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A Scale Development Study to Determine Primary School Teachers' Tendencies to Direct Students to Critical Thinking

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The goal of this study was to create a measurement tool to determine primary school teachers' tendency to direct students to critical thinking. Based on this purpose, first of all, the literature on the subject was scanned and the opinions of teachers were consulted. At the end of this process, an item pool consisting of 55 items was created. The scale items in the item pool were submitted to expert opinion for content validity. The items, which were arranged in line with the opinions of the experts, were transformed into a scale form with a five-point Likert-style option scale. The scale was applied to 500 primary school teachers working in the primary schools of the Ministry of National Education in Altındağ and Mamak, which are the central districts of Ankara, in the 2020-2021 academic year. Since EFA and CFA were planned in the research, the study group was divided into two. Accordingly, it was carried out on the data of EFA study group 1 and CFA study group 2. Study group (1) consists of 250 persons, and study group (2) consists of 250 persons. As a result of the exploratory factor analysis (EFA) applied for construct validity, it was observed that the scale had a one-dimensional structure consisting of 51 items. The total amount of variance explained by the single factor structure is 41,596%. The results of the independent samples t-test, which were used to determine the distinctiveness of each item on the scale, were significant (p≤.01). On the other hand, it was observed that the confirmatory factor analysis values of the scale were in accordance with the reference values accepted as criterion values for model data fit. The scale's Cronbach alpha reliability coefficient was found to be .97. It can be said that the results of the validity and reliability analysis obtained prove that the scale has the necessary psychometric properties.

Keywords: Critical thinking, primary school teaching, thinking skills

INTRODUCTION

The ability to think, which enables human beings to meet their nutritional, shelter, and security needs in the early ages, has also developed, evolved, and taken on its present form with humanity. Thinking has gone far beyond the effort of man to meet his basic needs; it has been the number one tool of his desire to know his own existence, nature, and even the universe, and to seek and find the creator.

Today, the concept of thinking has evolved far beyond its original meaning to include high-level thinking. High-level thinking has a much more complex and multidimensional structure than simple thinking. While we can express the basic thinking skills with the concepts of comprehension and application, the skills called "high-level thinking skills" include many processes that we have not yet expressed, such as critical, creative, reflective, metacognitive, and logical thinking (McTighe & Schollenberger, 1985).

High-level thinking skills often do not emerge spontaneously; they can only be acquired by an individual after a correct and systematic educational process (Walsh & Paul, 1988). In line with the aim of gaining high-level thinking skills for individuals, education programs prepared by taking high-level thinking skills into account have started to be used by many developed countries. Because high-level thinking skills have been revealed to be a skill that even individuals who have reached the graduate education age, let alone the primary school age, do not have in many countries in our day and age, it is obvious that people with these skills are the foundation of development and progress, and how much of a difference people with these skills will make in their societies. Therefore, in the light of research and studies, it should be one of the main duties of states to provide individuals with high-level thinking skills.

One of the critically important skills among higher-order thinking skills is critical thinking. The English word "critical" is derived from the Greek term "kritikos", which means judging, evaluating, and distinguishing. Again, the same term was used in Latin as "criticus" and in this form, it has become a concept that has been found in many languages. (Kaya, 1997). The concept of critical thinking is in the dictionary of the Turkish Language Association: "the process of obtaining as objective conclusions as possible, after carefully examining clues and evidence, taking into account all relevant processes while also making use of valid logical methods; judging, evaluating, and discerning; evaluating anything with its positive and negative aspects; finding and correcting mistakes, inaccuracies, or negativities" (TDK, 1981; TDK, 1995).

An individual who can think critically; identifies situations and problems that really matter and presents them clearly and intelligibly. Collects data related to these problems and analyzes the data obtained. It uses abstract ideas to properly evaluate data. Reaches results and solutions with correct reasoning. It puts the solutions it comes up with to the test using the existing criteria. He effectively shares the solutions he finds at the end of these processes with others (Yang & Chou, 2008).

