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Evaluation of Habits of Mind in Music Education: Scale Development Study

Research Article

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ABSTRACT

The aim of this study is to develop a scale enabling the determination and evaluation of the learning habits of mind displayed by music teacher candidates in the individual instrument education course. The scale form which was created for this purpose was presented to 10 experts who have a PhD degree in music education. As a result of the feedback from the experts, the scale form was shaped. The 41-item trial form was applied to 241 music teacher candidates who received music teacher training in 3 universities in the first stage of the scale development, and 223 music teacher candidates who received the same training in 3 universities in the second stage. A total of 464 people were reached. By analyzing the data obtained, a final scale form having 7 dimensions, and 27 items was reached. Cronbach's alpha reliability coefficients were found to be 0.897 and 0.906 for Exploratory Factor Analysis (AFA) and For Confirmatory Factor Analysis (CFA), respectively.

Keywords:
Habits of Mind, Music Education, Individual Instrument Education.

Introduction

In this century, in which technology has progressed rapidly and learning habits have changed, an individual's being able to compatible with her/his environment, to draw positive results from past experiences, to make observations and analyzes, to interpret information, to make predictions, to present what s/he has learned and to convert them into actions by making them functional by the end of the educational process are among the main objectives of education. Individuals' readiness and knowing correct learning methods are effective in order for the determined educational goals to be realized. Learning to learn as a result

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of correct learning methods is one of the important factors for individuals to realize effective and efficient learning in the education and training process.

In order for an effective learning to take place, it is important for individuals to determine the paths they take to learn by observing the learning processes, and if they succeed at the end of the learning process, to internalize the factors of the process leading to success and to use the same methods in the subsequent learning process in terms of the sustainability of that success. In this way, effective thinking behaviors that individuals show when they succeed can turn into mental habits. Like many disciplines, music education and musical performance also contain many emotional and behavioral elements that including cognitive, affective and physiological characteristics (Aydın, 2018).

Negative habits constitute the majority of the obstacles to being like the person in our dreams. Unless there is a force or change that affects thoughts and behaviors, we exhibit the same behaviors. This situation shows that the behavior has become a habit. Therefore, effective thinking behaviors and applying these behaviors in daily life, in other words turning these behaviors into habits and thinking effectively gain importance at this point (Ekici, 2016).

The process in which individuals achieve success works and develops with many different mental habits. Mental habits in this process are individual's using intellectual abilities in the event of a problem, such as reasoning, perseverance, creativity and mastery (Ekici, 2016: 860). Goldenberg (2009), who states that the habits of mind are habitual characteristics, defines them as habits that the person naturalizes and includes in her/his repertoire, and not only emphasizes but also as things that are possible for her/him to do. Lim (2008), on the other hand, defines the habits of mind with the concept of intuition that develops spontaneously when an action is performed based on the first thought that comes to mind in the event of a problem. Lim (2008) refers to the tendency to do the first thing or to behave under the influence of the first approach that comes to mind by force of habit (as cited in Ekici, 2016).

According to Costa and Kallick (2008), habits of mind are characteristics that people show when they behave intelligently and reasonably. These are what successful people do as a reflex behavior when they face a problem. The habits of mind are performed in response to questions and problems whose answers are not immediately known. According to Costa and Kallick, habits of mind are seldom disabled; on the contrary they are grouped and used in various situations. Mind habits are a combination of many abilities, attitudes, clues, past experiences and tendencies. These habits mean that we value one intellectual behavior compared to another. It is the tendency to choose effective models of intellectual behavior. Therefore, the choices we make about which patterns we should use at a given time are considered as a habit of mind.

Types of Habits of Mind Determined By Costa and Kallick

In this study, out of 16 habits of mind determined by Costa and Kallick, 6 of them which are thought to be related to instrument training were examined. Managing impulsivity, from the habits of mind, was divided into two parts as planning and strategy development for solution. These 6 habits of mind are described by Costa and Kallick (2008) as follows:

Persisting. Successful people remain committed to the task until they fulfill it. They don't give up easily. They can analyze to solve a problem, develop a system and strategy. They have alternative solutions to solve problems and they use them widely. Students can often give answers like "I don't know, I can't, and it's very difficult" in the face of questions they face. They may tend to give up in the face of problems. Successful people do not give up in the face of problems by finding solutions.

Managing Impulsivity. Effective problem solvers are planned people. They think before they act. They have a purpose, action plan and goals that they want to achieve before they begin. They act in accordance with

their action plans. They think ahead to solve problems and form solutions. They think about possible solution alternatives before taking action, and act reflectively by predicting the results of these alternatives. By gathering information they decrease the need for trial and error.

