



## Turkish standardization of early childhood creativity scale<sup>1</sup>

**Canan Yıldız Çiçekler**, *Necmettin Erbakan University, Turkey*, [cyildiz80@hotmail.com](mailto:cyildiz80@hotmail.com) ORCID: 0000-0001-6820-661X

**Devlet Alakoç Pirpir**, *Selçuk University, Turkey*, [devletalakoc@gmail.com](mailto:devletalakoc@gmail.com) ORCID: 0000-0002-5132-9020

**Neriman Aral**, *Ankara University, Turkey*, [aralneriman@gmail.com](mailto:aralneriman@gmail.com) ORCID: 0000-0001-9223-2797

**Abstract.** The aim of this study was to obtain a culturally adapted Turkish version of the Early Childhood Creativity Scale (ECCS), to test its validity and reliability and to establish the norms for Turkish culture. The study adopted survey design. Research sample included randomly selected 60-83 month old children from 12 different provinces that were determined based on NUTS 1 classification (Antalya, Balıkesir, Bursa, Erzurum, İstanbul, İzmir, Kastamonu, Kayseri, Konya, Malatya, Trabzon and Şanlıurfa). The sample size was calculated using the sampling formula based on the population of the study universe and 1750 children were sampled. Personal information form was used to obtain demographic information about children, and their level of creativity was measured with ECCS, which will be standardized in Turkey. SPSS 20 and LISREL (ver.8.80) were used for the analysis of the data. The analyses verified that ECCS is a valid and reliable tool, with established norms, to use with Turkish children.

**Keywords:** Creativity, child, validity, reliability, standardization

Received: 26.06.2018

Accepted:08.12.2019

Published: 15.03.2020

### INTRODUCTION

Creativity is an attitude, a process, a product, a unity of personal characteristics and a result of environmental conditions (Fox and Schirmacher, 2014). In the studies carried out by Aral (1990, 1999b) it was indicated that the creativity forms the basis of all the aspects of human life and there can be individualistic differences in individuals' creativity. Also, in a study done by Mangır and Aral (1992) it was emphasized that individuals have creative thinking skills. It is highly difficult to interiorize or accept just a single meaning of the creativity, in every discipline different meanings emerge upon asking the following questions; what, why, where, how, who, when, therefore; from this perspective it has many meanings (Can Yaşar, 2009). The creativity forms the basis of human life and its development with all aspects (Can Yaşar and Aral, 2010). The creativity process is characterized by taking risk, trying some things and testing. Children continue their learning when they discover what they think is not true and see what they do not know (Duffy 2006).

Children are born as being curious and they examine their environment deeply. In the children's lives the things they learn from their own discoveries leave more permanent traces than what they are taught by the adults around them. Such discoveries are more influential and attractive than what they learn from enjoyable picture books. Therefore; the first experiences of children are very crucial (Safaripoor, 2016). In the pre-school period when the physical, emotional, mental, social and artistic development of child gather speed at most and the basis of his personality are laid, it is required to give children a deliberative pre-school education to reveal their latent power and skills. The creativity has an important place in those areas of development and starting the pre-school education earlier plays an effective role in evaluating the creativity and increasing the productivity (Argun, 2004; Vygotsky, 2004).

In our country there is a need for bringing up individuals who are creative and open to change. Therefore, families and educators have the duty of bringing up children who interrogate

<sup>1</sup> Bu çalışma Selçuk Üniversitesi Bilimsel Araştırma Projeleri Koordinatörlüğü tarafından desteklenen 14401058 nolu projeden üretilmiştir.

and can express their feelings and thoughts. Supporting the home and school environment so that children can reveal and develop their creative power is the most primary duty (Aral and Yıldız Bıçakçı, 2014; Gizir, Ergen and Köksal Akyol, 2012; Kuru Turaşlı, 2012; Çetin, 2012). Children's experiences in the pre-school period affect the latter periods of their lives. Especially, when the speed in the mental development of the children and the experiences they gain in that period are taken into consideration, the importance of the necessity of supporting the children's creativity emerges. The children's muscle skills can be supported with a given material, the creativity and physical development can be integrated and supported with the activities such as children's playing a musical instrument, shaping the play dough, painting or moving the body in accordance with the rhythm. Also, the children's performances in their creative expressions can be influential in their communication with other children or adults around them by affecting their social development. The effects of the creativity can be observed in children's communication with the individuals in the social environment and in their problem-solving. Therefore, each of the children's developmental areas; physical, mental, motor, social, and emotional should be supported separately. Attention should be paid to children's reactions against the situations they come across, the way they deal with such situations and their understanding, perceiving and expressing of what they experience in their environment (Çetin, 2012; Öztürk Aynal, 2012; Yıldız Bıçakçı, 2014). It was emphasized in the literature that the creativity influence and support the children's development in different areas (Akçum, 2005; Aral, 1990; 1992; Aral, Köksal Akyol and Sığırtmaç, 2006; Aslan and Köksal Akyol, 2016; Can Yaşar and Aral, 2009; Çelebi Öncü, 2012; Ersoy and Başer, 2009; Fox and Schirmacher, 2014). Parents and educators should have the conscious that the creativity in children is different from the developmental areas and there can be variations in the development of creativity according to the children's age group and individual differences (Ömeroğlu and Turla, 2001). In Turkey, determining and developing the children's creativity are an important subject which is dwelt on and taken as a basis in the education system. In Turkey, while organizing many activities for developing the children's creativity, it is believed that there are deficiencies in determining the children's creativity (Çetin, Üstündağ, Kerimoğlu and Beyazıt, 2015; Yılmaz Özalp, 2005). Therefore, in this study it was aimed to adapt Early Childhood Creativity Scale (ECCS) into Turkish, which was believed to be influential in determining children's creativity in Turkey, and carrying out the validity, reliability and norm studies for Turkish culture.

