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Development of Specific Learning Disability Screening Scale

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Abstract

It is known that students with Specific Learning Disability (SLD) are noticed because of the difficulties they experience in academic lessons, especially in primary school years. Especially the difficulties they experience in reading, spelling mistakes, problems in arithmetic skills, attention problems, inability in taking responsibility and communication skills attract attention. The scale, which was developed in Turkey in order to identify students suspected of having SLD during the primary school years and between the ages of 8-11, by their teachers, is a five-points Likert type, 7-factors and 39-items measurement tool. The study was carried out with teachers working with students with Special Learning Disability in Ministry of Education and Special Education and Rehabilitation Centers in the 2019-2020 academic year. A total of 401 classroom teachers and special education teachers from Adana, Ankara, Antalya, Bursa, Çorum, Erzurum, Gaziantep, Isparta, İzmir, İstanbul, Kayseri, Konya, Sivas and Trabzon provinces participated in the study. In data analysis, Exploratory Factor Analysis and Confirmatory Factor Analysis were performed and a seven-factors structure was found. It was determined that seven-factors explained 73,224% of the total variance. The factors were as follows: writing process, communication skills, literacy skill, taking responsibility, attention skills, arithmetic skills and skill of recognition the numbers. The Cronbach Alpha coefficient of the scale was 0.963 and the RMSEA value was 0,063.

Keywords: Specific Learning Disability, Scan Scale, Teacher, Scale Development, Validity and Reliability

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INTRODUCTION

It is known that Specific Learning Disability (SLD) affects negatively one or more field like reading, writing, maths, speaking, listening and reasoning (Jena, 2013; Silver, Ruff, Iverson, Barth, Broshek, Bush, Koffler & Reynolds, 2008). On the other hand, it is seen that children with SLD are generally diagnosed in primary school years in the aged 8-10. In the process of diagnosing of these children, their academic failures draw attention when compared to their peers. The basis of the problems they experience in the academic achievement is the difficulties related to mostly reading skills, writing and maths skills (Mather & Gregg, 2006; Willcutt, McGrath, Pennington, Keenan, DeFries, Olson & Wadsworth, 2019). According to Gunay Aksoy (2019), recognition of SLD generally emerges with the difficulties they experience in reading, writing and maths when they start primary school. But SLD can also be recognized with the difficulties in the fields of attention, motor development and language development in preschool period. The right evaluation of these signs that seen in children by families, teachers and experts is important for appropriate diagnosis and initiation of treatment.

The USA individuals with Disabilities Education Act (IDEA, 1997) defines SLD individuals as a disability that shows itself in one or more of the skills that include reading, writing, speaking, listening, thinking or mathematical processing, using and understanding written or spoken language. According to IDEA, the definition of SLD includes some conditions such as developmental aphasia and dyslexia, minor brain dysfunctions, brain injuries and perceptual disorders. But this definition doesn't include hearing, vision, mental and physical disabilities and the learning problems caused by environmental and economic disabilities in individuals. Also, the results of the intelligence tests that applied to students with SLD are usually within or above normal limits. As a result, the fact that students with SLD don't have any apparent disability and their academic achievements is low, although their intelligence levels are within normal limits draws the attention of parents and teachers.

SLD is divided into three categories as mild, moderate and severe according to the level of learning disability experienced in 'Diagnostic and Statistical Manual of Mental Disorders' (DSM-V, 2013) (Cakıroglu, 2019: 10). Students with severe SLD experience serious learning disability in a lot of fields such as reading, writing and maths, and they need intense support for education. Students with moderate SLD can experience learning disability in one or more than one field. But with support education that given to these students, who are in moderate, serious improvements can be made in the field that they experience problems. Students with mild SLD, generally experience learning disability in one or two fields. With the support education that given to these students, who are in mild, their learning difficulties can be overcome.

Students with SLD in educational settings are attracting more attention by educators and researchers every day. Because although these students do not have any mental, physical or other sensory deficiencies, their failures in basic academic skills such as literacy and mathematics are challenging. In addition, it is considered important that the reason why these students' failures and whether they have SLD can be determined quickly with screening scales. It is known that the immediate identification of students with SLD during primary school years is also beneficial in terms of preparing the individual education program required for the student and providing support special education services. Screening scales are also needed to identify these students and to identify the fields where they experience difficulties. In this context, it is anticipated that this study, which is considered to be important, will contribute to the studies conducted to identify students with SLD and to future research. There are various studies conducted in the world to identify students with SLD in different age ranges. When the studies conducted in the literature to identify students with SLD are examined; the sample of the Specific Learning Disability Checklist (SLDC) developed by Oguzhan (2017) consists of a total 463 students, 227 girls and 236 boys, between the ages of 6-12. SLDC has prepared as child, parent and teacher forms. There are items about reading, writing, maths, attention and learning abilities in the checklist. The Visual Aural Digit Span Test/ VADST scanning tool was developed by Koppitz (1977). The test which purpose to evaluate the symptoms of specific learning disability, is based on measuring the verbal and written responses of students between the ages of 5-12

with auditory and visual presentations. Indigenous Scale for Assessment of Learning Disabilities developed by Zahra, Jamil & Khalid (2014), is developed for the students who have learning difficulties at the age of 6-12. There are 99 items in the scale and consist of cognitive features, language, listening skill, reading, writing and numerical ability.

