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The educational skills self-competence scale for parents of children with autism spectrum disorder: A validity and reliability study

Otizm spektrum bozukluğuna sahip çocuğu olan ebeveynlerin eğitsel becerilerine ilişkin öz-yeterlik ölçeği: Geçerlik ve güvenirlik çalışması

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ABSTRACT

***Aim*:** This study aims to develop an educational skills self-competence scale for parents of children with autism spectrum disorder (ASD).
Methods: In the current study, the self-competence scale regarding the educational skills of parents having a child identified with Autism Spectrum Disorder was developed, and validity and reliability studies were conducted. The scale development process included generating the scale items, studies on the content, and face validity, conducting a pilot study, item analysis, conducting EFA and CFA, and reliability studies.
Results*:* The factor loadings of the items included in the scale range from 0.50 to 0.812. The 6-factor structure explains 65.151% of the total variability as a result of the exploratory factor analysis. Cronbach alpha coefficient of the scale was found to be .921 for cognitive skills, .937 for language and communication skills, .854 for social and emotional skills, .874 for problem behaviors, .837 for psychomotor skills, and .837 for self-care skills. It is seen that the overall reliability coefficient of the scale was calculated as .962. Confirmatory factor analysis (CFA) was used to determine the quality and overall structure of the factors calculated, and the extent to which the scale explains self-competence regarding parents' educational competencies.
Conclusion: Data is a good fit with the model; and the 6-dimensional structure consisting of 40 items was confirmed. As a result of the study, it was concluded that the scale could measure the self-competency regarding the educational competencies of parents having children identified with ASD.

Keywords*:* autism spectrum disorder; parent; scale

ÖZ

Amaç: Otizm Spektrum Bozukluğuna (OSB) sahip çocuğu olan ebeveynlerin eğitsel becerilerine ilişkin öz-yeterlik ölçeği geliştirmektir.
Yöntem: Bu çalışmada Otizm Spektrum Bozukluğu tanısı alan çocuğa sahip ebeveynlerin eğitsel yeterliklerine ilişkin öz yeterlilik ölçeği geliştirilmiş, geçerlik ve güvenirlik çalışmaları yapılmıştır. Ölçek geliştirme süreci; ölçek maddelerinin oluşturulması, içerik ve görünüş geçerliği çalışmaları, pilot çalışma yapılması, madde analizi, AFA ve DFA yapılması ve güvenirlik çalışmalarını içermektedir.
Bulgular: Ölçekte yer alan maddelerin faktör yükleri incelendiğinde faktörlerin .50 ile .812 arasında değerler aldığı görülmektedir. Açımlayıcı faktör analizi sonucunda. 6 faktör toplam değişkenliğin %65.151'ini açıklamaktadır. Ölçeğin cronbach alpha güvenirlik katsayıları bilişsel beceriler için .921, dil ve iletişim becerileri için .937, sosyal ve duygusal beceriler için .854, problem davranışlar için .874, psikomotor beceriler için .837, özbakım beceriler için. .837 dir. Ölçeğin toplam güvenirlik katsayısının ise .962 olduğu görülmektedir. Ortaya çıkartılan faktörlerin genel yapısına, kalitesine ve ölçeğin ebeveynlerin eğitsel becerilerine ilişkin öz-yeterliklerini ne derece açıkladığına yönelik bilgiler Doğrulayıcı Faktör Analizi (DFA) aracılığıyla anlaşılmıştır.
Sonuç: Modelin veriye uyum sağladığı ve 6 boyutlu 40 maddelik yapının doğrulandığı görülmektedir. Ölçeğin OSB tanılı çocukları olan ebeveynlerin eğitsel becerilerine ilişkin öz-yeterliklerini ölçebildiği anlaşılmıştır.

Anahtar kelimeler*:* ebeveyn; otizm spektrum bozukluğu; ölçek

Introduction

Children identified with ASD display delayed patterns of development in social communication and interaction. They also have limited interests. These students strictly adhere to certain routines (Kırcaali-İftar, 2012). Individuals identified with ASD may experience abnormalities in their development related to cognitive skills, body movements, and postures. In addition to these impairments, they also experience difficulties in social communication and social interaction, delays in symbolic and imaginative play, or difficulties in their use of language (Travers et al., 2013) ASD is a complicated neurological disorder involving life-long effects on the development of a range of skills and abilities.