## METHODS

### *Research Model*

The research was done in the general survey method and it was aimed to adapt Early Childhood Creativity Scale (ECCS) into Turkish and carry out related studies for its validity in Turkish culture, its reliability and norm.

### *Population and Sample of the Study*

The study was carried out with 60 to 83 month-old children who developed normally, studied in 2014-2015 academic year in pre-school institutions in the city centers of twelve selected provinces; Antalya, Balıkesir, Bursa, Erzurum, İstanbul, İzmir, Kastamonu, Kayseri, Konya, Malatya, Trabzon and Şanlıurfa. In the study the number of 60 to 83 month-old children, which was determined by State Institution of Statistics according to 2012 census, was detected; the provinces included in the study were determined by taking nomenclature of territorial units for statistics (NUTS1) into consideration in order to designate the study group and a province was randomly selected from every territory. For age group selection, the population of the age group in each province and address-based population registration system (ABPRS) were considered. Simple random sampling method was taken as basis in order to determine the study group in the research and provide study efficiency (Büyüköztürk, 2011, Büyüköztürk et. al., 2016; Balcı, 2007). 2224 children, who were 60 to 83 month-old, included in the sample group. Due to the fact that some of the teachers did not make a comeback about the measurement tools and some

of the students were unwilling to fill the survey and the teachers had heavy workload; the study was continued with 1750 children. The distribution of the 60-65 months, 66-71 months and 78-83 months old children, who formed the study group, according to the provinces was presented in Table 1.

**Table 1.** *The distribution of the children, who formed the sample, according to the provinces*

Region	Province	60-65 months		66-71 months		72-77 months		78-83 months		Total	
		n	%	n	%	n	%	n	%	n	%
TR6 Mediterranean	Antalya	46	27	53	31.3	57	33.7	14	8.0	170	100
TR2 Western Marmara	Balikesir	11	25.6	14	32.7	14	32.6	4	9.4	43	100
TR4 Eastern Marmara	Bursa	58	29.6	60	30.6	60	30.6	16	9.1	196	100
TRA North-Eastern Anatolia	Erzurum	12	22.3	11	21	16	29.9	13	25	52	100
TR 1	İstanbul	109	24.9	89	20.5	95	21.8	143	32.8	436	100
TR3 Aegean	İzmir	84	32.7	73	28.4	65	25.2	36	21.3	258	100
TR8 Western Black Sea	Kastamonu	8	36.3	4	18.1	9	40.9	3	4.5	22	100
TR7 Middle Anatolia	Kayseri	20	14	46	32.3	32	22.4	44	30.9	142	100
TR5 Western Anatolia	Konya	42	20.5	50	24.3	66	32.2	47	23	205	100
TRB Middle Eastern Anatolia	Malatya	20	38.3	12	23	17	32.6	3	5.7	52	100
TR9 Eastern Black Sea	Trabzon	13	28.8	12	26.7	19	44.3	1	2.2	45	100
TRC South-Eastern Anatolia	Şanlıurfa	54	42	23	17.9	42	32.6	10	7.9	129	100
	Total	477		447		492		334		1750	

