantly according to their grade levels, academic achievements and socio-economic levels.

Malone, Pillow and Osman (2012), on the other hand, conducted a scale development study to measure the general sense of belonging. As a result of the analysis of the data collected online, they developed a scale consisting of 12 items and a 2-factor structure. They suggested this study was the first to document that the sense of belonging differs from the need to belong and that there is a strong link between belonging and the five major traits of Neuroticism and extroversion. The psychometric properties of this developed scale were also examined by Duru (2015). As a result of the study with university students, the two-factor structure was confirmed. Analysis results showed the scale had a high level of criterion-related validity, high internal consistency and test-retest consistency. Based on these findings, it was noted that the scale can be used to measure the general belonging level of students studying at the university level in our country.

Arslan and Duru (2017) also conducted a scale development study to determine the school belonging levels of the students. As a result of the analysis of 562 data collected from a secondary school and two high schools, a scale consisting of 10 items and a two-factor structure was obtained. The scale having high internal consistency coefficients, the goodness of fit indices

and factor loadings was added to the literature to be used to measure the level of belonging of middle and high school students.

Having addressed the concept of belonging from a different perspective, Keskin and Pakdemirli (2016) carried out a study to develop a valid and reliable scale to determine the professional belonging levels of private and public employees. As a result of the analysis of the data collected from officials working in the field of religious services, they developed a scale consisting of 39 items and three factors (professional management belonging, a professional organization belonging, a professional place belonging).

As stated in the related literature, the concept of school belonging plays a crucial role both in the current educational life of the students and in shaping future their road map. The scale development studies in the literature focused on either the concept of general belonging, Professional belonging or the school belonging of the students in middle school and above. However, in the literature, it wasn't encountered with a scale that can be used to measure the level of belonging of students in primary school, which marks the first step of the educational process. For this reason, it is considered that it will be significant to develop a valid and reliable measurement tool that demonstrates the school belonging levels of the students at primary school. With this scale, it is intended to fill this gap in the literature and present a valid and reliable measurement tool for future research.

METHODS

Research Design

It is a scale development study that was conducted to develop a scale to measure school belonging levels of primary school students. The research process was carried out following the sequential exploratory design of the mixed-method research methods. In the sequential exploratory design, the researchers begin with exploring qualitative data and the findings obtained in this process are used in the quantitative research dimension (Creswell, 2014). In the qualitative data collection phase, the literature review was conducted on the concept of belonging to determine the items to be included in the scale and to create a pool of items, interviews were made with the field experts and elementary school students (focus group) to collect qualitative data. The item pool for the scale was created by analysing the data obtained from the literature review and interviews through the content analysis technique. The pilot form created as a result of elimination from the item pool was sent to receive the opinions of four experts, two measurement-evaluation and two field experts. Kappa analysis was carried out to ensure inter-rater reliability among the experts. The Kappa analysis can be calculated in two different ways, Cohen and Fleiss Kappa. If the reliability between the two evaluators/raters is measured, Cohen Kappa; if the number of evaluators/raters is more than two, the Fleiss Kappa coefficient is used (Kılıç, 2015). Although there were four experts in total, the Cohen Kappa coefficient was calculated since the experts were divided into two (measurement and evaluation, field experts). As a result of the analysis, the Kappa value among measurement and evaluation experts was calculated as .84 and the Kappa value among field experts was calculated as .92. In the interpretation of the obtained findings, the ranges offered by Landis and Koch (1977) (.01--.20 Slight; .21--.40 Fair; .41—.60 Moderate fit; .61 — .80 Substantial; .81—1.00 Almost Perfect) were accepted as a reference. Accordingly, it was observed that there was an almost perfect level of inter-rater reliability in both types of experts. After testing the adequacy for content validity, the scale was administered to primary school students. After the analysis of the collected data, the final form was distributed to elementary school students specified as the second study group. The data obtained from the second application were included in statistical procedures for use in confirmatory factor analysis. Following the procedures, a valid and reliable scale was added to the relevant literature to be utilised in future research.

