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Playing Musical Instruments during Elementary School Age and the Selection of Secondary School and Profession

Diana Atanasov Piljek and Tamara Jurkić Sviben
Faculty of Teacher Education, University of Zagreb

Abstract

Numerous scientific researchers have been pointing to the connection between certain music activities and development of the non-musical competencies. Learning to play a musical instrument contributes to the development of the multiple intelligences elements. The aim of this work is to determine whether there is a connection between the learning process and the activity of playing a musical instrument in elementary school and the selection of secondary school type and occupation. In this research the following questions were considered: whether playing a musical instrument during elementary school age is connected with the process of choosing secondary school and occupation, with the overall success of the respondents in elementary and secondary school, their success in Mathematics, the level of future education and the knowledge of foreign languages. A total of 283 respondents of various age groups participated in this research, and they were divided into two categories: the respondents who were played a musical instrument during elementary school age and the respondents who did not.

Key words: *level of education; non-musical competencies; personal interests; playing.*

Introduction

The Fundamental Starting Points– Historical Context

Education through art has always been an important part of the fundamental education. Since the Roman times, special attention has been paid to the integrity of the body, spirit and soul. The content of music education has changed through historical eras. However, singing has always been the core music activity. Playing a musical instrument as a constituent part of music education emerged in ancient Greece (playing the lyre, aulos and kithara), and was later mentioned by a philanthropist in the 18th century. In his work "Emil or about education" (1762), J. J. Rousseau advocates practical

music making in elementary school, in which the musical alphabet is learned, as well as the meaning of the pedagogical process in music education. In European schools, playing a musical instrument occurred for the first time in the 19th century (Rojko, 2012), at the same time when the awareness of "the value of music and music education in the general education system" occurred (Požgaj, 1975, p. 13). Over the years, music education has been assuming a more and more important position in all curricula. In England, the traditional choir singing and group music making have become important music activities at all educational levels. In Germany, *Jugendbewegung* and *Schulwerk* were created by Carl Orff, which substantially influenced the development of music pedagogy (Rojko, 2012, p. 64) and presented a "particular impulse to the development of instrumental music performance in Europe".

The history of Croatian music education always followed the historical development of education. In Croatia, Aristotle's views on the educational influence of music can be traced back to the 16th century. Nikola Vitov Gučetić, a humanist from Dubrovnik, stated in his work *Dello stato delle Republiche*: "Children do not learn music merely for pleasure and refreshment of the soul, which they should not even know, but because of what they will do in the following years..." (Tuksar, 1978, p. 103). Furthermore, analyzing the influence of Aristotle's ideas on Gučetić's thoughts, Tuksar (1978, p. 104) concludes "that (since the Croatian Renaissance; the author's comment) it has called for music education to be conducted in a way that would enable young people to actively learn to play an instrument and sing, and to some extent to take part in the musical performances."

Although in the Renaissance Dubrovnik there were advanced ideas about the importance of music education, in the rest of Croatia music education in the period between the 14th and 18th century mostly required students only to sing. In the 19th century music education program was enriched with musical literacy. Up to 1958, music education was conducted through the activities of singing, literacy, listening and creative expression. The task of the *playing* area of music education was viewed as training for making music on an instrument whereby it implied "playing the children's instruments" (Osnovna škola, 1958, p. 229). In the new curriculum in 1960, the subject Music Education also included the activity of playing a musical instrument. In 1972, the subject was partially renamed, while the content of all music activities was more specified, including playing.

Playing as an activity at elementary school age is closely related to the learning of musical alphabet.

It is described as: "conscious mastering of rhythmic and metric forms which are consistent with melodic-rhythmic material..., conscious adoption of the diatonic scale tones and their relations within the melodic element of the scale and mode up to two key signatures, ...theoretical knowledge connected with the conscious mastering of the areas of singing, playing, active music listening and music making" (Naša osnovna škola, 1972, p. 292). Playing in the function of accompanying a previously learned song is performed with percussions, folk and popular instruments.