The Early Learning Observation & Rating Scale (ELORS) was developed by Coleman, West & Gillis (2010). With the Early Learning Observation & Rating scale (ELORS), it is aimed that families and teachers pay attention to the features that may be the early signs of learning disability and gather information about little children. This tool includes gathering information on the fields of perceptual and motor skills, self-management, social and emotional skills, early mathematics, early literacy and receptive and expressive language. The Dyslexia Early Screening Test developed by Fawcett & Nicolson (1995) is designed to be applied by teachers and healthcare professionals and it longs approximately 30 minutes applying to a child. The test consist of 11 basic subtests and some areas that includes various function tasks like motor skills, phonological skills and speed are evaluated.

There are a total 52 items in Okur's scale (2019), who developed the Early Signs of Learning Disability Screening Scale (ESLDSS) to identify children aged 4-6 who may have learning difficulties at early ages. The scale consist of 4 subscales (language development and communication, cognitive skills, psychomotor skills and social-emotional skills). The Learning Disabilities Diagnostic Inventory (LDDI) rating scale is developed by Hammil & Byrant (1998) to help the experts who work in this field to diagnose the students with learning difficulties who are at the age of 0-8 and 11-17. The scale consists of 6 independent scales as Listening, Speaking, Reading, Writing, Mathematics and Reasoning. Every scale includes 15 items which is easy to rate. Screening for Chineese Children with Dyslexia screening test developed by Chan, Ho, Tsang, Lee & Chung (2014) aims to screen the students with dyslexia in grades 1 through 6. In this scale, there are 65 items for reading, writing, mathematics, language, dictation, concentration, memory, sequential ability, spatial orientation and general performance.

It is seen that the scale development studies that conducted in the literature are mostly developed for wide ranging age groups. Besides, it is seen that these developed scales don't only target students who are educated at a certain grade. Unlike other scale studies that conducted in the field, this study was developed to identify only primary school students aged 8-11. It is thought that the scale developed in the study is important in terms of detecting the presence of SLD only in primary school students and in 8-11 range age, unlike other scales, therefore it will make great contributions to the field. And the other importance of the study is that; with this scale, it allows teachers to evaluate their students in the 8-11 age group attending primary school in a practical way in terms of SLD.

Early diagnosis and treatment for students with SLD are important. Therefore, it is obvious that the development of measurement tools to identify students with SLD will make valuable contributions to the field. In the current study, it is aimed to develop a screening scale to determine students with Specific Learning Disability who attending primary school in the range of 8-11 years of age.

METHOD

Research Model

This study is a scale development research. According to Erkus (2012; 2019:15), scales are tools used in measurement processes. The functional definition of the variable that is intended to be measured is called scale development. The stages of the development process of 'Special Learning Disability Screening Scale' are given in the below.

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Study Group

Study group of the research, in Turkey consist of teachers working with the students who have Special Learning Disability in the Ministry of National Education (MNE) and Special Education and Rehabilitation Centers in the 2019-2020 academic year. Teachers working with students with Special Learning Disability in MNE and Special Education and Rehabilitation Centers were reached with easily accessible sampling method. The teachers whose students with SLDwere between the ages of 8-11 and those who were in the 2nd, 3rd and 4th grades of primary school were included in the study, and the others were eliminated. Classroom teachers and special education teachers from Adana, Ankara, Antalya, Bursa, Çorum, Erzurum, Gaziantep, Isparta, İzmir, İstanbul, Kayseri, Konya, Sivas and Trabzon provinces participated in the study. Demographic information which is belong to the teachers involved in the scale development process is given in table 1.

Table 1. Demographic information of the teachers.

Variables		n	%
Gender	Female	247	61,6
	Male	154	38,4
Brach of teachers	Special Education Teaching	144	35,9
	Classroom Teaching	257	64,1
Total		401	100

When the Table 1 is analysed, it is seen that 61.6% of the teachers participating in the study were female and 38.4% were male and of the teachers; 64,1% were classroom teachers and 35,9% were special education teachers.

Demographic information about the students with special learning difficulties is given in Table 2.

Table 2. Demographic information of the students with special learning difficulties

Variables		n	%
Gender	Female	169	42,1
	Male	232	57,9
Age	8	79	19,7
	9	84	20,9
	10	105	26,2
	11	133	33,2
Living place	City Center	283	70,6
	Country Town	69	17,2
	Town	17	4,2
	Village	32	8,0
Grades	2	92	22,9
	3	101	25,2
	4	208	51,9
Total		401	100

When Table 2 is analysed, it is seen that 42,1% of the students with special learning disability whose lessons the participants conducted were female and 57,9% were men. Students' age changed between 8 and 11. Students attend the 2nd, 3rd and 4th grades od primary school. Of the students; 70,6% lived in city center, 17,2% lived in country town, 4,2% lived in town and 8% of students lived in village.