Study Group

The research was conducted with 541 primary school students were studying in the 2018-2019 academic year. The study group was divided into two: the first study and the second study group. The first study group consisted of 254 primary school students who were studying in three different schools in Antalya province. The students (32 students) who had a large number of missing items and who gave the same answer to all items in the scale were extracted from the dataset as they may not have answered carefully and intimately while filling the scale. Besides, those (15 students) who did not fulfil univariate and multivariate normality assumption were also eliminated from the dataset. At the last stage, the first study group consisted of 197 students (96=male, 101=female). Of these, 50 (25.4%) are studying in the 2nd grade, 64 (32.5%) in the 3rd grade and 83 (42.1%) in the 4th grade. The second study group consisted of 287 primary school students studying in three different schools in Antalya. The first procedures were also followed in the group and as a result, the data of 287 students were extracted since 42 of them either chose the same option in the entire scale or left a significant number of missing items and 45 of them did not meet the univariate and multivariate normality assumption. As a result, the analyses were computed with 197 students (94=male, 106=female). Of these, 52 (26%) were studying in the 2nd grade, 61(30.5 %) were studying in the 3rd grade, and 87 (43.5%) were studying in the 4th grade. Evidence for construct validity was sought by applying Exploratory Factor Analysis (EFA) to the first study group and Confirmatory Factor Analysis (CFA) to the second study group. Based on the data obtained from the second study group, item analyses, convergent and discriminant validity evidence analyses and Cronbach's Alpha reliability coefficient were calculated. Descriptive statistics on research groups are presented in Table 1.

Table 1. *Descriptive statistics on the study group*

Study Group	Demographic Info	Group	Frequency (*f*)	Percentage (%)
The First Study Group	**Gender**	Female	101	51.26
		Male	96	48.73
		Total	197	100
	Grade	2nd Grade	50	25.4
		3rd Grade	64	32.5
		4th Grade	83	42.1
		Total	197	100
The Second Study Group	**Gender**	Female	106	53
		Male	94	47
		Total	200	100
	Grade	2nd Grade	52	26
		3rd Grade	61	30.5
		4th Grade	87	43.5
		Total	200	100

While determining the study groups, some principles were followed. Foremost, it was decided to conduct the study in schools located in Antalya by the principle of providing ease of accessing data and economics. All the data obtained from the research groups were collected in public schools. Furthermore, all the grades except for the 1st grade were included in the study to advance generalisability of the study. Since these students (1st grades) gain partial literacy skills and they are predicted that they cannot adequately express themselves on the scale, they were not involved in the research. Also, bearing in mind that EFA and CFA should be performed with different study groups (Fabrigar, Wegener, Strahan & MacCallum, 1999), the analyses were computed separately regarding the dataset. The study groups and statistical analyses computed in the research are summarized in Table 2.

Table 2. *Study groups and statistical analyses computed in the research*

Study Group	Statistical Analysis	Evidence
The First Study Group	Exploratory Factor Analysis (EFA)	Construct Validity
The Second Study Group	Confirmatory Factor Analysis (CFA)	Construct Validity
The Second Study Group	Cronbach Alpha, Convergent Reliability, Calculating AVE-MSV-ASV, Item Analysis	Reliability, Convergent-Discriminant Validity and Item Discrimination

Procedure

The scale development procedure started with a literature review on the concept of belonging. Before writing items to be included in the scale, national and international publications on this subject were reviewed to underlie the concept of general belonging. The points which those studies focused and the missing issues were examined, and then the studies regarding the concept of belonging in the field of education were investigated and analysed in depth. However, since there was not so many work conducted in this field, it was decided that it will be more appropriate to conduct focus group interviews with the participants and interviews with field experts. The structure of the concept of belonging was formed by conducting focus group interviews with primary school students and teachers, and opinions and observations about what might happen in the item pool to be included in the study were obtained. To reflect the structure desired to be measured while creating the item pool, support and opinion were received from two experts who completed their doctorate in their field, and two measurement and evaluation experts who previously completed their doctorate in their field and were previously involved in many scale development/adaptation studies during the item writing and correction process. Due to the small age range, a Likert-type rating with pictures suitable for scoring as 1-5 was used for the statements in the scale. After the feedback from the experts' opinions, necessary changes and arrangements were made in the scale, and at the last stage, the opinions of two Turkish language experts were received to ensure their language compatibility. The items in the scale were revised in line with the opinions and opinions of the experts regarding the use of punctuation marks and spelling.