Thinking about Thinking (Metacognition). Successful people plan and evaluate the quality of their thinking skills and strategies. They have control over and are aware of their thoughts. They form internal questions in search of understanding and obtaining knowledge. They rehearse mentally before a performance. They develop mental maps and action plans. They observe their plans and reflect on the completed plan for self-evaluation. They are aware of what they have learned and how they have learned it. They organize mental pictures to improve their performance.

Striving for Accuracy and Precision. People who value accuracy, precision and craftsmanship take time to check over their products. Successful people are proud of their work and have a desire for accuracy as they take time to check over their work. Mastery includes accuracy, precision, faithfulness, and fidelity. They are aware of the criteria that they must comply with for their field they work in. They review the criteria they use to confirm that their finish product matches the criteria exactly. They have a sense of mastery. They constantly work to become masters of what they do. They're not sloppy.

Applying Past Knowledge to New Situations. Successful and intelligent people learn from the experience. When confronted with a new situation or a surprising problem, they draw forth the knowledge they obtained from their past experiences. They often say things like "that reminds me" or "it looks like this". They use their knowledge and experience to solve each new situation and to explain theories. They can derive meaning from an experience, continue to use it and apply it to a new situation.

Gathering Data through All Senses. Intelligent people know that all information gets into the brain through the sensory pathways: gustatory, olfactory, tactile, kinesthetic, auditory, visual. Most linguistic, cultural, and physical learning is derived from the environment by observing or taking in through the senses. Successful people use more than one sense organ to solve and understand any situation.

Related Works

Thesis and articles can be found in the literature review about the determination and evaluation of habits of mind.

Eren (2015) explained the general habits of mind, gave place to habits of mind types, and identified 16 habits of mind defined by Costa and Kallick, in "Habits of Mind Based Learning-Teaching Approach" section of the book named "Current Learning-Teaching Approaches with Activity Examples III" edited by Ekici. Also, at the end of the section, Eren gave an example of mathematics lesson with an activity plan prepared according to the habits of mind-based learning-teaching approach.

Korkmaz (2015) aimed to determine the mathematics teachers' habits of mind and their reflections on their students in the master thesis titled "Investigation of Mathematical Habits of Mind in Problem-Solving in the Context of Mathematics Teachers and Eighth Grade Students". The aim of the study was to reveal the mathematical habits of mind seen in mathematics teachers working in state secondary schools and their reflections on their students. The sample consisted of 52 mathematics teachers working in the state secondary schools of Karabük province in 2014-2015 academic years and 79 students in 8^{th} grade of 4 teachers selected among these teachers. "Knowing Our Habits as a Mathematician" form, developed by researchers and academicians who are experts in their fields, was used to collect the data and 6 problems requiring detailed solutions were given to teachers and students to be solved by them.

Tıraşoğlu (2013), in the master's thesis titled "Determining the Mathematical Habits of Mind of Mathematics Teacher Candidates in the Context of Mathematical Reasoning", made the assessment of

mathematics habits of mind of teacher candidates who study in primary school mathematics teaching in context of mathematical reasoning, within the scope of the course that was made by utilizing Polya's problem solving steps. The research was conducted in 2012-2013 academic years in the "Problem Solving" elective course of sophomore students in Gazi University, Faculty of Education, Department of Primary School Mathematics Teaching. The data of the study was collected with the achievement test prepared to examine the gains related to the problem solving elective course. The achievement test was developed by the researcher.

Körükçü (2015) examined the development of mathematical habits of mind of secondary school students in an enriched learning environment in his Ph.D. thesis titled "Investigation of the Development of Mathematical Habits of Mind of Secondary School Students in an Enriched Learning Environment". An enriched learning environment was designed for the students and an evaluation form was developed by the researcher for the assessment. The study group consisted of 20 students from seventh grade who attended a state school in İstanbul-Güngören in 2013-2014 academic years.

Doğanlar (2018) examined the algebraic habits of mind of secondary school mathematics teachers and their reflections on their courses, and habits of seventh grade students in his master thesis titled "Determination of Algebraic Habits of Mind of Secondary School Mathematics Teachers and Their Reflections to Their Courses". The sample of the study consisted of 2 secondary school mathematics teachers working in state schools in İzmir-Kemalpaşa in 2017-2018 academic years and 4th and 7th grade students of these teachers. Four open-ended algebra problems created by the researcher were used to collect data.

Bilgiç (2018) aimed to examine the effect of mathematical habits of mind of primary school mathematics teacher candidates in the problem solving process in his article titled "Examining the Mathematical Habits of Mind of Elementary School Mathematics Teacher Candidates in Problem Solving Process". The sample of the study consisted of 79 teacher candidates. The participants were given 7 weeks of training in which they could experience their habits of mind, and the teachers were given a problem before and after the training, and mathematical habits of mind they used in problem solving processes were examined.

