Instrument-Playing Students' Self-Concepts

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Abstract
Although the benefits of music have been known for many years, research on children's educational achievements has intensified, especially recently. Self-concept is an essential criterion of success in education,known as an individual's ideas and thoughts about himself are related to children's behaviors and concrete characteristics. Self-concept is a concept that can be developed with education. The aim of this study, in which the self-concepts of 12-13-year-old instrument-playing students were tested, is to draw attention to the role of musical instrument education in the development of self-concept. The research was conducted with 7th-grade students studying in a public school in Ankara. The research results, which were applied to the students who played and did not play the instrument, were evaluated with the statistical program. As a result of the research, although there was no statistically significant result in the self-concept scores related to the time to start learning the instrument, it was concluded that students who play instruments and those who want to play have higher than others. In addition, it is anticipated that further long-term studies are required to monitor how the self-concept scores of children who play instruments develop over time.

Keywords: Self-Concept, Music Education, Musical Instrument Education, Children Playing Instruments

Introduction

In recent years, the increase in research on music functions has led people to do more research in this area. Education, which reflects the process of creating desired behaviors (Ertürk, 1972; Sönmez, 1994) in music education, is the process of gaining desired musical behaviors through the individual's own life (Uçan, 2005). Although the benefits of music to the individual have been known for many years, research on this subject has been expanded recently. Music education helps children in many subjects, from language development to cognitive ability development, from social relations to individual thoughts. Today, researchers have focused on many effects of music. Even in studies on the brain, which are still not fully resolved, the effects of music are among the topics researchers are interested in. In one study, magnetic resonance imaging was used to compare the brain activity patterns of two groups of musicians and non-musicians. Non-musicians had higher activity of the left secondary auditory cortex, whereas musicians experienced more activation of the right posterior temporal and supramarginal areas (Gaab & Schlaug, 2003). This provided evidence that music has effects on the brain. Studies on teenagers have seen similar results. For example, neuronal connectivity was discovered in a study because being actively involved in music by playing a musical instrument at a young age improves cognitive

ability by increasing neuronal communication between the left and right hemispheres of the brain and has positive effects on learning, memory, fine motor skills, social and nonverbal reasoning. In order to grow the network, it was stressed the need to integrate youngsters into various types of instrument classes (Stoklosa, 2016). In a study comparing musicians and non-musicians, volume disparities in the motor, auditory, and visuospatial brain regions were discovered. According to the study, these disparities are the result of musicians learning complicated physical and auditory skills from a young age (Gaser & Schlaug, 2003). While drawing attention to the role of the premotor cortex in musical performance, it was emphasized that it is essential in both motor and auditory areas (Zatorre, Chen, & Penhune, 2007).

Since language acquisition is directly related to the brain, research on music and language is also essential. According to research, comprehensive music education impacts the perception of pitch contour in spoken language (Schön, Magne, & Besson, 2004). Some studies have looked at the brainstem encoding of linguistic pitch and discovered that musicians have more solid and faithful encoding than non-musicians (Wong, Skoe, Russo, Dees, & Kraus, 2007). Studies have also demonstrated that speakers of tonal languages like Cantonese have a more excellent auditory pitch, music perception, and cognitive capacity than English speakers (Bidelman, Stefanie, & Moreno, 2013).Speaking, which is an actual result of language acquisition, is indirectly related to music. Musicians may have sooner and larger brainstem responses to both spoken and musical stimuli in auditory and auditory-visual circumstances than non-musicians because musical training modifies cortical organization (Musacchia, Sams, & Kraus, 2007). According to one study, musicians have an advantage in speech perception and cognition later in life (Merten et al. 2021).

In addition to the benefits of music for people, there are also studies on the use of some adverse situations. According to a study, music education modulates the recall of spoken and spoken material in Alzheimer's disease (Baird, Samson, Miller, & Chalmers, 2017). According to a study on twins, music is a modifiable protective factor against dementia and cognitive impairment (Balbag, Pedersen, & Gaztz, 2014). A study found that music practice has cognitive and cerebral benefits in domain-specific functions (auditory perception) and more domain-oriented functions. As a result, music practice can be a helpful strategy for reducing the effects of aging-related cognitive issues (Román-Caballero, Arnedo, Triviño, & Lupiañez, 2018). Playing a musical wind instrument has the potential to be a long-term therapeutic agent for asthmatics, according to another research (Lucia, 1994). In addition, according to a study, students with disabilities can play musical instruments with the proper adaptations and support from their teachers and parents (McCord & Fitzgerald, 2006).