The presence of a child identified with ASD can be challenging for parents and may have emotional, physical, and financial impacts on families. This is because students identified with ASD often find it difficult to transfer and generalize the skills they have acquired. The learning process for these students may succeed if they are supported and strengthened in both school and home settings (Sarı et al., 2018). Involving parents in the curriculum design of their children may help students to improve their learning abilities. Parents usually provide additional educational opportunities concerning educational practices to improve students' skills. This may also enable the pupil identified with ASD to acquire the ability to generalize his/her skills in a variety of settings. When parents and school staff share a common approach and goal, pupils are more likely to succeed and generalize the skills they have acquired (Higgins et al., 2005).

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Parents need to learn practical skills that they can use to improve the quality of life of their children and families at home. Given the limited costs and resources, it is emphasized that parents need to be educated to contribute to their children during the educational process. For example, parents suggest that they have a strong desire to teach educational skills regarding behavioral strategies to their children identified with ASD at an earlier age and need more support and tools to help their children (Blake et al., 2017).

It is well known that appropriate parenting education offered using evidence-based practices for parents having a child identified with ASD contributes to the development of children with ASD and reduces family stress. Furthermore, given the time required to complete the diagnostic process and the importance of early intervention programs, providing parents with basic skills as early as possible can help overcome difficulties associated with ASD (Dunlap, 2019). Parents of children identified with ASD can overcome the difficulties they face in the adjustment process with their children and go through this process with fewer problems and less stress. The quality of the educational approach that would be offered to the child identified with ASD also increases considerably when the existing difficulties of parents with children identified with ASD are eliminated (Karaca, 2021).

It is emphasized that parenting competence is defined as those related to the ability of parents to acquire skills related to their activities in helping their children cope with problem behaviors, to contribute to their social and emotional development (Bolat et al., 2016), to acquire parenting skills for their children's education (Jones & Prinz, 2005), to monitor their children's behavior (Sanders et al., 2003), to provide them with communication and interaction skills (Abidin, 1995), psychomotor and cognitive skills, and to interact socially with others (Blair et al., 2011), and self-care skills (Booth & Booth, 1994). Karaca (2021) states that parents of children identified with ASD can provide support to their children to improve their psychomotor skills, provide support in teaching self-care skills such as dressing skills, provide support to eliminate difficulties in using language, and provide support for their cognitive and social competencies.

Parental involvement as practitioners in their children's education has gained the attention of researchers since the 1980s. Within this scope, it is known that parental education has gained much momentum over the past decades, with a vast number of practices and research facilities. The previous research conducted indicates that effective outcomes have been obtained by conducting parent-mediated research on various skills of children identified with ASD such as social and emotional development (Kaiser et al., 2000), joint attention skills (Schertz & Odom, 2007), requesting skills (Chaabane et al., 2009), self-care skills (Batu et al., 2014), community skills (Tekin-İftar, 2008), language and communication skills (Gillett & LeBlanc, 2007). Parents of children identified with ASD often face challenges concerning ASD (Neece & Baker, 2008).

There is also a parental self-efficacy scale developed by Guimond et al., (2005) and adapted to Turkish by Cavkaytar et al., (2014). However, it was found that the scale was limited to families of children with moderate and severe intellectual disability. That is why, there is a need for scales concerning educational competencies of parents with children identified with ASD to provide support to their children during their educational process. This study aims to develop an educational skills self-competence scale for parents of children with autism spectrum disorder (ESSCSP-ASD). The developed scale aimed to measure the self-efficacy perceptions of parents. Bandura (1997) defined self-efficacy as one's belief in his/her own ability to successfully accomplish a task by organizing the necessary activities to display a certain performance. It is believed that the scale developed within the scope of the research could meet the need for measurement and assessment tools required in the field for future applications and research into how parents support the education of individuals identified with ASD.

Methods

Type of study

In the current study, ESSCSP-ASD was developed, and validity and reliability studies were conducted. The scale development process included generating the scale items, studies on the content, and face validity, conducting a pilot study, item analysis, conducting EFA and CFA, and reliability studies.

Study group

Within the scope of the study, we informed parents having a child identified with ASD and collected data from 398 parents who agreed to take part in the study. The simple random sampling technique, one of the probability sampling methods, was adopted in the current study. Because especially probability sampling methods are used in studies designed based on quantitative research approaches. Probability sampling methods can be used to improve the representativeness of research subjects. Simple random sampling involves randomly selecting parents to be included in the study. In a simple random technique, parents have an equal chance of taking part in the research process. It is known that the study population is homogeneous together with the participant parents (Yağar & Dökme, 2018).