Scale Development Process Steps

Devellis (2016) emphasizes that certain processes should be followed during scale development stages. Within the scope of the study, these scale development stages expressed by Devellis (2016), McMillan & Schumacher (2006) are followed. These can be explained below;

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The Stage of Establishing the Theoretical Framework

A literature review was conducted to determine the theoretical framework to identifying Special Learning Disabilities in the literature. Firstly, in this context, literature was analysed; definitions, features, determinations, diagnosing, scales made for scanning tools, journals, books and articles were analysed. At the end of literature review, the researcher created a 52-item trial scale. As a result of the literature review, the researcher determined that the students with SLD had problems in some fields such as writing, reading, communication, attention, recognition numeral, counting and problem solving skill.

Item Pool Stage

After the literature study and the trial scale created, to create an item pool; five teachers working in the field of special education were requested to write items for Special Learning Disability. Determined theoretical framework was used in the article writing process. By each special learning disability dimension was expressed to teachers, in this regard teachers were asked to write down which learning difficulties students might have (For example, what do you think the actions that can identify a student has a learning disability in reading and writing? Write many as much as you can). These 5 teachers wrote a total of 146 items in 7 dimensions to identify Special Learning Disability within the theoretical framework that given to them. Then, the items that the teachers wrote were analysed, same expressions were combined and a total of 81 items were obtained. Finally, the researcher compared the items that he wrote and the ones that he got from the teachers and a total of 87 items were obtained.

Content Validity Stage

After the item pool stage, the scale that developed was presented to a total of 6 experts, including 3 lecturers working in special education and 3 teachers working in the field of special education. The experts analysed these 87 items, they gave correction suggestion for 5 items, they deleted 9 items and they suggested adding 1 new item. Finally, after the content validity process 79 items were included in the scale.

Pilot Implementation Stage

After the content validity stage, 79 items expressed as a 5-point Likert (‘1-never’, ‘2-rarely’, ‘3-occasionaly’, ‘4-usually’, ‘5- always’) were subjected to the pilot implementation process. Three teachers who have students with Special Learning Disability in their classrooms were requested to evaluate their students according to the scale. With the pilot study, it was aimed to test usability of the scale and to reveal possible problems to be faced. Teachers were asked to apply the developed scale and to make suggestions about the points where they had problems.. After the pilot implementation, some adjustments were made on the scale regarding the points that suggested by the teachers.

Validity and Reliability Calculation Stage

Before the validity and reliability calculations, normal distribution analyses of the data were made. In order to determine the normal distribution of the data that collected from 401 teachers, firstly Kurtosis and Skewness values were examined. The Kurtosis (0.499) and Skewness (0.612) values of the scale showed that the data were normally distributed (Pallant, 2007). In order to determine normality, the Kolmogorov Smirnov test was also applied to the data and the analysis showed that the data were normally distributed [$D_{(401)}$=.745, p>.05]. For the data that determined to be normally distributed in the next step, Exploratory Factor Analysis was performed to determine the factor structure of the scale. For the factor analysis process, both Exploratory and Confirmatory Factor Analysis were applied. Then, by looking at the item validity of each item in the scale, the item discrimination power of the items was determined. And finally, in order to determine that the developed scale is a reliable scale, the internal consistency coefficient (Cronbach Alpha) of the scale was calculated.

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During the scale development process, while the data analysis was done with the SPSS 21.0 (Statistical Package for the Social Sciences) statistical program, the AMOS 16.0 program was used for confirmatory factor analysis.

RESULTS

Results on the validity of the special learning disability screening scale

In order to introduce the validity of the Identification of Learning Disability Scale, the construct and item validity were examined. While factor analysis was performed to reveal the construct validity, the item discrimination power of items was calculated for item validity.

Construct validity of the scale for screening for special learning disabilities

For the construct validity of the scale that was developed to determine the Special Learning Disability firstly the factor structure was confirmed with Exploratory Factor Analysis (EFA), then the validity of the construct was confirmed with Confirmatory Factor Analysis (CFA). In the first stage, Exploratory Factor Analysis, the suitability of the data set for factor analysis was determined. For that aim, certain conditions must be met. The Kaiser-Meyer-Olkin (KMO) value is some of the values that can be checked for factor analysis based on the number of items with the Barlett sphericity test. The Kaiser Meyer Olkin (KMO) value that was made with the data set was calculated as 0.951. Barlett's Sphericity test results were also examined, which is the second statistic. Barlett's Sphericity test, which was found to be significant, also showed that the data set [2(3081)=29665.099, p<.05] was suitable for factor analysis (Field, 2005; Tabachnick & Fidell, 1996). When analysed according to the sample size, there are suggestions to apply to 3 to 5 times the number of items or to collect data from more than 300 people (Field, 2005; Tabachnick & Fidell, 1996). Thus, it has been seen that factor analysis can be applied by collecting data from 401 people in the scale with 79 items, both to reach more than 300 participants and in order to meet conditions for collecting data from 3-5 times the number of items. While the analysis was performed with Principal Component Analysis, which is one of the factorization techniques, to determine the explanatory factors, rotation was also performed with Varimax Rotation to determine the clarity and significance of correlation between the factors. In determining the number of factors, the Eigen-value (eingen value) was taken as 1.0, the lower limit of the factor loading value of items was taken as 0.40, and the difference in the load value was taken as 0.10 (Field, 2005; Tabachnick ve Fidell, 1996). After the first factor analysis made with 70 items, 12 factors were determined. In the table 3, the factor structure of the scale and the variance values of each factor are given as a result of the first factor analysis process.