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There have been many studies on critical thinking skills in the last century. Robert Ennis is one of the prominent names when looking at the research on identifying and explaining these skills. Ennis (1991), critical thinking; classified under three headings: tendencies, competencies, and good judgment. The competencies are listed under seven characteristics. These are;

1. Being an observer
2. To reveal the meaning of a concept, point, or explanation
3. Not to generalize
4. Designing, expressing hypotheses, options, projections, predictions, and concepts
5. Presenting well-organized, well-formed reasons
6. Evaluate deductive, inductive reasoning, explanations, value statements, and concepts expressed by a competent person
7. Recognizing standard problems and executing appropriate behaviors (activities)

Ennis emphasized that critical thinking is not only based on skills but also on the need for people to have critical thinking dispositions. According to Ennis (1985), the tendencies that reveal the existence of critical thinking skills are as follows;

1. Working to present a clear statement of the problem or argument.
2. Investigating the causes
3. Editing and testing the information obtained.
4. Using and considering sources that inspire confidence
5. Determining the general situation when making a decision
6. Trying out the remaining issues to determine the main point that will lead to the goal
7. Ensuring logical originality or preserving underlying relevance
8. Trying to find alternatives
9. Being open-minded
    a. Do not take seriously other viewpoints other than your own.
    b. Postponement or refusal to make judgments when evidence and reasons are insufficient
    c. Trying to understand the reasons for not reaching conceptual knowledge
10. Changing the situation when the evidence and reasons are considered sufficient
11. Examining the subject in detail according to the allowed dimensions
12. Systematically separating the parts that make up a complex structure
13. Showing sensitivity to emotions at every stage of the process of accessing information

Studies to include "critical thinking skills" in education programs have been on the agenda since the 1950s. Although there is common agreement on the need to gain this skill, there are different ideas about how it should be reflected in educational programs. A group of scientists led by Lipman (1987) argued that critical thinking should be taught in a separate program. On the other hand, there are those who claim that this skill can be implicitly acquired in the programs of other courses. The "Critical Thinking Handbook", prepared by Paul, Binker and Weil (1990) recommends that teachers teach critical thinking skills within the language, social studies, and science curriculum and also guides them to plan their lessons accordingly.

Teachers are the implementers of educational programs. As a result, the teacher's role is critical in assisting students in acquiring the desired behaviors. In order to raise individuals with high-level thinking skills, which are the requirements of the age, there is a need for teachers who are equipped with these skills and who can transfer what they have learned to others.

One of the high-level thinking skills that teachers are expected to have is critical thinking. The teacher should benefit from in-class activities in order to impart this skill to his students. Examples of behaviors to consider when implementing classroom activities to help students develop critical thinking skills (Beyer, 1987; Kazanç, 1989; Beyer, 1991; Doğanay & Ünal, 2006; Şekerci & Bilgin, 2008; Kurnaz, 2013; Paul; & Elder, 2013) are as follows:

When asked a question, students should be given 3-5 seconds to think and offer the most logical answer. If the question is of a high-level and complex nature, you may be given up to a minute of reflection. Thus, the student can reach the answer himself by using the questioning method.

The teacher should create a classroom climate where everyone can express themselves freely by preparing a democratic discussion environment for the students. People can express their ideas more easily and learn more quickly in an environment where they feel comfortable.

The teacher can present a predetermined problem to the class and ask them to approach it from two different perspectives. Thus, the student can develop his empathy skills by approaching the event from a point of view that he does not defend. First, he develops the ability to empathize with the other person, and then he can reach a level where he can question himself and what he during the lesson, the teacher should frequently ask the students, "Why?" while questioning the reason behind a behavior, the teacher can initiate a discussion by asking the first question, "Why?" to the class. Then, by asking the same question about the answers given at least four more times, students can think deeply and identify the underlying causes of the behaviors. Thus, students can come to the source of the problem or behavior and produce different solutions. Teachers should give students time to answer questions at the level of synthesis and evaluation and make them question whether there are alternative solutions based on the answers given by the students. Thus, students will learn that a problem may not have a single solution and will seek alternative solutions. This is one of the critical behaviors that must be shown to gain critical thinking skills. As can be understood from these explanations, teachers have a key role in directing students to think critically. Given the critical importance of young ages in laying the foundations of higher-order thinking skills, it is critical to identify primary school teachers' tendencies to direct students to critical thinking and to identify these tendencies.

In this respect, the research aimed to develop the tendency to direct students to the critical thinking scale to determine the tendency of primary school teachers to direct students to critical thinking.

METHOD

Research Design

Descriptive survey method was used in the research. Descriptive studies are studies that reflect the existing structure as it is and aim to collect data to determine certain characteristics of a group (Büyüköztürk, Kılıç, Çakmak, Akgün, Karadeniz, & Demirel, 2016).

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Study Group

In the study, a scale was developed to examine the tendency of primary school teachers to direct students to critical thinking. While developing the scale, a two-stage process was followed. Exploratory Factor Analysis (EFA) was applied in the first stage to reveal the factor structure of the scale. In the second stage, the accuracy of the factor structure of the scale revealed by EFA was tested with Confirmatory Factor Analysis (CFA). In this direction, the study group for the research consists of primary school teachers working in the primary schools of the Ministry of National Education in Altındağ and Mamak, which are the central districts of Ankara, in the 2020-2021 academic year. While determining the study group, a convenient sampling method and the easy accessibility principle were used. While determining the number of the study group, it was taken into account that the scale items should have 5 or 10 times as many people (Tavşancıl, 2014) and 500 primary school teachers were reached.