One hundred (25.1%) of the participants who participated in the process of developing a scale were male and 298 (74.9%) were female. The literature review conducted to decide on the sample size of the self-competence scale regarding the educational skills of parents suggests that at least a sample of 200 participants is needed for analysis (Pallant, 2007), a sample of 300 participants can be considered as a suitable representation (Field, 2013). However, the common view suggests that the number of items included in the scale is the decisive factor and that the ideal number of participants should be 5 to 10 times bigger than the number of items (MacCallum et al., 1999). A total of 280 parents whose child has been identified with ASD were consulted in the confirmatory factor analysis for scale development. Out of 280 parents, 176 were females, and 104 were males. A simple random sampling technique, one of the probability sampling methods, was used to select the parents.

Data collection tools and the development of the scale

The educational skills self-competence scale for parents of children with autism spectrum disorder consisting of a 5-point Likert scale (strongly disagree -1, disagree -2, neither agree nor disagree -3, agree -4, strongly agree -5) was used in the present study. The lowest score that could be obtained from the original scale is 40 and the highest score is 200. A higher total score on the scale implies a high level of self-competence for parents regarding their educational competencies, whereas a lower score suggests a high level of self-competence regarding their educational competencies.

Different types of validity are used to determine the validity of the instrument when developing a measuring instrument. The

most frequently preferred validity types are criterion-dependent validity, content validity, and construct validity among the validity types (Büyüköztürk, 2009). In line with this purpose, construct validity and content validity methods were included in the validity design of ESSCSP-ASD aimed to be developed for assessing the self-efficacy perceptions of parents having a child identified with ASD regarding the educational competencies. Expert opinion was sought in determining the content validity of ESSCSP-ASD. The construct validity was examined through Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA). The Cronbach's alpha method was used to determine the reliability of the ESSCSP-ASD.

In the process of developing the scale, the relevant literature was examined. To ensure the content validity and the face validity of the instrument, we requested 3 experts in the Department of Special Education to provide critiques and suggestions. Finally, the scale was administered directly to 40 parents of children identified with ASD similar to the sample to which the scale would be applied. Thus, opinions were sought to ensure that the items were clear and unambiguous. The implementation period and the degree to which items had the same meaning in all participants were tested.

The scale with 75 items formed in the item pool was reduced to 51 items in line with the expert opinions. Thus, we tried to ensure content validity. To ensure the content and face validity of the scale, pre-tests, and factor analysis were conducted after obtaining expert opinions (Karasar, 2014). Afterward, reliability studies were conducted.

The main purpose in the scope of the scale development studies is to develop a more reliable and valid measurement tool as a result of all studies. All these procedures conducted during the present research process aimed to ensure the validity and reliability (Büyüköztürk, 2009) of the measurement tool.

Data collection process and analysis

Research data were collected in Konya province. Necessary permissions were obtained from the Provincial Directorate of National Education before the implementation process. It took approximately 14 minutes to complete the scale. The study's purpose was explained to the parents before implementing the scale, and they were informed that reports would not contain any personal information. Thus, we enabled them to complete the scale in a more eligible way. The data were collected from parents in 3 different Special Education Practice schools and 5 different private special education and rehabilitation centers. The data were analyzed using statistical package programs.

Ethical aspect of research

Ethics committee approval for this study was received from Necmettin Erbakan University Social and Humanity Scientific Research Ethics Committee and was approved by the scientific committee (Decision no: 2021/196, Date: 19.03.2021).

It is known that factor analysis is one of the most frequently used techniques to provide evidence of construct validity in the scale development process. It is defined as a multivariate statistic that aims to discover a smaller number of conceptually meaningful new variables by bringing together a large number of interrelated variables (Çokluk et al., 2012). Exploratory factor analysis is a technique used to reveal what kind of relationship there is between the items included in a measurement tool and how many sub-dimensions the items in the scale can have (Seçer, 2015).

In line with the expert opinions, ESSCSP-ASD was designed as a 5-point Likert-type scale ranging from "strongly disagree", "disagree", "neither agree nor disagree", "agree", and "strongly agree". To determine how successful the items in the scale are at distinguishing individuals in terms of the characteristics they measure, the t-test was used to determine whether there was a significant difference between the item scores of the upper 27% and lower 27% groups determined based on the total score obtained. Cronbach Alpha internal consistency coefficient was taken into account to determine reliability based on the internal consistency of the scale.

