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# Tool for Measuring Readiness Level of Children Who Will Start Primary School: Attainment Test for Primary School Admission (ATPA)

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## Abstract

This research aims to develop a tool to measure the school readiness of children who will start primary school. Changes have occurred in the primary school starting age following the developments that took part in the Turkish Education System. This change has caused parents to have intense hesitations about enrolling their children in school. As a result of changing the age of starting education, it aims to develop a test that aims to eliminate the question mark in the parents and teachers of children in critical months as the age of starting primary school. This study was conducted with the quantitative research method. The obtained data were subjected to EFA and CFA analyzes by the Amos program. As a result of the research findings, the Attainment Test for Primary School Admission (ATPA-C), which was prepared considering the preschool and primary education aims, took its final form as a 17-item measurement tool gathered together in five factors. As a result of the analyses of the research made with the data of 1285 students, it was detected that the scale had the necessary validity and reliability findings for practice and research.

**Keywords:** Preschool Student, Primary School Readiness, School Maturity Level, Scale Development

## 1. Introduction

In the world where globalization is accelerating in the first decade of the 21st century, we are witnessing that the education sector, which has gained importance over the years, has undergone a rapid change in our country. The radical changes, particularly since 2010, especially the changes made in the school starting age, have led to intense debates about the starting time of children's compulsory primary school education. Depending on the parent's request, children could start the first grade of primary school between the years 2012-2014, in a range ranging from 60 months to 68 months. With the changes made afterward, the registration age is defined by the article: "Children who have completed 66 months as of the end of September of the year in which the registration is made are registered in the first class of primary schools. Children aged between 60-66 months, who are considered ready for a primary school in terms of development, are registered in the first grade of primary school with a written

request from their parents. However, the statement "... by the petition to be submitted by the parents of the children 66, 67 and 68 months old who have the right to register and by the health report of those who are 69, 70 and 71 months old documenting that they are not ready to start primary school can be directed to a preschool education or postpone their registration for one year "with the same regulation is explained in the Ministry of National Education (MoNE) Pre-School Education and Primary Education Institutions Regulation (MoNE, 2014).

Even though some of the children who will start primary school have preschool education, a significant part of them is devoid of this opportunity. While the rate of preschool schooling is 39.54% in the 2015-2016 academic year, the schooling rate of children in the last year of preschool education, who will start the 1st grade of primary school a year later, reaches 67.17%. The schooling rate of the primary school-age population of the same year is 99.81% (MoNE, 2016). With the 2023 vision document, since one of the most critical tasks of preschool education institutions in terms of readiness for primary school is to ensure that children reach these readiness levels, it is aimed to achieve 100% of the 5-year-old schooling rate in preschool education (MoNE 2023 Education Vision, 2019a). It is supported by different research results that students with sufficient readiness levels in primary school are more successful in different subjects and adapt to school better. It was determined that receiving preschool education positively affects children's school readiness to complete the study examining the school readiness of children who received preschool education and those who did not receive preschool education (Erkan & Kırca, 2010). One of the most critical factors in preschool education is the academic knowledge and skills that children will acquire in preschool education institutions, where they step into a formal education environment. The child's academic achievements during the preschool education at an early age Sanol and Pianta (2012) determine the socio-emotional and success levels of 5th-grade students at school readiness level. Students' mathematics readiness differences are considered a readiness dimension that should be considered for not making the difference in mathematics learning of students at the primary school level more significant (Polat Unutkan, 2007).

School readiness has been used under different names. School maturity is expressed as being ready to school; school readiness. In this study, the expression "School Readiness" was preferred. In addition to the various concepts used, different school entry level definitions have also been made. *Even though the level of school readiness is defined in various ways and dimensions, the definition that children have the essential competencies to perform learning activities in primary school may be more general.* Even though there are different definitions, school readiness is generally accepted to include cognitive, emotional, and social qualities that reflect the child's ability to function successfully in school contexts (Lemelin et al., 2007). The fact that students start primary school at different levels of readiness causes the levels of students to differ even more over the years. Besides causing various difficulties for students, it also results in that teachers become unhappy because they see it as an obstacle in the education process (Arı, 2015).

The fact that students receive preschool education affects their level of readiness for primary school. The results of research show, students are more successful in reading tests in international exams after taking preschool education. The results of the reading skills test in the International Student Assessment Program (Programme for International Student Assessment- PISA) conducted by the Organization for Economic Cooperation and Development (Organization for Economic Co-operation and Development- OECD) show that students who have taken preschool education for one year or more are more successful (Arıcı & Altıntaş, 2018). In the research of Lemelin et al., it was determined that genetic and environmental factors affect preschool students' school readiness, and the level of school readiness has an effect on academic success in the first years of primary school (2007). In the study conducted by Arı and Özcan, it was determined that the cognitive maturity of the students is at an adequate level, and the development of literacy skills occurs positively when children start the first grade (2016).

Even though the school readiness studies are a work that should be done at all levels of education, the level of readiness in preschool education is also fundamental (Harman & Çelikler, 2012). It was determined that receiving preschool education positively affects children's school readiness to complete the study examining the school readiness of children who received preschool education and those who did not receive preschool education (Erkan & Kırca, 2010).

Regarding age level and school readiness of students who will start primary school, it has been determined that having pre-primary education before primary school is a higher level in the adjustment level of children starting primary school than not having preschool education. According to the research findings, the adjustment level of children who started primary school at the age of five was lower than those who started primary school at 7 (Yoleri & Tanış, 2014). In the studies of Gündüz and Çalışkan, it was determined that the school maturity level of the age group varies depending on age (2013). Children aged 66 months and younger have a below-average school maturity level, whereas children aged 66-84 months have an above-average school maturity level.