Since EFA and CFA were planned in the research, the study group was divided into two. Accordingly, the trial scale form in which EFA would be conducted was applied to Study Group 1. The study was carried out on the data of the CFA Study Group 2, which was used to verify the factor structure of the scale. There are 250 primary school teachers in Study Group 1 and 250 primary school teachers in Study Group 2.

Scale Development Process

In the study, the following steps were followed in order to measure the tendency of primary school teachers to direct students toward critical thinking. In the scale development process, first of all, the conceptual structure of the scale should be determined. While determining the conceptual structure, it should be clearly stated whether the scale is needed and what the purpose of the scale is. In the second stage, it should be decided which of the classification, ranking, interval, and ratio scaling techniques will be used in the developed scale. After the scale type and scaling technique are determined, the items should be written, and an item pool should be created. The items created in the third stage should be submitted for expert opinion. Expert opinions should be used to determine the validity of the items' content. In addition, after the experts have evaluated the items, some should be corrected or removed from the scale if deemed necessary. After this stage, the scale should be applied to the participants. After the application, a validity and reliability study should be done for the scale within the scope of the fourth stage. In the validity study, factor analysis and item-level analyses should be performed. Internal consistency coefficients can be calculated for the reliability of the scale. At the last stage, the scale whose validity and reliability studies were carried out should be reviewed again, and an application instruction should be prepared.

After the item pool was created during the scale development process, the validity of the content was first examined. "Scope validity" determines whether the test items reflect the aim to be measured (Büyüköztürk, 2012, p.161). In determining the validity of the content, firstly, expert opinion was sought. First of all, the items in the created item pool were examined in terms of compliance with the language and spelling rules according to the opinions of two researchers who are experts in Turkish education, and necessary corrections were made. Then, the scale items were examined and evaluated by a total of 5 experts, two of whom are field experts about the scale, and a measurement and evaluation expert.

In order to examine the content validity of the items, the triple rating scale of the expert evaluation form was arranged in accordance with the scoring of each item, with 1 (needs to be corrected) , 2 (not applicable), 3 (appropriate). In addition to scoring the items according to this scale, an explanation section was created to provide additional suggestions from the experts on the subject.

In order to calculate the content validity of the feedback from the expert evaluation forms, the scores of the items obtained from the experts were analyzed with the Lawshe technique. The content validity index is obtained by determining the compatibility and inconsistency between the intelligibility of the items created with the Lawshe technique, their correctness in terms of grammar, the suitability of the structure to be measured with the target audience, and their views on other issues (Yurdagül, 2005). In the Lawshe technique, the opinions of at least five experts are considered sufficient, while the opinions of a maximum of 40 experts are taken. For each item on the scale, the expert's scores were obtained through the triple rating scale, and the scores were calculated for each item. In order to determine the content validity of the scale, the content validity ratios of the items should be calculated. Content validity rates were developed by Lawshe (1975, p.567). The content validity rate for an item is obtained by dividing 1 minus the ratio of the number of experts who stated the "appropriate" opinion to the total number of experts. Because the study considered the opinions of five experts .94 was chosen as a criterion for an item at the α=.05 significance level. After removing 5 items with a content validity ratio of less than.94, it was decided that the test scale would consist of 55 items. In addition, the correction suggestions suggested by the experts for the items were taken into consideration, and the items were revised.

Findings Obtained from Exploratory Factor Analysis (EFA)

EFA was conducted to provide evidence of construct validity for the scale developed within the scope of the research. Construct validity is a judgment about the appropriateness of inferences made based on individual test scores for a variable called "construct" (Cohen & Swerdlik, 2015, p.193). The underlying factors of the structure to be measured with EFA are attempted to be determined and defined (Floyd & Widaman, 1995, p. 286). Thus, the factors to be measured with EFA and the number of factors were attempted to be determined.

