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İlkokul, Ortaokul ve Lise Dönemindeki Çocuklar İçin Felsefi Sorgulama (P4C) Yoluyla Eleştirel Düşünmenin Değerlendirilmesi Ölçeği Geçerlik Güvenirlik Çalışması

Validity and Reliability of the Scale for Evaluating Critical Thinking through Philosophical Inquiry (P4C) in Primary, Secondary, and High School Students

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ABSTRACT

The aim of this study is to develop and conduct validity and reliability studies for the "Scale for Evaluating Critical Thinking through Philosophical Inquiry for Primary, Secondary, and High School Students." The working group for the scale development phase consisted of teachers and students from the 2021-2022 academic year. For primary school students, the scale was completed by their teachers, while secondary and high school students filled it out themselves. In this context, the study included 37 teachers for 404 primary school students and 445 secondary and high school students. To increase the representativeness of the sample, data were collected from a total of 849 students from 14 primary schools, 10 secondary schools, and 7 high schools in Izmir. The suitability of the obtained data was determined through normal distribution, linearity, and outlier analyses. For construct validity of the scale, exploratory factor analysis (EFA) was used to examine the underlying structure, and confirmatory factor analysis (CFA) was used to assess model fit. Kaiser-Meyer-Olkin and Bartlett's tests were applied to determine the appropriateness of the data for factor analysis. The results of the EFA for the primary school form indicated no need to remove any items, confirming that the scale consisted of a single factor with 24 items. The secondary and high school form resulted in a five-point Likert scale with 5 factors and 29 items, categorized as Sharing Thoughts, Question Generation, Analyzing Thoughts, Inquiry, Focusing on Stimuli. The factors identified through EFA were tested with CFA, and the results showed that the primary and secondary school forms of the scale were valid and reliable.

Keywords: Philosophy for children, scale, critical thinking, primary school, secondary school, high school.

ÖZ

Çalışmanın amacı ilkokul, ortaokul ve lise dönemindeki Çocuklar İçin Felsefi Sorgulama Yoluyla Eleştirel Düşünmenin Değerlendirilmesi Ölçeği geliştirilmesi ve geçerlik güvenirlik çalışmalarının yapılmasıdır. Ölçeğin geliştirilme aşamasında çalışma grubunu 2021-2022 eğitim öğretim yılında eğitim veren öğretmenler ve öğrenciler oluşturmaktadır. İlkokul dönemindeki öğrenciler için ölçeği öğretmenler

doldurmuştur. Ortaokul ve lise dönemindeki öğrenciler ise kendileri doldurmuştur. Bu doğrultuda çalışmanın ilkokul bölümüne 404 öğrenci için 37 öğretmen, ortaokul ve lise bölümüne ise 445 öğrenci katılmıştır. Araştırmada çalışma grubunun örneklemi temsil gücünü arttırmak için İzmir İl'inde bulunan 14 ilkokuldaki, 10 ortaokuldaki ve 7 lisedeki toplam 849 öğrenciden veri toplanmıştır. Elde edilen verilerin normal dağılım, doğrusallık ve uç değer analizleri ile uygunluğu belirlenmiştir. Ölçeğin yapı geçerliği için açımlayıcı faktör analizi ile ölçeğin örtük yapısı, doğrulayıcı faktör analizi ile ise ölçeğin model uyumu incelenmiştir. Faktör analizine uygunluk belirlenirken Kaiser-Meyer-Olkin ve Bartlett testleri uygulanmıştır. İlkokul formu için AFA sonucunda yine herhangi bir maddenin çıkarılmasına gerek duyulmamış ve AFA, ölçeğin tek faktör ve 24 maddeden, ortaokul-lise formunun ise "Düşünceyi Paylaşma", "Soru Oluşturma", "Düşünceyi Analiz Etme", "Sorgulama", "Uyarıcıya Odaklanma" olmak üzere 5 faktör ve 29 maddeden oluşan 5li Likert tipinde birer ölçek olduğu sonucuna varılmıştır AFA sonucunda elde edilen faktörler DFA ile test edilmiş ve uyum değerlerinden de elde edilen sonuçlar ölçeğin ilkokul ve ortaokul formlarının geçerli ve güvenilir olduğunu göstermiştir.

Anahtar Kelimeler: Çocuklar için felsefe, ölçek, eleştirel düşünme, ilkokul, ortaokul, lise.

INTRODUCTION

"Thinking is using your eyes, ears, and heart." - Confucius

The act of thinking, which liberates humans, is a process that must be carefully constructed because it shapes reality. According to Aristotle, thinking is the highest form of existence and the foundation of the science of philosophy. John Dewey defines the act of thinking as a mental process that includes functions such as problem-solving, decision-making, remembering, attention, and imagination. Vygotsky describes the thinking process as organizing and making sense of knowledge. Critical, creative, reflective, and caring thinking skills integrated into educational processes enrich the experience (Demirel & Yağmur, 2017; Miterianifa et al., 2021). A positive attitude toward higher-order thinking skills, which are emphasized as 21st-century skills, contributes to the rapid adaptation to current living conditions and a successful life process (Dwyer et al., 2012; Dwye & Halpern, 2003; Hogan & Stewart, 2014). Cultivating this positive attitude from early childhood will contribute to raising individuals who are productive and capable of coping with problems in the future (Tekkalan et al., 2023).