### Data Collection Tools

Personal information form developed by the researchers was used in the study in order to determine the demographic information of the children included in the study. In the personal information form there were questions about the children's date of birth, gender and the provinces they were in. Further, "Early Childhood Creativity Scale" (ECCS), which was developed by Elizabeth Kay Bennett (1988) from Tennessee University and later revised and its validity and reliability studies carried out by Eason Giannangeola and Franceschini (2009), was employed in the study. The Early Childhood Creativity Scale (ECCS) consists of two parts. First part includes items related to the level of class that teachers teach, teachers' education level, their teaching experiences and their ages. Second part is related to teachers' evaluation of children's level of creativity and includes twelve items about the children's creativity. Those twelve items were selected from a questions used in an observational study which was related to young children' creativity and in which fifteen classroom teachers took part as evaluator. Among those question items; the items, of which evaluative reliability and inter-item correlation were low, were eliminated. The correlation of the rest of the items was examined with the children's performances in the two scales; Multidimensional Stimulus Fluency Measure (Convergent validity) and Wechsler Preschool and Primary Scale of Intelligence (Distinctive validity). It was detected that the twelve items, which remained in the scale, met both of the validity criteria sufficiently. After calculating internal consistency coefficients ( $\alpha=.95$ ) for the twelve items of the scale, the scale was finalized through determined twelve items. ECCS is a measurement tools which is in the type of seven point Likert scale (1=Almost Never, 7= Almost all the time) and is grouped uni-dimensionally. The total score obtained from the responds to

items of the scale indicates child's level of creativity. The minimum score of the scale is 12 and maximum score of it is 84. Also, within the context of study "School Rating Scale", which was developed by Ryser (2007) and of which validity and reliability studies and adaptation to Turkish were carried out by Yıldız Çiçekler and Aral (2016), was used in order to determine the criteria validity of the scale. The School Rating Scale is a 35-item evaluation scale and measures children's skills of creativity, their skills about the related area, the processes about the creativity and children's motivation of internal duty. To what extent the child's exhibits the behaviors defined by the items is evaluated using four point Likert scale. The child's total raw score varies in the range 35-144 (Ryser 2007). The validity and reliability of the Early Childhood Creativity Scale, which was used in the study, was carried out by Çeliköz (2017) with 201 children. Six experts' views were taken for the scope and face validity of the scale. Minimum 0.99 adaptive value was taken as criterion for the experts' views. The Cronbach Alpha validity of the scale was found as 0.95 and split-half reliability of it was obtained as 0.92.

### **Data Collection**

Within the scope of the study; firstly, Turkish translation studies was carried out in order to determine the linguistic equivalent (Alpar, 2012) of the scale so that the validity and reliability studies of ECCS could be done. Turkish translation of the test was carried out with two child development specialists, who were competent with English and Turkish, and a language expert with the aim of introducing ECCS to Turkish. In the latter process, with the back-translation method the items of the test were translated to English again and the consistency of the items with the English expressions was examined and the unity of expression among the items was found. The survey was examined by a Turkish Language expert in order to determine the clarity of the expressions in the scale and related corrections were made. The sample group of ECCS, of which Turkish translation was made and linguistic equivalent was provided, was determined with the aim of carrying out its validity, reliability studies and calculating its norm value. In the study teachers of 60-83 months old children were selected from Directorate of National Education of twelve provinces; Antalya, Balıkesir, Bursa, Erzurum, İstanbul, İzmir, Kastamonu, Kayseri, Konya, Malatya, Trabzon and Şanlıurfa. Further, the necessary applications were made to Ministry of National Education in order to practice the survey to the teachers, then the teachers were interviewed and the norm studies of the scale was carried out in parallel with the validity and reliability analysis of the scale. The application of the measurement tools varies in the range of 15-20 minutes. At first, a pre-application was made to ten teachers in Konya in order to determine the possible problems in the application with the aim of data collection. Moreover, in the twelve provinces the administration of the schools, in which the applications would be made, was interviewed and the aim of the study was explained. Before starting to data collection of the study, the teachers of the children, who were included in the study group, were interviewed and time planning was made. The teachers were asked to fill the related scale for each one of the children in their classroom by taking the children's situation into consideration. Within the scope of reliability of the measurement tools, the test-retest application was made four weeks after the first application. For the criterion validity of the measurement tools, the teachers of the classrooms, where the applications was made, were asked to determine the children whose level of creativity was good and poor and the children's level of creativity was evaluated.

### **Data Analysis**

Data obtained from the study were evaluated and the data were inputted into computer. For the analysis of data obtained from ECCS and general information form LISREL ver.8.80 and IBM SPSS Statistics 20 program was used. First of all, the analysis for the content, structure and criterion validity were given within the scope of validity study which is carried out to determine to what extent the scale accurately measures (Büyüköztürk, 2011) the individual's feature which is wanted to be measured (Seçer, 2015). At the beginning the translation of the original