Data Analysis

Upon administering the scale to two different study groups, several analyses were performed to reveal the psychometric properties of the measurements obtained. Firstly, exploratory factor analysis (EFA) was computed to get evidence concerning the structure of the measurements. Before the EFA, it is required to check whether the data meet the assumptions for factor analysis. The Kaiser-Mayer-Olkin (KMO) value, which determines whether the data group has sufficient sample size for the EFA, and the Bartlett test, where multivariate normality is examined, is a statistical way to test assumptions. If the KMO values are higher than .60 and the Bartlett test is statistically significant, it indicates the sample size is sufficient and factor analysis can be performed (Büyüköztürk, 2018).

Stevens (1996) stated that compared to other factorisation techniques, principal component analysis is stronger in terms of revealing the structure of the measurement tool, does not require tough mathematical analyses and is frequently used in extracting factors. Taking account the features it holds, principal component analysis was considered as “suitable” technique for this study. In determining the factor loadings of the items EFA, varimax rotation technique, one of the orthogonal rotation methods, was used. When interpreting the results obtained from EFA, the factor loading of .55 was taken as the cut-off point because it was considered as satisfactory to include an item in the theoretically expected factor (Çokluk,

Şekercioğlu & Büyüköztürk. 2012). The items below this value were eliminated from the scale. In addition to the factor loadings of the items, it was stated that if the common factor variance (h2) which is another criterion in determining the factor structure and the expression of the sum of the squares of the factor loadings that an item showed in all factors is low, the item should be removed from the measurement tool in the factor analysis (Kalaycı, 2010). Thompson (2004) recommends that.50 value of common variance should be accepted as a criterion in his studies. Tabachnick and Fidell (2007) stated that if the common variance of an item is lower than.20, it gives information related to the fact that the items measure different situations. It is not always possible to obtain high common variance values because of the study area in social sciences and human behaviour represents various latent structures. Therefore, .20 criterion was preferred for common factor variance in this study. It is seen that there are many fit indices in the CFA that have entered the literature to test the model. The criteria for the decision of the fit indexes were accepted as stated in the literature and the results were interpreted.

The reliability of the scores obtained from the school belonging scale was calculated with Cronbach's Alpha and composite (structural) reliability methods (CR). It is seen that the measurements with the reliability coefficient of .70 and above are accepted as reliable (Domino & Domino, 2006). Another method for testing the structure of the measuring tool is to examine the convergent and discriminant validity coefficients of the factors. In convergent validity, it is expected the items of a factor measuring the same conceptual structure should be at least moderately correlated (r> .05); discriminant validity refers to the low relationship (r <.05) of items across the factors but to be related in the same structure. Verification of the CFA results means that the factors and factor items in the scale have a certain level of convergent and discriminant validity. However, for convergent validity, CR and AVE (Average Variance Extracted,) values give clues. CR is a criterion that takes into account the standardized path coefficients (factor loadings) and error variances of the items in a factor and gives clues about structure reliability of a factor, namely convergent. The .70 CR value is evidence for the factor's structural reliability. AVE, on the other hand, is the criterion of convergent validity between items representing a latent structure. If the coefficient for this value is over.50, it provides evidence of convergent validity. In summary, AVE> .50, CR> .70 and CR> AVE conditions are sought on a scale with convergent validity. Discrimination validity can be defined as the fact that the items are less related to factors other than the factor to which they belong. For this purpose, AVE gives MSV (Maximum Squared Variance) and ASV (Average Shared Square Variance). It is expected that the square root of MSV <AVE, ASV <AVE and AVE on the scale with discrimination validity will be greater than the inter-factor correlation (Hair et al., 2014).

To determine the discrimination level of the items in the scale, 27% upper-lower group comparisons and item-total correlation were calculated. In the study, statistical package programs were used for computing EFA, CFA and Cronbach Alpha reliability and item analysis. The calculations regarding the convergent and discriminant validity of the scale were made by hand. Factor loadings and error values obtained from CFA were used to calculate the convergent and discrimination validity.

FINDINGS

Construct Validity

EFA and CFA were performed to test the construct validity of the scale items.