Critical thinking (CT) is a cognitive process that involves the systematic and logical analysis of mental processes. Lai (2011) defines CT skills as students' ability to analyze arguments, draw conclusions using reasoning, evaluate, make decisions, and solve problems. In the educational context, CT skills constitute an objective decision-making process and self-regulation resulting from the interpretation, analysis, evaluation, conclusions, and explanations of evolutionary, conceptual, methodological, criterial, or contextual considerations that form the basis of inquiry (Moseley et al., 2005). Critical thinkers examine their thought processes by defining their goals, questioning assumptions, and considering relevant information and perspectives. Additionally, they assess the clarity, accuracy, and appropriateness of their thoughts (Yurt, 2024). Critical thinking enables individuals to achieve the best solutions by deeply and creatively utilizing their cultural and intellectual backgrounds.

Research shows that the Philosophy for Children (P4C) approach produces effective results in fostering higher-order thinking skills such as critical thinking (Cassidy & Christie, 2013; Doherr, 2000; Dyfed County Council, 1994; Fields, 1995; Ghaedi et al., 2015; Giménez-Dasí et al., 2013; Haas, 1980; Institute for the Advancement of Philosophy for Children [IAPC], 2002; Lipman et al., 2010; Naraghi et al., 2013; Sasseville, 1994; Williams, 1993).

Participation in philosophical discussions can contribute to the development of children's critical thinking skills and strengthen their problem-solving abilities. The P4C approach is seen as an effective tool for developing students' analytical, critical, creative, reflective, and caring

thinking abilities (Boyacı et al., 2018).

> "*P4C is not concerned with content but with process. This approach is not about teaching a child philosophy, but rather encouraging them to evaluate the world with their own perception and construct their own thoughts. P4C gives even the youngest minds the opportunity to express themselves in a place where they feel safe*." - Matthew Lipman (1923-2010)

As Lipman states in the quote above, the P4C approach is a method that facilitates the development and expression of thinking skills from an early age. This approach, which has remained valid since the 1970s and continues to evolve thanks to Lipman's students, supports both cognitive skills through critical reasoning and creative thinking, and social-emotional development through its communal nature (Hymer & Sutcliffe, 2012). The 10 steps of a P4C session are as follows: preparation, stimulus presentation, thinking, question formation, reflection on questions, selecting a question, initial thought collection, building bridges between thoughts, final thought collection, and summarizing (Haynes, 2002).

According to Lipman, a community of inquiry can engage in discussions and seek answers to all questions based on broad concepts. The stories Lipman wrote for this purpose allow for the creation of questions related to important philosophical areas such as ethics, politics, epistemology, and aesthetics (Lipman, 2003). Through this approach, Lipman proposes a philosophy-based method to develop critical thinking in children, presenting traditional philosophy as a means to convey intellectual knowledge to individuals capable of mature and complex thinking. Entering adulthood does not automatically make a person a critical thinker. Lipman and his colleagues (Lipman et al., 2010; Lipman, 2003) argue that developing good thinking is achieved not through technique, repetition, and memorization, but through practice. The origins of all approaches aimed at developing critical thinking are rooted in philosophy. This is because critical thinking develops through reasoning, establishing connections, developing cause-and-effect relationships, making inferences, focusing on questions and problems, and making interpretations based on personal experiences and available data (Daniel & Auriac, 2011). At this point, Philosophy for Children (P4C) is a way of thinking that helps develop critical thinking. Through the implementation of this approach in the classroom, children improve both cognitive and social skills such as exploring a topic, focusing on it, generating questions about it, thinking about these questions, structuring their thoughts, comparing their own thoughts with others, and respecting others' opinions (Kennedy, 2010). The emphasis on developing these skills as part of 21st-century competencies has created a need to observe and assess skill development. The study "Development of a Scale for Evaluating Critical Thinking through Philosophical Inquiry for 5-6-Year-Old Children," which responds to this need, has created a reliable and valid measurement tool to assess philosophy education for children (Karadağ et al., 2017). This scale has been used in both international and local studies across 38 different works. In these studies, in addition to philosophical inquiry skills, variables such as problem-solving skills, philosophical attitude, and mind mapping have been considered (Boyacı et al., 2018; Durmuş & Çalışkan, 2022; Işıklar & Öztürk, 2022; Koyuncu & Demircan, 2022; O'Reilly et al., 2022; Özyürek et al., 2022; Polat & Aydın, 2020; Türksoy, 2020).