form was made in order to provide the linguistic validity of the measurement tools, and then the appropriateness of the measurement tools to the original language was controlled with back-translation technique. Also, in the content validity section; the expert's views were applied for the effectiveness and appropriateness of each of the item in the scale for measuring the defined behaviors (Büyüköztürk et. al., 2016). Results related to content validity ratio (CVR) and content validity index (CVI) were analyzed in the study. It was indicated by Yurdagül (2005) that the technique used for the calculation of Content Validity Ratio (CVR) was developed by Lawshe (1975). In that technique at least five and at most forty experts' views can be taken for the items of the scale to be used in the study. The experts examine the items, which are considered to be used in the study, under three categories (item measures the targets, it is related to the construct but it is unnecessary, it does not measure the targeted structure). Thus, the experts' views for the items are combined and the content validity ratio of the study is calculated. The following formula is used for Content Validity Ratio (CVR);

$$CVR = \frac{N_c}{N/2} - 1 \quad (1)$$

Content validity index (CVI) is calculated with the total of content validity ratio of the scale items (significant in the level of 0.05) to be used in the study (Yurdugül, 2005).

“Confirmatory Factor Analysis (CFA)” was carried out in the study in order to confirm the scale in the construct validity process (Büyüköztürk et. al., 2016). Item analysis (total item correlation, Cronbach Alpha, groups with bottom 27% and top 27% independent t-test), two split-half correlation, test-retest and criterion validity techniques were used within the scope of ECCS reliability study (Büyüköztürk, 2011; Büyüköztürk et. al., 2016). Also, the norm values of ECCS, percentiles between 60-83 months (60-65 months, 66-71 months, 72-77 months, 78-83 months) and creativity percentage values according to the months were given in the study.

## RESULTS

In this section of the study the findings obtained from the validity, reliability and norm studies of “Early Childhood Creativity Scale (ECCS)” were presented within three parts.

### Findings Related to the Validity of Early Childhood Creativity Scale (ECCS)

Firstly, the linguistic validity of the measurement tools was carried out in order to provide content validity of ECCS; therefore, the expressions of the scale in the source language were translated into Turkish- the target language. After ensuring the language equivalent of the measurement tool, the views of twelve field experts consisting of academics from Child Development, Pre-School Teaching, Measurement and Evaluation, Classroom Teaching and teachers who were expert in the related field were taken for the latest form of the study. Further, those experts were asked to evaluate the items in ECCS using three point rating scale in the form of “Appropriate”, “I am indecisive” and “Not Appropriate” and make criticism for improving the items in the directive. Content validity ratio (CVR) was calculated for each one of the items in the evaluation of views taken by the twelve experts. After calculating the content validity ratio (CVR), content validity index was determined by averaging CVRs (Gözüm and Aksayan, 2003). As a result of the calculation of CVR values, it was found that all the items had 1.00 CVR and all the items were accepted by the researchers. CVI value, which was calculated by averaging those values, was determined as 1.00. Those values meant that the content validity was provided. After the analysis, all the items in the measurement tools were accepted as the experts approved them and it was determined that the content validity of the measurement tools was ensured.

Confirmatory factor analysis applied in the study is a technique used in the examination of model consistency of the factor construct of the measurement tool in its original form during its adaptation to Turkish (Seçer, 2015). The status whether a model is consistent or inconsistent with the data is practiced by evaluating some consistency indices (Meydan and Şeşen, 2015). One group of those indices is comparative consistency indices. Those are; normed fit index (NFI), non-normed fit index (NNFI), Comparative fit index (CFI), root mean square error of approximation. Absolute fit indices are; goodness of fit index (GFI) and adjusted goodness of fit index (AFFI) (Bayram, 2010; Meydan and Şeşen, 2015; Sümer, 2000; Raykov, 1997). As Chi-square value is responsive to the size of the sample, the chi-square value increases as the sample grows. That situation makes it difficult to give decision about confirmation of the model. Floyd and Widaman (1995) brought forward a new proposal in order to solve this problem. In the cases when the normality is not provided in the big samples,  $X^2$  value (S-B  $X^2$ ) which is obtained with Satorra Bentler correction produces values near to  $X^2$  in the cases when the number of individual is few in the sample. Satorra-Bentler statistic is ideal for various sizes of samples (Byrne, 1994; Everitt and Howell, 2005). In the light of this information it was believed that it would be much more beneficial to separate the sample into sub-divisions instead of carrying out the testing of the model in the big samples through whole sample. This situation is also important in terms of repeating the analysis and obtaining additional evidence. Therefore, the fit indices were controlled by dividing the sample into two.

**Table 3.** Fit Index results of the confirmatory factor analysis of ECCS

Fit Indices	N=1750		Normal Theory (ML) Group1 (n=875)		Normal Theory (ML) Group 2 (n=875)	
	Normal Theory (ML)	Satorra Bentler (Diagonal WLS)	Before Modification	After Modification*	Before Modification	After Modification*
$X^2$	1379.27	1325.44	743.13	180.76	748.27	191.28
sd	54	54	54	41	54	41
$X^2/sd$	25.54	24.54	13.76	4.41	13.86	4.67
RMSEA	0.12	0.12	0.12	0.06	0.12	0.06
SRMR	0.04	0.04	0.04	0.02	0.04	0.02
GFI	0.88	1.00	0.88	0.97	0.88	0.96
NFI	0.97	0.97	0.97	0.99	0.97	0.99
NNFI	0.97	0.97	0.97	0.99	0.97	0.99
CFI	0.97	0.97	0.97	0.99	0.97	0.99

\*Covariance links were carried out between the same items.