Exploratory Factor Analysis (EFA)

In the study, KMO value for sampling adequacy was calculated as .838, Bartlett's Test of Sphericity, which was computed to test multivariate normality assumption, was significant ($\chi 2=644.080$, sd=78). Based on these findings, it can be interpreted as the suitability of data for factor analysis. In the EFA, principal components factorisation technique and varimax orthogonal rotation technique were used; as a result, the three-factor structure explaining 52.57

% of the total variance was appropriate to the theoretical basis. The scree plot obtained for deciding the number of the factors is shown in Figure 1.

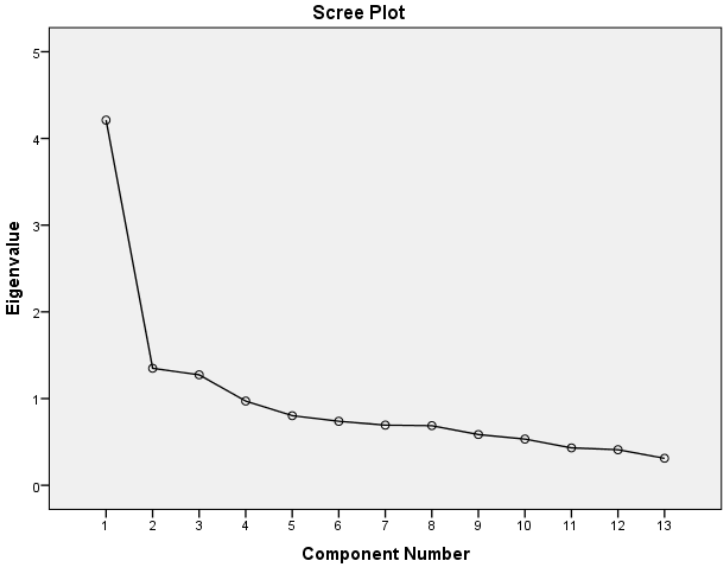

FIGURE 1. *Scree plot of school belonging scale*

In interpreting the plot, the point at which linearity begins is considered as a cut point in deciding the number of factors. When the scree plot obtained from the analysis is examined, it is seen that the linearity starts after 3 bars which can be interpreted as the three-factor structure in the data set.

In accordance with the findings of EFA, five items were extracted from the scale since two items had lower factor loading than the pre-determined .55 cut-off point and three items showed high factor loadings (overlapping) more than one factor. The findings obtained as a result of this analysis were presented in Table 3. Accordingly, it is seen that all the scale items had factor loading greater than .55 cut-off point. In addition, communalities of the items are .35 and above which meets the required criteria.

Table 3. *Factor structure and loadings of school belonging scale*

Factor	Item	Factor Loadings			Communalities
		Factor 1	***Factor 2***	***Factor 3***	
Factor 1	M1	**.82**	.01	.06	.66
	M17	**.73**	.14	.10	.56
	M9	**.70**	.24	-.01	.55
	M15	**.70**	.26	.05	.55
	M18	**.68**	.27	-.01	.53
	M3	**.61**	.08	-.04	.38
	M6	**.59**	.09	.11	.36
Variance Explained 27.81 %					
Factor 2	M12	.10	**.81**	.03	.67
	M5	.19	**.71**	.06	.54
	M10	.25	**.68**	.02	.51
Variance Explained 14.40 %					
Factor 3	M16	.02	.07	**.73**	.53
	M2	.45	-.04	**.63**	.59
	M4	-.11	.04	**.60**	.37
Variance Explained 10.36 %					
TOTAL VARIANCE EXPLAINED 52.57 %					

In addition, it was determined the common factor variances of all items in the scale were .35 and above and met the required criteria. Taking the items in the scale and theoretical basis into account, the first factor was named Tendency to School (TS), the second factor was Friend

Relations (FR) and the third factor was Alienation to School (AS). The first factor consisted of seven items and contributed to 27.81 % of the total variance. The factor loadings of this factor ranged from .59 to .82. The second factor consisted of three items; their factor loadings were between .68 and .81 and contributed 14.40 % of the total variance. The third factor consisted of three items whose loadings ranged from .60 to .73 and contributed 10.36 % of the total variance.