The scale, developed by the researchers of this study, has met a significant need in the field by targeting the evaluation of critical thinking skills in children in early childhood through philosophy. Due to the scale's limitation to assessing only preschool children, the need to develop a similar scale for other grade levels has been identified. In this regard, the aim of this study is to develop a scale for evaluating critical thinking through philosophical inquiry for children in primary, secondary, and high school, and to conduct validity and reliability studies.

METHOD

Working Group

The study group for the development of the scale consists of teachers and students from the 2021-2022 academic year. For primary school students, the scale was completed by their teachers. In contrast, secondary and high school students filled out the scale themselves. Accordingly, the distribution of the students participating in the study is presented in detail in Table 1.

Table 1

Demographic Characteristics of the Study Group

Primary School		**f**	**%**	**Second School-High School**		**f**	**%**
Gender	F	194	48	**Gender**	F	295	66.3
	M	210	52		M	150	33.7
	Total	404	100		**Total**	445	100
Grade Level	1st Grade	29	7.2	**Grade Level**	5th Grade	28	6.3
	2nd Grade	141	34.9		6th Grade	36	8.1
	3rd Grade	126	31.2		7th Grade	60	13.5
	4th Grade	108	26.7		8th Grade	81	18.2
	Total	404	100		9th Grade	23	5.2
					10th Grade	42	9.4
					11th Grade	116	26.1
					12th Grade	59	13.3
					Total	445	100

A purposive sampling method was used when forming the study group. In purposive sampling, researchers select a group that is suitable for their study based on the characteristics of the sample. This is because the requirements of the study are specific (Cohen et al., 2002). Accordingly, when collecting data from the study group, one group was first provided with philosophy education for children, and then data was collected from this group. In the literature, there are various recommendations regarding the minimum sample size required to obtain sufficiently stable factor solutions. A fundamental misunderstanding in this area is the belief that the minimum sample size or the minimum ratio of sample size to the number of variables will not change across studies. In fact, the necessary sample size depends on several aspects of the study, including the level of shared variance among the variables and the level of specificity of the factors. For this purpose, researchers present a theoretical and mathematical framework that provides the basis for understanding and predicting these effects (MacCallum et al., 1999). When determining the size of the study group, in order for the measurement tool to be valid and reliable, the size of the study group should be at least five times greater than the number of items in the scale (Tavşancıl, 2002). Accordingly, 37 teachers participated in the primary school section of the study for a total of 404 students, while 445 students participated in the middle and high school sections. To increase the representativeness of the study group's sample, data were collected from a total of 849 students across 14 primary schools, 10 middle schools, and 7 high schools located in İzmir Province. Since the data entries for the scale, which will undergo validity and reliability testing, were filled out by teachers for primary school students, it was considered a criterion that the teachers have at least five years of professional experience.

Item Development Process

The item pool was created by a professor and an associate professor specializing in the field of Philosophy for Children. In this process, the literature on the Philosophy for Children approach was reviewed, and the learning outcomes for primary, middle, and high school were examined. The items created were evaluated by a professor from the Philosophy Department, who specializes in the Philosophy for Children approach, and a faculty member from the Elementary Education Department. Based on the feedback received, the items were revised.

Subsequently, in accordance with the Delphi report (Facione, 1990), critical thinking was evaluated and restructured within the scope of analysis, evaluation, inference, interpretation, explanation, and self-regulation.

In the third stage, the items were sent to two experts in Turkish language for evaluation in terms of linguistic comprehensibility. Accordingly, the scale items were reviewed, and the initial form of the scale was established.

Finally, to ensure that the items were understood by both teachers and students, the scale was filled out by 4 teachers and 10 students, and it was found that there were no expressions that negatively affected the comprehensibility of the items.

In this context, the primary school scale consists of 24 items, while the middle and high school scales consist of 31 items. The scale, designed in a five-point Likert format, was rated by students and teachers as follows: (1) Never, (2) Rarely, (3) Sometimes, (4) Often, (5) Always.

Data Collection Process

The data collection process was carried out as follows:

- After obtaining the necessary permissions, the educational institutions where the Philosophy for Children training would be conducted were identified, and meetings were held with their administrators.
- A total of 60 teachers were included in the training, divided into two separate groups.
- Each group received a total of 35 hours of training on the Philosophy for Children approach and its applications over the course of one week.
- After conducting four separate Philosophy for Children sessions, the teachers were asked to fill out the scales. This request was made because the Philosophy for Children experience was new for both the teachers and the students, and it was believed that accurate observation of the scale items would be possible only after a certain number of sessions.
- The scale was filled out by teachers for primary school students, while middle and high school students completed it themselves.
- After conducting the exploratory factor analysis, new data were collected using the revised version of the scale in order to perform the confirmatory factor analysis.