> Curriculum from 1972 especially focused on the importance of playing.
> …if students, for any reason, are not able to sing, they can actively participate in the musical performance of the class. Generally, each student should be, to some extent, taught to play one rhythmic or one melodic instrument, depending on the working conditions in the school. Due to this, contemporary music pedagogy demands that regular education include playing activities as well, instead of perceiving them only as leisure activities. Therefore, playing as a music activity was introduced in the first grade of elementary school and in the future grades it should be gradually developed. For group playing in the class those musical instruments are chosen which are not too technically demanding for the child...
> It is of vital importance that the students master the simplest form of accompanying a song on musical instruments... Lessons in which playing musical instruments is taught should be incorporated in the regular timetable... However, lessons in which students learn to play the instruments which demand higher technique performance and which are not suitable for the whole class, should be organized in the forms of extra music lessons...
> Upon mastering the rhythmical playing technique on percussions first, melodic instruments such as tamburica, melodica, mouth organ (harmonica), guitar, recorder, xylophones, metal musical instruments, mandolin, etc. can later be introduced. Students who have mastered playing techniques on any instrument in the music school or in some form of music lessons should participate in the class performance or in accompanying a song sung in class. (Naša osnovna škola, 1972, p. 290)

Music Education Today

In Croatia, music activity of playing melodic instruments was included in music education in schools during the last change of the curriculum in 2006. Until then, playing melodic instruments was possible to achieve by *playing by ear* (for the students whose musical hearing was well developed) or *by scores* (assuming that the student gained the basics of musical alphabet). In the new curriculum, musical literacy is perceived as "*educational achievement*: basic knowledge of the fundamental signs of musical alphabet - on the recognition level… elementary (verbal) knowledge of the (picture) musical alphabet…" (NPIP 2006, p. 73). The mentioned level of music picture recognition is not sufficient for the activity of practical playing of melodic instruments in the music lesson. A contemporary music lesson, for the aforementioned reasons, no longer allows playing melodic instruments, and the reduction in the number of music lessons does not allow the possibility of playing by ear.

The Connection of Certain Aspects of Music Education and the Development of Individual Capabilities

Education is perceived as "organized cognitive and psychomotor learning. Along with education, certain intellectual and psychomotor abilities develop to some extent as well" (Pastuović, 1999, pp. 44-45). The purpose of education is not merely to fulfill

the basic needs (according to Maslow's hierarchy of needs), but to enable more successful self-achievement which contributes to the happiness and better quality of life of the individual (according to Pastuović, 2012). Education is training for different professions and profession is defined as a "meaningful activity which one person does" (Petričević, 2011, p. 13). Vocation should be chosen by taking into account a person's own interests, success and abilities, which can be encouraged and developed from the early childhood. Later education shapes specific competencies which are related to personal abilities, aspirations and level of motivation. Accordingly, individuals decide on the enrolment in a specific secondary school and select their future vocation. The role of music activities in the frame of elementary education is not only the basic music education, but also the development of non-musical abilities, which influence the modeling of complete personality. According to the *theory of multiple intelligences* by H. Gardner (2006), which states that each person has several intelligences which are at different developmental levels, special attention should be paid to children and they should be provided with an opportunity to develop elementary components of all intelligences as early as possible. Their development is greatly aided by music activities with which non-musical abilities are developed as well. Music "helps the development of intellectual (conclusion, analysis, memorizing, abstraction, understanding) and motor (speed, coordination, precision) abilities" (Šulentić Begić & Špoljarić, 2011, p. 449). Campbell (2003) states that music has a positive influence on intelligence – development of verbal skills, working habits, memorization of the facts, visual and auditory memorization, level of communication, creativity, empathy, spirituality, character, and it also reduces stress. Numerous scientific research studies confirm the positive effects of playing music on the area of verbal development. The link between music and reading was pointed out by Forgeard et al. (2008, p. 383) who state that "musical abilities prepare the background for phonology and reading abilities." This link is more pronounced among the children who are active in making music compared to the children who were never exposed to music activities. Active engagement in music and music articulation (Gromko, 2005) helps in voice analysis and word synthesis. Moritz et al. (2012) proved the relation between early rhythmic skills, music lessons and phonological awareness among preschool children (5-6 years old). Music activity helps in the process of learning foreign languages (Shabani & Torkeh, 2014). The connection of mathematics and music is contained in the elements of spatial intelligence, which is particularly developed during the activity of playing a musical instrument (Gardiner, 2000; Hetland, 2000; Rauscher et al., 1997).