Table 3. Variance values explained after the first factor analysis.

Factors	Variance Values That Explained After the First Rotation Process		
	Eigen-value	Variance (%)	Cumulative Variance (%)
1	30,164	38,182	38,182
2	6,157	7,794	45,975
3	3,885	4,918	50,893
4	2,808	3,554	54,447
5	2,463	3,117	57,565
6	1,873	2,371	59,936
7	1,622	2,053	61,989
8	1,498	1,896	63,885
9	1,399	1,771	65,656
10	1,228	1,555	67,210
11	1,144	1,448	68,658
12	1,066	1,350	70,008

The factor analysis process that was seen in Table 3 was repeated four times with the Varimax Rotation process to capture statistical values for factor analysis. The reason of this is to identify the items that are not suitable for the factor structure and decrease the correlation value and by removing these items from the scale, the correlation between the factors in the scale structure is minimized. In this context, rotation process was done for the four times at the end 20 items was deleted from the scale. In the first rotation process 22 items (2,6,8,9,11,12,15,17,18,26,31,32,33,40, 42,63,64,67,71,73,74,78), in the second rotation process 8 items (3,4,5,7,10,34,60,65), in the third rotation process 5 items (27,28,30,46,61) and in the fourth rotation process 5 items (45,48,58,59,62) were deleted. After the deleting item process, a seven-factor structure was determined in the scale..

Table 4. Variance values that explained after the fourth rotation process.

Factors	Variance Values That Explained After the Rotation Process		
	Eigenvalue	**Variance (%)**	**Cumulative Variance (%)**
1	16,527	42,378	42,378
2	3,461	8,874	51,252
3	2,405	6,168	57,420
4	2,013	5,160	62,580
5	1,736	4,450	67,030
6	1,299	3,331	70,361
7	1,117	2,863	73,224

While the Eigen-value of the first factor of the scale was calculated as 16,527; the variance was 42,378%. The Eigen-value and variance values for the other factors were 3.461 for the second factor, 8.874% for the explained variance, 2.405 for the third factor and 6.168% for the explained variance, 2.013 for the fourth factor and 5.160% for the explained variance, 1.736 for the fifth factor and the explained variance is 4.450%, the Eigen-value for the sixth factor is 1.299 and the variance explained is 3.331% and finally the Eigen-value for the seventh factor is 1.117 and the variance explained is 2.863%. Finally, by examining the items on the 'Special Learning Disability Screening Scale', which is with 7 structures and has 39 items, factors on the scale was called as *writing process skills (19,20,21, 22,23,24,25,31), communication skills (49,50,51,52,53,54,55,56), learning to read and write skills (1, 13,14,16,29,35), taking responsibility skills (66,68,69,70,72), attention skills (75,76,77,79), arithmetic skills (39,41,43,44,47) and recognizing numerals skills (36,37,38).* The 'KMO and Bartlett's Sphericity test results obtained after four rotations for the factor analysis process are given in table 5.

Table 5. The 'KMO and Barlett's Sphericity' Test results that obtained after the fourth rotation process.

Measuring Kaiser-Meyer-Olkin Sample Adequecy	
Chi-Square	,941
Degrees of Freedom (df)	13897,840
Bartlett's Test	741
Significance Level (Sig.)	,05

Confirmatory factor analysis was performed on the data set with AMOS 16.0 program to confirm the construct validity and the results for determining the Specific Learning Disability (Figure 1).