Before starting the implementation of EFA, assumptions need to be tested. Accordingly, the Kaiser-Meyer-Olkin (KMO) coefficient and the Bartlett Test of Sphericity were calculated to test the suitability of the data for factor analysis and the adequacy of the sample. In order to extract a factor from the sample, the KMO value must be at least 0.50. "In accordance with the factor analysis, a score of 0.50-0.60 shows poor, 0.60-0.70 moderate, 0.70-0.80 good, 0.80-0.90 very good, and above 0.90 excellent" (Field, 2009, p.659). The significance of the Bartlett Test of Sphericity indicates that there is a sufficient level of relationship between the items. The significance of the Bartlett Test of Sphericity indicates that the data come from a multivariate normal distribution (Çokluk, Şekercioğlu, & Büyüköztürk, 2016). The KMO value was excellent (KMO =.952) because of EFA performed without using any rotation method, and the Barlett Test of Sphericity was also significant (χ^2=8177.510; $p < 0.01$). Accordingly, it can be said that the study group 1 data comes from a normal distribution and is suitable for performing EFA.

As a result of EFA performed without determining the number of factors and without using the rotation method, 11 factors with an eigenvalue greater than 1 were obtained, and the total amount of variance explained by these 11 factors is 63.49%. As a result of the unrotated factor analysis, the eigenvalue of the first factor was 22,107 and the variance explained was 40.19%. The eigenvalue of the second factor is 1.753 and the variance it explains is 3.188. Since the eigenvalue of the first factor was more than 5 times the eigenvalue of the second factor, it was decided that the developed scale was one factor. However, other criteria need to be considered to decide on the appropriate number of factors in the scale. In order to decide on the appropriate number of factors in EFA, the scree graph should also be examined. The number of factors is determined by

taking the eigenvalues up to the point where the slope disappears or is very small in the scree plot. The scree plot obtained as a result of the non-rotated principal factors analysis is shown in Figure 1.

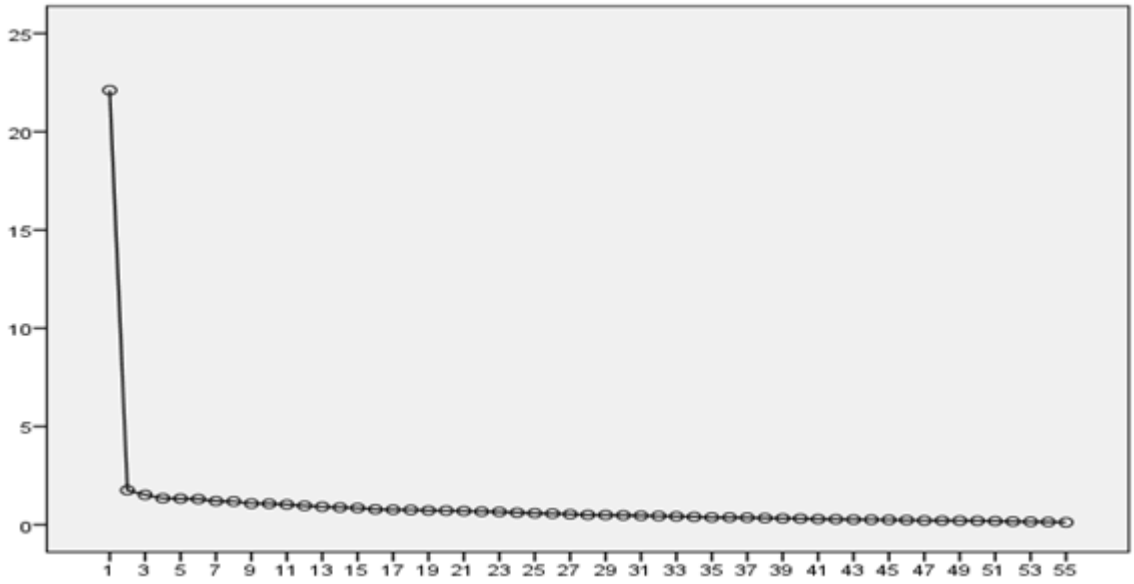

Figure 1. Scree Plot

When Figure 1 is examined, it is seen that there is a big difference (more than five times) between the first factor with the highest eigenvalue and the second factor with the second highest eigenvalue. Furthermore, because the first factor explained more than two-thirds of the variance, a single factor structure was chosen for the developed scale (Büyüköztürk, 2012).

After obtaining the single factor structure, EFA was performed again. In the reconstructed EFA, the factor number was fixed at 1. In addition, since it is a single factor, no rotation method was used. In addition, factor load values were used to determine the items to be included under a single factor. In scale development studies, the lowest factor load value is .32 (Tabachnick & Fidell, 2013, p. 654). The factor load values of items 11, 12, and 13 were less than .32 as a result of the reconstructed EFA. Therefore, these items were removed and factored again, and it was determined that the load value of Item 14 was less than .32 at this time. As a result of the exclusion of item 14 from the analysis, the EFA was repeated. As a result of the reconstructed EFA, the factor load value of the remaining 51 items was found to be greater than .32. Thus, the scale developed with EFA has a single factor structure and consists of 55 items. The name of the single factor was "Primary School Teachers' Tendency to Direct Students to Critical Thinking".