KMO criterion is defined as the proportion of the sum of squares for the total correlation values of the variables to the sum of squares of total and part correlation values. According to Field (2013), it is suggested that the correlation pattern in the R matrix is strong when the above-mentioned value approaches 1, whereas it represents a spread in the pattern when it approaches 0. Kaiser (1974) identified 0.5 as an acceptable cut-off value, and classified values between 0.5–07 as mediocre, those between 0.7–0.8 as good, those between 0.8–0.9 as great, and values above 0.9 as marvelous. The KMO value was .915, and the sphericity test value (Chi-Square: 11228.860) was significant ($p<.001$).

It is known that the sample size should be at least 5-10 times larger than the number of the scale items to perform factor analysis related to obtained data when developing a measurement tool. In the present study, data were obtained from a sample size of 398 respondents for the 40 items included in the scale. Data obtained in the present study were suitable for exploratory factor analysis (EFA). Furthermore, it is highlighted that a sample size of 300 people when developing a scale is appropriate for factor analysis (Field, 2013). Kim-Yin (2004) suggests that the sample size should be at least 200 for an item with a factor loading of .40, and if the sample size is at least 350 people, the factor loading should be higher than .30 (Çokluk et al., 2012). The sample size of the present study was determined as 398.

Tabachnick and Fidell (2001) suggested that the factor loadings should be .32 and above. We, therefore, set the factor loading with a value above .32 as the criterion in the present study.

Results

Table 1. Table of components revealed as a result of exploratory factor analysis

Components	Initial Eigenvalues			Factor Loadings after Rotation (Varimax)		
	Total (Eigenvalues)	Explained Variance (%)	Cumulative Variance (%)	Total (Eigenvalues)	Explained Variance (%)	Cumulative Variance (%)
1	16.324	40.810	40.810	6.257	15.642	15.642
2	3.131	7.828	48.639	6.161	15.402	31.044
3	2.077	5.192	53.831	3.855	9.636	40.680
4	1.776	4.440	58.271	3.622	9.056	49.736
5	1.382	3.455	61.726	3.184	7.959	57.695
6	1.370	3.425	65.151	2.982	7.455	65.151
7	.930	2.326	67.476			

Following the factor analysis, item-total correlations and factor variance values are presented in Table 1 above. Factors were formed through the analysis conducted by selecting the components with an eigenvalue of 1 and above as a result of exploratory factor analysis. Principal component analysis was used as the extraction method. Six factors accounted for 65.151 percent (%) of the total variance.

As a result of the rotation process, it was observed that the first factor contributed the most (%15.642), and the second factor (%15.402) was among the other factors with a high level of contribution. The rotation process was implemented based on the 6 factors that were derived from the principal components analysis as in the original form of the scale. Based on the research structure (Çokluk et al., 2012), the Varimax method, one of the orthogonal rotation techniques, was used. The lower limit of .32 suggested by Tabachnick and Fidell (2001) was taken into account to determine the item factor loadings. As a result of the rotation process, items 1, 2, and 7 included in the "social and emotional skills" factor in the original form of the scale were removed from the scale as they were inappropriate. The rotation process was applied again as 9 factors. After that, items 10,11,15,16,18,38, and 39 included in the sub-dimension of "Cognitive Skills" and "Self-care Skills" were excluded from the scale because they either loaded with values below the 0.32 cut-off point and/or cross-loaded. The rotation process was repeated once again. Item 47 included in the sub-dimension of "Problem behaviors" was removed. The scale consisting of 40 items with 6 factors was put into final form.

Analysis of factor loadings of the items included in the scale in Table 2 indicates that load values range from .50 to .812. The analysis results of the items related to the sub-factors of the scale in the table above show that the first factor was grouped under the heading of "Cognitive Skills" and consisted of 10 items. The second factor was grouped under "Language and Communication Skills", and consisted of 11 items. The third factor was named "Social and Emotional Skills", and consisted of 6 items. The fourth factor was named "Problem Behaviors", and consisted of 5 items. The fifth factor grouped under "Psychomotor Skills" consisted of 4 items. Finally, the sixth factor was grouped under "Self-care Skills", and consisted of 4 items.

Considering the 6 factors with eigenvalues greater than 1, it was determined that ESSCSP-ASD consisted of 6 factors. Items showing a difference of 0.10 or below between item-total correlation values were removed. Besides, items with item correlation values below 0.32 were excluded from the analysis. ESSCSP-ASD consists of 40 items.