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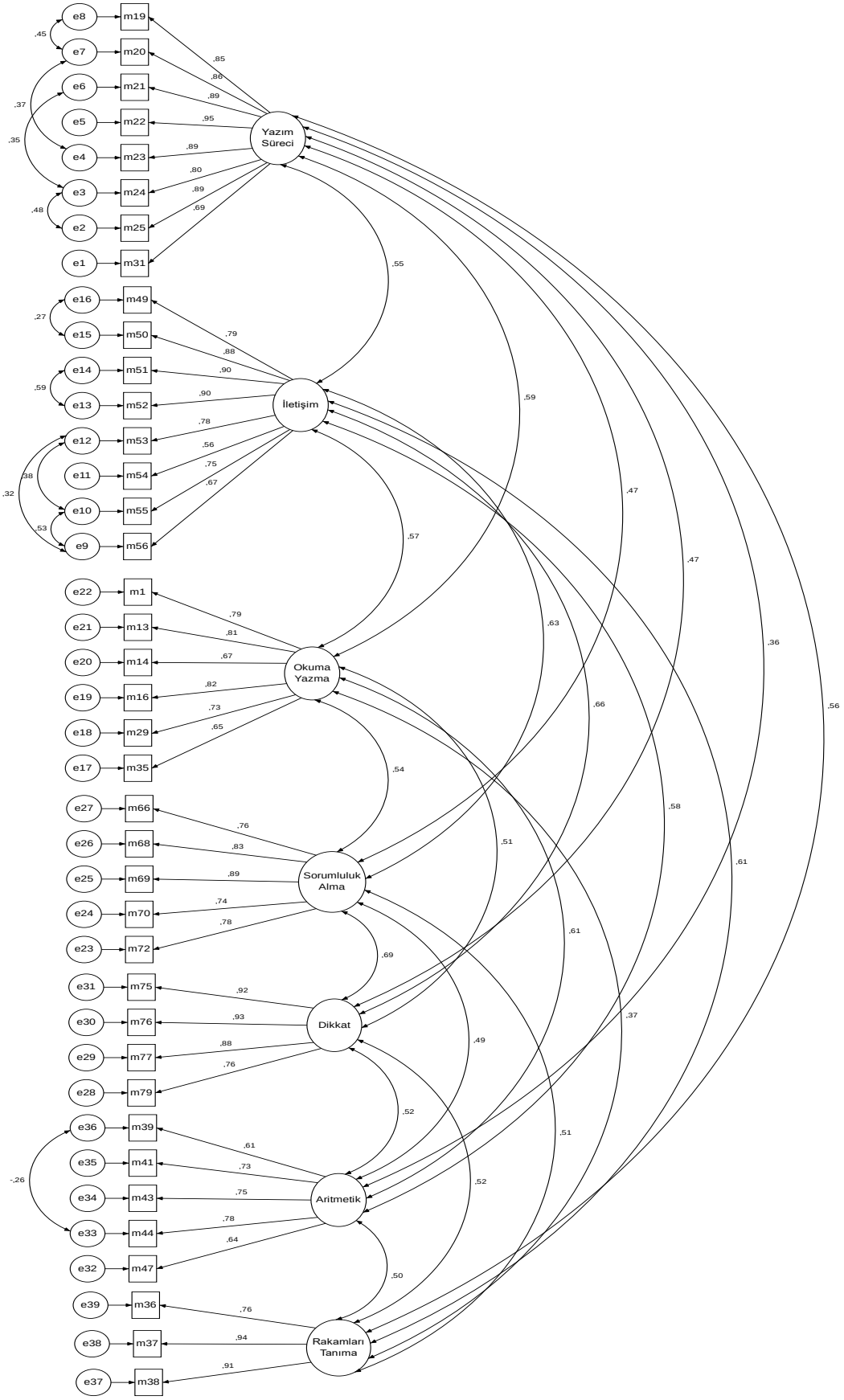


Figure 1. Confirmatory Factor Analysis Model

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There are statics that were suggested to determine the suitability of confirmatory actor analysis of the scale (Arbuckle, 2009; Bowen & Guo, 2011; Hoyle, 2012). In order to determine the validity of the model that developed in line with these suggestions, Chi-square Goodness of Fit ($\chi 2$), Comparative Fit Index (CFI), Root Mean Square Error of Approximation (RMSEA) and Tucker-Lewis Index (TLI) values were examined. These values were $\chi 2/df=3.454$ ($\chi 2=2352.274$; df=681), RMSEA=0.078, TLI=0.91 and CFI=0.94), and fit indices are acceptable or close to acceptable. But, in order for the model to better fit; by making suggestions in the Modification Indices that were suggested by Arbuckle (2009) and Hoyle (2012), the covariance between the error values within the same latent variable, the factors, are correlated. Among the errors of the observed variables within the scope of the correction indices, the adjustments foreseen for the definition of covariance; some adjustments were made for the items 2-3, 3-6, 4-7 and 7-8 in the latent variables of 'writing process skills', items 9-10, 9-12, 10-12, 13-14 and 15-16 in the latent variable 'communication skills' and items 33-36 in the latent variable 'arithmetic skills'(Figure 1). Finally, adjustments were added to the model. Fix index values after the correction and acceptance intervals are given in the table below (Table 6).

Table 6. Model fit index values.

Compliance Statics	Perfect Fit	Acceptable Fit	Fit Values of the Model
χ^2/df	≤3	≤5	2.604
RMSEA	≤0.05	0.06 – 0.08	0.063
CFI	≥0.97	0.95 – 0.96	0.951
TLI	≥0.95	0.94 – 0.90	0.923

As seen in Table 6, fit values $\chi^2/df=2.604$ ($\chi^2=$ 1746,981; df=671) (RMSEA=0.063; TLI=0.923 and CFI=0.951) that were calculated in the model shows the correction of the model.

Item Validity of the Scale for Screening for Special Learning Disabilities

In order to determine item validity of the scale for screening for Special Learnings Disability, it was investigated whether the mean of the lower and upper 27% groups differed or not. The differences were compared according to this (Table 7).

Table 7. Comparison of the t values of the lower and upper groups (n1=n2=108).