In the research conducted by Erkan, it was determined that preschool education and mother's education level made a significant difference in children's school readiness, but gender and father's education level did not significantly differ on school readiness (2011). In the research of Erkan and Kırca, it was determined that primary school students received preschool education and parents' education levels made a significant difference in terms of students' school readiness levels. Nevertheless, it was determined that gender did not make a significant difference in terms of readiness levels (2010). Yeşil Dağlı (2012) sets forth that parents give importance to their children's school readiness and find it essential for their children to succeed in primary school. However, she considers students' readiness for primary school more important in terms of self-care skills rather than the cognitive domain. Receiving supportive education in the preschool period positively affects the students' readiness for primary school. While a support program is needed for this development, it is necessary to determine the students' readiness levels before and after the education with appropriate measurement tools (Kutluca Canbulat, & Tuncel, 2012).

A study about writing skills of preschool students, it was determined that preschool students' level of gaining writing skills was adequate. As gaining writing skills in preschool education will contribute to students' success in the writing processes as they start primary school, studies should be conducted on this subject. Determining the level of writing skills of children starting the first grade of primary school is necessary. The development of the students should be supported by creating different groups for the writing training of the students whose readiness is determined. Writing skills should be supported with activities designed per their development level (Yangın, 2007).

In a study by Polat Unutkan, it was determined that young children are not ready enough in terms of mathematics skills when they start primary school (2007). Differences in students' mathematics readiness are considered a readiness dimension that should be considered for not making the difference in mathematics learning of students at the primary school level more significant (Polat Unutkan, 2007). Evaluating the success of children who start primary school knowingly about reading and writing, Başar determined that this situation creates negative results (2013). Research results data reveal that children who have learned to read and start primary school have problems with writing. Besides, low motivation causes various problems in primary school education (Başar, 2013).

Curriculum applied in the preschool education process is one of the most important factors affecting students' readiness for primary school. The Montessori program can make students ready for primary school more effectively than the MoNE program (Kayılı & Arı, 2011). It was determined, in a study examining the views of parents and teachers about the readiness of preschool children for a primary school, that parents had different views about their children's school readiness (Ayten, & Sönmez Ektem, 2014). One of the essential factors in preschool education is the academic knowledge and skills that children will acquire in preschool education institutions, where they step into a formal education environment. The child's academic achievements during preschool education at an early age are the most important equipment for the child's future education life (Uyanık & Kandır, 2010).

In a study conducted with preschool teachers, it is recommended to develop new scales measuring various skills to determine the readiness level of students who will start primary school. One of the findings of the same study is the effective use of these scales by guidance services (Çakıcı, 2015). In the study conducted by Çakmak, Elibol and Akıncı Demirbaş, it was determined that school maturity levels could change even with monthly differences in the student's age (2014). As they live in a highly variable developmental process that accelerates from time to time and slows down from time to time, preschool children can differ in many aspects from their peers of the same age and the same sex, who experience ups and downs in this period (Erkan, 2011).

Çakıcı, in his research with teachers regarding the readiness status of primary school first-grade students, determined that the students were not found at a sufficient level by the teachers in the five developmental areas of cognitive, linguistic, socio-emotional, motor, and self-care. Determining the findings obtained in this study, not in the first grade, but the last year of preschool education, in the year before starting primary school will enable teachers to create a more conscious and effective program to implement the first grade curriculum. Further to that, there is a need for teacher opinions and an assessment-evaluation process with broader participation (2015). One of the suggestions made by Çakıcı in this study is to develop tests that can measure students' readiness who will start primary school and ensure that such tools are applied in preschool education institutions and primary schools (2015). When the MoNE preschool program is examined, it is a program that includes the acquisitions of the preschool program that will ensure readiness for a primary school in five different areas, Cognitive Development, Language Development, Social-Emotional Development, Motor Development, Self-Care Skills Development sub-areas in order to prepare children for primary school (2013). By achieving the gains in these five areas stated, it is to ensure that children are as ready as possible for primary school life to learn literacy and basic arithmetic. School readiness and school readiness tests used in our country developed abroad and adapted to Turkish, and developed in our country. One of the tests developed and widely used abroad is the Metropolitan Readiness Test (Öner, 1997) and another is called the Brainline School Readiness Test (Bağçeli Kahraman ve Başal, 2013).

The test is usually applied to children who start the first grade of primary school in preschool institutions and primary schools in the Metropolitan School Readiness Test. The Metropolitan School Readiness Test, developed by Hildreth, Griffiths, and Mc Gauvran to measure school readiness and primary school readiness, was adapted into Turkish by Ayla Oktay in our country (Güneri, 2016, pp. 95-118). The Metropolitan test, as a test that aims to measure school readiness, expects the student to understand the motions and apply them after understanding them. The Metropolitan test applied individually consists of 6 subtests and a total of 100 items. The distribution of the items to the subtests are as follows: Word comprehension (19 items), Sentences (14 items), General knowledge (14 items), Criticism (19 items), Numbers (24 items), Copying (10 items). With the application time of each subtest being different, the total response time for the test is 24 minutes. In the test where 1 point is given for each line, the sum of the scores gives the overall test result. No special training is required for the tester to administer the test. (Öner, 1997, pp. 207-209). The test, which was prepared by the African Brainline Distance Education Center in 2003 with the name "Brainline School Readiness Test," consists of 25 It tests and 281 items. In addition to family and teacher opinions, student practices are also included in the test. The Turkish adaptation of the Brainline School Readiness Test was carried out by Bağçeli Kahraman and Başal (2013).