In parallel with the findings obtained from the study it was seen that  $X^2$  value was pretty high with samples of 1750 individuals. However, after Satorra-Bentler correction on significant change was observed in  $X^2$  and  $X^2/sd$  (ML  $X^2=1379.27$  sd=54  $X^2/sd=25.54$ ; SB WLS  $X^2=1325.44$  sd=54  $X^2/sd=24.54$ ). In this case, the sample was divided into two as Floyd and Widamand suggested and it was observed that  $X^2$  value of two groups consisted of 875 individuals was more significant compared to the samples consisted of 1750 individuals, it decreased significantly; between the divided two groups  $X^2$  value was invariant (Group 1  $X^2=743.13$  sd=54  $X^2/sd=13.76$ ; Group 2  $X^2=748.27$  sd=54  $X^2/sd=13.86$ ). When the other fit indices were examined, it was understood that the problem about the chi-square value stemmed from only the size of the sample. Fit indices in all models showed values which were near to each other.

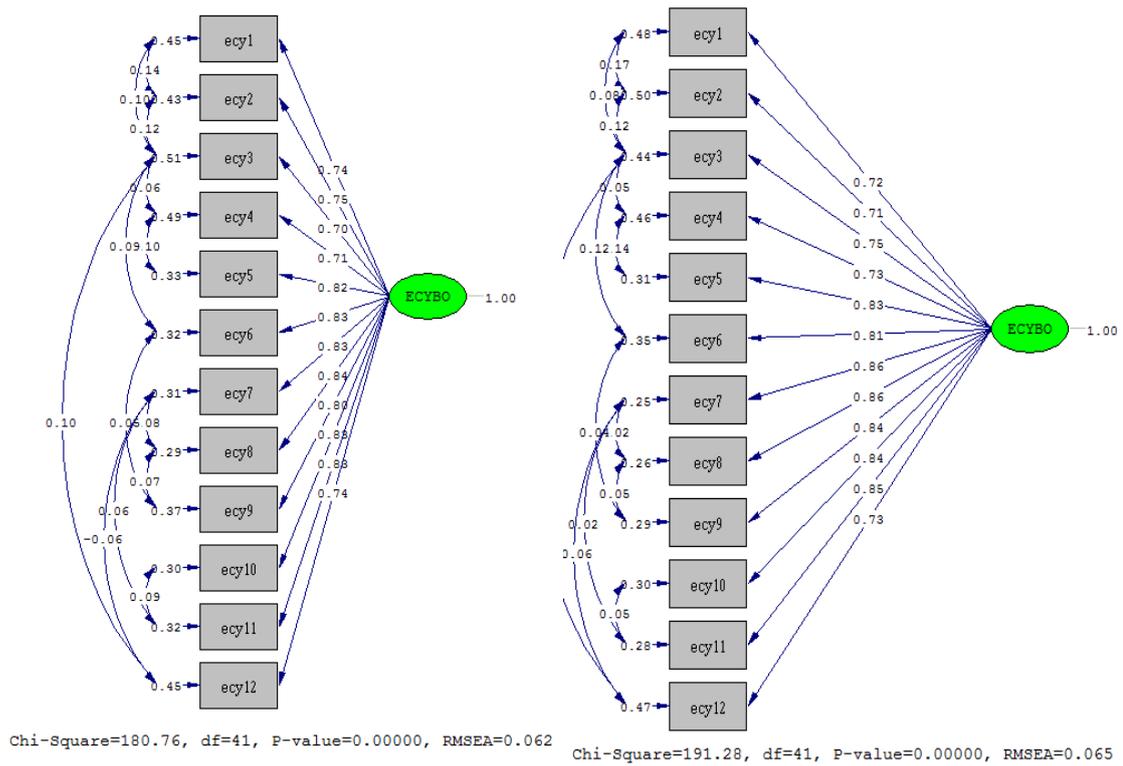
The invariance of  $X^2$  between the groups continued similarly after the modification (Group 1  $X^2=180.76$   $sd=54$   $X^2/sd=4.41$ ; Group 2  $X^2=191.28$   $sd=54$   $X^2/sd=4.67$ ). In table 3 and 4 and in figure 2 it was detected that fit indices obtained from the confirmatory factor analysis belonging to twelve-item single factorial construct of the scale reached the appropriate levels after the modifications.