Ekici and Akdeniz (2017) aimed to determine the habits of mind of candidate teachers in science branches with a sample group consisting of 187 primary school teachers in their study titled "Analysis of Candidate Teachers' Habits of Mind: An Example from Science Branches". Candidate teachers enrolled in Physics, Chemistry and Biology department were included in the scope of the study. In order to collect habits of mind data, Likert type habits of mind form consisting of 48 questions was used in the study.

Köse and Tanışlı (2014) aimed to determine the primary school teacher candidates' habits of mind in geometry in their article titled "Mental Habits of Primary School Teacher Candidates in Geometry". The sample of the study consisted of 57 primary school teachers who were studying in the 3rd grade of a primary school teaching program of a state university. Data were collected with four open-ended geometry problems related to perimeter and area concepts. The collected data were analyzed in accordance with the stages of descriptive analysis by taking the literature into account.

Korkmaz et al., (2016) in their article entitled "Mathematical Habits of Mind in Problem Solving", aimed to determine the habits of mind of mathematics teachers. The aim of the study was to determine the mathematical habits of mind of mathematics teachers working in state secondary schools. The sample of the study consisted of 52 mathematics teachers. While collecting the data, "Knowing Our Habits as a Mathematician" form was used and 6 problems requiring detailed solutions were solved.

Purpose of the Study

In this study, it is aimed to develop a scale that will allow the determination and assessment of the learning habits of mind used by the music teacher candidates in the individual instrument education course.

Method

At the beginning of the scale development, 16 habits of mind determined by Costa and Kallick were examined and 6 of these which were thought to be related to music education were included in the study. Since the habit of mind "Managing Impulsivity" has two sub-dimensions in terms of content, it is divided into two as "planning" and "developing strategies for solutions" by researchers. Creating scale items, referring to expert opinion, validity and reliability studies were performed in the process of scale development. (Dalkıran et. al., 2014). For the determination and evaluation of the selected types of habits of mind, a repository of questions was created by the researchers and questions that were consistent with the purpose of the study were selected from this repository. A trial form was formed from the selected questions and sent to 10 experts with a Ph.D. degree in the field of music education to get their opinions on the suitability of the habits of mind and the questions prepared for music education and the purpose of the study. After receiving the opinions of experts, a 41-point Likert Type trial form was created. This form, again by taking expert opinion, is ranked as *Strongly Disagree, Disagree, Moderately Agree, Agree,* and *Completely Agree*. The trial form was then applied to the music teacher candidates who participated in the research.

Study Group

In this study, there are two different groups from which data was collected. The first of these is the group in which data is collected for exploratory factor analysis in scale development stage. Attention was paid to making this group similar to the one with which comparisons would be made. In the first study group of 241 teacher candidates, 92 (38.2%) were male and 149 (61.8%) were female. 76 (31.5%) of the participants were in the first year, 59 (24.5%) were in the second year, 50 (20.7%) were in the third year and 56 (23.2%) were in the fourth year.

The second of the study groups was the one in which confirmatory factor analysis was performed during the scale development stage and the data was collected in order to make comparisons according to the variables. 99 (44.4%) of the participants were male and 123 (55.2%) were female. 60 (26.9%) of the participants were in the first year, 65 (29.1%) were in the second year, 61 (27.4%) were in the third year and 34 (15.2%) were in the fourth year.

Analysis of Data

There is no extreme value in the group in which the first data were collected. Negative items (2,5,7,19 and 37) were reverse-coded and missing values were assigned a mean.. Exploratory Factor Analysis (EFA) was performed to determine construct validity. The reliability of the whole scale and its sub-dimensions were determined by calculating Cronbach's alpha internal consistency coefficient.

In the group from which the second data were collected, subjects numbered 75 and 98 were deleted because they were extreme values. Items 2 and 5 were reverse coded and missing values were assigned a mean. Confirmatory Factor Analysis (CFA) was performed to obtain additional evidence for construct validity. The reliability of the whole scale and its sub-dimensions were determined by calculating Cronbach's alpha internal consistency coefficient.

Confirmatory Factor Analysis Syntax:

DFA

Observed Variables

S1- S27

Covariance Matrix from File DFA.COV

Sample Size: 223

Latent Variables: DHEP, IZA, OBY, DKC, MZA, TDA, DHEC, ZA

Relationships:

S7 S11-S14 = DHEP

S1-S6 = IZA

S24-S27 = OBY

S18-S20 = DKC

S15-S17 = MZA

S21-S23 = TDA

S8-S10 = DHEC

DHEP IZA OBY DKC MZA TDA DHEC = ZA

Path Diagram

End of Problem

In the scope of the study, comparisons were made according to variables in the data that was collected with the scale that was developed later.