To understand the effectiveness of scale items in distinguishing individuals in terms of the characteristics measured, the t-test was used to determine whether there was a significant difference between the scores of each item of the upper 27% and lower 27% groups determined by the total score. According to Table 3 showing the results related to sub-dimensions of Social-emotional skills, and cognitive skills, there was a statistically significant difference ($p<0.05$) between the mean scores of the lower group and upper group for each item.

The results related to sub-dimensions of Language and communication skills, Self-care skills, Problem behaviors, and Psychomotor skills, there was a statistically significant difference ($p<0.05$) between the mean scores of the lower group and upper group for each item.

Table 2. Findings obtained from exploratory factor analysis and eigenvalues of the item

	Factors					
	1	2	3	4	5	6
Cognitive 12	0.569					
Cognitive 13	0.709					
Cognitive 14	0.657					
Cognitive 17	0.572					
Cognitive 19	0.812					
Cognitive 20	0.789					
Cognitive 21	0.804					
Cognitive 22	0.699					
Cognitive 23	0.719					
Cognitive 24	0.579					
Language and communication 26		0.580				
Language and communication 27		0.675				
Language and communication 28		0.548				
Language and communication 30		0.623				
Language and communication 31		0.594				
Language and communication 32		0.718				
Language and communication 33		0.648				
Language and communication 34		0.679				
Language and communication 35		0.701				
Language and communication 36		0.712				
Language and communication 37		0.630				
Social-emotional 3			0.613			
Social-emotional 4			0.698			
Social-emotional 5			0.722			
Social-emotional 6			0.683			
Social-emotional 8			0.589			
Social-emotional 9			0.611			
Problem behaviors 44				0.733		
Problem behaviors 45				0.759		
Problem behaviors 46				0.765		
Problem behaviors 48				0.500		
Problem behaviors 49				0.600		
Psychomotor 50					0.690	
Psychomotor 51					0.761	
Psychomotor 52					0.668	
Psychomotor 53					0.679	
Self-care 40						0.730
Self-care 41						0.746
Self-care 42						0.738
Self-care 43						0.668

*Values lower than ±0.20 were not included in the table.

When the findings related to each item in Table 3 are analyzed, it can be concluded that the ESSCSP-ASD distinguishes between parents who have educational competencies related to the education of their children identified with ASD and those who do not have, and thus has an internal validity. A detailed examination of the table 4 reveals: There is a strong and statistically significant positive correlation between Social-Emotional Skills and Language & Communication Skills ($r=0.668$), suggesting a close relationship between these two skill dimensions. There is also a strong relationship between Cognitive Skills and Language & Communication Skills ($r=0.642$).

Table 3. The independent sample t-test results for the upper and lower group related to sub-dimensions