Confirmatory Factor Analysis (CFA)

Confirmatory factor analysis was applied to the data collected from the second study group to test whether the model-data construct of the structure consisting of 13 items and three factors obtained as a result of EFA was confirmed. Findings related to the fit indices obtained as a result of CFA are shown in Table 4.

Table 4. *Fit indices obtained in the second-order confirmatory factor analysis*

Fit Indices Examined	Fit Indices (before modification)	Result	Fit Indices (after modification)	Result
Satoro Bentler χ^2/sd*	1.87	Absolute fit	1.45	Absolute fit
GFI * **	.92	Acceptable fit	.94	Acceptable fit
RMSEA **	.063	Acceptable fit	.048	Absolute fit
AGFI ***	.88	Bad fit	.90	Acceptable fit
IFI * **	.93	Acceptable fit	.96	Absolute fit
NFI * **	.87	Bad fit	.90	Acceptable fit
NNFI * **	.92	Acceptable fit	.95	Absolute fit
SRMR ***	.063	Acceptable fit	.056	Acceptable fit
CFI * **	.93	Acceptable fit	.96	Absolute fit
PNFI ***	.69	Acceptable fit	.70	Acceptable fit
PGFI ***	.63	Acceptable fit	.63	Acceptable fit

*(Kline, 2011), **(Byrne & Campbell, 1999), *** (Bentler, 1980),**** (Schermelleh-Engel & Moosbrugger, 2003).

When the findings in Table 4 are examined, it is seen that the fit indices (NFI and AGFI) of the model without modification are bad, and the value of $\chi 2$ / df is absolute and the other fit indices are in the acceptable range. To improve the model thereby the fit indices, modifications were made between the 18th and 9th items in the same factor in line with the experts' opinions and the literature review. The findings attest that the three-factor model obtained from CFA has absolute and acceptable fit indices which show that the model is confirmed. The path coefficients for the model are shown in Figure 2.

T values obtained from CFA were presented in Table 5. When the findings were examined, it was determined t-test values were between 7.83 and 9.76 for the first factor, 5.46 to 7.69 for the second factor, and 8.72 to 9.82 for the third factor. T value being greater than 1.96 is an indication of .05 significance, if it is greater than 2.58, it means there is significance at .01 level (Jöreskog & Sörbom, 2000; Kline, 2011). When this information is taken into account, we see that all the t values of CFA are significant at .01 level. In other words, the t values obtained as a result of CFA indicate that the number of data included in the study is sufficient for factor analysis, the model-data fit is confirmed and there is no item to be removed from the model.