Data Analysis

The obtained data were assessed for normal distribution, linearity, and outlier analysis. The construct validity of each scale was examined using exploratory factor analysis (EFA) to determine the underlying structure of the scale, confirmatory factor analysis (CFA) to assess the model fit of the scale, Cronbach's alpha and additionally McDonald's omega was utilized for internal consistency reliability. When the assumption of tau-equivalence is not met, the actual reliability tends to be underestimated, and the extent of this underestimation depends on how severely the assumption is violated. In such situations, McDonald's omega provides a more accurate reliability estimate by correcting the downward bias associated with Cronbach's alpha (Dunn, Baguley, & Brunsden, 2014). This coefficient can be computed using the unstandardized

factor loadings derived from confirmatory factor analysis (Yurdabakan & Çüm, 2017). Numerous studies have demonstrated that McDonald's omega is among the most robust alternatives for estimating reliability (Revelle & Zinbarg, 2009; Zinbarg, Revelle, Yovel & Li, 2005, 2006); therefore, it was employed to assess internal consistency reliability in this study. The suitability for factor analysis was determined using the Kaiser-Meyer-Olkin and Bartlett tests. After conducting the exploratory factor analysis, new data were collected from 104 students for the revised primary school version and from 111 students for the revised middle-high school version, and confirmatory factor analysis was subsequently performed.

FINDINGS

1. Findings from the Analysis of the Scale for Assessing Critical Thinking through Philosophical Inquiry for Primary School Student

1.1. Item Analysis

Before proceeding to the exploratory factor analysis of the scale, item analysis was conducted to determine the contribution of each item to the variance of the measurement tool and to ensure the validity of the scale items. Detailed results of this analysis are presented in Table 2. An increase in the Cronbach alpha value upon the removal of an item from the test indicates that the item is inconsistent with the overall scale. However, the Cronbach alpha value obtained when the item is included in the scale should also be checked, and the inclusion of the item in the scale should be reevaluated by field and language experts (Seçer, 2015). Accordingly, item analysis was performed for each scale, and detailed results are provided below. The Cronbach's alpha coefficient was found to be .985 for all participants and .983 for both female and male participants individually. McDonald's omega value was found to be .980 for all participants and .975 and .986 for female and male participants. The values of each item in the scales were examined, and based on statistical indicators, it was decided not to remove any items from the scale for the primary school level.

Table 2

Results of Item Analysis Conducted for the Scale for Assessing Critical Thinking through Philosophical

Item	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
M1	86.9808	539.572	.752	.980
M2	86.9327	536.995	.803	.979
M3	87.1635	537.847	.799	.979
M4	87.1538	536.151	.774	.980
M5	87.2692	531.869	.825	.979
M6	87.2788	533.989	.830	.979
M7	87.3365	530.478	.830	.979
M8	87.1731	534.203	.856	.979
M9	87.1923	536.060	.827	.979
M10	87.1442	537.076	.807	.979
M11	87.4038	529.039	.799	.980
M12	87.3750	533.052	.806	.979
M13	87.1538	536.733	.774	.980
M14	87.3173	533.034	.808	.979
M15	87.0962	530.942	.882	.979
M16	87.2788	531.232	.871	.979
M17	87.4038	531.835	.880	.979
M18	87.5000	532.214	.803	.979
M19	87.3462	531.704	.890	.979
M20	87.5385	534.639	.740	.980
M21	87.5192	528.407	.849	.979
M22	86.9712	534.009	.798	.979
M23	87.6154	529.967	.767	.980
M24	86.9615	535.416	.775	.980

1.2. Findings Regarding Construct Validity

1.2.1. Results of Exploratory Factor Analysis

To determine the relationships between the variables in the scale, Exploratory Factor Analysis (EFA) was used to reduce the number of variables and reach a smaller, meaningful structure that could collectively explain the variables (Durmuş, Yurtkoru & Çinko, 2010). In this study, first, the Kaiser-Meyer-Olkin (KMO) value and Bartlett's Test of Sphericity (BTS) were conducted to assess whether the data obtained from the sample of 104 students and 9 teachers was suitable for exploratory factor analysis (Field, 2009; Pallant, 2001). The KMO coefficient of the scale was found to be .974. When examining the results of the Bartlett's Test of Sphericity (BTS) (Chi-Square = 10706,28; df = 276; $p < .05$), it was observed that the data was suitable for factor analysis. Based on the conclusion that the data was suitable for factor analysis, EFA was conducted to examine the factor structure of the scale. The factor pattern of the scale obtained as a result of the analysis is presented in Table 3. According to the results, the scale consisted of a single factor with 24 items. The variance explained by each item alone is shown in Table 3.