Findings and Comments

The results of Kaiser-Meyer-Olkin (KMO) and Bartlett's Test of Sphericity conducted to test the suitability of the sample size for factorization are presented in Table 1.

Table 1. Kaiser-Meyer-Olkin (KMO) and Bartlett's Test of Sphericity results

KMO and Bartlett Test		
Kaiser-Meyer-Olkin		0.868
Bartlett Test of Sphericity	Chi-square	2847.627
	sd	351
	p	0.000

When Table 1 was examined, the KMO value of the study group was found to be 0.868. The Bartlett's Test of Sphericity result was statistically significant. Sample size was suitable for factorization.

The contribution of each component to the total variance was evaluated when deciding the number of factors. The scree plot was also examined. The scree plot is presented in Figure 1.

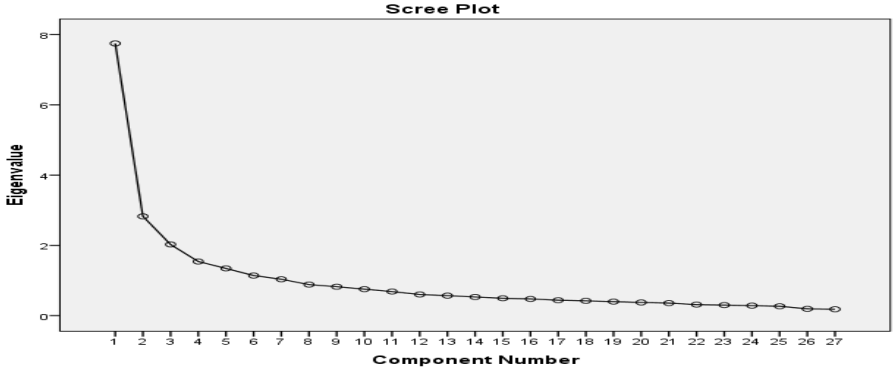

Figure 1. Scree Plot

According to the contribution of the components to the total variance and the scree plot, the number of factors was decided to be seven and the analysis was repeated in a way that would have seven factors. In order to reveal the factor pattern of the scale, principal components analysis was chosen as the factorization method. In the pattern formed as a result of the analysis, substances with a factor load less than 0.30 and showing overlap (high load on both factors) (7, 8, 9, 18, 19, 20, 21, 22, 26, 27, 28, 32, 36, 37) were dismissed.

The eigenvalues and explained variance percentages related to all possible factors and the factors in the determined number obtained from the analysis are presented in Table 2.

Table 2. Eigenvalues Related to Factors and Explained Variance Percentages

	Values Related to All Possible Factors			Rotated Values Related to Factors in the Determined Number		
Component	Eigenvalue	Explained Variance Percentage	Sum Explained Variance Percentage	Eigenvalue	Explained Variance Percentage	Sum Explained Variance Percentage
1	7,748	28,698	28,698	3,255	12,057	12,057
2	2,826	10,466	39,164	2,945	10,908	22,965
3	2,026	7,504	46,667	2,716	10,061	33,026
4	1,540	5,703	52,370	2,451	9,078	42,104
5	1,343	4,975	57,345	2,304	8,535	50,639
6	1,140	4,223	61,568	2,300	8,518	59,157
7	1,035	3,834	65,402	1,686	6,244	65,402
8	,883	3,272	68,673			
9	,823	3,049	71,722			
10	,754	2,792	74,514			
11	,684	2,534	77,047			
12	,602	2,228	79,276			
13	,569	2,108	81,384			
14	,531	1,966	83,349			
15	,493	1,827	85,176			
16	,474	1,757	86,933			
17	,439	1,624	88,557			
18	,421	1,560	90,117			
19	,399	1,477	91,593			
20	,375	1,389	92,982			
21	,357	1,320	94,303			
22	,313	1,161	95,463			
23	,299	1,109	96,572			
24	,284	1,053	97,625			
25	,267	,988	98,613			
26	,193	,713	99,326			
27	,182	,674	100,000			

When Table 2 is analyzed, it is seen that the eigenvalue of the first factor is 3.255, the contribution of the factor to the total variance is 12.057%, the eigenvalue of the last factor is 1.686 and the contribution of the factor to the total variance is 6.244% after the rotation. All factors together account for 65.402% of the variance.

Factor load values obtained by seven iterations using Varimax vertical rotation method related to the factor design of the scale are presented in Table 3.