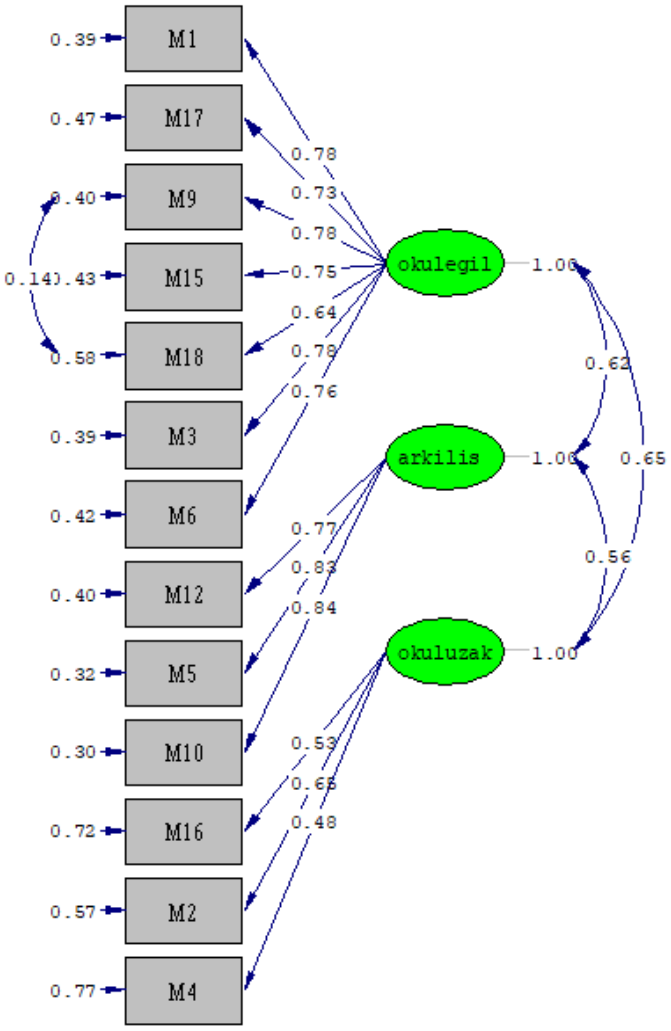

FIGURE 2. *Path diagram of the school belonging scale for primary school students*

Table 5. *T-Test Values of the Scale Obtained from CFA*

Item	T value	Item	T Value	Item	T Value
OE1	7.86*	OE6	9.76*	OU1	9.79*
OE2	7.83*	OE7	9.15*	OU2	8.72*
OE3	8.91*	Aİ1	6.21*	OU3	9.82*
OE4	7.99*	Aİ2	5.46*		
OE5	9.05*	Aİ3	7.69*		

* significant at the .01 level.

Reliability, Convergent-Discriminant Validity and Correlation Values of Factors

Composite Reliability (CR) and Cronbach Alfa were preferred for the reliability of factors in the school belonging scale. AVE, MSV and ASV values of the factors were calculated for the validity of convergent and discriminant. For convergent validity, the following equivalences AVE>.5, CR>.7 and CR>AVE; for discriminant validity: it is suggested AVE> .5 for combination validity; MSV<AVE, ASV<AVE and $\sqrt{AVE}$ > inter-factor correlation is suggested (Hair et al., 2014) CR, AVE, MSV, ASV and correlation values of the factors in the school belonging scale are presented in Table 6.

Table 6. *Reliability, validity and correlation values of factors*

Factors	Alpha	CR	AVE	MSV	ASV	1	2	3
1.Tendency to School	.85	.90	.55	.33	.30	(.74)		
2.Friend Relations	.74	.75	.66	.33	.30	.57	(.81)	
3.Alienation to School	.70	.50	.34	.27	.27	.51	.52	(.58)
Entire Scale	.92	.93						

* Values in parentheses indicate $\sqrt{AVE}$ values.

According to Table 6, the Cronbach Alpha reliability coefficients of the measurements were .85 for Tendency to School, .74 for Friend Relations and.70 for Alienation to School. The low number of items in factors 2 and 3 affects the reliability coefficient negatively. However, it can be said that the values obtained are sufficient and reliable in terms of internal consistency. Compound reliability coefficients for measurements; .90 for Tendency to School factor; .75 for the Friend Relations factor; It was found to be .50 for the Alienation to School factor. It is seen that the coefficients of the first and second factors are sufficient, but the coefficient for the third factor is relatively lower. When the values related to the convergent validity of the sub-factors in the scale are examined, since the AVE values of the Tendency to School and Friendship Relations factors are greater than .50 and lower than the CR value, they have convergent validity. However, the AVE value of Alienation to School factor is lower than CR but it does not meet the .50 criteria specified in the literature, so it appears to have doubts about its validity. The fact that the AVE values of the factors are higher than the MSV and ASV values mean the factors have discriminant validity. Also, the fact that the √AVE scores of the factors are greater than the correlations between the factors indicates there is a discriminant validity.

Item Analysis

Table 7. *Item analysis findings of the school belonging scale*

New Item Nu	Old Item Nu	Item-Total Correlation	Mean	SD	*T* value
OE1	M1	.619	4.62	.58	12.98
OE2	M17	.570	3.53	1.42	19.78
OE3	M9	.585	4.17	.88	14.06
OE4	M15	.592	4.46	.66	14.85
OE5	M18	.525	4.58	.58	10.70
OE6	M6	.451	4.67	.56	8.04
OE7	M3	.420	4.61	.48	8.07
Aİ1	M12	.514	4.56	.41	11.55
Aİ2	M5	.483	4.67	.45	11.02
Aİ3	M10	.465	4.71	.41	9.83
OU1	M16	.430	3.95	1.07	4.82
OU2	M2	.486	3.85	1.12	5.69
OU3	M4	.374	4.15	1.12	4.91

* significant at the .01 level.