Marmara School Readiness Scale is one of the tests developed to measure school readiness in our country, and the Primary School Readiness Scale is the other. It is the Marmara Primary Education Readiness Scale developed and standardized by Unutkan in 2003. This scale has 5 sub-dimensions: mathematics, science, sound, line, and labyrinth studies. The scale includes a total of 74 questions. The researcher applies the scale to the children individually (Polat Unutkan, 2007). Experts apply the scale to the children one-on-one. The second scale developed in our country, called the Primary School Readiness Scale, was developed by Canbulat and Kırıktaş to determine the school readiness levels of primary school first-grade students (Canbulat & Kırıktaş, 2016). Teachers about their students organize it.

The fact that there is a wide range of primary school starting ages increases the need to determine whether the children are ready for this situation or not. Enrolling children in the first grade of primary school by only considering their age and without any evaluation may cause more frequent problems that students may encounter in the first grade. Uyanık and Kandır state that despite the student's holistic development, there is a lack of sufficient information about whether the children are ready for school and whether they have the maturity to start school when the structuring of preschool education in our country and the implementation of the programs are examined. These findings point to the need for comprehensive and up-to-date readiness tools (2010).

Depending on the changing circumstances during the development process of the current research, studies to develop more up-to-date and inclusive readiness tests continue. New tests aiming to measure students' school readiness with different approaches are further being developed. In addition to the HighScope approach, Sak and Yorgun created a measurement tool that measures students' readiness for primary school, considering different cultural and educational characteristics (2020). In the study conducted by Cassidy (2005), it is stated that sharing

the report cards and reports prepared about the children during the start of primary school with primary school teachers is very important for the success of the students in primary school. Sharing the reports prepared on the preschool development status of the students with primary school teachers and their parents is one of the crucial issues in terms of making the necessary arrangements in the education of children at the primary school level should be taken into account.

The innovations and changes introduced by the 2023 Education vision document, both adaptation, and development, are considered to require a measurement tool that is more compatible with the changing new structure. In addition to a test applied only to students, a need for tests in which the opinions of teachers and parents of students will be evaluated exists. The Primary School Gain Test, which is planned as a holistic measurement tool, consists of three different forms. In the first stage of the study, the Attainment Test for Primary School Admission (ATPA-C) was developed, which allows students to apply under the supervision of an expert. The first study is presented here as the study conducted for ATPA-C. The other two forms were prepared as the Attainment Test for Primary School Admission Teacher form (ATPA-T), which includes the evaluations of the students' preschool teachers about the student, and the Attainment Test for Primary School Admission form (ATPA-P), in which the readiness level of the children is determined in line with the opinions of their parents. ATPA-T and ATPA-P studies continue. By these three separate forms, it is aimed that the student can make a holistic readiness level assessment. The first study is presented here as the study conducted for ATPA-C. During the development of the ATPA-C form, the primary purpose of this study is to develop a readiness test, which can be returned in a short time without boring students, can be easily applied by guidance and psychological counseling experts, and which can provide written reports about the student's readiness level to all stakeholders who contribute to the student's primary school education.

This research aims to develop a tool to measure the school readiness level of children who will start primary school. A new school readiness tool was needed because the current school readiness or school readiness tools are not up-to-date, not easily accessible, and have similar reasons. The designed measurement tool measures the child who is thought to be ready to start primary school from three different parties (child, parent, and teacher). By scoring these three measurements separately and together, it is aimed to conclude the school readiness level of the child. It is aimed to provide convenience in terms of cost, time, accessibility, and applicability of the designed measurement tool. In this study, the validity and reliability study of the Child Form of the Attainment Test for Primary School Admission (ATPA-C) was conducted.

## **2. Method**

The research is a quantitative study conducted in the scanning model. In the research, the validity and reliability study of the measurement tool applied with the data collected from children who have reached the age of starting primary school was conducted.

### *2.1. Study Group*

The study group consists of students between 60-72 months old, residing in Istanbul and considered at the school starting age according to the Ministry of National Education Pre-School Education and Primary Education Institutions Regulation (MoNE, 2019b). Data were collected from 1285 students attending 6 different preschool institutions in Ümraniye and Maltepe districts. Schools and students participated in the study voluntarily. The data collection process was carried out between 2014 and 2018. All parents and schools which participated in the study gave the consent for the research voluntarily.

### *2.2. Preparation of the Data Collection Tool*

The preparations for the test started with a request to the researcher working as an administrator in a private school from advisory teachers working in the same primary school, teachers working in kindergarten and primary school, and school founders who are educators. Firstly, a study group was formed to prepare for the test and included a

preschool teacher, an advisor, a classroom teacher, and an academician. The study group first created an item pool. In the beginning, an evaluation pool of 40 items was created. Close ones were eliminated, and the number of items was reduced to 20. Expert opinion was obtained from two academicians working in primary education and preschool for 20 items, and 3 out of 20 items were removed from the measurement tool in line with expert opinion. The remaining 17 items were administered to 1285 children accompanied by a specialist teacher. The answers given by the child in the scale items are scored with a 3-point Likert-type success score as 0, 1, and 2.

### 2.3. Collection of Data

The data were collected by the experts working in the guidance services of the schools in the research group by reading questions to the students and asking them to answer them. Answers of the students were marked on the form and then entered into the SPSS package program.

### 2.4. Analysis of Data

The SPSS package program and the AMOS package program were used in the analysis of the data. The following analyzes were respectively carried out in the research: Independent Groups t-test for item discrimination, Pearson Correlation test for item sum, Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) for construct validity, Cronbach's Alpha test, an internal consistency indicator for scale reliability, Pearson Correlation test for correlations between scale items and independent groups t-test to test the gender and age sensitivity of the scale in a different sample, Pearson Correlation analyzes to test the relationship of the ANOVA test and the scale with age and time used were conducted.

## 3. Results

The validity and reliability study findings were conducted using 1285 students for the scale development study areas below. Validity and reliability studies were started by testing item discrimination.

### 3.1. Item Discrimination

For testing the item discrimination power of the scale items, the 27% group with the highest score and the 27% group with the lowest score were compared with the independent group's t-test.