Music activities conducted during elementary school age are conducive to the continuous development of the music activities which Mirković-Radoš defines as " ...exceptionally complex phenomena which encompass a whole series of capabilities, such as understanding and memorizing the melody, perception of rhythm, understanding the tonality, determination of the intervals, noticing the aesthetics of music and perfect pitch" (Mirković-Radoš, 1996; Dobrota, 2012, p. 39). Hyde et al. (2009) point out that music activities of playing a musical instrument affect the

plasticity of the brain, specifically brain adaptability and using and strengthening of the nerve contacts and paths. Thus, the research showed that among the 6-year-olds who were learning to play musical instruments for 15 months, anatomic changes were visible in the parts of the brain which are controlling the playing activity. These changes are present not only in the motor cortex, but also in the auditory cortex and corpus callosum. The results of the neuroscientific research also prove that people who are actively engaged in music have a greater amount of grey matter in the brain (Gaser & Schlaug, 2003). Playing musical instruments develops evenly both sides of the brain and enhances the creation and development of neural connections (Amunts et al., 1997). Furthermore, playing musical instruments has been associated with the accelerated maturation of the cerebral cortex in the area of motor cortex and coordination center, the part of the brain which is responsible for emotion control, and the center for the impulse regulation (Hudziak et al., 2014). Also, a vast body of research confirms the positive connection between continuous music activities and a high level of academic achievements (Babo, 2001; Cardarelli, 2003; Frakes, 1984; Huang, 2004; Linch, 1993; Trent, 1996).

Research Methodology

The main problem of this research was to investigate whether there is a difference in the selection of secondary school type, achievement in mathematics throughout the entire education, knowledge of foreign languages, future level of education and the choice of profession, depending on whether the person was playing a melodic musical instrument during elementary school age.

The aim of the research was to determine whether there is, and to which extent, the connection between playing melodic instruments during elementary school age and the choice of secondary school type, achievement in mathematics during education, knowledge of foreign languages and future level of education and choice of profession.

Hypotheses

H_1 Respondents who were playing a melodic instrument during elementary school age will choose different secondary school type than those who did not play any musical instruments.

H_2 Respondents who were playing a melodic instrument during elementary school age will have higher achievements in mathematics during the whole education than the ones who did not play any musical instruments.

H_3 Respondents who were playing a melodic instrument during elementary school age will speak more foreign languages than the ones who did not play any musical instruments.

H_4 Respondents who were playing a melodic instrument during elementary school age will achieve a higher education level than the ones who did not play any musical instruments.

H_5 Respondents who were playing a melodic instrument during elementary school age will choose a different profession than the ones who did not play any musical instruments.

Sample of Respondents

The research included a sample of respondents who were born by and in 1989, and who were older than 25 years (N=283). Due to economic reasons, snowball sampling method was used. Questionnaires were distributed to a certain number of respondents and later on they were passed on from one respondent to another. In total there were 41 respondents (15%) at the age of 60 or more, 135 (48%) at the age of 40-59, 38 (13%) at the age of 35-39 and 69 (24%) who were younger than 35. All subjects completed elementary school in the Republic of Croatia and according to the curriculum which was valid until 2006. The sample consisted of 192 females (68%) and 91 males (32%).

Depending on their answers to questions regarding music education (questions 1-8 in the questionnaire) the respondents were classified as players or non-players.

Data Acquisition

The data were acquired through a specially designed questionnaire consisting of 14 questions. The questions were related to: playing a musical instrument (and which one) in the music lessons in elementary school; the intensity of participation in the music lessons in elementary school; playing in an elementary school orchestra; playing in the folklore orchestra of some Folklore Society; playing during some course or private lessons; attending music school; average grade in Mathematics during the entire education; the type of secondary school which respondents attended; attending music or dance secondary school; the number of foreign languages which respondents were using and vocation of the respondents.

Research Procedure

The questionnaire was divided into two segments. The first eight questions were related to the information about music education of the respondents, who were divided into groups, depending on the following facts: whether they were playing in the elementary school or not; according to the number of years of playing some instrument; whether they were learning musical alphabet in elementary school or not; to what extent they were interested in Music Culture lessons in elementary school; whether they were playing in the orchestra in elementary school as a part of extra-curricular activity or folklore society; whether they attended a course or private lessons in playing an instrument and whether they attended music school.

The second part of the questionnaire refers to the success in mathematics during the entire education, the type of secondary school which respondents attended, attending a music or dance secondary school, the number of foreign languages they speak, vocation of the respondents and their profession. Each of the presumed hypotheses was connected with one question from the second part of the questionnaire and

was tested eight times, referring respectively to each question from the first part of the questionnaire. The data are of non-parametric (nominal) nature. Statistical intersection was made using the chi-square test (Tables 1, 4 and 5). Mann-Whitney (Tables 2 and 3) and Kruskal-Wallis tests (Tables 2 and 3) were also used for individual results.

Results and Discussion

Table 1 shows the first group of 8 questions related to the selection of secondary school type**.**

Out of eight single crossings, statistical significance was shown in two cases.