The finding was obtained that after modifications links, fit indices reached to acceptable and very good levels (Table 4) factor load of the items was bigger than 0.40 (between 0.70 and 0.85), error variance was low (between 0.29 and 0.51), t value for all the items was significant in the level of 0.01 and the model showed a good consistency (Çokluk et. al., 2010; Meydan and Şeşen, 2015). As a result of content validity, the finding was obtained that the items in the scale and the factor construct were valid.

**Table 4.** Confirmatory factor analysis results of ECCS

Item No	Group1 (n=875)				Group2 (n=875)			
	Std. $\beta$	t	SH	R <sup>2</sup>	Std. $\beta$	t	SH	R <sup>2</sup>
1	0.74	25.02**	0.45	0.55	0.72	24.30**	0.48	0.52
2	0.75	25.80**	0.43	0.56	0.71	23.67**	0.50	0.50
3	0.70	23.15**	0.51	0.49	0.75	25.38**	0.44	0.56
4	0.71	23.72**	0.49	0.50	0.73	24.81**	0.46	0.53
5	0.82	29.20**	0.33	0.67	0.83	29.68**	0.31	0.69
6	0.83	29.53**	0.32	0.69	0.81	28.45**	0.35	0.66
7	0.83	29.73**	0.31	0.69	0.86	31.55**	0.25	0.74
8	0.84	30.40**	0.29	0.71	0.86	31.29**	0.26	0.74
9	0.80	27.77**	0.37	0.64	0.84	30.36**	0.29	0.71
10	0.83	29.94**	0.30	0.69	0.84	30.09**	0.30	0.71
11	0.83	29.40**	0.32	0.69	0.85	30.74**	0.28	0.72
12	0.74	25.14**	0.45	0.55	0.73	24.50**	0.47	0.53

In the determination of the criterion validity of ECCS, the differences between the students whose level of creativity was perceived as good or poor by their teacher were examined and the results were given in Table 5.



a) Group 1 (n=875)

b) Group 2 (n=875)

**FIGURE 2.** Confirmatory factor analysis diagram

**Table 5.** According to teachers' evaluation score averages, standard deviation and t-test results belonging to *EECS*

Sub Scales	Teacher Evaluation	n	$\bar{x}$	S	t	d	p
Early Childhood Creativity Scale	Good	30	61.03	23.17	3.74	8	.000*
	Poor	30	39.10	22.23			

\*p< 0.05

When Table 5 was examined, a significant difference between the children's creativity according to the teachers' evaluation and the children's score averages gained in the total score was realized. In the significant differences it was seen that the scores of the children whose creativity level was good in the teacher's evaluation was higher than those whose creativity levels were poor, and criterion validity of the measurement tool was in the high level.

### Findings Related to Reliability of Early Childhood Creativity Scale (EECS)

Item analysis (item total correlation, Cronbach's Alpha, bottom 27% and top 27% independent groups t-test), two split-half test correlation, test-retest and parallel (equivalent) form reliability were applied within the scope of reliability studies. Item analysis results were given in Table 6. When the results of the reliability analysis in Table 6 were examined, Cronbach Alpha coefficient belonging to the scale as a whole was found pretty high in the level of 0.96 . It was also indicated that total item correlations for all the items in the scale were higher than 0.30 (between 0.72 and 0.83) and t value belonging to bottom and top 27% parts of all items was significant in the level of 0.01. The first half (m1-m6) and second half (m7-m12) Cronbach Alpha coefficients of the scale were found as 0.91 and 0.93. Spearman Brown two split-half test correlation was calculated as 0.93 (Table 6). Test-Retest reliability (n:28) was carried out and the results were given in Table 7.

**Table 6.** Item analysis results of ECCS

Item No	t (n1=n2=473)	r (n=1750)	$\alpha$	$\alpha$	Spearman Brown r
1	-44.28**	0.74			
2	-40.93**	0.74			
3	-44.62**	0.76			
4	-41.53**	0.73		0.91	
5	-48.82**	0.81			
6	-48.89**	0.81	0.96		0.93
7	-50.60**	0.82			
8	-52.94**	0.83			
9	-49.35**	0.80		0.93	
10	-48.94**	0.81			
11	-52.88**	0.82			
12	-40.96**	0.72			

r: Total Item Correlation      t: Bottom and Top % 27 t test       $\alpha$ : Cronbach Alpha      \*\*p<0.01

**Table 7.** Test-retest result of ECCS

Item No	r (n=28)
1	0.71**
2	0.80**
3	0.56**
4	0.43**
5	0.57**
6	0.44**
7	0.60**
8	0.41**
9	0.66**
10	0.44**
11	0.48**
12	0.58**
TOTAL	0.81**

\*\*p<0.01

\*p<0.05

When the results in Table 7 were examined, it was seen that Pearson correlation, between the first and second application to the same group (n=28), was significant in the level of 0.01 for all the items and total score of the scale. "School Rating Scale" was used in the study as an equivalent form with ECCS for parallel (equivalent) form reliability and the obtained data were given in Table 8.