Table 3

Results of Item Analysis Process for the Scale Assessing Critical Thinking through Philosophical Inquiry for Elementary School Children

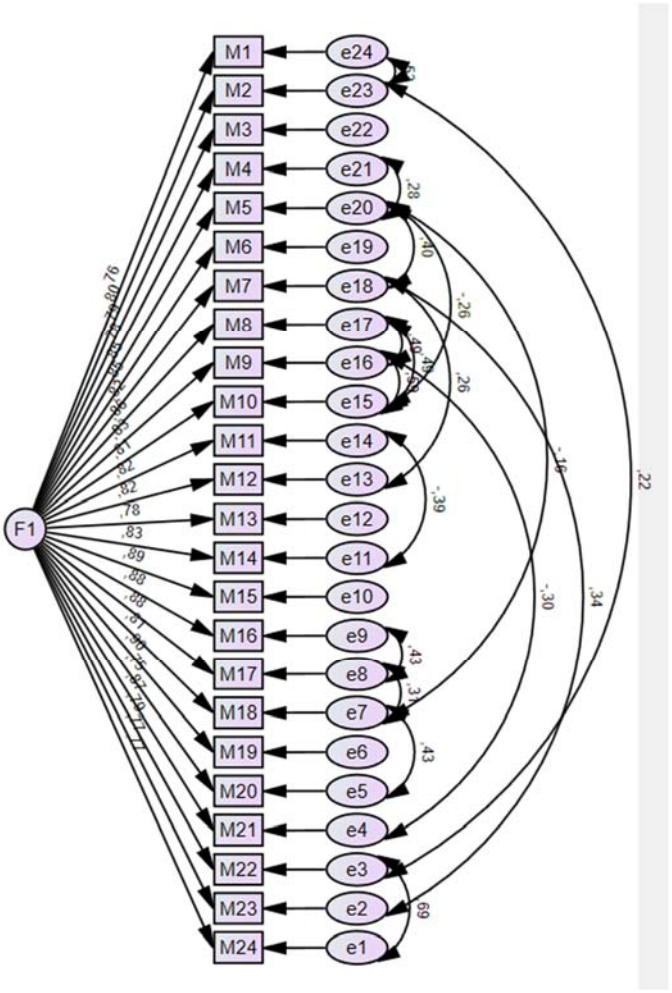
Item	Total	% of Variance	Cumulative %
M1	18.528	77.200	77.200
M2	.834	3.475	80.675
M3	.704	2.935	83.610
M4	.506	2.109	85.719
M5	.433	1.805	87.523
M6	.313	1.303	88.827
M7	.309	1.287	90.114
M8	.278	1.160	91.274
M9	.251	1.047	92.320
M10	.229	.956	93.276
M11	.201	.836	94.112
M12	.179	.745	94.857
M13	.158	.660	95.517
M14	.146	.610	96.127
M15	.134	.557	96.684
M16	.122	.507	97.191
M17	.112	.467	97.658
M18	.103	.429	98.087
M19	.097	.405	98.492
M20	.092	.385	98.877
M21	.087	.363	99.241
M22	.077	.322	99.563
M23	.059	.248	99.811
M24	.045	.189	100.000

1.2.2. Results of Confirmatory Factor Analysis

In order to test the factor structure of the scale items based on the results of exploratory factor analysis, a confirmatory factor analysis (CFA) was conducted. Multiple fit indices were used to validate the model fit. The model fit of the scale was examined using first-order CFA. The analysis results indicated that the goodness-of-fit chi-square value for the factor structure consisting of 24 items and a single factor was significant ($\chi2 = 491.641$; $p = .00$), and the $\chi2/df$ value related to model fit was found to be 2.092. The other fit index values were RMSEA: .103, NFI: .852, CFI: .916, RFI: .826, IFI: .917, TLI: .901. The fit index results are considered to be good and acceptable. The path diagram for the first-order CFA of the scale is presented in Figure 1.

Figure 1

The Single Factor Structure Model of the Scale for Evaluating Critical Thinking through Philosophical Inquiry for Primary School Children



2. Findings from the Analysis of the Scale for Assessing Critical Thinking through Philosophical Inquiry for Middle and High School Student

2.1. Item Analysis

Before proceeding to the exploratory factor analysis of the scale, item analysis was conducted to determine the contribution of each item to the variance of the measurement tool and to ensure the validity of the items in the scale. Detailed results of this analysis are presented in Table 4. The Cronbach's alpha coefficient was found to be .947 for all participants and .952 and .934 for female and male participants individually. As a result of the exploratory factor analysis, the scale was found to have a five-factor structure, and the reliability analyses of new version were conducted on a new sample. Based on the findings, the Cronbach's alpha coefficient was calculated as .913 for the entire sample, and .907 and .920 for female and male participants, respectively. McDonald's omega value was found to be .909 for all participants and .900 and .914 for female and male participants.