Table 1: Independent groups t-test for item discrimination

Item No.	Group	N	X	SD	t	df	p
item01	Lower 27%	347	1.464	.8839	-8.592	479.464	.000
	Upper 27%	347	1.911	.3959			
item02	Lower 27%	347	1.683	.7275	-6.307	453.135	.000
	Upper 27%	347	1.948	.2898			
item03	Lower 27%	347	1.499	.8648	-6.230	576.891	.000
	Upper 27%	347	1.839	.5348			
item04	Lower 27%	347	1.248	.9687	-8.509	593.184	.000
	Upper 27%	347	1.775	.6280			
item05	Lower 27%	347	1.265	.9641	-11.893	447.135	.000
	Upper 27%	347	1.925	.3727			
item06	Lower 27%	347	1.323	.9463	-11.530	427.145	.000
	Upper 27%	347	1.942	.3263			
item07	Lower 27%	347	1.202	.9764	-11.814	489.056	.000
	Upper 27%	347	1.885	.4542			

item08	Lower 27%	347	0.447	.8290	-21.731	672.889	.000
	Upper 27%	347	1.712	.6993			
item09	Lower 27%	347	1.274	.9602	-7.548	614.371	.000
	Upper 27%	347	1.746	.6621			
item010	Lower 27%	347	1.055	.9970	-10.960	595.100	.000
	Upper 27%	347	1.755	.6500			
item011	Lower 27%	347	1.533	.8438	-8.931	422.116	.000
	Upper 27%	347	1.960	.2816			
item012	Lower 27%	347	.971	.7287	-20.095	513.723	.000
	Upper 27%	347	1.853	.3705			
item013	Lower 27%	347	.758	.7206	-19.706	628.903	.000
	Upper 27%	347	1.697	.5191			
item014	Lower 27%	347	1.187	.8308	-14.892	446.557	.000
	Upper 27%	347	1.899	.3202			
item015	Lower 27%	347	.156	.4287	-18.401	524.682	.000
	Upper 27%	347	1.063	.8128			
item016	Lower 27%	347	.127	.4381	-14.628	530.794	.000
	Upper 27%	347	.853	.8144			
item017	Lower 27%	347	1.585	.8050	-7.560	464.871	.000
	Upper 27%	347	1.939	.3389			
Total	Lower 27%	347	1.104	.3236	-33.842	476.532	.000
	Upper 27%	347	1.747	.1432			

As seen in Table 1, the difference between the arithmetic means of the upper 27% group and the lower 27% group in all 17 items and the total score of the scale was found to be statistically significant at the  $p < .001$  level, and it was observed that the scale met the item discrimination criterion.

### 3.2. Item Total Correlation

Item-total correlation is a type of test that examines the relationship between scale items and scale total score.

Table 2. Pearson correlation test for item-total correlation

Item No.	Item Total		Item No.	Item Total	
	r	p		r	p
item01	.497**	.000	item010	.532**	.000
item02	.437**	.000	item011	.492**	.000
item03	.403**	.000	item012	.452**	.000
item04	.398**	.000	item013	.453**	.000
item05	.472**	.000	item014	.423**	.000
item06	.491**	.000	item015	.461**	.000
item07	.474**	.000	item016	.402**	.000
item08	.478**	.000	item017	.423**	.000
item09	.392**	.000			



As seen in Table 2. as a result of the Pearson Correlation analysis which was conducted to test the correlation of 17 items with the total score to test the item-total correlation of the scale. The relationship between all items and the total scale score was found to be significant at the  $p < 0.001$  level and it was determined that the scale met the item total criterion.

Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) was used to test the scale's construct validity.

### 3.3. EFA

For the EFA for the construct validity of the scale, the Eigen lower cut-off value was 1.00, the varimax 25 vertical rotation and the eigenvalue cut-off point was .40 (Altunışık et al., 2004; Kalaycı, 2010).

In order to test the construct validity of the scale. as a result of the EFA performed with the data collected from 1285 students. the sample adequacy was found to be appropriate with the value of  $KMO = .759$ . and as a result of the Bartlett test ( $p < .001$ ). it was determined that the items were suitable for performing EFA (chi square=3816.237;  $SD = 136$ ).

Table 3: FA Factor Variances

Factor	Initial Eigenvalues			Total Factor Loads			Rotated Sums of Factor Loads		
	Total	Variance %	Cum. %	Total	Variance %	Cum. %	Total	Variance %	Cum. %
1	3.54	20.85	20.85	3.54	20.85	20.85	2.46	14.45	14.45
2	1.73	10.16	31.01	1.73	10.16	31.01	1.91	11.22	25.66
3	1.46	8.60	39.61	1.46	8.60	39.61	1.71	10.06	35.72
4	1.19	7.02	46.63	1.19	7.02	46.63	1.46	8.61	44.33
5	1.06	6.26	52.89	1.06	6.26	52.89	1.45	8.56	52.89

As can be seen in Table 3. it was seen that 17 items were collected in 5 factors as a result of EFA. It was detected that 17 items of the scale explained the 52.89% of the variance under five factors. which of them is. according to the rotated factor loads. 1st Factor that explained 14.45% of its variance with a factor load of 2.46. 2nd Factor that explained 11.22% of its variance with a factor load of 1.91. 3rd Factor that explained 10.06% of the variance with a factor load of 1.71. 4th factor that explained 8.61% of its variance with a factor load of 1.46. 5th factor that explained 8.56% of its variance with a factor load of 1.45.