According to the re-analysis, the KMO value was obtained at an excellent level (KMO= .96), while it was found significant in the Barlett Test of Sphericity (χ^2=7884,345; p<.01). The eigenvalue and the explained variance ratio for the single factor of the scale obtained within the scope of the research are shown in Table 1.

Table 1 Eigenvalue and Variance Ratio of Single-Factor Structure

	Sum of Converted Squared Weights		
Factor	Eigenvalue	Explained Variance %	Total %
1	21,773	41,596	41,60

The total amount of variance explained by the single factor structure is 41,596%. The eigenvalue obtained for a single factor was 21,773, and the variance it explained was 41,596%. The higher the explained variance rate, the stronger the factor structure of the developed scale. In scale development studies in the field of social sciences, variance rates ranging from 40% to 60% are accepted as sufficient variance rates. Furthermore, the variance rate explained in single-factor structures must be 30% or higher (Çokluk, Şekercioğlu, & Büyüköztürk, 2016). In this direction, the total variance rate of 41.60% explained by the single factor structure was found to be above the acceptance limit. The factor loading values of the items collected under a single factor are shown in Table 2.

Table 2 Factor Load Values of the Items Obtained as a Result of EFA

Items	Factor Load
Item 1	,506
Item 2	,562
Item 3	,603
Item 4	,526
Item 5	,500
Item 6	,441
Item 7	,582
Item 8	,529
Item 9	,475
Item10	,453
Item 15	,577
Item 16	,618
Item 17	,624
Item 18	,655
Item 19	,698
Item 20	,709
Item 21	,710
Item 22	,668
Item 23	,708
Item 24	,719
Item 25	,730
Item 26	,749
Item 27	,711
Item 28	,655
Item 29	,738
Item 30	,565
Item 31	,683
Item 32	,665
Item 33	,732
Item 34	,740
Item 35	,660
Item 36	,653
Item 37	,618
Item 38	,632
Item 39	,558
Item 40	,644
Item 41	,753
Item 42	,721
Item 43	,702
Item44	,646
Item 45	,726
Item 46	,719
Item 47	,682
Item 48	,536
Item 49	,658
Item 50	,701
Item 51	,747
Item 52	,708
Item 53	,718
Item 54	,733
Item 55	,698

There are 51 items under a single factor on the developed scale. When the item's factor loading values are examined, it is discovered that the load values range between ,441 and ,753. Each item's factor load value was found to be greater than ,320.

Findings of Item-Level Validity

In order to provide evidence for the validity of the developed scale, item-level analyses were also carried out. Accordingly, item-scale total score correlation and 27% upper-lower independent group t-test analyses were performed for the scale consisting of 51 items with one factor. The Pearson correlation coefficient was used for item-scale total correlations. The item-scale total correlation values obtained for each item and the 27% upper-lower group independent samples t-test results for the items are shown in Table 3.

Table 3 Item-Scale Total Correlations and Upper-Subgroup Independent Sample t-Test Results for the Single-Factor Scale

Factor (Primary School Teachers' Tendency to Direct Students to Critical Thinking)					
Items	R	Upper-Lower Group t Test	Items	R	Upper-Lower Group t Test
Item 1	,51**	9,84**	Item 31	,68**	12,65**
Item 2	,57**	11,26**	Item 32	,66**	12,44**
Item 3	,61**	12,58**	Item 33	,73**	18,15**
Item 4	,53**	9,52**	Item 34	,74**	16,07**
Item 5	,50**	9,53**	Item 35	,66**	13,52**
Item 6	,45**	6,91**	Item 36	,65**	12,66**
Item 7	,59**	13,40**	Item 37	,62**	12,39**
Item 8	,53**	10,79**	Item 38	,63**	11,92**
Item 9	,48**	8,29**	Item 39	,56**	8,14**
Item 10	,46**	7,59**	Item 40	,64**	11,09**
Item 15	,58**	10,52**	Item 41	,75**	16,92**
Item 16	,62**	13,03**	Item 42	,72**	14,97**
Item 17	,63**	10,72**	Item 43	,70**	13,61**
Item 18	,65**	12,02**	Item 44	,64**	10,50**
Item 19	,69**	15,84**	Item 45	,72**	14,22**
Item 20	,71**	15,51**	Item 46	,72**	14,43**
Item 21	,71**	16,22**	Item 47	,68**	12,17**
Item 22	,66**	12,81**	Item 48	,54**	8,94**
Item 23	,70**	14,42**	Item 49	,66**	13,16**
Item 24	,71**	15,35**	Item 50	,70**	14,93**
Item 25	,73**	16,33**	Item 51	,74**	17,09**
Item 26	,75**	16,94**	Item 52	,71**	13,68**
Item 27	,71**	15,65**	Item 53	,71**	15,55**
Item 28	,65**	12,15**	Item 54	,73**	17,91**
Item 29	,74**	16,49**	Item 55	,69**	16,35**
Item 30	,57**	9,35**			