Item	Groups	$\overline{X}$	sd	df	T	Item	Groups	$\overline{X}$	Sd	df	t
i1	Lower	3,15	1,06	214	12,091*	**i21**	Lower	2,74	0,96	214	13,053*
	Upper	4,54	0,55				Upper	4,31	0,80		
i2	Lower	2,80	1,10	214	14,171*	**i22**	Lower	2,59	0,95	214	16,243*
	Upper	4,54	0,65				Upper	4,36	0,62		
i3	Lower	2,48	1,07	214	14,608*	**i23**	Lower	2,48	0,86	214	17,268*
	Upper	4,35	0,78				Upper	4,31	0,69		
i4	Lower	2,95	1,06	214	13,151*	**i24**	Lower	2,30	0,83	214	18,715*
	Upper	4,50	0,60				Upper	4,20	0,65		
i5	Lower	2,18	0,87	214	18,503*	**i25**	Lower	2,29	0,80	214	19,590*
	Upper	4,15	0,68				Upper	4,22	0,65		
i6	Lower	1,96	0,93	214	16,082*	**i26**	Lower	2,24	0,82	214	17,049*
	Upper	3,91	0,85				Upper	4,06	0,75		
i7	Lower	2,15	0,95	214	16,608*	**i27**	Lower	2,68	1,01	214	11,173*
	Upper	4,04	0,71				Upper	4,04	0,76		
i8	Lower	1,91	0,79	214	18,563*	**i28**	Lower	2,21	0,81	214	16,180*
	Upper	3,91	0,79				Upper	3,98	0,80		
i9	Lower	1,88	0,84	214	14,271*	**i29**	Lower	2,41	0,95	214	15,689*
	Upper	3,68	1,00				Upper	4,19	0,70		
i10	Lower	2,10	0,85	214	14,460*	**i30**	Lower	2,31	0,87	214	14,513*
	Upper	3,81	0,89				Upper	4,02	0,85		
i11	Lower	1,87	0,77	214	16,699*	**i31**	Lower	2,19	0,94	214	15,560*
	Upper	3,80	0,91				Upper	4,05	0,80		
i12	Lower	2,89	1,09	214	12,576*	**i32**	Lower	2,49	1,01	214	13,735*
	Upper	4,50	0,77				Upper	4,22	0,84		
i13	Lower	2,83	1,06	214	13,001*	**i33**	Lower	2,33	0,83	214	17,652*

	Upper	4,43	0,70				Upper	4,25	0,76		
i14	Lower	2,20	0,85	214	14,504*	**i34**	Lower	1,89	0,75	214	16,476*
	Upper	3,93	0,89				Upper	3,86	0,99		
i15	Lower	1,91	0,87	214	12,635*	**i35**	Lower	2,37	0,93	214	17,401*
	Upper	3,58	1,07				Upper	4,28	0,65		
i16	Lower	1,99	0,93	214	12,789*	**i36**	Lower	2,69	0,87	214	16,021*
	Upper	3,68	1,00				Upper	4,31	0,59		
i17	Lower	3,02	1,49	214	8,111*	**i37**	Lower	2,56	0,93	214	16,384*
	Upper	4,38	0,90				Upper	4,31	0,61		
i18	Lower	3,18	0,97	214	10,621*	**i38**	Lower	2,65	0,90	214	16,235*
	Upper	4,48	0,83				Upper	4,35	0,62		
i19	Lower	3,29	1,07	214	10,417*	**i39**	Lower	2,63	1,01	214	14,179*
	Upper	4,55	0,66				Upper	4,27	0,65		
i20	Lower	3,32	1,11	214	10,972*						
	Upper	4,65	0,59								
SCALE	Lower	2,46	0,34	214	36.957*						
OVERALL	Upper	4,18	0,34								

* p<.05

It was seen that the difference between the upper and lower groups of the items was significant, and item discrimination was ensured for the all items that make up the 'Special Learning Disability Screening Scale' (Table 7).

Results Regarding the Reliability of the Screening for Special Learning Disability Scale

In order to determine the reliability of the 'Special Learning Disability Screening Scale', the internal consistency coefficient (Cronbach Alpha) was calculated. Internal consistency coefficient value belonging to the scale consisting of 7 factors and 39 items was calculates as α=.963. Internal consistency coefficient values for sub-factors were calculated as .957 for writing process skills, .933 for communication skills, .877 for learning reading and writing skills, .898 for responsibility taking skills, .924 for attention skills, .814 for arithmetic skills and .898 for number recognition skills. In the scale split test reliability was calculated as 0.936 and test retest reliability was calculated as 0.854. In the light of the results, it can be said that the scale is a reliable scale (DeVellis, 2016; Field, 2005).

DISCUSSION

According to the results of this study, 'Special Learning Disability Screening Scale' consist of 7 factors and 39 items. The first factor is writing process, the second factor is communication skills, the third factor is literacy skills, the fourth factor is responsibility taking skills, the fifth factor is attention skills, the sixth factor is arithmetic skills and the seventh factor is identified as number recognition skills. When it is compared with the literature, it can be said that scale factors and items are coherent. Thus, considering the studies on the scales developed and examining the characteristics of students with SLD in the literature, it is known that there are problems in reading (Oguzhan, 2017; Zahra, Jamil & Khalid, 2014), reading comprehension and expression (Hammill & Byrant 1998; Willcutt & et al., 2019; Zahra, Jamil & Khalid, 2014). In the researches, the fact that students with SLD have problems in writing (Oguzhan, 2017; Willcutt & others., 2019), spelling mistakes (Hammill & Byrant 1998; İlker & Melekoglu, 2017) and written expression (Hammill & Byrant 1998; İlker & Melekoglu, 2017) also shows that our developed scale is compatible with the items and factors.