When the findings in Table 7 are examined, it is seen that the t-test values of the 27% lower and upper group scores of the school belonging scale items ranged between 8.04 and 19.78 (for the first factor), between 9.83 and 11.55 (for the second factor), and between 4.82 and 5.69 (for the third factor). Besides, the results of item-total correlations were found to be between .420 and .619 for the first factor, .465 and .514 for the second factor, and .374 and .486 for the third factor. Item-total correlation provides information about the discrimination levels of items. In the literature, the value .30 is stated as an adequate value in terms of distinguishing. It can be said that all the items in the scale have a value above the cut-off point, so all the items in the scale are distinctive.

Interpreting Scores Obtained from the School Belonging Scale

The school belonging scale having a 5-point Likert type rating features consists of 13 items. It has three sub-factors, therefore, interpretations can only be made through sub-factors rather than total scores. The score range of the first factor is 7-35, it is 3-15 for the second and third factor. The increase in the scores of sub-factors can be interpreted as a higher level of school belonging regarding the relevant factor.

DISCUSSION, CONCLUSION AND SUGGESTIONS

In this study, it was aimed at developing a valid and reliable scale for measuring school belonging levels of primary school students. The pre-analysis procedures were carried out as follows: the review of relevant literature on the concept of belonging, conducting interviews with field experts, making focus-group interviews with the students, creating an item pool, preparing a pilot form and asking the experts' opinions, administering the pilot application and the first application (to be used in the exploratory factor analysis). The data were collected from 254 primary school students in the first application. After eliminating missing values and outliers, EFA was computed with the data of 197 students. Since Kaiser-Meyer-Olkin (KMO) Test value for sampling adequacy was .838 and the Bartlett test result which is computed to check multivariate normality was significant (χ^2=644.080, *sd*=78), the collected data were considered as "suitable" for factor analysis.

In EFA, principal components factorisation technique and varimax orthogonal rotation method were used; according to the findings, it was decided that a three-factor structure explaining 52. 57% of the total variance was in accordance with the theoretical basis. As a result of EFA, 3 items whose loadings were lower than the pre-determined .55 cut-off point and another 3 items were overlapping thus they were extracted from the scale. Taking items in the factors and theoretical basis into account, the factors were named as follows: 1st factor=Tendency to School (TS), 2nd factor= Friend Relations (FR), and 3th factor= Alienation to School (AS). To test whether the structure obtained in EFA is confirmed, confirmatory factor analysis (CFA) was performed. To perform this analysis, second data were collected from 287 primary school students, 87 of those were eliminated during the missing values and outliers' analyses. As a result of CFA, the modification was made between the items (18 and 9) of the same factor to improve CFA results in the first stage and then the model was confirmed as the results obtained were between absolute and acceptable values. In addition to EFA and CFA results, convergent and discriminant values were checked, so evidence for construct validity was enriched. When the values of the factors regarding the convergent validity were examined, it was found that AVE (Average Variance Extracted) values of the first and second factor were greater .50 and lower than CR (Composite Reliability) value, so they fulfilled the criteria for the convergent validity. On the other hand, the EVA value of the third factor was lower than the CR value but it did not meet the .50 criteria specified in the literature; therefore it appears to have doubts about its convergent validity. The fact that the EVA values of the factors are greater than MSV and ASV values is an indication of discriminant validity. In addition, the fact that the $\sqrt{AVE}$ scores of the factors are greater than the correlations between the factors shows that there is a discriminant validity.

For reliability evidence, Cronbach's Alpha coefficient and composite reliability value of the scale were calculated. The Cronbach's alpha reliability coefficients were found as .85 for the first factor, .74 for the second factor, and .70 for the third factor. As can be seen, the low number of items in factors 2 and 3 affects the Cronbach's Alpha reliability coefficient negatively. Nevertheless, it can be said that the obtained values are sufficient and reliable in terms of internal consistency. Besides, the composite reliability which is based on the factor loadings of the items was calculated to support additional reliability evidence. According to the analysis results, the following reliability coefficients were obtained: .90 for the first factor, .75 for the second factor, and .50 for the third factor. It is seen that the coefficients of the first and second factors are sufficient, but it is relatively lower for the third factor.