Difference	n	Mean		SS		Std. Error		t	p
		Lower	Upper	Lower	Upper	Lower	Upper		
Social-Emotiona L3	107	1.68	2.4	0.81	1.13	0.07	0.11	-5.30	0.000
Social-Emotiona L4	107	1.79	2.42	1.04	1.13	0.1	01	-9.50	0.000
Social-Emotiona L5	107	1.97	2.34	1.09	1.01	0.1	0.09	-2.59	0.000
Social-Emotiona L6	107	1.9	2.54	0.98	1.11	0.09	0.1	-4.40	0.000
Social-Emotiona L8	107	1.7	2.23	0.98	0.90	0.09	0.08	-4.12	0.000
Social-Emotiona L9	107	1.88	2.6	1.03	1.14	0.09	0.11	-4.82	0.000
Cognitive 12	107	1.54	2.02	0.83	0.99	0.08	0.09	-3.86	0.000
Cognitive 13	107	1.51	2.11	0.97	1.23	0.09	0.11	-3.92	0.000
Cognitive 14	107	1.99	2.48	1.16	1.34	0.11	0.13	-2.87	0.000
Cognitive 17	107	1.49	2.24	0.89	1.30	0.08	0.12	-4.87	0.000
Cognitive 19	107	1.49	1.85	1.05	1.13	0.1	0.1	-2.37	0.019
Cognitive 20	107	1.71	2.01	1.20	1.31	0.11	0.12	-2.03	0.043
Cognitive 21	107	1.42	1.8	0.89	1.03	0.08	0.09	-2.90	0.004
Cognitive 22	107	1.41	1.89	0.95	1.18	0.09	0.11	-3.31	0.001
Cognitive 23	107	1.57	2.14	1.01	1.20	0.09	0.11	-3.74	0.000
Cognitive 24	107	1.58	1.91	0.82	0.97	0.07	0.09	-2.65	0.009
Language and Communication 26	107	1.9	2.77	0.89	1.03	0.08	0.09	-6.58	0.000
Language and Communication 27	107	2.19	2.78	1.19	1.18	0.11	0.11	-3.61	0.000
Language and Communication 28	107	1.83	2.72	1.00	1.17	0.09	0.11	-5.99	0.000
Language and Communication 30	107	2.06	2.7	1.22	1.09	0.11	0.10	-4.00	0.000
Language and Communication 31	107	2.02	2.56	1.13	1.14	0.10	0.11	-3.41	0.001
Language and Communication 32	107	2.3	2.95	1.31	1.24	0.12	0.12	-3.68	0.000
Language and Communication 33	107	2.06	2.73	1.09	1.09	0.10	0.10	-4.50	0.000
Language and Communication 34	107	2.09	3.05	1.22	1.17	0.11	0.11	-5.84	0.000
Language and Communication 35	107	2.3	3	1.17	1.11	0.11	0.10	-4.41	0.000
Language and Communication 36	107	2.35	3.1	1.13	1.17	0.10	0.11	-4.73	0.000
Language and Communication 37	107	2.16	3.1	1.16	1.21	0.11	0.11	-5.73	0.000
Self-Care 41	107	1.85	2.38	1.39	1.37	0.13	0.13	-2.76	0.006
Self-Care 42	107	1.53	2.42	0.74	1.14	0.07	0.11	-6.74	0.000
Self-Care 43	106	1.75	2.68	0.96	1.27	0.09	0.12	-5.97	0.000
Self-Care 44	106	1.89	2.58	1.21	1.23	0.11	0.11	-4.11	0.000
Problem Behaviors 45	107	2.22	2.85	1.25	1.27	0.12	0.12	-3.67	0.000
Problem Behaviors 46	107	1.65	2.62	1.01	1.28	0.09	0.12	-6.10	0.000
Problem Behaviors 47	107	1.69	2.46	1.11	1.27	0.10	0.12	-4.71	0.000
Problem Behaviors 49	106	2.06	3.09	1.19	1.31	0.11	0.12	-5.95	0.000
Problem Behaviors 50	105	2.4	3.28	1.27	1.21	0.12	0.11	-5.08	0.000
Psychomotor 51	107	1.45	2.46	0.78	1.05	0.07	0.10	-7.94	0.000
Psychomotor 52	105	1.47	2.48	0.87	1.03	0.08	0.09	-7.67	0.000
Psychomotor 53	105	1.52	2.64	0.77	1.02	0.07	0.08	-8.99	0.000
Psychomotor 54	107	1.23	2.77	0.42	0.87	0.04	0.08	-16.44	0.000

The correlation between Problem Behaviors and Language & Communication Skills is among the highest (r=0.696), indicating a significant relationship between language and communication skills and problem behaviors. Looking at the reliability coefficients, the Language & Communication Skills dimension has the highest Cronbach alpha value (0.937), indicating that this scale is highly reliable. The Cognitive Skills (α=0.921) and Problem Behaviors (α=0.874) dimensions also have very high reliability coefficients. In summary, this table shows significant relationships among the assessed skill dimensions and that the sub-dimensions used in the scale development study have high reliability coefficients. This means the sub-dimensions measure these skill dimensions consistently and reliably.

Exploratory factor analysis revealed the main factors of the ESSCSP-ASD. Confirmatory factor analysis (CFA) was performed to obtain information regarding the overall structure and quality of the factors determined and determine whether or not the scale represented the competencies related to the educational skills of parents. Confirmatory factor analysis is conducted in 3 main stages. In the first stage, a measurement model is established. The measurement model is then tested and evaluated. Exploratory factor analysis was used to define the measurement model.