Also, in the literature; it is determined that the students with SLD have problems like number recognition in maths (Olkun, Akkurt-Denizli & Gocer-Sahin, 2015), arithmetic skills (Coleman, West & Gillis 2010; Watson, Gable 2013), problem solving (Olkun, Akkurt- Denizli and Gocer-Sahin, 2015; Talbot, Astbury and Mason, 2010; Watson and Gable,2013) and it also shows that the developed scale is valid and reliable. Besides, in the literature; the fact that students with SLD have communication problems (Coleman, West, & Gillis, 2010; Okur, 2019; Zahra, Jamil and Khalid, 2014), have problems in taking responsibility (Coleman, West, & Gillis, 2010), and detecting

problems in attention skills (Oguzhan, 2017) suggests that the developed scale will be effective in determining students with SLD.

In the current study, it was founded that 7 factors with Eigen-values greater than 1 were formed and these 7 factors explained 73,224 percent of the total variance. The Eigen-value of the first factor of the scale was 16,527 and the explained variance was 42,378%. And respectively, the eigenvalue belonging to the second factor was 3,461, the explained variance was 8,864%, the Eigen-value belonging to the third factor was 2,405, the explained variance was 6,168%, the Eigen-value belonging to the fourth factor was 2,013, the explained factor was 5,160%, the Eigen-value belonging to the fifth factor was 1,736, the explained variance was 4,450%, the Eigen-value belonging to the sixth factor was 1,299, the explained variance was 3,331%, and the Eigen-value belonging to the seventh factor was 1,117 and the explained variance was 2,863%. In the literature, it is stated that it is appropriate for the total explained variance rate to be above 60% as a result of EFA (Karagoz, 2016: 880). These results about the developed scale suggest that the scale will make a positive contribution to the field in identifying students with SLD.

According to the confirmatory factor analysis, RMSEA, CFI, TLI and X2/sd values were .063, .951, 0.923, 2.604, respectively.. The fix index values that were obtained as a result of the analyses, can be expressed as acceptable or good fit (Cokluk, Sekercioglu & Buyukozturk, 2014: 272). Since the value of X2/sd= 2.604, which is one of the fit indices, is less than 3, it has a perfect fit value (Cokluk & et al., 2014: 271). As a result of the analysis, $\chi 2/df$, which is one of the fit indices, shows the perfect fit. According to the literature, RMSEA value between .05 and .08 is qualified as good fit (Brown, 2006: 84). In this study, RMSEA value of 0.063 indicates a good fit. The CFI value of 0.951 indicates a perfect fit (Ozdamar, 2016: 185). For TLI a value of 0.923 indicates an acceptable fit.

RESULT AND SUGGESTIONS

This study is limited to the data obtained from 401 classroom teachers and special education teachers who have worked with students with SLD in the ages 8-11. As a result of the study, the 'Special Learning Disability Screening Scale' was developed with 39 items and 7 factors was determined. It was found that there were 7 factors with Eigen-values greater than 1 and these 7 factors explained 73,224 percent of the total variance. The confirmatory factor analysis, χ^2/df, RMSEA, TLIand CFIvalues were 2.604 (χ^2= 1746,981; df=671), 0.063, 0.923, 0.951, respectively.

The internal consistency coefficient value of the Special Learning Disability Screening Scale, consisting of 7 factors and 39 items, was calculated as α=.963'. Internal consistency values for the sub-factors ranged from 0.814 to 0.957.

In the light of the results obtained from this study, 'Special Learning Disability Screening Scale' (Appendix 1) can be used as a scale with proven validity and reliability by teachers and researchers in order to screen students in the 2nd, 3rd and 4th grades of primary school and aged 8-11 years whether they have a Special Learning Disability or not.

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The author declare that they have no competing interests.

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This study was carried out considering Committee on Publication Ethics' (COPE) the ethical guidelines. The participants consist of teachers and they participated to the study voluntarily. The participants informed about the privacy of the study and ensured their names were not taken. The views taken from the participants do not match with any of their demographics in case of not being disadvantaged.

REFERENCES

Arbuckle, J. L. (2009). *Amos 18 user's guide.* Chicago, IL.: SPSS Inc.

Bowen, N. K., & Guo, S. (2011). *Structural equation modeling*. Oxford University Press.

Brown, T. (2006). *Confirmatory factor analysis for applied research.* New York: The Guilford Press.

Chan, D., Suk-Han Ho, C., Tsang, S.-M., Lee, S.-H., & Chung, K. (2004). Screening for Chinese children with dyslexia in Hong Kong: the use of the teachers' behaviour checklist. *Educational Psychology, 24*(6), 811-824. https://doi.org/10.1080/0144341042000271769

Cokluk, O., Sekercioglu, G., & Buyukozturk, Ş. (2014). *Sosyal bilimler icin cok degiskenli istatistik spss ve lısrel uygulamaları.* Ankara: Pegem Akademi.

Coleman, M. R., West, T., & Gillis, M. (2010). *Early learning observation & rating scale: Parent-individual child form.* New York, NY: National Center for Learning Disabilities.

DeVellis, R. F. (2016). *Scale development: Theory and applications* (Vol. 26). Sage publications.