Table 4

Results of Item Analysis for the Evaluation Scale of Critical Thinking through Philosophical Inquiry for Second School and High School Students

Item	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
M1	112.6036	281.478	.511	.910
M2	112.9910	277.300	.489	.911
M3	112.9459	286.252	.382	.912
M4	113.0721	284.286	.400	.912
M5	112.7838	283.862	.424	.912
M6	112.8378	279.483	.498	.911
M7	112.9369	274.369	.623	.908
M8	112.9820	281.018	.471	.911
M9	112.8018	282.688	.457	.911
M10	112.7207	278.858	.492	.911
M11	113.1532	276.876	.624	.909
M12	112.9459	276.197	.570	.909
M13	113.4054	286.716	.218	.916
M14	112.7838	273.262	.630	.908
M15	112.7027	282.084	.529	.910
M16	112.7568	277.531	.561	.910
M17	113.0360	275.053	.542	.910
M18	112.7568	279.368	.537	.910
M19	113.1171	275.850	.566	.909
M20	112.9009	272.272	.613	.908
M21	113.1171	275.668	.586	.909
M22	112.7297	278.326	.567	.910
M23	112.6126	280.239	.513	.910
M24	112.8829	276.868	.594	.909
M25	112.7658	278.963	.552	.910
M26	112.9369	280.587	.407	.912
M27	112.7477	276.990	.574	.909
M28	113.2703	289.290	.172	.917
M29	112.7658	286.617	.240	.915
M30	112.6667	281.988	.515	.910
M31	112.6036	281.478	.511	.910

2.2. Findings Related to Construct Validity

2.2.1. Results of Exploratory Factor Analysis

In this study, the suitability of the data obtained from a sample of 334 students attending middle and high school for exploratory factor analysis was first determined by conducting the

Kaiser-Meyer-Olkin (KMO) test and the Bartlett's Test of Sphericity (BTS) (Field, 2009; Pallant, 2001). The KMO coefficient of the scale was found to be .952. When examining the results of the Bartlett's Test of Sphericity (BTS) (Chi-Square = 5244.961; df = 465; $p < .05$), it was observed that the data were suitable for factor analysis. Based on the conclusion that the data were appropriate for factor analysis, an exploratory factor analysis (EFA) was performed to examine the factor structure of the scale. The resulting factor pattern of the scale is presented in Table 5. In line with the findings obtained, items 9 and 12 were removed from the scale, resulting in a scale consisting of 29 items and 5 factors. The variance level explained by each item individually is shown in Table 5.

Table 5

Results of Item Analysis for the Scale Measuring Critical Thinking Through Philosophical Inquiry for Middle and High School Students

Item	Total	% of Variance	Cumulative %
M1	12.566	40.534	40.534
M2	1.493	4.816	45.350
M3	1.229	3.963	49.314
M4	1.141	3.682	52.995
M5	1.106	3.568	56.564
M6	.941	3.037	59.600
M7	.932	3.008	62.608
M8	.883	2.849	65.457
M9	.799	2.576	68.033
M10	.724	2.334	70.367
M11	.694	2.237	72.605
M12	.660	2.129	74.734
M13	.646	2.083	76.817
M14	.583	1.880	78.697
M15	.558	1.801	80.498
M16	.547	1.765	82.263
M17	.504	1.626	83.888
M18	.479	1.547	85.435
M19	.472	1.522	86.957
M20	.455	1.467	88.424
M21	.415	1.338	89.762
M22	.398	1.285	91.047
M23	.360	1.162	92.210
M24	.354	1.143	93.352
M25	.331	1.066	94.419
M26	.321	1.036	95.454
M27	.317	1.022	96.476
M28	.304	.982	97.458
M29	.297	.959	98.417
M30	.264	.851	99.268
M31	.227	.732	10.000

2.2.2. Results of Confirmatory Factor Analysis

Following the exploratory factor analysis, a confirmatory factor analysis was conducted to test the factor structure of the scale items. Multiple fit indices were used to validate the model fit. The model fit of the scale was examined through first-order CFA. The analysis revealed that the chi-square fit value for the factor structure consisting of 29 items and 5 factors was significant (χ^2 = 605.270; p = .00), with a χ^2/df value of 1,667 for model fit. Other fit index values were RMSEA:

.078, RMR: .105, GFI: .757, NFI: .626, CFI: .800, RFI: .582, IFI: .807, and TLI: .776. The results of the fit indices were considered good and acceptable. The first-order CFA path diagram of the scale is presented in Figure 2.