**Table 8.** *ECCS and school rating scale test-retest results*

		ECCS
School Rating Scale	n	59
	r	0.53
	p	0.000

Upon the examination of Table 8, it was realized that the correlation coefficient ( $r=0.53$ ) between ECCS and School Rating Scale, which were applied with a four-week interval to the same group ( $n=59$ ), was significant ( $p<0.01$ ). According to the results obtained from reliability and validity studies, it was concluded that the validity of the items in the scale was high. In Table 9 findings related to the descriptive statistics of the Early Childhood Creativity Scale (ECCS) were given.

**Table 9.** *Descriptive statistics of ECCS*

Number of Item	$\bar{X}$	SS	Min.	Max.	Skewness
12	50.23	25.26	12.00	84.00	-0.070

It was shown in the Table 9 that arithmetic mean of the Early Childhood Creativity Scale (ECCS) was 50.23, and its skewness value was 0.070. The findings related to norm values of ECCS and the obtained results were given in Table 10.

**Table 10.** *Norm values of ECCS*

n	1750
$\bar{X}$	55.7669
SS	15.64867
Median	56.0000
Mode	65.0000
Variance	244.881
Range	72.0000
Minimum	12.0000
Maximum	84.0000
Total	97592.00
Skewness	-0.345
Skewness Standard Error	0.059
Kurtosis	-0.285
Kurtosis Standard Error	0.117
Cronbach Alpha	0.956
Guttman Split-Half	0.931
Spearman Brown	0.932

**Table 10.** (Continued)

Standard Error of Measurement	0.37407
Percentages	
25	46.0000
50	56.0000
75	67.0000

When Table 10 was examined, it was seen that norm value of the first percentile 25% of the ECCS was 46.00, the norm value of its second percentiles 50% was 56.00 and the norm value of its third percentiles 75% was 67.00. In Table 11 the percentiles of Early Childhood Creativity Scale (ECCS) were given.

**Table 11.** *Percentiles of ECCS according to months*

Months	Percentiles		
	%25	%50	%75
60-65	45	55	65
66-71	47	56	66
72-77	46	56	68
78-83	45	60	71

When percentiles of ECCS according to the months were examined it was seen that 60-65 months old children can take 45 points in the 25% percentiles, 55 points in the 50% percentiles and 65 points in the 75% percentiles. Also, 66-71 months old children can take 47 points in the 25% percentiles, 56 points in the 50% percentiles and 66 points in the 75% percentiles. 72-77 months old children can take 46 points in the 25% percentiles, 56 points in the 50% percentiles and 68 points in the 75% percentiles. 78-83 months old children can take 45 points in the 25% percentiles, 60 points in the 50% percentiles and 71 points in the 75% percentiles

## DISCUSSION and CONCLUSIONS

Content validity, construct validity and criterion validity were applied for the validity of Early Childhood Creativity Scale (ECCS). In the study when the findings about the validity of the scale were examined, the expressions of the scale in the source language were translated into Turkish- the target language- within the scope of content validity and twelve experts' views were also taken. The experts were asked to evaluate the items and directives of the scale in terms of their appropriateness to the aim of the study and development of children. In the evaluation of each of the experts' views, the content validity ratio and content validity index belonging to each of the items were determined. As a result of the calculation of content validity ratio, it was detected that all the items had 1.00 content validity ratio and all of them were accepted by the experts. The content validity index which was calculated by averaging those values was determined as 1.00 and it was concluded that content validity was provided for the scale.

Within the scope of construct validity the confirmatory factor analysis was carried out for the next stage in the adaptation process of the scale. Within the scope of factor analysis; normed fit index (NFI), non-normed fit index (NNFI), Comparative fit index (CFI), root mean square error of approximation (RMSEA), goodness of fit index (GFI) and adjusted goodness of fit

index (AFFI) were examined. As chi-square value is responsive to the size of the sample, the chi-square value increases as the sample grows. That situation makes it difficult to give decision for the confirmation of the model. Floyd and Widaman (1995) brought forward a new proposal in order to solve this problem. In the cases when the normality is not provided in the big samples,  $X^2$  value (S-B  $X^2$ ), which is obtained with Satorra Bentler correction, produces values near to  $X^2$  values of the cases when the number of individual is few in the sample. Satorra-Bentler statistic is ideal for various sizes of samples (Byrne, 1994; Everitt and Howell, 2005). In the light of this information it was believed that it would be much more beneficial to separate the sample into sub-divisions instead of carrying out the testing of the model in the big samples through whole sample. This situation is also important in terms of repeating the analysis and obtaining additional evidence. Therefore, the fit indices were controlled by dividing the sample into two. In the study it was seen that  $X^2$  value was pretty high with samples of 1750 individuals. But after Satorra-Bentler correction no significant change was observed in the  $X^2$  and  $X^2 /sd$  and the sample was divided into two as Floyd and Widamand (1995) suggested and it was observed that  $X^2$  value of two groups consisted of 875 individuals was more significant compared to the samples consisted of 1750 individuals, it decreased significantly; between the divided two groups  $X^2$  value was invariant.