Table 4: Rotated Components Matrix

Item	Factor load of items				
	1	2	3	4	5
item01	.699				
item02	.685				
item06	.564				
item011	.558				
item010	.492				
item05	.458				
item017	.445				
item013		.853			
item012		.853			

item014	.603
item016	.900
item015	.892
item08	.760
item07	.731
item04	.710
item09	.660
item03	.599

Table 4 shows the distribution of 17 items of the scale to 5 factors and the factor loads in each factor. Since there were no items with a factor load of  $>.100$  in two or more of the items. The structure revealed by EFA was considered to be appropriate and Pearson Correlation analysis was performed to examine the correlations between the factors.

Table 5: Correlation values between factors

		Total	F1	F2	F3	F4	F5
Total	<i>r</i>	1	.810**	.560**	.470**	.582**	.576**
	<i>p</i>		.000	.000	.000	.000	.000
F1	<i>r</i>	.810**	1	.274**	.169**	.375**	.300**
	<i>p</i>	.000		.000	.000	.000	.000
F2	<i>r</i>	.560**	.274**	1	.218**	.150**	.150**
	<i>p</i>	.000	.000		.000	.000	.000
F3	<i>r</i>	.470**	.169**	.218**	1	.143**	.171**
	<i>p</i>	.000	.000	.000		.000	.000
F4	<i>r</i>	.582**	.375**	.150**	.143**	1	.188**
	<i>p</i>	.000	.000	.000	.000		.000
F5	<i>r</i>	.576**	.300**	.150**	.171**	.188**	1
	<i>p</i>	.000	.000	.000	.000	.000	

As seen in Table 5 the relationship between the 5 factors and the relationship between the factors and the total score is significant at the  $p<.001$  level.

### 3.4. CFA

It was preferred to test the structure revealed by EFA with CFA as well. In the multiple normality test for CFA, as it was seen that the scale multivariate value was greater than 10.00 and the kurtosis and skewness values of the items were greater than 1.5. it was determined that the distribution was not normal (Bayram, 2013; Büyüköztürk et al., 2012; Çokluk et al., 2012; Kline, 2011; Mardia, 1974) and the Asymptotically Distribution Free Method ADF which is used for non-normal distributions in CFA and developed by Browne (1984) is preferred.

In the first level CFA test, it was determined that the tested model showed perfect fit with  $\chi^2=270.27$ ;  $p=.000$ ;  $df=109.00$ ;  $\chi^2/df=2.48$ ;  $RMSEA=.03$ ;  $SRMR=.03$ ;  $CFI=.88$ ;  $GFI=.99$  and  $AGFI=.99$  values (excluding CFA) (Çokluk et al., 2012; Gürbüz, 2019; Kline, 2011; Meydan ve Şeşen, 2011; Olya, 2017; Şimşek, 2007). When the method which is independent of distribution is preferred, although it is considered sufficient to have only  $\chi^2/df$  value less than 0 (Gürbüz, 2019; Olya, 2017), the fact that other values are high confirms the harmony of the scale structure. The relationship between scale items and factors is shown in the table below.

Table 6: Standardized Regression Weights

Regression Weights	Estimate	S.E.	Critical Ratio (c.r.)	p	Standardized $\beta$
item017 <- Fa1	1.00				.36
item011 <- Fa1	1.47	.20	7.36	***	.57
item010 <-- Fa1	2.07	.27	7.60	***	.51
item06 <-- Fa1	1.72	.24	7.29	***	.53
item05 <-- Fa1	1.59	.22	7.33	***	.48
item02 <-- Fa1	.96	.16	6.19	***	.47
item01 <-- Fa1	1.55	.21	7.45	***	.53
item014 <-- Fa2	1.00				.44
item013 <-- Fa2	2.14	.18	11.69	***	.81
item012 <-- Fa2	1.88	.15	12.76	***	.79
item016 <-- Fa3	1.00				.77
item015 <-- Fa3	1.29	.11	11.50	***	.92
item08 <-- Fa4	1.00				.50
item07 <-- Fa4	1.08	.10	10.73	***	.68
item09 <-- Fa5	1.00				.40
item04 <-- Fa5	1.42	.18	8.04	***	.54
item03 <-- Fa5	.89	.13	6.96	***	.44

As seen in Table 6, loads of the items on the factors are significant at the  $p < .001$  level. Although the relationship between some items and the factor is below  $\beta < 0.50$ , it was unnecessary to remove the items as the same items were found to have sufficient load on the factors as a result of EFA. Further, as a result of CFA, it was determined that the variances of all items were significant at the  $p < .001$  level. Following these findings, the second level CFA test of the scale was conducted.