Table 1

Playing melodic instruments during elementary school age and selection of secondary school type

		N	χ^2	df	p
Playing an instrument in elementary school	Yes	120	1.918	5	.860
	No	163			
How long the instrument was played	1 year	14	15.751	25	.922
	2 years	32			
	3 years	14			
	4 years	33			
	More than 4 years	31			
	No	159			
Knowing musical alphabet	Yes	255	4.784	5	.443
	No	28			
Intensity of participation in music lessons	Intense	99	7.567	15	.940
	Above average	140			
	Average	34			
	Not at all	10			
Playing in the orchestra in elementary school	Yes, more than 2 years	35	25.064	10	.005**
	Yes, 1-2 years	21			
	No	227			
Playing in the orchestra of folklore society	Yes, more than 2 years	24	9.968	10	.443
	Yes, 1-2 years	11			
	No	248			
Playing in a course or private lessons	Yes, more than 2 years	41	22.825	10	.011*
	Yes, 1-2 years	56			
	No	186			
Graduated from music school	Yes, elementary	33	8.877	20	.816
	Yes, secondary	64			
	Dropped out in elementary	33			
	Dropped out in secondary	6			
	No	147			

Table 1a

Type of school and playing in the orchestra in elementary school

			Grammar school	Economic school	Technical school	Professional school	Music school	Art school
Playing in the orchestra in elementary school	Yes, for more years	N	28	3	3	0	0	1
		%	80.0	8.6	8.6	0.0	0.0	2.9
	Yes for one or two years	N	14	0	0	4	3	0
		%	66.7	0.0	0.0	19.0	14.3	0.0
	No	N	158	14	29	7	12	7
		%	69.6	6.2	12.8	3.1	5.3	3.1

Table 1b

Type of school and playing in a course or private lessons

			Grammar school	Economic school	Technical school	Professional school	Music school	Art school
Playing in a course or private lessons	Yes, for more years	N	30	3	1	6	0	1
		%	73.2	7.3	2.4	14.6	0.0	2.4
	Yes for one or two years	N	38	2	8	1	4	3
		%	67.9	3.6	14.3	1.8	7.1	5.4
	No	N	132	12	23	4	11	4
		%	71.0	6.5	12.4	2.2	5.9	2.2

It was established that the children who were playing an instrument for more years in the orchestra during elementary school age, were more frequently selecting grammar school for further education, and less often technical secondary school (χ^2=25.064, df=10, p< .01). Also, it was found that the children who were learning to play a musical instrument for more years through courses or private lessons substantially more frequently selected professional school, rather than technical or secondary music school (χ^2=22.825, df=10, p< .05). Such results provide the foundation for the rejection of zero hypothesis and a partial acceptance of the hypothesis no. 1, which states that respondents who were playing a melodic instrument during elementary school age chose a different secondary school type than those who did not play any melodic instrument.

Playing in any type of orchestra develops social competencies (cooperation, team work), creates competitive atmosphere and builds self-confidence. It is not surprising that these students to a greater extent choose to continue their secondary school education in grammar schools, which are needed for the development of specified competencies. Courses or private lessons in playing a melodic instrument imply individual work or work in smaller groups, where general skills are directly transferred mostly sufficiently for the amateur level of playing. Such type of tutoring can have an

influence on reducing the aspiration, lower development of self-confidence and a lack of competitive atmosphere. Choosing this way of tutoring can be a behavioral pattern in the selection of secondary school type, and therefore these students more often opt for more practical professions which are provided by professional secondary schools.

Table 2 shows the first group of 8 questions related to success in Mathematics during the entire education. Out of eight single crossings, statistical significance was shown in two cases.

Table 2

Playing melodic instruments during elementary school age and success in Mathematics

		Mean rank	Mann-Whitney U	Kruskal-Wallis χ^2	Z	df	p
Playing melodic instrument in elementary school	Yes	131.00	8460.000	/	-2.336	/	**.019***
	No	150.10					
How long the melodic instrument was played	1 year	135.61	/	6.289	/	5	.279
	2 years	122.80					
	3 years	132.07					
	4 years	131.77					
	More than 4 years	137.18					
	No	150.36					
Knowing musical alphabet	Yes	142.70	3391.000		- .524		.600
	No	135.61					
Intensity of preoccupation with music class	Intense	132.17	/	4.815	/	3	.186
	Above average	143.73					
	Average	157.68					
	Not at all	161.75					
Playing in the orchestra in elementary school	Yes, more than 2 years	143.94	/	0.079	/	2	.961
	Yes, 1-2 years	138.67					
	No	142.01					
Playing in the orchestra of folklore society	Yes, more than 2 years	144.44	/	1.750	/	2	.417
	Yes, 1-2 years	168.05					
	No	140.61					
Playing in a course or private lessons	Yes, more than 2 years	153.30	/	7.137	/	2	**.028***
	Yes, 1-2 years	159.28					
	No	134.31					
Graduated from music school	Yes, elementary	155.45	/	6.594	/	4	.159
	Yes, secondary	133.00					
	Dropped out in elementary	162.65					
	Dropped out in secondary	115.58					
	No	139.34					