When the other fit indices were examined, it was understood that the problem about the chi-square value stemmed from only the size of the sample. Fit indices in all models showed values which were near to each other. The invariance of  $X^2$  between the groups continued similarly after the modification. In table 3 and 4 and in figure 2 it was detected that fit indices obtained from the confirmatory factor analysis belonging to twelve-item single factorial construct of the scale reached the appropriate levels after the modifications. The finding was obtained that after modifications links, fit indices reached to acceptable and very good levels, factor load of the items was bigger than 0.40 (between 0.70 and 0.85), error variance was low (between 0.29 and 0.51), t value for all the items was significant in the level of 0.01 and the model showed a good consistency (Çokluk et. al., 2010; Meydan and Şeşen, 2015). Within the scope of reliability of the measurement tool the criterion validity was examined lastly. In the evaluation the significance was found between the children's creativity and the score they gained from the total score. When the significant differences were examined as a result of the analysis, it was found that the scores of the children, whose level of creativity was good according to the teacher evaluations, was higher than those whose level of creativity was poor and the criterion validity belonging to the measurement tools was also high.

Confirmatory Factor Analysis (CFA) was carried out in the study in order to confirm the scale in the construct validity process (Büyüköztürk et. al., 2016). Item analysis (total item correlation, Cronbach Alpha, groups with bottom 27% and top 27% independent t-test), two split-half correlation, test-retest and parallel (equivalent) form reliability were applied for the reliability of Early Childhood Creativity Scale (ECCS).

Validity techniques were used within the scope of ECCS reliability study (Büyüköztürk, 2011; Büyüköztürk et. al., 2016). Also, the norm values of ECCS, percentiles between 60-83 months (60-65 months, 66-71 months, 72-77 months, 78-83 months) and creativity percentage values according to the months were given in the study. Upon the examination of item analysis related to the reliability of the scale, Cronbach Alpha coefficient was found pretty high in the level of 0.96. It was found that the item-total correlations for all the scale items were higher than 0.30 (between 0.72 and 0.83), and the t-values for the comparison of the top and bottom 27% of all items were significant at 0.01 level. The Cronbach Alpha coefficients of the first half (m1-m6) and the second half (m7-m12) of the scale were found as 0.91 and 0.93, respectively. The Spearman Brown split-half test correlation was calculated to be 0.93. When the results of test-retest reliability of the scale was examined, it was observed that the Pearson's correlation between the first and the second test within the same group (n=28) was significant at 0.01 level for the all items and the total score of the scale. Parallel (equivalent) form reliability is explained with the Pearson correlation between the test scores obtained from the application of two equivalent forms which are prepared to measure the same feature at the same time or in two different times (Büyüköztürk, 2011). It was found that the correlation coefficient (r=0.53)

between the scores of two scales, which were applied to the same group with a four-week interval for parallel (equivalent) form reliability, was significant.

It was found that the arithmetic mean of the Early Childhood Creativity Scale (ECCS) was 50.23, and its skewness value was 0.070. It was seen that norm value of the first percentile 25% of the ECCS was 46.00, the norm value of its second percentiles 50% was 56.00 and the norm value of its third percentiles 75% was 67.00.

When percentiles of ECCS according to the months were examined it was seen that 60-65 months old children can take 45 points in the 25% percentiles, 55 points in the 50% percentiles and 65 points in the 75% percentiles. Also, 66-71 months old children can take 47 points in the 25% percentiles, 56 points in the 50% percentiles and 66 points in the 75% percentiles. 72-77 months old children can take 46 points in the 25% percentiles, 56 points in the 50% percentiles and 68 points in the 75% percentiles. 78-83 months old children can take 45 points in the 25% percentiles, 60 points in the 50% percentiles and 71 points in the 75% percentiles. According to the results obtained from the reliability and validity studies; the validity of the items in the scales was high, and the scale was reliable. In parallel with the obtained findings;

Norms can be formed for Turkish children by carrying out standardization studies of ECCS for different age groups. ECCS can be used as a data collection tool for the studies about determining the creativity of children in the early childhood period.

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