The measurement model was revealed from the path diagram using the structures identified from the exploratory factor analysis. The factors expressed in the model constituted the independent variables, while expressions such as S1, S2, S3, etc. were treated as dependent variables. Ranges related to data-fit index values (Meyers et al., 2006; Schermelleh-Engel and Moosbrugger, 2003; Şimşek, 2007) of the ESSCSP-ASD and the findings related to the obtained fit values are given in below;

$x^2/sd=2.1$; RMSEA=0.075; CFI=0.97; NFI=0.94; NNFI=0.96; SRMR =0.061; RFI=0.94; IFI=0.97; PNFI=0.87; GFI; 0.91

RMSEA (Root Mean Square Error of Approximation) is defined as the measure based on the difference between the covariance matrix between the parameters of the proposed model and the covariance matrix between the observed variables in the sample. RMSEA values between 0.05 and 0.08 indicate an acceptable fit, while values between 0 and 0.05 indicate a good fit.

Table 4. Correlation analysis between sub-dimensions and cronbach alpha reliability coefficient for the dimensions (n=398)

		Social Emotional	Cognitive	Language and Communication	Self-care	Problem Behaviors	Psycho-motor
Social-emotional skills	r	1	.548**	.668**	.419**	.615**	.532**
	p		**0**	**0**	**0**	**0**	**0**
Cognitive skills	r	.548**	1	.642**	.583**	.470**	.447**
	p	**0**		**0**	**0**	**0**	**0**
Language & communication skills	r	.668**	.642**	1	.507**	.696**	.542**
	p	**0**	**0**		**0**	**0**	**0**
Self-care skills	r	.419**	.583**	.507**	1	.469**	.497**
	p	**0**	**0**	**0**		**0**	**0**
Problem behaviors	r	.615**	.470**	.696**	.469**	1	.559**
	p	**0**	**0**	**0**	**0**		**0**
Psycho-motor skills	r	.532**	.447**	.542**	.497**	.559**	1
	p	**0**	**0**	**0**	**0**	**0**	
The Cronbach alpha reliability coefficient		0.854	0.921	0.937	0.837	0.874	0.837

Obtained RMSEA value as a result of the Confirmatory Factor Analysis (CFA) in the present study was 0.075, and the obtained value was within the acceptable fit value range.

The CFI, defined as a Comparative Fit Index, is used to compare the covariances of the proposed model with the independent model assumed to be a poor fit for the data. The range of 0.95 – 0.97, among the critical values of CFI, indicates an acceptable fit, while values between 0.97 – 1.00 indicate a good fit. The CFI value obtained as a result of the Confirmatory Factor Analysis (CFA) in the present study was found 0.97. It can be said that the obtained values are in good agreement. NFI, known as the Goodness of Fit Index, shows the amount of general covariance between the observed variables calculated by the assumed model. NFI values between 0.90 and 0.95 indicate an acceptable fit, while values between 0.95 and 1.00 refer to a good fit. It was found The NFI value obtained as a result of the Confirmatory Factor Analysis (CFA) in the current study was 0.94, and this value indicated an acceptable fit. Values for SRMR, Chi-Square, and df are .061, 1527.30 and 725 respectively. Thus, Chi-Square/df is 2,10. It is stated that this value should be less than 3. Considering the result obtained in this study, it is observed that there is a good agreement. In addition, it was concluded that IFI was .097, and RFI was .094.

In Figure 1, the Confirmatory Factor Analysis (CFA) of the self-competence scale related to the educational competencies of parents with a child identified with Autism Spectrum Disorder is presented. The standardized factor loadings, which represent the strength and significance of the relationships between observed variables and their underlying latent factors, ranged from .65 to .89. This range indicates a moderate to strong association between the items on the scale and the construct they are intended to measure, suggesting that each item contributes significantly to the representation of parental educational competencies in the context of ASD.

Discussion

The present study aimed to develop a self competence scale regarding the educational competencies of parents having a child with Autism Spectrum Disorder (ASD). Procedures related to the validity and reliability of the scale were conducted in accordance with this purpose.

The relevant literature was examined in the process of developing the scale, and 3 experts in the Department of Special Education were requested to provide suggestions to determine the content and face validity. Following that, an item pool related to the scale was created, and the content and face validation were conducted using experts' opinions. Pre-testing, factor analysis, and finally reliability calculation were followed. As a result of the research, it was concluded that the KMO value was .915 and the Sphericity test value was significant (p<.001).

A factor load of greater than .32 was taken as a criterion in the present study. Analysis of the factor loadings related to the scale items indicates that factor values ranged from .50 to .812. As a result of the exploratory factor analysis, factors were formed following the selection of the components with an eigenvalue of 1 or above. Principal component analysis was used as an exploratory method. 6 factors explain 65.151% of the total variance. As a result of the exploratory factor analysis, the distribution of a total of 40 items to the six sub-dimensions of the scale is as follows: "Cognitive skills" 10 items, "Language and Communication skills" 11 items, "Social and Emotional skills" 6 items, "Problem behaviors" 5 items, "Psychomotor skills" 4 items, and "Self-care skills" 4 items. Considering the 6 factors with eigenvalues above 1, it was determined that ESSCSP-ASD consisted of 6 factors.