An examination of the scale items and factor structure revealed a five-factor model, with the subscale items categorized as follows:

Factor 1 – Sharing Thoughts: M1, M2, M3, M4, M5, M6, M13, M15

Factor 2 – Question Generation: M16, M17, M18, M19, M20, M21

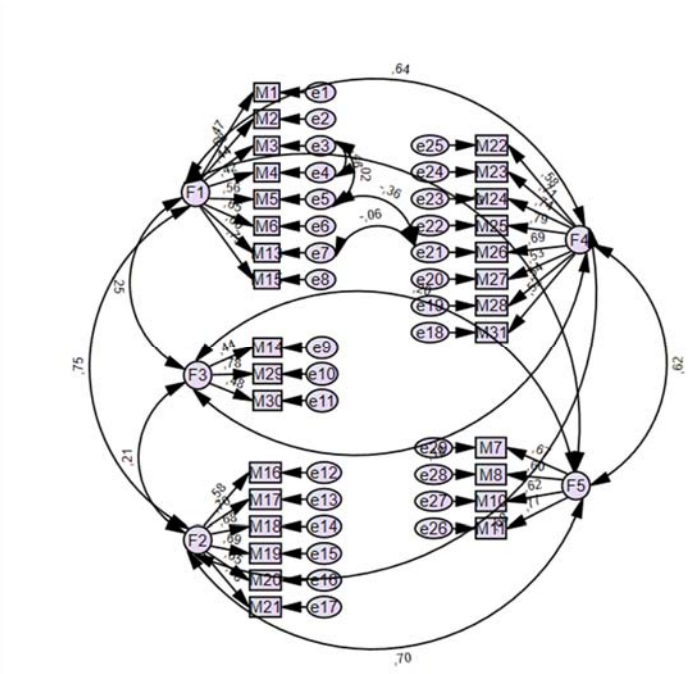
Factor 3 – Analyzing Thoughts: M14, M29, M30

Factor 4 – Inquiry: M22, M23, M24, M25, M26, M27, M28, M31

Factor 5 – Focusing on Stimuli: M7, M8, M10, M11

Figure 2

Five-Factor Structure Model of the Scale for Assessing Critical Thinking Through Philosophical Inquiry for Middle and High School Students



RESULTS

In this study, two different scales were developed to assess critical thinking skills through philosophical inquiry for primary school, middle school, and high school students. To achieve this, the impact of the philosophy approach on the thinking skills of students in these educational stages was first determined in the literature. Then, the aims and achievements of the subjects taught in primary school (Turkish, Life Sciences, Social Studies, Science), middle school (Turkish, Social Studies, Science), and high school (literature, history, geography, philosophy, chemistry, physics, biology) were examined. Following this review, it was identified which of these achievements and indicators were directly affected by the philosophical approach for children, and a pool of items was created. The items in the scale are related to children's skills in

philosophical inquiry, making philosophical judgments, explaining philosophical judgments and giving examples, creating questions of different types and structures, perception, self-expression, and using language as a tool for self-expression.

The "Scale for Assessing Critical Thinking Through Philosophical Inquiry (P4C) for Primary School Students" is filled out by teachers to observe and evaluate children in classes where philosophical sessions are conducted. The analyses conducted based on the obtained data showed that the scale is unidimensional and consists of 24 items.

The "Scale for Assessing Critical Thinking Through Philosophical Inquiry (P4C) for Middle and High School Students" is filled out by students after practices conducted in classes where philosophical sessions are held. The analyses conducted based on the obtained data revealed that the scale is multidimensional and consists of 29 items, which are grouped into five factors: Sharing Thoughts, Question Generation, Analyzing Thoughts, Inquiry, Focusing on Stimuli.

The analyses demonstrate that the scales "Assessment of Critical Thinking Through Philosophical Inquiry for Primary School Students" and "Assessment of Critical Thinking Through Philosophical Inquiry for Middle and High School Students" are valid and reliable tools for evaluating students' critical thinking skills through philosophical inquiry. These scales will enable the assessment of whether the philosophy program's objectives are achieved and whether students genuinely engage in philosophical inquiry during the applications conducted with primary, middle, and high school students.

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GENİŞLETİLMİŞ ÖZ

Eleştirel düşünme (ED), zihinsel süreçlerin sistematik ve mantıksal analizini içeren bir bilişsel süreçtir. Lai (2011), ED becerilerini, öğrencilerin argümanları analiz etme, akıl yürütme yoluyla sonuç çıkarma, değerlendirme yapma, karar alma ve problem çözme yeteneği olarak tanımlamaktadır. Eğitim bağlamında ED becerileri, sorgulamanın temelini oluşturan evrimsel, kavramsal, metodolojik, ölçütlere dayalı veya bağlamsal hususların yorumu, analizi, değerlendirmesi, sonuç çıkarımı ve açıklamalarından kaynaklanan objektif bir karar verme sürecini ve öz-düzenlemeyi teşkil eder (Moseley vd., 2005). Eleştirel düşünen bireyler, amaçlarını tanımlayarak, varsayımları sorgulayarak ve ilgili bilgileri ve bakış açılarını dikkate alarak düşünme süreçlerini incelerler. Ayrıca, düşüncelerinin netliğini, doğruluğunu ve uygunluğunu değerlendirirler (Yurt, 2024). Eleştirel düşünme, bireylerin kültürel ve entelektüel birikimlerini derinlemesine ve yaratıcı bir şekilde kullanarak en iyi çözümlere ulaşmalarını sağlar.