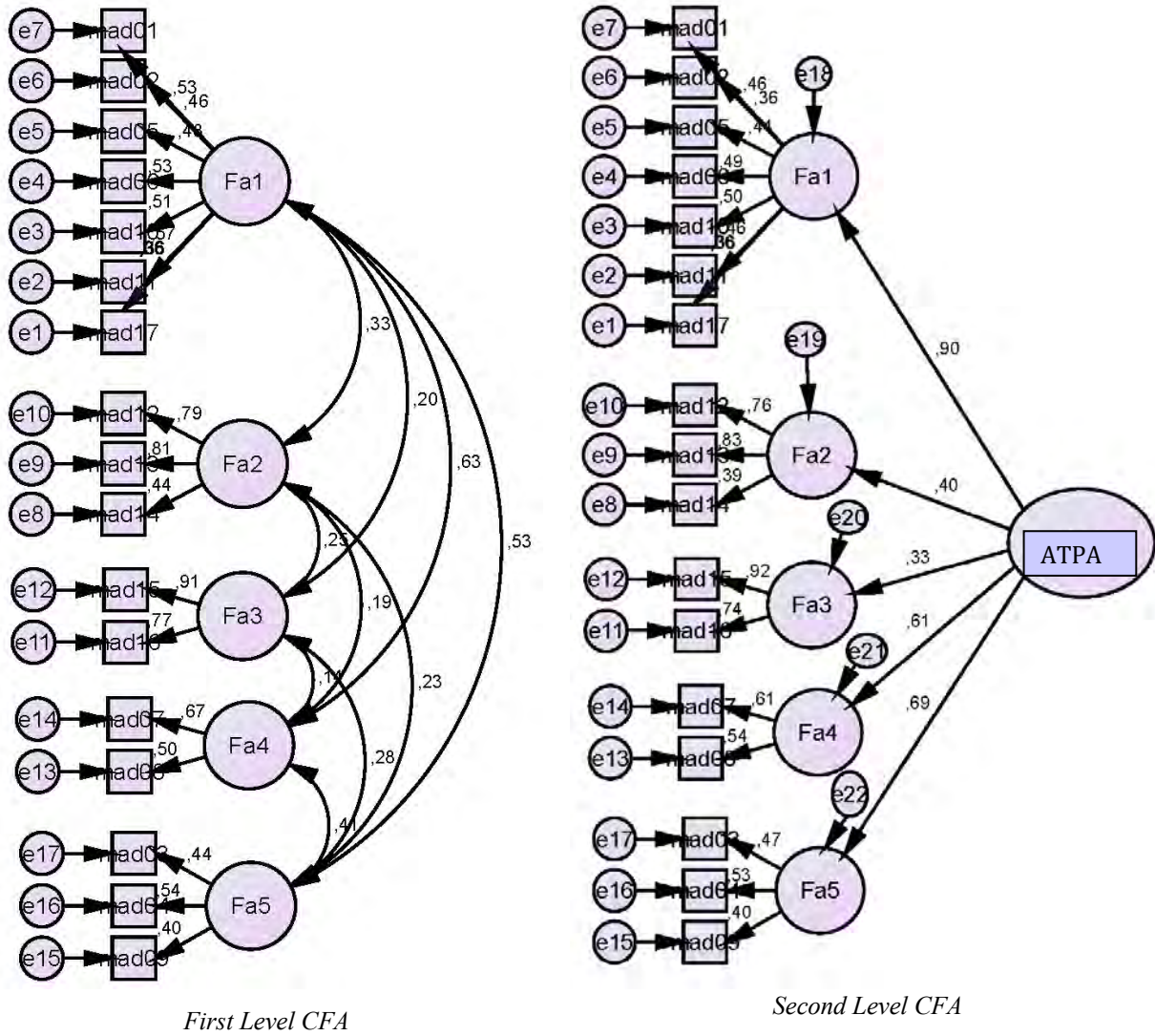


Figure 1: First and Second Level CFA Path Diagrams

As a result of the second level CFA.  $\chi^2=307.77$ ;  $p=.000$ ;  $df=114.00$ ;  $\chi^2/df=2.70$ ;  $RMSEA=0.04$ ;  $SRMR=.04$ ;  $CFI=.86$ ;  $GFI=.99$  and  $AGFI=.99$  from the fit indicators of the model tested were determined and it was determined that the fit indicators of the model (excluding CFA) are perfect (Çokluk, Şekerçioğlu & Büyüköztürk, 2012; Gürbüz, 2019 ; Kline, 2011; Meydan & Şeşen, 2011; Olya, 2017; Şimşek, 2007;). The following variance values were obtained as a result of the second level CFA.

Table 7: Second level CFA regression weights

Regression Weights	Estimate	S.E.	Critical Ratio	p	Standardized
Fa1 <--- atpa	1.00				<b>.90</b>
Fa2 <--- atpa	.51	.10	5.30	***	<b>.40</b>
Fa3 <--- atpa	.89	.17	5.10	***	<b>.33</b>
Fa4 <--- atpa	1.80	.31	5.87	***	<b>.61</b>
Fa5 <--- atpa	1.24	.22	5.55	***	<b>.69</b>
item017 <--- Fa1	1.00				.36
item011 <--- Fa1	1.16	.18	6.50	***	.46
mad10 <--- Fa1	2.08	.29	7.26	***	.50
mad06 <--- Fa1	1.61	.23	6.88	***	.49

mad05	<---	Fa1	1.46	.21	6.96	***	.44
mad02	<---	Fa1	.68	.13	5.13	***	.36
mad01	<---	Fa1	1.35	.20	6.90	***	.46
mad14	<---	Fa2	1.00				.39
mad13	<---	Fa2	2.57	.26	9.79	***	.83
mad12	<---	Fa2	2.10	.19	11.23	***	.76
mad16	<---	Fa3	1.00				.74
mad15	<---	Fa3	1.36	.13	10.33	***	.92
mad08	<---	Fa4	1.00				.54
mad07	<---	Fa4	.88	.10	8.73	***	.61
mad09	<---	Fa5	1.00				.41
mad04	<---	Fa5	1.37	.17	8.15	***	.53
mad03	<---	Fa5	.94	.13	7.12	***	.47

As seen in Table 7 as a result of the second level CFA with variance load of F1=.90. F2=.40. F3=.33. F4=.61 and F5=.69 the total scale was found to be significantly correlated at the  $p < .001$  level.