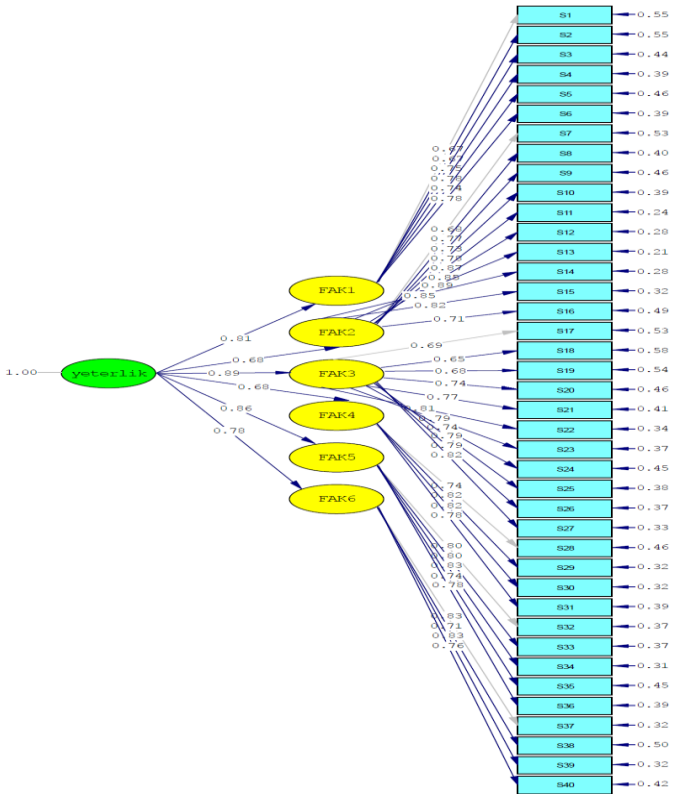

Figure 1. Factor structures obtained as a result of confirmatory factor analysis

Confirmatory factor analysis (CFA) was used to determine the quality and overall structure of the factors calculated, and the extent to which the scale explains self-competence regarding parents' educational competencies. According to the confirmatory factor analysis, fit index values of the items were found sufficient. As a result of the confirmatory factor analysis, the standardized factor loadings of the self-competence scale regarding the educational skills of parents having a child identified with ASD ranged from .65 to .89. These factor values were found statistically significant according to t values within the scope of parametric testing. Results indicate that the model has shown a good fit to the data, and a 40-item structure consisting of 6 dimensions was confirmed. The reliability of the scale was determined using Cronbach's alpha reliability coefficients. Reliability coefficients were obtained as .921 for the cognitive skills sub-dimension, .937 for the Language and Communication skills sub-dimension, .854 for the Social and Emotional skills sub-dimension, .874 for the Problem behaviors sub-dimension, .837 for Psychomotor skills" sub-dimension, .837 for Self-care skills sub-dimension. It is observed that the overall reliability coefficient of the scale was calculated as .962. As a result of the study, it was concluded that ESSCSP-ASD could measure the self-efficacy perceptions related to the educational competencies of parents about the education of their children identified with ASD. ESSCSP-ASD is limited to measuring the self-efficacy perceptions related to educational competencies of parents having a child identified with ASD. For future studies, measurement tools that could measure the self-efficacy perceptions of parents of children with different special needs regarding educational competencies can be developed. In addition, research should be conducted to understand the needs of parents in terms of providing support for the education of their children identified with ASD. In that way, the educational needs of parents can be identified, and experimental research can be carried out to address their needs through appropriate interventions.

Conflict of Interest

There is no conflict of interest.

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Ethics Committee Approval

Ethics committee approval for this study was received from Necmettin Erbakan University Social and Humanity Scientific Research Ethics Committee and was approved by the scientific committee (Decision no: 2021/196, Date: 19.03.2021.).

Informed Consent

Written consent was obtained from the participants.

Peer-Review

Externally peer-reviewed.

Author Contributions

M.A.K.: Design, Methodology, Data Collection, Data Analysis, Methodology, Writing.

H.S.: Consulting.

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