Since it is possible to achieve all these gains with music education, studies are increasing the importance given to music education. The trend of research on the achievements of music education is also diverse. However, the common point of performance indicators shows that music is necessary for success in many areas. According to one study, formal childhood exposure to music was positively associated with IQ and academic achievement, with minor but significant and long-lasting relationships(Schellenberg, 2006). Being a musician had a minor influence on long-term memory but a moderate effect on short-term and working memory, according to a study of young musicians and non-musicians. As a result, it was discovered that musicians outperformed non-musicians in memory tests (Talamini, Altoè, Carretti, & Grassi, 2017). It is proposed that musicians' superior scores relative to non-musicians have beneficial impacts on verbal memory due to changes in brain organization caused by long-term musical education (Brandler & Rammsayer, 2003). Similarly, One more study suggests that people who received music education outperformed those who did not, suggesting that musical education leads to improved memory for oral material (Kilgour, Jakobson, & Cuddy, 2000).

In light of all this information, some studies show that music education brings academic success. According to one study, teens who play an instrument may make more progress and have higher academic performance (Hallam & Rogers, 2016). Kids who receive music education have better results in all

disciplines than those who do not, according to a study examining whether students who love/perform music have better academics than others (Cabanac, Leonid, Bonniot-Cabanac, & Cabanac, 2013). Although there is no structural difference between musicians and musicians in mathematical tasks, it has been suggested that students who receive music education outperform those who do not receive in mathematical tasks that structurally overlap with music (Bahr & Christensen, 2000). According to a survey of 7000 students, pupils who participate in musical activities score much higher on exams, regardless of the amount of time they spend doing so (Thornton, 2013).

The importance of music education is also seen in the results of these studies. However, one point should not be overlooked here, which is the fact that the earlier you start music education, the greater the benefit. This is why music education in childhood is essential. Research has suggested that children can gain sensorimotor synchronization abilities in their first-year thanks to music education (Bailey & Penhune, 2010). In the research conducted the following year, it was suggested that the musical education of children before the age of 7, which is the sensory period for music education, may affect behavior and the brain (Penhune, 2011). Shortly after, in a study for the same age group, it was concluded that musicians who started education before the age of 7 performed more accurately in the auditory rhythm synchronization task (Bailey & Penhune, 2012). A study of twins suggests that early musical initiation is associated with higher ability and achievement (Wesseldijk, Mosing, & Ullén, 2020). The study conducted only two years after this research suggested that the maturational change of children aged 6-9 years is essential for integrating motor knowledge. For this reason, it is emphasized that Early Music Education is Related to the Gray Matter Structure in the Ventral Premotor Cortex and Auditory-Motor Rhythm Synchronization Performance (Bailey, Zatorre, & Penhune, 2014)

Cognitive psychology research, which is the scientific study of mental processes such as attention, language use, memory, perception, problem solving, creativity, and reasoning, has provided evidence that music education benefits people. According to a study, having a high level of musical involvement throughout one's life has a sizeable predictive effect on cognitive performance in old age (Hanna-Pladdy & MacKay, 2011). According to another study, musicians can improve capacity in many forms of visual attention, suggesting the potential cognitive benefits of long-term musical training (Rodrigues, Loureiro, & Caramelli, 2013). Singing, playing an instrument, and having various musical experiences were cited in the study, which was later carried out to promote self-esteem and musical development (Culp, 2016). A recent study concluded that playing music in childhood or adulthood is associated with cognitive reserve (Romeiser, Smith, & Clouston, 2021). Playing a musical instrument impacts the brain and cognitive function since it activates many brain regions at once, involves cognitive and motor functions, and engages numerous sensory systems. When researchers looked into these aspects of musical instrument playing and considered older persons who play musical instruments as potential guards against cognitive decline, they discovered that playing music is linked to improved cognitive abilities (Schneider, Hunter, & Bardach, 2019).

Self-concept, known as an individual's ideas and thoughts about himself, is related to children's behaviors and concrete characteristics (Yıldız & Fer, 2008). Self-concept, which represents children's self-confidence in many ways, from their student life to their social life, can also be called self-confidence. Children's self-confidence during development is essential not only for their social environment but also for academic success. Since music has a feature such as a self-confidence, it may be beneficial for children's future lives to increase their self-confidence through music education during their developmental period. Gains in cognitive benefits, especially by playing a musical instrument, can contribute to the development of students in social and academic terms. The research aims to draw attention to the role of instrument playing in education by testing students' self-concepts. The sample taken for the research consisted of sub-headings such as physical competence, physical appearance, peer relations, parent relations, mathematics, reading, public school, general self, with variables such as whether or not they want to play an instrument, whether they play

an instrument and how long they have received this education. A questionnaire consisting of questions was applied. The problem sentence of the research is "how are the self-concepts of children who play an instrument."