** p≤,01

When Table 3 is examined, the item-scale total correlation values of the items under a single factor vary between .45 and .75. Accordingly, "the item-scale total correlation coefficients greater than .20 provide evidence for the validity of the scale items" (Büyüköztürk, 2012, p.171). In addition, the high item-scale correlation values indicate that the items serve the purpose of measuring the feature to be measured. In addition, Table 3 shows the results of the independent samples t-test for the upper-lower group, which was conducted to reveal the distinctiveness of each item. The upper-lower group independent samples t-test results were significant (p≤.01). That is, there is a significant difference between the averages of the 27% upper group and the lower groups. In addition, the positive and significant t values obtained indicate that the averages are in favor of the upper group. In this direction, it can be said that the items can distinguish individuals according to the measured feature.

Findings Regarding the Reliability of the Scale

In order to examine the reliability of the scale developed within the scope of the research, the Cronbach Alpha reliability coefficient was calculated. Since the developed scale has only one factor, the Cronbach Alpha coefficient of the total score of the scale was calculated for the reliability study. The Cronbach Alpha internal consistency reliability coefficient obtained for the entire scale is shown in Table 4.

Table 4 *Cronbach's Alpha Coefficient for the Total Scale*

Factor	ItemNumber	Cronbach's Alpha Internal Consistency Coefficient (α)
PSTTDSCT SCALE	51	,97

When Table 4 is examined, the reliability coefficient obtained for the whole scale was found to be .97. According to Büyüköztürk (2012), a Cronbach Alpha coefficient greater than .70 is sufficient for reliability. Accordingly, the reliability coefficient obtained for the whole scale shows that the reliability is quite high.

Findings from Confirmatory Factor Analysis (CFA)

In order to provide evidence for the validity of the "Primary School Teachers' Tendency to Direct Students to Critical Thinking" scale, which was developed within the scope of the research and for which a single factor model structure was obtained as a result of EFA, CFA was conducted on the data of Study Group 2, consisting of 250 people. There are some assumptions that need to be tested before performing CFA. Accordingly, the KMO coefficient and the Bartlett Test of Sphericity were performed first to determine the sample's suitability for factor analysis and factor extraction (Leech, Bartlett & Morgan, 2005). The KMO value obtained from the Study Group 2 data was found to be high, and the Bartlett Test of Sphericity was significant [KMO= .94; χ^2=9995.210; p= .00<.05]. The fact that the KMO coefficient is high, and the chi-square (χ^2) value obtained from the Barlett Test of Sphericity is significant, shows that multivariate normality is provided and the data are suitable for factor extraction. Secondly, the assumption of whether there is a multivariate outlier in the items was tested. For this, Mahalanobis distances of the items were calculated, and it was seen that there were no extreme values. Finally, to test whether there is a multicollinearity problem between the items, the correlations between the items were calculated. The fact that the correlation coefficient between the items ranges between .70 and 1.00 indicates a multicollinearity issue. The correlation between the obtained items was calculated, and no correlation value greater than.70 was found. It can be said that there is no multicollinearity problem between the items of the scale developed in this direction.

After providing the assumptions for the CFA, the analysis was started. In CFA, the maximum likelihood method was used to estimate the model parameters, and the model-data fit was examined. In order to evaluate the data fit of the single factor model, χ2/sd, RMSEA, NFI, NNFI, CFI, GFI, AGFI index values were calculated. Accordingly, the χ2/sd statistical ratio being less than 5, the GFI and AGFI index values being higher than .90, and the RMSEA value being lower than .05 are accepted as criterion values for model-data fit (Jöreskog & Sörbom, 1993; Marsh & Hocevar, 1988). In addition to these index values, NFI, NNFI and CFI values take values between 0 and 1, and the fact that these values are close to 1 show that the model-data fit is high. In addition, .90 is accepted as the criterion value for NFI, NNFI and CFI, and it shows that scores obtained above this value are accepted (Raykov & Marcoulides, 2006; Schumacker & Lomax, 2010). In addition, a RMSEA value lower than .10 is accepted as the lower limit for model data fit (Anderson & Gerbing, 1984; Cole, 1987; Marsh, Balla & McDonald, 1988). In this study, the fit index values obtained regarding the model-data fit for the CFA conducted on the Study Group 2 data of the "Primary School Teachers' Tendency to Direct Students to the Critical Thinking Scale" are shown in Table 5.