Erkus, A. (2012). Varolan olcek gelistirme yontemleri ve olcme kuramları psikolojik olcek gelistirmede ne kadar islevsel: yeni bir oneri. *Journal of Measurement and Evaluation in Education and Psychology, 3*(2), 279-290.

Erkus, A. (2019). Psikolojide olcme ve olcek gelistirme ı: temel kavramlar ve islemler. Ankara: Pegem Akademi.

Fawcett, A. J., & Nicolson, R. I. (1995). The dyslexia early screening test. *The Irish Journal of Psychology, 16*(3), 248-259. https://doi.org/10.1080/03033910.1995.10558060

Field, A. (2005). *Discovering statistics using SPSS.* London: Sage

Fuchs, L. S., & D. L. Compton, D. L. (2019). Models for ınnovation: advancing approaches to higher-risk and higher-ımpact learning disabilities science. *New Directions for Child and Adolescent Development,* 165, 5-10. https://doi.org/10.1002/cad.20287

Gunay Aksoy, S. (2019). Specific learning disorder -a life long difficulty. *İstanbul Kanuni Sultan Süleyman Tıp Dergisi, 11*(Ek1), 34-39. doi: 10.5222/iksstd.2019.88609

Hammilll, D. & Bryant, B. (1998). *Learning disabilities diagnostic ınventory (LDDI Kit).* Texas, Austin: Pro-ed An International Publisher.

Hoyle, R. H. (Ed.). (2012). *Handbook of structural equation modeling*. New York: Guilford press.

İlker, O. & Melekoglu, M. A. (2017). İlköğretim döneminde özel öğrenme güçlüğü olan öğrencilerin yazma becerilerine ilişkin çalışmaların incelenmesi. *Ankara Üniversitesi Eğitim Bilimleri Fakültesi Özel Eğitim Dergisi, 18*(03), 443-469. DOI: 10.21565/ozelegitimdergisi.318602

Individuals with Disabilities Education Act Amendments of 1997 20 U.S.C. § 1400 et seq.

Jena, S. P. K. (2013). *Learning disability: Teory to practice.* New Delphy: Sage Publicatio

Karagoz, Y. (2016). *SPSS ve AMOS 23 uygulamalı istatistiksel analizler.* Ankara: Nobel Akademik Yayıncılık.

Koppitz, E. M. (1977). *The visual aural digit span test.* New York: Grune and Stratton.

Mather, N., & Gregg, N. (2006). Specific learning disabilities: clarifying, not eliminating, a construct. *professional psychology: research and practice,* 37(1), 99-106. https://doi.org/10.1037/0735-7028.37.1.99

McMillan, J. H., & Schumacher, S. (2006). *Research in education: Evidence-based inquiry (sixth Ed.).* Boston: Pearson.

Oguzhan, M. (2017). *Usability of the specific learning disorder checklist in primary school children.* (Master Thesis), Ankara University Institute of Social Sciences, Ankara.

Okur, M. (2019). *Determining the psychometric properties of the early signs of learning disability screening scale.* (Master Thesis), Anadolu University Institute of Educational Sciences, Eskisehir.

Olkun, S., Akkurt-Denizli, Z. & Gocer-Sahin, S. (2015). Ogrencilerin diskalkuliye yatkınlıklarının belirlenmesinde nokta sayılama ve sayısal karşılaştırma becerileri. *Turkish International Journal of Special Education and Guidance & Counseling, 3*(2), 62-71.

Ozdamar, K. (2016). *Olçek ve test gelistirme yapısal esitlik modellemesi.* Eskisehir: Nisan Kitapevi.

Pallant, J. (2007) *SPSS survival manual: a step by step guide to data analysis using spss for windows. 3rd Edition.* New York: McGraw Hill Open University Press.

Silver, C. H., Ruff, R.M., Iverson, G.L., Barth, J. T., Broshek, D. K., Bush, S., Koffler, S. P., & Reynolds, C. R. (2008). Learning disabilities: the need for neuropsychological evaluation. *Arch Clin Neuropsychol, 23*(2), 217–219. https://doi.org/10.1016/j.acn.2007.09.06

Tabachnick, B. G., & Fidell, L. S. (1996). *Using multivariate statistics*. Northridge. Cal.: Harper Collins.

Talbot, P., Astbury, G., & Mason, T. (2010). *Key concepts in learning disabilities.* London: SAGE Publications.

Watson, S. M. R., & Gable, R. A. (2013). Unraveling the complex nature of mathematics learning disability: ımplications for research and practice. *SAGE Learning Disability Quarterly, 36*(3), 178-187. DOI: 10.1177/0731948712461489.

Willcutt, E. G., McGrath, L. M., Pennington, B. F., Keenan, J. M., DeFries, J. C., Olson, R. K., & Wadsworth, S. J. (2019). Understanding comorbidity between specific learning disabilities. *New Directions for Child and Adolescent Development, 165*, 91–109. https://doi.org/10.1002/cad.20291

Zahra, J., Jamil, F. & Khalid, R. (2014). Development and preliminary validation of an indigenous scale for assessment of learning disabilities. *Pakistan Journal of Social and Clinical Psychology, 12*(2), 27-37.