It was found that the values of item-total correlation, which gave information about the discrimination levels of the items in the scale, were between.374 and.619. Considering that the items above .30 are considered sufficient in terms of discrimination, each item in the scale can be considered as "distinctive".

The 13-item school belonging scale, which has a five-point Likert-type rating, has a structure with three sub-factors. Therefore, the total score cannot be obtained from the scale. The interpretations can be made for each factor separately. The increase in the scores obtained from the school belonging scale means that the students' school belonging level is high.

As stated in the review of literature, the developed scale is the single tool measuring school belonging level at the primary school level. Considering the sentence structures and data sources used in the development process, the Psychological Sense of School Belonging scale which was developed by Goodenow (1993) and adapted into Turkish and Turkish culture, is more likely suitable for being used in secondary education and higher education institutions. Likewise, the scale developed by Arslan and Duru (2017) aimed at measuring school belonging levels of the students followed the same path as Goodenow (1993), and the researchers utilized from secondary and high school students during the scale development procedure. On the other hand, the data proceeded in the study were entirely collected from primary school students. Besides, by taking into account the age and developmental characteristics of the students, the visual (picture) rating key was used in the study. It paved the way for students to respond to the items more sincerely. Considering both the data source and the validity and reliability evidence of the scale, it is thought that it will make a significant contribution to the relevant literature.

The research has some limitations and suggestions for the researchers as well as the strengths set out above. These limitations bring some suggestions for future research and researchers. First of all, the data collected within the scope of this research are limited to students who continue their education at primary education levels (2, 3 and 4th grades). As stated by Bademci (2013), reliability findings are properties related to measurements, while interpretations made as a result of measurements are considered validity properties. Accordingly, it is necessary to renew the validity and reliability analyses for data to be collected from different study groups. Another suggestion is for researchers who will conduct research using the school belonging scale. Considering the related literature on school belonging, it was found that school belonging was associated with variables such as academic success, number of attendance to school, student-teacher relationship, attitude towards school, and participation rate in and out of class activities. It is thought that the researchers gathering the data considering these variables will make it easier to make descriptive descriptions belonging to the study group.

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Ek 1: Okula Aidiyet Ölçeği

Merhaba arkadaşlar aşağıdaki ifadeleri cevaplandıralım mı? Önce okuyoruz daha sonra yüzlerden bir tanesini işaretliyoruz. Hadi bakalım!

Eski Madde Numarası	Yeni Madde Numarası	Çok Mutsuz	Mutsuz	Biraz Mutlu	Mutlu	Çok Mutlu
1	**1. Okula gelince**					
2	2. Okul bitince					
3	**3. Okulda öğretmenimi görünce**					
4	4. Başka bir okulda öğrenci olsaydım					
5	**5. Okulda arkadaşlarımı görünce**					
6	6. Okulun kurallarına uyduğumda					
17	**7. Okul her gün olsaydı**					
12	8. Okulda arkadaşlarımla zaman geçirirken					
9	**9. Sabah okul için hazırlanırken**					
10	10. Okulda arkadaşlarımla konuşurken					
15	**11. Ders işlerken**					
16	12. Okuldaki insanlardan uzak kalınca					
18	**13.** Sınıfa girince					

Appendix 1: School Belonging Scale (Suggested English Version)*

Hello friends, shall we answer the following statements? We will read first and then choose one of emotions. Here you go!

Old Item Number	New Item Number	Very Sad	Sad	Little Happy	Happy	Very Happy
1	**14. When I come to school,**					
2	15. When the school finishes,					
3	**16. When I see my teacher at school,**					
4	17. If I was a student in a different school,					
5	**18. When I see my friends at school,**					
6	19. When I obey the school rules,					
17	**20. If there was school every day,**					
12	21. While spending time with my friends at school,					
9	**22. While preparing for school in the morning,**					
10	23. While talking to my friends at school,					
15	**24. While I am at a lesson,**					
16	25. While staying away from people at school,					
18	**26.** When I enter the classroom,					

* English version of the scale is a suggestion. Therefore, the researchers planning to use English version are required to conduct factor analysis and recheck reliability of the scale.