Table 5 ***Model Data Fit Index Values Obtained from DFA***

Model	χ^2/sd	RMSEA	NFI	NNFI	CFI	GFI	AGFI
Single-Factor Model	2,55	,07	,97	,98	,98	,99	,99

When Table 5 is examined, it is seen that the χ^2/sd value is less than 3 and the NFI, NNFI, CFI, GFI and AGFI values are very close to 1. Accordingly, the fit index values meet the criterion values. It is seen that each fit index value meets the criterion values. In line with these findings, we can say that the single-factor model fits the data quite well. The graphical representation of the measurement model of the single-factor structure is presented in Figure 2.

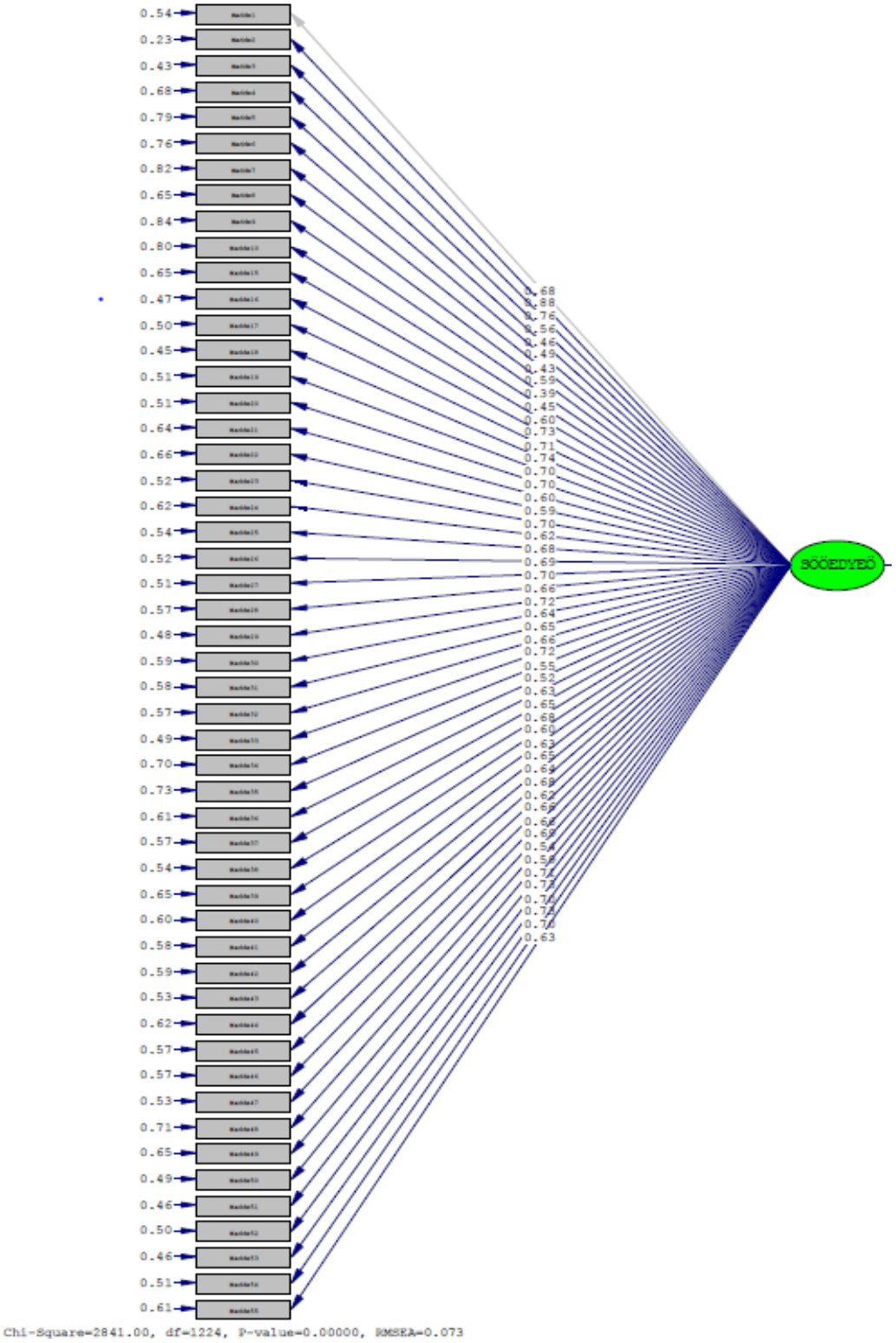

Figure 2. **Measurement model of single factor structure**

Figure 2 shows the standard factor loading values and error variances for the items. Accordingly, first of all, the significance level of the t values for the items should be checked. In order to ensure model-data fit, t values should be found to be significant. Accordingly, if the t values exceed 1.96, it can be said that significance is achieved at the .05 significance level, and if it exceeds 2.56, at the .01 significance level (Çokluk, Şekercioğlu, & Büyüköztürk, 2016). It was seen that the t values obtained for the items in the scale developed within the scope of the research were greater than 2.56 and were significant at the ,01 significance level. It is seen that the standard load values of the items in a single factor differ between λ=.39 and λ=.88, and the error values vary

between ε=.23 and ε=.84. Accordingly, it is understood that the factor loading values of each item are above .32 and the error values are below .90. In this direction, it was concluded that the model data fit index values obtained by CFA met the criteria values and that the measurement model showed a good level of fit with the relevant data.

Conclusion and Discussion

With this study, it is aimed to develop a scale to determine the tendency of primary school teachers to direct students toward critical thinking. For this purpose, a 5-point Likert-style item pool was created by following the scale development stages, and the items in the newly created item pool were arranged in line with the experts' opinions and the application form was given its final form. The application was made for 500 primary school teachers. The obtained data set was divided into two data sets of 250 people for EFA and CFA analysis. Accordingly, it was carried out on the data of EFA Working Group 1 and CFA Working Group 2. As a result of exploratory factor analysis and reliability analysis, four items were removed from the scale. As a result of this process, a single-factor scale structure with 51 items was obtained. Then, confirmatory factor analysis was performed on the data set of study group 2 in order to test whether the single-factor scale structure was confirmed.

As a result of Exploratory Factor Analysis and reliability analysis; Kaiser-Meyer-Olkin (KMO) value is .95 and Barlett Sphericity value as a result of Barlett test [X2= 8177,510; p<.001]. It was observed that the Cronbach Alpha reliability coefficient for the scale was .97. In addition, it was determined that the t-test results between the scores of the upper-lower 27% groups differed at the significance level of P<.001.