### 3.5. Reliability

Table 8: ATPA-C factor structure and reliability

Item No.	Item	Number of items	Cronbach Alpha	Factor Name Suggestion
item01	Which of the following is different from the others in	7	.68	F1. Cognitive Development
item02	Which of the following is used when painting			
item05	Which of the following is a pet			
item06	Which of the following is a wild animal			
item010	Which shape has no corners?			
item011	Underline the most in number			
item017	Cross out the blue triangle			
item012	Draw over the figure below	3	.72	F2.Motor Skills Development
item013	Draw the same shape as the following next to it			
item014	Draw the same shape as the following next to it			
item015	Draw the same shape as below next to it	2	.82	F3. Spatial-Motor Competence Development
item016	Draw the same shape as below next to it			
item07	Which of the following is a fruit	2	.69	F4. Cultural Development
item08	Which of the following is a vegetable			
item03	Which of the following is a wind instrument	3	.58	F5. Discrimination Skill Development
item04	With which of the following can we put soup on our			
item09	Which of the following must be cooked in order to be			
Scale total		17	.75	

The scale's internal consistency which successfully passed item discrimination item-total. EFA and CFA tests were tested, and the Cronbach Alpha coefficient of 17 items was found to be .75. It was determined that the internal

consistency of the first factor consisting of 7 items was .68; the internal consistency of the second factor consisting of 3 items was .72; the internal consistency of the third factor consisting of 2 items was 0.82; the internal consistency of the fourth factor consisting of 2 items was .69 and the internal consistency of the fifth factor consisting of 3 items was .58. The scale which emerged as a result of the validity and reliability tests was named Attainment Test for Primary School Admission Child Form (ATPA-C) and the following names were given to the factors.

### 3.6. Sensitivity of the Scale to Duration, Age and Gender

After the validity and reliability studies were completed to test the Attainment Test for Primary School Admission (ATPA-C) sensitivity to gender, age, and duration. Data were collected and analyzed by applying it to 158 students. Of the 158 students included in the study, 66 (41.8%) were female, and 92 (58.2%) were male. The age groups of the students are as follows: 5 of them (3.2%) are 45-51 months old, 8 (5.1%) of them are 52-57 months old, 38 (24.1%) of them are 58-63 months old, 49 (31.0%) of them are 64-69 months old, 45 (28.5%) of them are 70-75 months old, and 13 (8.2%) of them are 76 months and older.

Table 9: Descriptive findings

Sub Factor	N	Min.	Max.	X	SD	Skewness		Kurtosis	
						s	SE	s	SE
F1. Cognitive Development	158	.00	2.00	1.54	.52	-.95	.19	.95	.38
F2. Motor Skills Development	158	.00	2.00	1.32	.55	-.84	.19	.28	.38
F3. Spatial-Motor Competence	158	.00	2.00	.65	.67	.76	.19	-.46	.38
F4. Cultural Development	158	.00	2.00	1.55	.72	-.88	.19	.10	.38
F5. Discrimination Skill	158	.00	2.00	1.74	.49	-.98	.19	.87	.38
ATPA-C Total	158	.24	2.00	1.43	.37	-.81	.19	.07	.38

As seen in the table, while the total mean of ATPA-C is  $X=1.43$  ( $SD=.37$ ), the scores of the scale factors are at the levels as follows: from highest to lowest: F5: Discrimination skill development  $X=1.74$  ( $SD=.49$ ), F4: Cultural development  $X=1.55$  ( $SD=.72$ ), F1: Cognitive development  $X=1.54$  ( $SD=.52$ ), F2: Motor skills development  $X=1.32$  ( $SD=.55$ ) and F3: Spatial-motor competence development  $X=0.65$  ( $SD=.67$ ). The distortion and flatness of all factors and the sum of the scale are less than 1.00. Accordingly, it can be said that the distribution of the data is normal.

Table 10: Independent groups' t-test for the differentiation of ATPA-C scores by gender

Sub Factor	Gender	N	X	SD	t	df	p
F1. Cognitive Development	Female	66	1.54	.53	.03	156	.972
	Male	92	1.54	.50			
F2. Motor Skills Development	Female	66	1.42	.47	2.09	154	.038
	Male	92	1.25	.59			
F3. Spatial-Motor Competence Development	Female	66	.61	.64	-.68	156	.497
	Male	92	.68	.69			
F4. Cultural Development	Female	66	1.67	.64	1.89	153	.060
	Male	92	1.46	.77			
F5. Discrimination Skill Development	Female	66	1.76	.40	.39	156	.698
	Male	92	1.73	.55			
Total	Female	66	1.47	.36	.90	156	.370
	Male	92	1.41	.38			

By F1: Cognitive development F3: Spatial-motor competence development F4: Cultural development F5: Discrimination skill development from the sub-dimensions of the scale. The differences between male and female students in ATPA total scores were not statistically significant ( $p > .05$ ). At the F2: motor skills development sub-dimension, the difference in favor of females between males and females was significant at the  $p < 0.05$  level. Even though the differentiation is significant in F2 when the overall scale is evaluated, the assessment of ATPA-C towards students is gender-neutral (objective).

Table 11: ANOVA test performed to test the differentiation of ATPA-C scores according to age groups

<i>Sub Factor</i>	<i>Age(Months)</i>	<i>N</i>	<i>X</i>	<i>SD</i>	<i>Groups</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>
F1.Cognitive Development	1(45-51)	5	.97	.56	Intergroup	2.23	5	.45	1.72	.133
	2(52-57)	8	1.54	.43	Intragroup	39.44	152	.26		
	3(58-63)	38	1.54	.38	Total	41.68	157			
	4(64-69)	49	1.60	.47						
	5(70-75)	45	1.50	.66						
	6 (76 and	13	1.70	.39						
	Total	158	1.54	.52						
F2.Motor Skills Development	1(45-51)	5	.00	.00	Intergroups	13.24	5	2.65	11.67	.000
	2(52-57)	8	.67	.50	Intragroups	34.51	152	.23		
	3(58-63)	38	1.38	.41	Total	47.75	157			
	4(64-69)	49	1.39	.48						
	5(70-75)	45	1.41	.48						
	6 (76 and	13	1.49	.66						
	Total	158	1.32	.55						
F3. Spatial-Motor Competence Development	1(45-51)	5	.20	.45	Intergroups	3.60	5	.72	1.65	.149
	2(52-57)	8	.13	.23	Intragroups	66.16	152	.44		
	3(58-63)	38	.70	.72	Total	69.75	157			
	4(64-69)	49	.72	.62						
	5(70-75)	45	.66	.66						
	6 (76 and	13	.69	.83						
	Total	158	.65	.67						
F4.Cultural Development	1(45-51)	5	.40	.55	Intergroups	7.42	5	1.48	3.02	.013
	2(52-57)	8	1.63	.74	Intragroups	74.68	152	.49		
	3(58-63)	38	1.57	.74	Total	82.09	157			
	4(64-69)	49	1.66	.60						
	5(70-75)	45	1.51	.79						
	6 (76 and	13	1.62	.65						
	Total	158	1.55	.72						
F5. Discrimination Skill Development	1(45-51)	5	1.47	.87	Intergroups	1.68	5	.34	1.42	.220
	2(52-57)	8	1.42	.66	Intragroups	35.91	152	.24		
	3(58-63)	38	1.73	.49	Total	37.59	157			
	4(64-69)	49	1.80	.47						
	5(70-75)	45	1.81	.42						
	6 (76 and	13	1.67	.47						
	Total	158	1.74	.49						
Total	1(45-51)	5	.73	.23	Intergroups	3.26	5	.65	5.27	.000
	2(52-57)	8	1.21	.31	Intragroups	18.79	152	.12		