It was found that the children who were playing a musical instrument within regular elementary school education had a statistically significant better grade in Mathematics compared to other children (Mann-Whitney U=8460.000, Z=-2.336, p<.05). It was also found (Kruskal-Wallis test) that the children who learned to play a musical instrument in a course or private lessons, regardless of how long the learning process was, have statistically significant lower grade in Mathematics compared to the children without such tutoring (χ^2=7.137, df=2, p<.05).

These results provide the foundation for the rejection of zero hypothesis and a partial acceptance of hypothesis no. 2. Respondents who were playing a melodic instrument during elementary school age were better at Mathematics during the entire education than the ones who did not play any melodic musical instruments.

It is not surprising that the students who were playing a musical instrument during elementary school age, regardless of the type of tutoring, achieved statistically significantly better scores in Mathematics throughout their education. An insight into literature has proved many connections between music and Mathematics, especially in the development of spatial intelligence, logic and abstract thinking, creating of working habits and organizational skills.

With the results of Kruskal-Wallis test, it was found that children who were intensely or under-averagely occupied with music education in elementary school were more successful in mastering foreign languages when compared to the peers whose occupation with music education was average or non-existent (χ^2=10.047, df=3, p<.05).

The results also show that the children who were learning to play a musical instrument in a course or private lessons longer were more successful in mastering foreign languages, compared to the children who did not learn to play musical instruments in private lessons, while the worst result in the knowledge of foreign languages was found with the children who had music lessons no longer than 1-2 years (χ^2=14.552, df=2, p<.01).

Furthermore, the respondents who finished secondary music school or at least elementary music school were found to have better knowledge of foreign languages, compared to those who dropped out of music school (either elementary or secondary) as well as the ones who never enrolled into music school (χ^2=9.795, df=4, p<.05).

The obtained results provide the foundation for the rejection of zero hypothesis and a partial acceptance of hypothesis no. 3. Respondents who were playing a melodic instrument during elementary school age have a better knowledge of foreign languages than the ones who did not play any instruments.

It was noticed that most of the respondents who did not play any instrument in elementary school stated that music lessons engaged them *averagely* or *not at all*. Those respondents were not successful in mastering foreign languages. Respondents who were intensely and under-averagely occupied with music lessons were later on more successful in mastering foreign languages.

Since the basic elements of music (melody, rhythm) are closely connected with hearing, speaking, and thereby learning foreign languages (Shabani & Torkeh, 2014), it is not

surprising that the respondents who did not play any melodic instrument in elementary school have lower auditory perception on the aforementioned elements of music.

Table 3 shows the first group of 8 questions related to the knowledge of foreign languages. Out of eight single crossings, statistical significance was shown in three cases.

Table 3

Playing melodic instruments during elementary school age and knowledge of foreign languages

		Mean rank	Mann-Whitney U	Kruskal-Wallis χ^2	Z	df	p
Playing a melodic instrument in elementary school	Yes	143.12	9645.500		- .229		.819
	No	141.17					
How long the melodic instrument was played	1 year	150.75		5.417		5	.367
	2 years	120.23					
	3 years	150.75					
	4 years	158.94					
	More than 4 years	139.50					
	No	141.81					
Knowing musical alphabet	Yes	142.13	3536.000		- .096		.924
	No	140.79					
Intensity of preoccupation with music class	Intense	128.73		10.047		3	**.018***
	Above average	153.61					
	Average	126.13					
	Not at all	164.70					
Playing in the orchestra in elementary school	Yes, more than 2 years	152.74		3.392		2	.183
	Yes, 1-2 years	163.62					
	No	138.34					
Playing in the orchestra of folklore society	Yes, more than 2 years	141.67		1.776		2	.411
	Yes, 1-2 years	169.77					
	No	140.80					
Playing in a course or private lessons	Yes, more than 2 years	115.02		14.552		2	**.001****
	Yes, 1-2 years	169.28					
	No	139.73					
Graduated from music school	Yes, elementary	131.73		9.795		4	**.044***
	Yes, secondary	121.19					
	Dropped out in elementary	158.94					
	Dropped out in secondary	150.75					
	No	149.21					

In contrast to them, the respondents who were intensely occupied with the music lessons were able to develop music perception, which they transferred to learning a foreign language.