Table 3. Factor Pattern

	Factors						
	1	2	3	4	5	6	7
M15	,858	,078	,027	,043	,151	,084	,023
M16	,829	,218	-,048	,049	,073	,048	,048
M17	,814	,024	,092	,050	,110	,057	,015
M14	,749	,061	-,011	,133	,047	,076	,198
M10	,465	,219	,230	-,157	,111	-,138	,351
M3	,146	,750	,187	,171	,107	,090	,018
M2	-,003	,723	,204	,133	,001	,051	,131
M5	,208	,645	,130	-,134	,287	,108	-,056
M4	,073	,612	,042	,489	,144	,036	,113
M1	,177	,554	,264	,387	,021	-,037	,062
M6	,089	,522	-,100	,389	,289	,116	,114
M41	,072	,189	,727	,148	,076	,205	-,099
M38	,032	,077	,718	,111	-,019	,002	,201
M39	-,083	,110	,704	,229	,157	,120	,172
M40	,108	,202	,695	,235	,144	,173	-,076
M30	,083	,190	,263	,710	,158	,126	,173
M31	,049	,119	,340	,693	,279	,044	-,015
M29	,061	,247	,295	,663	,062	,038	,132
M24	,159	,064	,035	,124	,818	,109	,030
M23	,049	,152	,197	,193	,735	,103	,199
M25	,232	,249	,096	,129	,727	,096	,179
M34	-,002	,066	,123	,066	,088	,880	,128
M33	,057	,067	,154	-,134	,153	,843	,155
M35	,167	,089	,114	,262	,059	,709	,019
M11	,355	-,049	,024	,131	,031	,112	,728
M12	,014	,132	,056	,096	,209	,146	,712
M13	,065	,232	,280	,210	,275	,255	,434

When Table 3 is examined, it is seen that there are no items with factor load values below 0.30. Also, there is no overlapping material in the pattern. Factor load values of the items range from 0.434 to 0.880. The distribution of the items in the final 27-item form of the scale to the factors and the naming of the factors are as follows (the numbers in parentheses are the numbers in the final form of the items in the factors);

Factor 1: Managing Impulsivity Habit of Mind (Planning) (s7, s11-s14)

Factor 2: Data about Persisting Habit of Mind (s1-s6)

Factor 3: Applying Past Knowledge to New Situations Habit of Mind (p24-s27)

Factor 4: Striving for Accuracy Habit of Mind (s18-s20)

Factor 5: Metacognition Habit of Mind (p15-s17)

Factor 6: Gathering Data through All Senses Habit of Mind (s21-s23)

Factor 7: Managing Impulsivity Habit of Mind (Developing Strategy for Solution) (s8-s10)

As the second step of the scale development process, the final form of the scale was applied in a different group and the second level confirmatory factor analysis was performed in order to obtain evidence of validity. The path diagram (t values) obtained as a result of confirmatory factor analysis (CFA) is presented in Figure 2.