Method

Research Model

This study is based on a survey method. Questionnaires are forms that provide information about some data about themselves by marking the answers given to the questions of the people participating in the research (Creswell, 2008).The survey model is defined as "research conducted on bigger samples, generally compared to other studies, in which the perspectives of participants on a subject or event, or their interests, skills, talents, attitudes, etc. are determined" (Büyüköztürk, Çakmak, Akgün, Karadeniz, & Demirel, 2016).

Participants

The study group consists of 58 7th grade students studying in Ankara / Turkey from 2020-2021. While the research sample group consists of 32 students who play musical instruments, the number of students who do not play any instrument is 26. For the reliability of the research results, students were selected from students of similar socio-economic status, accompanied by responsible teachers at the school.

Data Collection Tools

Self-description questionnaire-I was used in the study. Marsh had developed the original version of the tool within the framework of Shavelson, Hubner, and Stanton's self-concept theory (Yıldız & Fer, 2008). Yıldız and Fer were carried out for the validity and reliability of the Turkish version of the "Self-Definition Questionnaire-I" by Yıldız and Fer (Yıldız & Fer, 2008).The research was evaluated with the distribution of the questions in the inventory according to their factors. Self-description questionnaire-I contains the following components under three main headings: academic, non-academic, and general self-concepts.

Table 1 Dimensions and Subscales of Self-Description Questionnaire-I

Dimensions	Subscales	Number of Items
Academic Self-Concepts	Math	10
	Reading	10
	School-general	10
Non-Academic Self-Concepts	Physical ability	9
	Physical appearance	9
	Peer relations	9
	Parents relations	9
General Self Concept	General self-concept (other factors)	10
Total		**76**

Source : Quoted from Yıldız & Fer (2008).

Data Analysis

After obtaining the necessary permission for the prepared inventory, the self-description questionnaire-I was applied to the students who were suitable for the sample. After completing the questionnaire with the help of multiple choice 5-point Likert-type questions, the data were classified for analysis. After deactivating the erroneous data, the data of a student group of 58 students who were suitable for scientific use were entered into the SPSS 24 program. The normal distribution was used to decide on the statistical suitability of the analysis and which tests will be applied. After checking whether the skewness and kurtosis coefficients were suitable for the normal distribution, analyzes were started. Since some of the components in the data set were not suitable for normal distribution, the analyzes were made with non-parametric tests. "Mann-Whitney U," "Wilcoxon W," and "Kruskal-Wallis H" tests were used in the analysis.

Findings

In this section, variables such as the study group's willingness to play an instrument, playing an instrument, and when to start learning an instrument were analyzed with the results of the self-concept inventory.

Students' Willingness to Play a Musical Instrument

In the study, students were asked to be willing to play a musical instrument. The self-concept

inventory data of the students, who were divided into two groups those who want to play the instrument and those who do not, were analyzed together with the variable in question. The findings are shown below.

Table 2 Students' Willingness to Play a Musical Instrument

	Variance	N	Mean Rank	Sum of Ranks
Self-concept total	Students who want to play a musical instrument	45	33,590	1511,500
	Students who do not want to play musical instruments	13	15,350	199,500
	Total	**58**		

Students' willingness to play a musical instrument on the table. While there are 45 Students who want to play a musical instrument, 13 students stated that they do not want to play any musical instrument.

In the table below, the data of the self-concept inventory, which is divided into eight components, are seen separately according to the components.

Table 3 Students' Willingness to Play a Musical Instrument According to Self-Concept Components

	Math	Reading	School-General	Physical Ability	Physical Appearance	Peer Relations	Parents Relations	General Self-Concept (Other Factors)
Mann-Whitney U	102.500	111.000	67.000	276.500	158.500	198.500	161.500	129.500
Wilcoxon W	193.500	202.000	158.000	1.311.500	249.500	289.500	252.500	220.500
Z	-3.550	-3.393	-4.211	-.299	-2.503	-1.758	-2.499	-3.048
Asymp. Sig. (2-tailed)	.000	.001	.000	.765	.012	.079	.012	.002

The table shows the data of the self-concept inventory. Considering the ratings, the p values of "pgysical ability" and "peer relations" are greater than 0.05 (physical ability p=0.765 and peer relations p=0.079). Therefore, whether or not the students want to play musical instruments is not statistically significant for the "pgysical ability" and "peer relations" components. On the other hand math, reading, school-general, physical appearance, parents relations, general self-concept (other factors components) have p values less than 0.05 (math p=0.00, reading p=0.01, school-general p=0.00, physical appearance p=0.01, parents relations p=0.01, general self-concept p=0.02. Thus, between students who want to play a musical instrument and students who do not want math, reading, and school-general, It was found to be statistically significant for physical appearance, parental relations, and general self-concept scores.