For the respondents whose interest in music lessons was *below average*, extra questions should be designed in order to determine whether those respondents, in spite of their below-average interest, nevertheless played a melodic instrument in class. In spite of low interest, the level of sensitivity for melody and rhythm is shown in the learning of a foreign language.

Accordingly, the respondents who learned to play a musical instrument in a course or in private lessons over the years, and in that way developed hearing sensibility to a melody and rhythm, sense of hearing and speaking (phonologic awareness), sensibility in the expression and persistence in training and repetition of the patterns (Shabani & Torkeh, 2014) gained the predispositions for successful mastering of foreign languages.

The respondents who had shorter music instruction (1-2 years) and showed a possible character trait in a lack of persistence in music activities, transferred such behavior pattern to the process of learning foreign languages and showed the worst results in that segment of questions.

Identically, the respondents who graduated from secondary or at least elementary music school and proved to be more successful in their knowledge of foreign languages, also showed a level of persistence in the chosen activities, which has a positive effect on different areas of shaping a complete personality and development of all aforementioned positive connections between music activities and learning of foreign languages.

Table 4 shows the first group of questions related to the achieved education level. From eight single crossings, statistical significance was showed in two cases.

It was found that the respondents who were above average interested in music lessons significantly more often than others achieved a higher level of education, such as Master's degree or became Assistant Professors, while the respondents whose interest in music lessons was average were satisfied with the secondary school education level or higher level of education (χ^2=27.506, df=15, p<.05).

A sort of aberration in this context may be detected by considering the data on a higher achieved level of education (Professor or Assistant Professor) among the respondents with below-average level of interest in music lessons.

Also, it has been found that the respondents who successfully finished elementary or secondary music school more frequently achieved a scientific level of education (Master's degree or Assistant Professor), while the respondents who dropped out of further education in elementary music school more frequently remained at the level of secondary school education (χ^2=33.497, df=20, p<.05).

The obtained results provide the foundation for the rejection of zero hypothesis and a partial acceptance of hypothesis no. 4. In other words, the respondents who were playing a melodic instrument during elementary school age achieved a higher education level than the ones who did not play any melodic instruments.

An above-average occupation with music lessons and multiple years of learning to play an instrument entail persistence, patience, higher aspirations and good timetable.

Such qualities are crucial in achieving a high level of education and in a career. On the contrary, an average preoccupation with music lessons and dropping out of music school at elementary level implies the same behavior pattern regarding education in general.

Some extremes in the results could be explained with the exact way of thinking (for example, a doctor of science in the area of natural sciences) and development of the omnipolar elements of multiple intelligence, which are related to musical aspect.

Table 4

Learning and activity of playing a musical instrument and achieved level of education

		N	χ^2	df	p
Playing instrument in elementary school	Yes	120	5.313	4	.257
	No	163			
How long the instrument was played	1 year	14	11.158	20	.942
	2 years	32			
	3 years	14			
	4 years	33			
	More than 4 years	31			
	No	159			
Knowing musical alphabet	Yes	255	2.115	4	.715
	No	28			
Intensity of preoccupation with music class	Intense	99	27.273	12	**.007****
	Above average	140			
	Average	34			
	Not at all	10			
Playing in the orchestra in elementary school	Yes, more years	35	4.559	8	.803
	Yes, 1-2 years	21			
	No	227			
Playing in the orchestra of folklore society	Yes, more years	24	8.610	8	.376
	Yes, 1-2 years	11			
	No	248			
Playing in a course or private lessons	Yes, more years	41	12.403	8	.134
	Yes, 1-2 years	56			
	No	186			
Graduated from music school	Yes, elementary	33	29.384	16	**.021***
	Yes, secondary	64			
	Dropped out in elementary	33			
	Dropped out in secondary	6			
	No	147			

Table 4a

Achieved level of education and intensity of preoccupation with music lessons

			Professor	Assistant Professor	Master's degree	University degree	Higher education	Secondary school education
Intensity of preoccupation with music class	intense	N	1	15	14	62	5	2
		%	1.0	15.2	14.1	62.6	5.1	2.0
	average	N	6	10	10	95	10	9
		%	4.3	7.1	7.1	67.9	7.1	6.4
	under-average	N	4	3	3	23	1	0
		%	11.8	8.8	8.8	67.6	2.9	0.0
	Not at all	N	2	0	0	7	0	1
		%	1	15	14	62	5	2