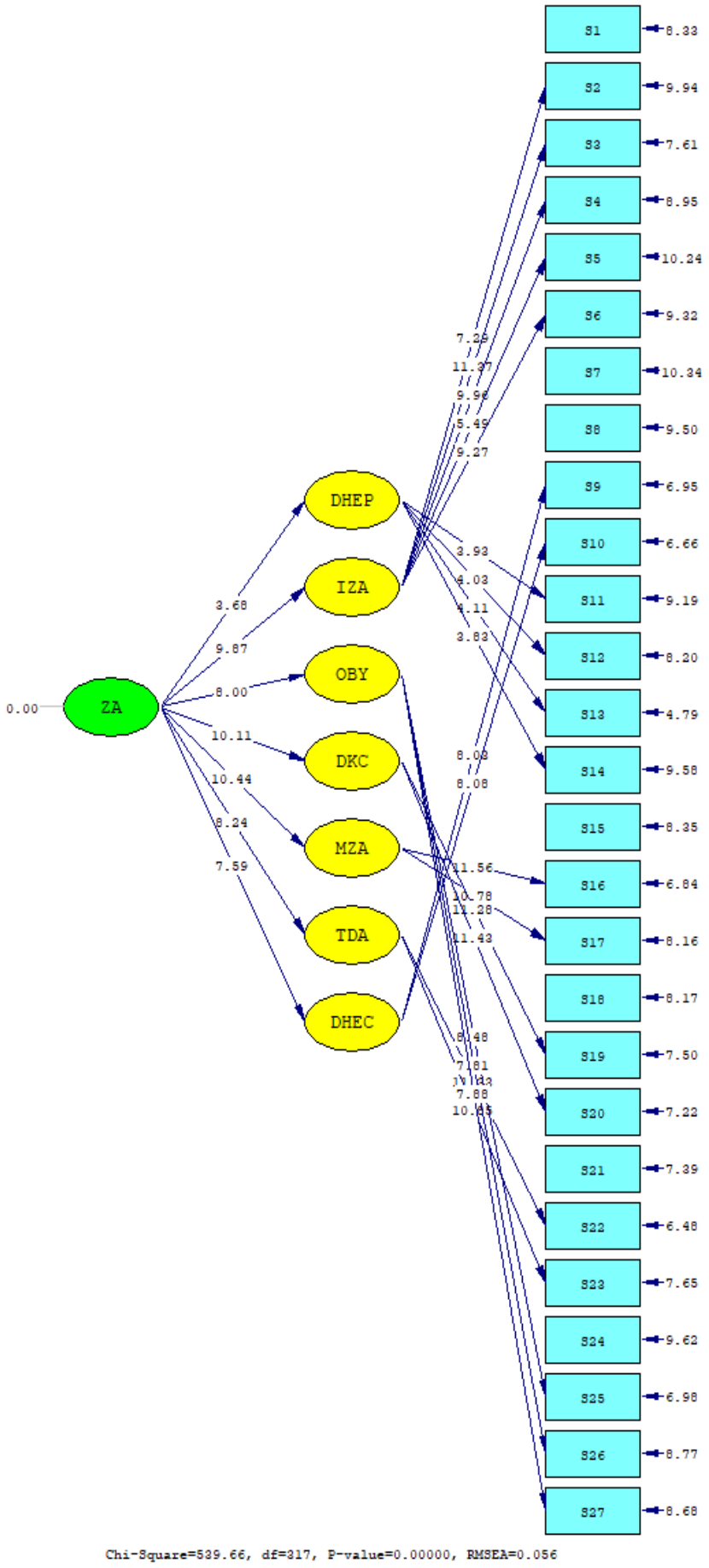

Figure 2. Confirmatory Factor Analysis Path Diagram (t Values)

Figure 2 shows that t values of all items are significant at 0.01 level. In this case, there is no need to discard any item from the scale.

In Figure 3 the path diagram (showing standardized factor loads and error variances) obtained by second-level confirmatory factor analysis was presented.