The overall image of the inventory, whose components are given separately in Table 3, of students who want to play an instrument and those who do not can be seen in the table below.

Table 4 The Overall Analyses of Students' Willingness to Play a Musical Instrument

	Test Statistics
	Variance
Mann-Whitney U	106.000
WilcoxonW	197.000
Z	-3.478
Aymp.Sig. (2 tailed)	.001

Self-concept data can be seen in the table, where eight components are analyzed together. According to the table, it is seen that the p-value is less than 0.05 (0.01). In the light of these data, it was revealed that there was a statistically significant difference in

the self-concept scores of the students who played musical instruments compared to the students who did not play. As seen in the first table, the self-concept scores of the children who want to play an instrument are higher than the students who do not want to play.

Students' Musical Instrument Playing Status

The students were asked whether they play musical instruments. Self-concept inventory data of the students, divided into two groups, those who play instruments and those who do not, were analyzed together with the variable in question. The findings are shown below.

Students' data are shown in the table. While there are 32 students playing instruments, 26 students stated that they do not play musical instruments.

Table 5 Students' Musical Instrument Playing Status

	Variance	N	Mean Rank	Sum of Ranks
self-concept	students playing instruments	32	36.94	1182.00
	students who do not play instruments	26	20.35	529.00
	Total	58		

The table below shows the data of students who play and do not play an instrument, according to the self-concept inventory, which is divided into eight components.

Table 6 Sstudents who Play and do not Play an Instrument

	Math	Reading	School-General	Physical Ability	Physical Appearance	Peer Relations	Parents Relations	General Self-Concept (Other Factors)
Mann-Whitney U	191.500	183.500	133.000	359.500	270.000	261.500	305.000	186.000
Wilcoxon W	542.500	534.500	484.000	887.500	621.000	612.500	656.000	537.000
Z	-3.517	-3.644	-4.431	-.885	-2.287	-2.423	-1.775	-3.606
Asymp. Sig. (2-tailed)	.000	.000	.000	.376	.022	.015	.076	.000

In the table, it seems that the pe values of "physical ability" and "parents relations" are greater than 0.05 (physical ability p=0.376 and "parents relations p=0.076). According to these data, there is no statistically significant difference in terms of "physical ability" and "parents relations" components whether students play musical instruments or not. Other components are Math, reading, school-general, Physical appearance, peer relations, general self-concept p values less than 0.05 math, and reading. school-general, general self-concept p values= 0.00, physical appearance 0.22, peer relations p= 0.015).

The data obtained showed a statistically significant difference in the self-concept values of whether or not to play a musical instrument for the other six components, except for "physical ability" and "parents relations."

In the table below, whether the students play an instrument or not is generally evaluated by gathering eight components under a single heading.

Table 7 The Overall Analyses of Students who Play and do not Play an Instrument

	Variance
Mann-Whitney U	178.000
Wilcoxon W	529.000
Z	-3.722
Asymp. Sig. (2-tailed)	.000

The self-concept scores of the students according to whether they play an instrument or not are shown above. There is a statistically significant difference between students who play an instrument and those who do not since the p-value is less than 0.05 (p=0.00). As seen in the first table, the self-concept

scores of students who play instruments are higher than those who do not.

Time for Students to Start Playing a Musical Instrument

Time for students to start playing musical instruments information was asked to the students. It was analyzed together with Self-concept inventory data with three variables, less than a year, one to two years, and more than two years. The findings are shown below.

Thirty-two of the students participating in the research play an instrument. The table above shows the self-concept data and the time that the students started their instrument training. According to the table, eight students have played the instrument for less than one year, six students have been playing for 1-to 2 years, and 18 students have been playing for more than two years.

Table 8 Time for Students to Start Playing a Musical instrument

	variance	N	Mean Rank	sum of Ranks
self-concept	less than a year	8	10.38	83.04
	one to two years	6	16.50	99.00
	more than two years	18	19.22	345.96
	Total	**32**		

The table below shows the duration and self-concept scores of children who play instruments.