Table 4b

Achieved level of education and graduation from music school

			Professor	Assistant Professor	Master's degree	University degree	Higher education	Secondary school education
Graduated music school	Yes, elementary	N	1	4	5	20	1	2
		%	3.0	12.1	15.2	60.6	3.0	6.1
	Yes, secondary school	N	3	7	10	43	0	1
		%	4.7	10.9	15.6	67.2	0.0	1.6
	Yes, quit in elementary	N	0	3	2	23	5	0
		%	0.0	9.1	6.1	69.7	15.2	0.0
	Yes, quit in secondary school	N	2	0	0	4	0	0
		%	33.3	0.0	0.0	66.7	0.0	0.0
	No	N	7	14	10	97	10	9
		%	1	4	5	20	1	2

Table 5 shows the first group of 8 questions related to the choice of future vocation. Out of eight single crossings, statistical significance was showed in three cases.

It was found that the respondents who played a musical instrument during regular classes in elementary school more frequently chose University of Law or Medical University, unlike the respondents who did not play any instruments. Those respondents more frequently chose universities in the field of natural sciences (χ^2=23.100, df=10, p<.01).

It was also found that the participants who were learning musical alphabet in elementary school frequently chose universities in the field of humanities, and less frequently a university of music arts (χ2=34.822, df=10, p<.01).

Also, the respondents who finished secondary music school significantly more frequently chose universities in the field of humanities than universities of economics, teacher education or some technical universities ($\chi 2=100.736$, df=10, $p<.01$).

The obtained results provide the foundation for the rejection of zero hypothesis and a partial acceptance of hypothesis no. 5. The respondents who were playing a melodic instrument during elementary school age chose a different vocation than the ones who did not play any instruments.

Table 5

Learning and the activities of playing a musical instrument and the choice of future vocation

		N	χ^2	df	p
Playing instrument in elementary school	Yes	120	23.100	10	**.010****
	No	163			
How long the instrument was played	1 year	14	64.381	50	.083
	2 years	32			
	3 years	14			
	4 years	33			
	More than 4 years	31			
	No	159			
Knowing musical alphabet	Yes	255	34.822	10	**.000****
	No	28			
Intensity of preoccupation with music class	Intense	99	22.055	30	.852
	Above average	140			
	Average	34			
	Not at all	10			
Playing in the orchestra in elementary school	Yes, more than 2 years	35	27.783	20	.115
	Yes, 1-2 years	21			
	No	227			
Playing in the orchestra of folklore society	Yes, more than 2 years	24	26.905	20	.138
	Yes, 1-2 years	11			
	No	248			
Playing an instrument in a course or private lessons	Yes, more than 2 years	41	29.342	20	.081
	Yes, 1-2 years	56			
	No	186			
Graduated from music school	Yes, elementary	33	100.736	40	**.000****
	Yes, secondary	64			
	Dropped out in elementary	33			
	Dropped out in secondary	6			
	No	147			

Table 5a

Choice of future vocation and playing an instrument in elementary school

			Lawyer, Judge	Econonomist	Medical profession	Musician	Dancer	Professor of humanities	Professor of natural sciences	Teacher	Technical profession	Profession in tourism	Craftsman		
Playing an instrument in elementary school	Yes	N	4	8	5	0	1	56	0	27	18	0	1
		%	3.3	6.7	4.2	0.0	0.8	46.7	0.0	22.5	15.0	0.0	0.8
	No	N	0	12	1	2	0	75	13	32	26	1	1
		%	0.0	7.4	0.6	1.2	0.0	46.0	8.0	19.6	16.0	0.6	0.6

Table 5b

Choice of future vocation and knowing musical alphabet

			Lawyer, Judge	Econonomist	Medical profession	Musician	Dancer	Professor of humanities	Professor of natural sciences	Teacher	Technical profession	Profession in tourism	Craftsmen
Knowing musical alphabet	Yes	N	4	19	6	0	1	122	11	52	39	0	1
		%	1.6	7.5	2.4	0.0	0.4	47.8	4.3	20.4	15.3	0.0	0.4
	No	N	0	1	0	2	0	9	2	6	5	1	0
		%	0.0	3.8	0.0	7.7	0.0	34.6	7.7	23.1	19.2	3.8	0.0