On the other hand, the fit values obtained as a result of the confirmatory factor analysis carried out in order to test whether the factor structure of the scale was confirmed; RMSEA, .07; $\chi 2/df=2.6$; NFI=.97; NNFI=.98; CFI=.98, GFI=.99 and AGFI=.99. In this context, it was seen that the items in the model represented the relevant structures well. It can be said that the factor structure of the developed "Primary School Teachers' Tendency to Direct Students to Critical Thinking" scale was also confirmed by CFA. When all the findings are evaluated together, it can be said that the developed scale has the necessary psychometric properties. The highest score that can be obtained from the scale is 255, and the lowest score is 51. The high score to be obtained from the scale indicates that the teachers' tendency to direct students to think critically is high and the opposite tendency is low.

When the literature is examined, it is possible to encounter many studies examining what critical thinking is. In these studies, it is noteworthy that they mostly deal with critical thinking skills, critical thinking disposition, and variables affecting the skill, critical thinking and cognitive characteristics, teaching critical thinking skills based on content, the concept of critical thinking, and its relationship with the rest of the thinking skills. (Polat, 2017; Açışlı, 2016; Can & Kaymakçı, 2015; Koçak, 2015; Türkmen, 2014; Emir, 2012; Özelçi, 2012; Karalı, 2012; Çetinkaya, 2011; Ekinci, 2009). However, no scale development study was found to determine the tendency of primary school teachers to direct students to critical thinking. It is thought that this scale development study will enrich both the literature and the field of application in this sense. In addition, it is a recommendation for researchers to intensify studies on scale development, especially in directing higher-order thinking. In addition, the scale form obtained in this study can be applied to a wider audience and adapted for teachers in different branches. In this respect, the application of the measurement tool only on classroom teachers is one of the limitations of the research.

Declarations

Conflict of Interest

No potential conflicts of interest were disclosed by theauthor(s) with respect to the research, authorship, or publication of this article.

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The study was approved by the researchteam's university ethics committee of the Gazi University (ApprovalNumber/ID: 2020/446 Hereby, we as the authors consciously assure that for the manuscript the following is fulfilled:

- This material is the authors' own original work, which has not been previously published elsewhere.
- The paper reflects the authors' own research and analysis in a truthful and complete manner.
- The results are appropriately placed in thecontext of prior and existing research.
- All source sused are properly disclosed.

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