Table 9 Time to Start Instrument Training

	Math	Reading	School-General	Physical Ability	Physical Appearance	Peer Relations	Parents Relations	General Self-Concept
Kruskal-Wallis H	1.941	2.798	5.595	5.197	2.453	4.277	4.804	3.163
df	2	2	2	2	2	2	2	2
Asymp. Sig.	.379	.247	.061	.074	.293	.118	.091	.206

The results of the shuffle analysis according to the self-concept components of the period from the time the students started the instrument to the present time are shown in the table. According to the table, the p values of all components are higher than 0.05. For this reason, the cell-concept components and the instrument start-up time are not statistically significant.

Table 10 The Overall Data of Time to Start Instrument Training

	Self-Concept
Kruskal-Wallis H	4.930
df	2
Asymp. Sig.	.085

The table above shows the collective comparison of the students' starting time to the instrument and their cell-concept scores. According to the table, since the cell-concept score is higher than 0.05, there is no statistically significant difference between the time to start playing the instrument and the cell concept.

Conclusion and Discussion

In the study, whether the students aged 12-13 wanted to play an instrument, their situation of playing an instrument, the time spent by the students who played the instrument since they started learning, and their self-concept scores were analyzed. The analyses made were selected from students with similar characteristics, taking into account the students' socio-economic status and their age groups.

Most of the students who participated in the research stated that they wanted to play an instrument. In the analysis made according to the cell-concept components, it was observed that all components except "pgysical ability" and "peer relations" scores were high. The total self-concept scores of the students who wanted to play an instrument were higher than those who did not want to play. Therefore, the desire to play an instrument increases

the students' self-confidence. After removing the playing learning area from the music curriculum in Turkey (Albuz & Demirel, 2019), instrument teaching in schools is given to students who want it with supplementary courses. The students' willingness to play an instrument is interpreted as a reflection of the self-confidence that the students who play an instrument have gained from doing a subject lovingly while pointing to the high self-concept scores of the students willing to participate. One of the biggest obstacles to playing an instrument is the fact that the instruments are not affordable for everyone, maybe due to the fact that the students did not want to play an instrument but did not receive this training because they could not get it. In order to support instrument education at this point, providing students with instruments and education-related support can prevent financial problems.

In the comparative analysis of the self-concept scores of students who play and do not play an instrument, it was observed that there was a significant difference in all components except for the "Physical ability" and "parents relations" components. Total self-concept scores have a significant distribution between the instrument player and non-player variables. It has been observed that students who play an instrument have higher scores than those who do not. Therefore, playing an instrument increases students' self-confidence. The age range of the sample group in the study is the age at which students discover themselves, and their self-confidence forms the basis of their success in many subjects.

For this reason, musical education, especially instrument education, should be started at an earlier age so that more gains should be made than the gains of playing an instrument. As can be seen in the experimental studies conducted in the literature review section, the benefits of playing an instrument on the brain, especially at an early age, are invaluable. As seen in the experimental study conducted in the research, it is possible to gain cognitive benefits as well as physical benefits with instrument training.

There was no statistically significant difference between the components in the self-concept scores that the students received from the moment they started their instrument education until today. For this reason, for students in the 12-13 age group, how long they have played an instrument is not an important variable in terms of self-confidence. Despite this, considering that children who play instruments have higher scores than those who do not play, it is predicted that the student's self-confidence will start to increase when he/she starts instrument training. In other words, even the beginning of instrument training by 12-13-year-old students contributes positively to the increase of self-confidence. For this reason, instrument training should be given to students at all levels.

The fact that students receive music education throughout their education life improves both their spiritual and academic success. According to the research results, instrument education, which contributes to the student's self-confidence, should be included in music education. Education supported by instrument training in music education programs organized according to students' readiness levels supports musical development and academic development. In addition to primary education, students should be supported to learn to play an instrument outside of class hours. Courses given in addition to out-of-school private and school lessons are essential areas for instrument training. It is also essential to work with the right teacher at the right time and carry out these courses with a plan and program. At this point, although the importance of the program seems essential, the role of the teacher comes to the fore. National education programs should support the instrument lessons given by private and state music courses and take some measures to make them more attractive. As it is known, due to the high prices of instruments, many students cannot even think of playing an instrument. For this reason, the musical education of children from low-income families disappears before they even begin. Especially children who have musical talent and will have a future in this field should be determined well in advance, necessary financial support should be provided, and they should be provided with instrument training.

Future generations can only be shaped by education. The role of music education is to properly support future generations with music. Musical instruments, which are the most important tools

of music, are indispensable in music education. Therefore, instrument education can contribute to the proper education of future generations with music.

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