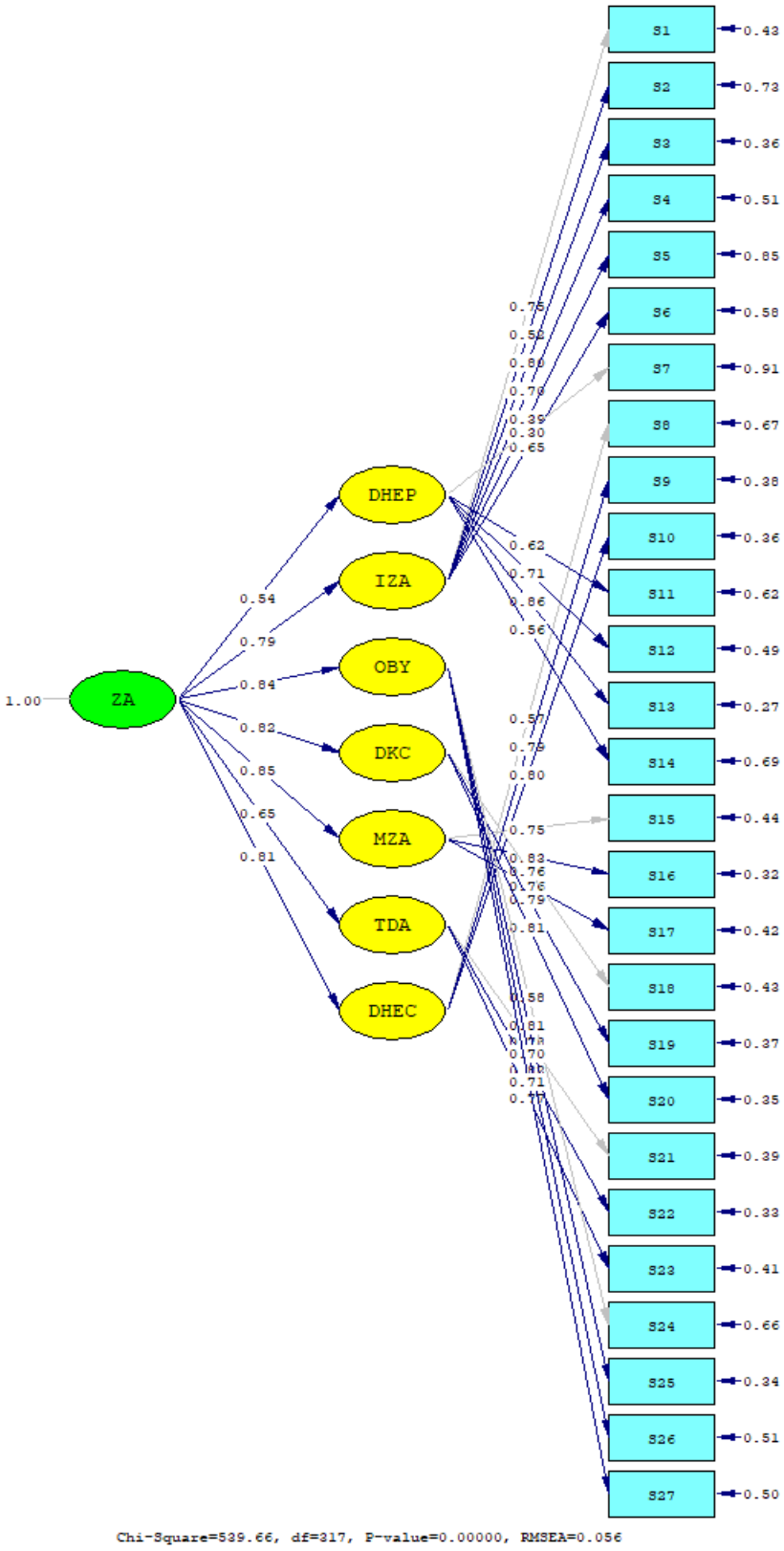

Figure 3. Confirmatory Factor Analysis Path Diagram (factor loads and error variances)

When Figure 3 is examined, it is seen that factor loads of items in the scale (standardized estimation values) vary between 0.30-0.86. There are no items with a load value below 0.30 in the scale.

As a result of the analysis, p value was found to be significant at 0.01 level. However, the p value of large samples is likely to be significant (Yılmaz and Çelik, 2009). Therefore alternative fit indices are used. Other fit index values of the scales: x^2 /sd ratio was estimated as (539.66 / 317) = 1.70. A ratio of ≤3 indicates a perfect fit (Kline, 2005). RMSEA = 0.056, SRMR = 0.070. When these values are between 0.05 and 0.10, it corresponds to the perfect fit criterion (Schermelleh-Engel and Moosbrugger, 2003). GFI = 0.85, CFI = 0.97, NNFI = 0.96 and IFI = 0.97; here, indexes above 0.95 corresponds to perfect fit, above 0.90 corresponds to good fit (Tabachnick and Fidell, 2001).

Cronbach's alpha coefficient, which is an internal consistency measure, was used to calculate the reliability of the scores obtained from the scale. Cronbach's alpha internal consistency coefficients of the scale are presented in Table 4.

Table 4. Cronbach's alpha reliability coefficients of the scale

		All Items	**Factor 1**	**Factor 2**	**Factor 3**	**Factor 4**	**Factor 5**	**Factor 6**	**Factor 7**
EFA	Cronbach Alfa	0.897	0.838	0.814	0.782	0.801	0.793	0.813	0.623
CFA	Cronbach Alfa	0.906	0.544	0.787	0.773	0.820	0.816	0.820	0.746

When the Cronbach alpha internal consistency coefficients in Table 4 are examined, it is seen that the reliability of both total score and sub-factors are on a high level; and only the seventh factor in data obtained from EFA group and the first factor in data obtained from CFA group are reliable on a medium level (Özdamar, 2004).

Conclusion and Recommendations

When the obtained validity and reliability evidences are evaluated together, it is seen that the developed scale is a valid and reliable measurement tool that can be used in future studies. The reliability coefficients of the scale were 0.897 for Exploratory Factor Analysis (EFA) and 0.906 for Confirmatory Factor Analysis (CFA). All factors together account for 65.402% of the variance. The developed scale can measure according to the purpose of the study.

Researchers who will make new studies on the habits of mind in the field of music education are advised to conduct studies to measure the habits of mind in different dimensions of music education (chorus, orchestral studies, hearing education, etc.), to reconsider the consistency of the habits of mind that are not included in this study with music education by the researchers of this study. Also, educators, who provide individual instrument training courses, should benefit from this scale in order to recognize the learning habits of students, to develop their habits of mind, and to form a teaching plan according to their habits of mind.

REFERENCES

Aydın, B. (2018). Müzik Performans Kaygısının Oluşumu, Belirtileri ve Performan Sürecine Etkileri. rı (Editörler: Prof. Dr. Hasan Arapgirlioğlu, Prof. Dr. Serdar Tuna, Doç. Dr. Mehmet Gönül, Doç. Dr. Sinan Sönmez) *Güzel Sanatlar Alanında Yenilikçi Yaklaşımlar.* 59-79. Ankara: Gece Akademi.