Felsefi tartışmalara katılım, çocukların eleştirel düşünme becerilerinin gelişmesine ve problem çözme yeteneklerinin artmasına katkıda bulunabilir. Çocuklar için Felsefe (P4C) yaklaşımı, öğrencilerin analitik, eleştirel, yaratıcı, yansıtıcı ve özenli düşünme yeteneklerini geliştirmede etkili bir araç olarak görülmektedir (Boyacı vd., 2018).

Bu çalışmanın araştırmacıları tarafından geliştirilen ve okul öncesi dönemde çocukların felsefe bağlamında eleştirel düşünme becerilerini değerlendirmeyi amaçlayan bir ölçek, alandaki önemli bir ihtiyaca yanıt vermiştir. Ölçeğin yalnızca okul öncesi çocukları değerlendirme yeteneği nedeniyle, diğer sınıf seviyeleri için benzer bir ölçek gereklidir. Buna uygun olarak, bu çalışma, ilkokul, ortaokul ve lise dönemlerindeki çocuklar için Felsefi Sorgulama Yoluyla Eleştirel Düşünmeyi Değerlendirme Ölçeği'nin geliştirilmesi ve geçerlilik ile güvenilirlik çalışmalarının yapılmasını amaçlamaktadır.

Ölçek geliştirme aşamasında, çalışma grubu 2021-2022 eğitim-öğretim yılından öğretmenler ve öğrencilerden oluşmuştur. Öğretmenler ilkokul öğrencileri için ölçeği doldururken, ortaokul ve lise öğrencileri ölçeği kendileri doldurmuştur.

Madde havuzu, Çocuklar için Felsefe alanında uzmanlaşmış bir profesör ve bir doçent tarafından oluşturulmuştur. Bu süreçte, P4C yaklaşımına ilişkin literatür gözden geçirilmiş ve ilkokul, ortaokul ve lise müfredatının kazanımları incelenmiştir. Maddeler daha sonra P4C yaklaşımında uzmanlaşmış Felsefe Bölümünden bir profesör ve İlköğretim alanında doktora yapmış bir öğretim üyesi tarafından değerlendirilmiştir. Verilen geri bildirimlere dayalı olarak maddeler revize edilmiştir.

Veri toplama süreci şu şekilde yürütülmüştür: Gerekli izinlerin alınmasının ardından, P4C eğitimi verilecek eğitim kurumları belirlenmiş ve yöneticilerle görüşmeler yapılmıştır. Eğitime dahil edilen 60 öğretmen iki gruba ayrılmıştır. Her grup, bir hafta boyunca toplam 35 saat P4C yaklaşımı ve uygulamaları eğitimi almıştır. Eğitimi tamamlayan öğretmenlerden, dört ayrı P4C oturumunu yürüttükten sonra ölçekleri doldurmaları istenmiştir. Bu gereklilik, hem öğretmenler hem de öğrenciler için P4C deneyiminin yeniliği göz önüne alındığında, ölçek maddelerinin doğru bir şekilde gözlemlenmesini sağlamıştır. Son olarak, ilkokul çocukları için ölçek öğretmenler tarafından, ortaokul ve lise öğrencileri için ise öğrenciler tarafından doldurulmuştur.

Toplanan verilerin uygunluğu, normal dağılım, doğrusal ilişki ve aykırı değer analizleriyle belirlenmiştir. Her bir ölçeğin yapı geçerliliği, gizil yapıyı belirlemek için açıklayıcı faktör analizi ve model uyumunu değerlendirmek için doğrulayıcı faktör analizi ile incelenmiştir. Faktör analizine uygunluğu belirlemek için Kaiser-Meyer-Olkin ve Bartlett testleri uygulanmıştır. Açıklayıcı faktör analizi yapıldıktan sonra, doğrulayıcı faktör analizi gerçekleştirilmiştir.

"İlkokul Çocukları için Felsefi Sorgulama Yoluyla Eleştirel Düşünmeyi Değerlendirme Ölçeği," öğretmenler tarafından P4C oturumlarının yürütüldüğü sınıflarda çocukları gözlemlemek ve değerlendirmek için doldurulmaktadır. Toplanan verilerin analizleri, ölçeğin 24 maddelik tek bir faktörden oluştuğunu ortaya koymuştur.

"Ortaokul ve Lise Çocukları için Felsefi Sorgulama Yoluyla Eleştirel Düşünmeyi Değerlendirme Ölçeği," öğrenciler tarafından sınıflarında gerçekleştirilen P4C oturumlarının ardından doldurulmaktadır. Toplanan verilerin analizleri, ölçeğin beş faktör olmak üzere 29 maddeden oluştuğunu göstermiştir. Ölçeğin alt faktörleri, "Düşünceyi Paylaşma", "Soru Oluşturma", "Düşünceyi Analiz Etme", "Sorgulama", "Uyarıcıya Odaklanma" olarak adlandırılmıştır.