3(58-63	38	1.45	.32	Total	22.05	157
4(64-69	49	1.50	.28			
5(70-75	45	1.44	.44			
6 (76 and	13	1.53	.39			
Total	158	1.43	.37			

As seen in the table, as a result of the ANOVA test which was conducted to test the differentiation of ATPA-C scores according to age group the following findings were obtained: At the ATPA-C sub-dimensions F1: Cognitive development. F3: Spatial-motor competence development and F5: Discrimination skill development scores it was determined that the scores of the students increased as the age (month) groups of the students got older but the differentiation was not statistically significant ( $p>0.05$ ).

At the ATPA-C sub-dimensions F2: Motor skills development. F4: Cultural development. and at the ATPA total scores. it was determined that as the age (months) groups grew. the student scores also increased. and the difference was significant at least at the  $p<.05$  level.

Accordingly, when the overall scale is evaluated, it can be said that the scale score is sensitive to age. The Pearson Correlation test was also performed without grouping the student ages, and the findings are presented below.

Table 12: Pearson correlation test for the relationship of ATPA-C scores with age and time used

Sub Factor	Age		Time	
	r	p	r	p
F1. Cognitive Development	.129	-.151	-.151	.106
F2. Motor Skills Development	.324**	-.220**	-.220**	.000
F3. Spatial-Motor Competence	.147	-.029	-.029	.065
F4. Cultural Development	.134	-.012	-.012	.093
F5. Discrimination Skill Development	.096	-.059	-.059	.232
ATPA Total	.241**	-.165*	-.165*	.002

As seen in the table the following findings were obtained in the Pearson Correlation test conducted to test the relationship between ATPA-C scores and age and time used.

The sub dimensions of F1: Cognitive development ( $r=.129$ ;  $p=.106$ ). F3: Spatial-motor competence development ( $r=.147$ ;  $p=.065$ ). F4: Cultural development ( $r=.134$ ;  $p=.093$ ) and F5: Discrimination skill development ( $r=.096$ ;  $p=.232$ ) among ATPA-C sub dimensions are not statistically significant with age. F2: The positive correlations of motor skills development sub-dimension ( $r=.324$ ;  $p=.000$ ) and ATPA Total scores ( $r=.241$ ;  $p=.002$ ) with age were statistically significant at the  $p<0.01$  level.

F1 from ATPA-C sub-dimensions: Cognitive development ( $r=-.151$ ;  $p=.058$ ). F3: Spatial-motor competence development ( $r=-.029$ ;  $p=.721$ ). F4: Cultural Development ( $r=-.012$ ;  $p=.884$ ) and F5: The negative correlations of the sub-dimensions of discriminating skill development ( $r=-.059$ .  $p=.459$ ) with the time used in completing the test were not found statistically significant. F2: Motor skills development ( $r=-.220$ ;  $p=.006$ ) sub-dimension and ATPA Total score ( $r=-.165$ ;  $p=.038$ ) were determined that the negative relationship with the time used to fill the test was significant at least at the  $p<0.05$  level.

## 5. Discussion

In this study conducted to develop the Attainment Test for Primary School Admission Child Form (ATPA-C). The validity and reliability study of the 5-factor scale consisting of 17 items of 3-point Likert type was first conducted with 1285 students and then the sensitivity of the scale to age and gender was tested with 158 students.



It was determined that the scale items provided item discrimination and item-total correlations at  $p < .001$  significance level, and the 17-item scale collected in 5 factors as a result of EFA explained 52.89% of the variance. As a result of the first and second level CFA. It was seen that it had excellent fit indicators ( $\chi^2/df = 2.70$ ; RMSEA = .04; SRMR = .04; CFI = .86; GFI = .99 and AGFI = .99) and the standardized variances of the scale items and factors were significant at the  $p < .001$  level. Cronbach Alpha coefficient of 17 items was found to be .75. It has been determined that the scale is sensitive to the age, gender, and duration of use of the student.

According to these results, it can be concluded that ATPA-C is a valid and reliable scale for those who want to examine and do research on the school readiness of children who will start primary school. A holistic school readiness tool will be developed upon completion of the validity and reliability study of the ATPA-T and ATPA-P forms. Future studies will be available for different school types and student groups when the development of all three forms is completed. In addition to the assessment that expert teachers will obtain with ATPA-C obtaining the assessments of the parents with the ATPA-P form and the preschool classroom teachers with the ATPA-T about the readiness of the children and sharing these with the relevant stakeholders as written reports will allow the education and training processes in primary school to be arranged according to the development and needs of the students.

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