Bilgiç, E.N.Ü., (2018). İlköğretim Matematik Öğretmen Adaylarının Matematiksel Zihin Alışkanlıklarının Problem Çözme Sürecinde İncelenmesi. *Necatibey Eğitim Fakültesi Elektronik Fen ve Matematik Eğitimi Dergisi (EFMED)* 12(1), 63-82.

Costa, A.L., Kallick, B.(2008). *Learning and Leading with Habits of Mind*, USA: Association for Supervision and Cirriculum Development.

Dalkıran, E., Baltacı, H., Karataş, Z., Nacakcı, Z. (2014). Developing of Individual Instrument Performance Anxiety Scale: Validity-Reliability Study. *International Journal of Assesment Tools in Education.* 1(1-2), 13-25.

Doğanlar, H. (2018). *Ortaokul Matematik Öğretmenlerinin Cebirsel Zihin Alışkanlıklarının Belirlenmesi ve Derslerine Yansımaları.* Yüksek Lisans Tezi. Dokuz Eylül Üniversitesi Eğitim Bilimleri Enstitüsü İlköğretim Anabilim Dalı İlköğretim Matematik Öğretmenliği Programı, İzmir.

Ekici, G. (2016). Öğrenme-Öğretme Kuramları ve Uygulamadaki Yansımaları (Editör: Doç. Dr. Gülay Ekici) *Zihin Alışkanlıklarına Göre Öğrenme-Öğretme Yaklaşımı.* 855-899. Ankara: Pegem Akademi.

Ekici, G., Akdeniz, H. (11-14 Mayıs 2017). Öğretmen Adaylarının Zihin Alışkanlıklarının Analizi: Fen Alanı Branşlarından Bir Örnek (Bildiri). 9. Uluslar arası Eğitim Araştırmaları Kongresi, Ordu Üniversitesi.

Eren, M. (2015). Zihin Alışkanlıkları Temelli Öğrenme-Öğretme Yaklaşımı. (Editör: Doç. Dr. Gülay Ekici) *Etkinlik Örnekleriyle Güncel Öğrenme-Öğretme Yaklaşımları-III*. 485-507. Ankara: Pegem Akademi.

Kline, R.B. (2005). Principles and Practice of Structural Equation Modelling. New York, NY: Guilford.

Korkmaz, S. (2015). *Problem Çözmede Matematiksel Zihin Alışkanlıklarının Matematik Öğretmenleri ve Sekizinci Sınıf Öğrencileri Bağlamında İncelenmesi.* Yüksek Lisans Tezi. Bolu Abant İzzet Baysal Üniversitesi Eğitim Bilimleri Enstitüsü İlköğretim Anabilim Dalı Matematik Öğretmenliği Bilim Dalı, Bolu.

Korkmaz,S., Dündar, S., Yaman, H. (2016). Problem Çözmede Zihnin Matematiksel Alışkanlıkları. *Turkish Journal of Computer and Mathematics Education.* 7(1), 35-61.

Körükçü, E. (2015). *Zenginleştirilmiş Öğrenme Ortamında Ortaokul Öğrencilerinin Matematiksel Zihin Alışkanlıklarının Gelişiminin İncelenmesi.* Doktora Tezi. Marmara Üniversitesi Eğitim Bilimleri Enstitüsü İlköğretim Anabilim Dalı İlköğretim Matematik Öğretmenliği Bilim Dalı, İstanbul.

Köse, N.Y., Tanışlı, D. (2014). Sınıf Öğretmeni Adaylarının Geometrideki Zihinsel Alışkanlıkları. *Kuram ve Uygulamada Eğitim Bilimleri* 14(3), 1203-1230.

Özdamar, K. (2004). *Paket programlar ile istatistiksel veri analizi (çok değişkenli analizler).* Eskişehir: Kaan Kitabevi.

Schermelleh-Engel, K., Moosbrugger, H., (2003). Evaluating the fit of structural equation models: Tests of significance and descriptive goodness-of-fit measures. *Methods of Psychological Research Online,* 8(2), 23-74.

Tabachnick, B. G., Fidell, L. S. (2001). *Using Multivariate Statistics* (5th Ed.) USA: Pearson.

Tıraşoğlu, N.B. (2013). *Matematik Öğretmen Adaylarının Matematiksel Muhakeme Bağlamında Matematiksel Zihin Alışkanlıklarının Belirlenmesi.* Yüksek Lisans Tezi. Gazi Üniversitesi Eğitim Bilimleri Enstitüsü İlköğretim Anabilim Dalı Matematik Öğretmenliği Bilim Dalı, Ankara.

Yılmaz, V., Çelik, H. E. (2009). *LISREL İle Yapısal Eşitlik Modellemesi-1.* Ankara: Pegem Akademi.