Table 5c

Choice of future vocation and graduation from music school

			Lawyer, Judge	Econonomist	Medical profession	Musician	Dancer	Professor of humanities	Professor of natural sciences	Teacher	Technical profession	Profession in tourism	Craftsmen
Graduated from music school	Yes, elementary	N	1	3	3	0	0	14	0	6	5	1	0
		%	3.0	9.1	9.1	0.0	0.0	42.4	0.0	18.2	15.2	3.0	0.0
	Yes, secondary school	N	1	1	0	1	0	54	2	4	1	0	0
		%	1.6	1.6	0.0	1.6	0.0	84.4	3.1	6.3	1.6	0.0	0.0
	Yes, quit in elementary	N	2	3	1	1	0	13	1	9	3	0	0
		%	6.1	9.1	3.0	3.0	0.0	39.4	3.0	27.3	9.1	0.0	0.0
	Yes, quit in secondary school	N	0	0	0	0	0	1	2	1	2	0	0
		%	0.0	0.0	0.0	0.0	0.0	16.7	33.3	16.7	33.3	0.0	0.0
	no	N	0	13	2	0	1	49	8	39	33	0	2
		%	0.0	8.8	1.4	0.0	0.7	33.3	5.4	26.5	22.4	0.0	1.4

Conclusion

"Among many objectives of transferring the musical knowledge the most important may be the task of humanistic education... Active music practice strengthens the development of other capabilities in children and equally positively influences physical and mental qualities. The life of such a child will be richer, regardless of which pathe or she will choose later. Only the child raised in that way will at the same time be a valuable member of society..." (Wartberg, 2003, p. 77).

Music education helps to develop a complete personality. Habits gained during music practice prepare young people for more successful building of their own careers. Skills mastered in music education area are a preparation for the disciplinary approach in solving problems and multitasking at work. Group music making prepares children for more successful teamwork and strengthens the need for individual success within the group. Education through music encourages flexibility in the working environment, emotional maturity, social and emotional intelligence development and the criteria of aesthetic evaluation.

Music activates the work of both brain hemispheres and stimulates the centers important for the development of skills that are needed in numerous vocations, and it also improves language activity. Reading sheet music and visual tracking of the melody lines strengthen spatial orientation. Playing musical instruments is a very complex psychomotor activity and the practice itself, even in a shorter period, influences concentration, psychological and motor activity, as well as coordination of both hands with visual and auditory activity.

Such development of complete personality raises the cultural level of an individual, indirectly influences his or her local and global surroundings, as well as the general quality of life. Such education is closely connected with the vocation selection, which leads to developed cultural society.

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Diana Atanasov Piljek
Faculty of Teacher Education, University of Zagreb
Savska cesta 77, 10000 Zagreb, Croatia
diana.atanasov-piljek@ufzg.hr

Tamara Jurkić Sviben
Faculty of Teacher Education, University of Zagreb
Savska cesta 77, 10000 Zagreb, Croatia
tamara.jurkicsviben@ufzg.hr

Sviranje glazbenih instrumenata u osnovnoškolskoj dobi i odabir srednje škole i zanimanja

Sažetak

Brojna znanstvena istraživanja ukazuju na povezanost određenih glazbenih aktivnosti s razvojem neglazbenih kompetencija. Učenje sviranja glazbenog instrumenta doprinosi razvoju elemenata višestrukih inteligencija.
Cilj ovoga rada je ispitati postoji li veza između učenja i aktivnosti sviranja nekog glazbenog instrumenta u osnovnoj školi s odabirom srednje škole i zanimanja.
Za potrebe istraživanju razmatrana su pitanja: postoji li veza između sviranja glazbenog instrumenta u osnovnoškolskoj dobi s odabirom srednje škole i zanimanja, s uspjehom iz matematike, razinom budućeg obrazovanja i poznavanjem stranih jezika. U istraživanju su sudjelovala 283 ispitanika različitih dobnih skupina podijeljenih u dvije kategorije: ispitanici koji su svirali glazbeni instrument u osnovnoškolskoj dobi i oni koji to nisu. Ispitivanje je provedeno provjerenim anketnim upitnikom. Rezultati su analizirani neparametrijskim metodama obrade podataka te upućuju na potrebu sviranja glazbenog instrumenta u osnovnoškolskoj dobi i na višestruku korist sviranja u razvoju neglazbenih kompetencija mlade osobe.

Ključne riječi: *neglazbene kompetencije; osobni interesi; razina obrazovanja; sviranje.*