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Verification of Metric Characteristics of the Bentley Test of Musical Abilities on a Sample of Croatian Music School Students

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Abstract

Theories and research try to explain musical ability as primarily innate or acquired, as well as single or composed of several elementary abilities. However, a satisfactory definition of this skill (or these skills) implies pluralism of views, theories and research. The Measures of Musical Abilities test, by Arnold Bentley, diagnoses the current level of basic musical skills of children aged 7 to 14. This paper describes the test applied in Croatia for the first time. By checking metric characteristics of the test on a sample of Croatian music school students, the obtained coefficient α was 0.74, whereas with the test-retest method r was 0.81, indicating a satisfactory reliability of the test. The significances of the correlations of students' results achieved in the test and teachers' assessments of students' abilities, and their moderately high positive correlation, confirm the validity of the test. In comparison with the results of other available relevant research, in this study the lower score on the chord analysis test and the lower total score on the Bentley test were obtained, which may be explained by general cultural differences, as well as different methods of musical training in different countries. The obtained results show that the higher number of years of musical training is significant for a higher total score on the Bentley test.

Key words: *music; Music School in Varaždin; test reliability; test validity.*

Introduction

Diversity of human abilities in many cultures has encouraged the idea of the need for their understanding and verification, in order to identify and select individuals

whose specific characteristics are a prerequisite for successful performance of certain jobs or tasks (Motte-Haber, 1990). The selection is made in different ways, depending on the abilities which are considered important in a particular society. For example, in China, in the period from the 7th to the early 20th century, special examination system for admission into the civil service was administered. The exam consisted of several levels, and candidates were required to write poetry, essays, and answer questions about various historical Chinese texts. Success at the highest level of the test provided a position in the imperial service as well as reputation in society (Gardner, Kornhaber, & Wake, 1999). As opposed to that, many traditional cultures assign responsible positions to their elder and more experienced members who are, due to their knowledge accrued through experience, considered the most capable for the post (Gardner et al., 1999). Scientific approach in investigating and comparing the diversity of people has become possible owing to a strong development of scientific psychology in the late 19th century. Thus, questions, research methods and assumptions about inherited and acquired abilities, set by ancient Greek philosophers, got a new context (Gardner et al., 1999). Today, the examination and identification of differences in sensory, intellectual, social and other abilities are dealt with through differential psychology, using a variety of psychometric methods (JLZ, 1955-1964, vol. 6). Being closely related to general psychology, it provides significant help in many areas of human activity, including, among others, the selection of a profession or selection procedures in hiring, while significant application can also be found in education.

Capabilities are dynamic, rather than static human characteristics and they develop through activities, which should be kept in mind during their research. In addition, because of their number, diversity and interconnectedness in the performance of different activities, each classification of abilities is conditional (Poljak, 1982).

Defining ability, Poljak (1982, p. 15) believes that this term indicates the quality of personality which is formed for successfully performing an activity - work, action or function. According to a method of performing activities, he divides abilities into physical and mental, while, according to the fields of activities they are divided into:

- sensory or perceptual - based on a sensory activity and include capabilities of a sensory experience,
- manual or practical - related to handiness in a variety of practical activities,
- ability to express oneself - enable oral, written, artistic and other types of expression,
- intellectual or mental (intelligence) - as the most important abilities they are the basis for the development of all others.

The term ability can also be explained as a set of inherited and acquired conditions that allow performance of an activity i.e. make condition for some form of behaviour (JLZ, 1955-1964, vol. 7, pp. 129-130). There are two starting points for the examination of the so defined capabilities. On the one hand, the basic assumptions of abilities such as memory, understanding and concentration are checked, while on the other hand, in the form of these abilities the ability to perform concrete activities - e.g. playing

the trumpet or playing tennis, is tested. As a result of the interaction of these studies various instruments for the analysis of specific skills - different tests are formed and the ability itself becomes a synonym for the successful solving of a particular test.

Musical Ability

Musical ability can be realized in different ways. Someone can play or sing well, someone can compose, arrange music or conduct, and someone has developed a sophisticated musical perception and ability of aesthetic judgment of music. Bentley (1966, p. 14) believes that all these individuals, as active participants in a musical experience, can be said to possess musical ability, as opposed to those who do not have such an ability - although the distinctive characteristics of their abilities are hard to describe. Seashore (1967, p. 2) defines musical ability as capacity to listen, feel and understand music and, usually, some form of musical expression, which results in being directed towards music. In his definition, Teplov (1966, p. 25, according to Mirković-Radoš, 1998, p. 16) interprets musical ability as "qualitatively original combination of all the abilities on which the ability to deal successfully with musical activity is dependent." According to Radoš (2010, p. 54), the core of musicality is the ability of aesthetic experience of music, and sensitivity to the affective value and artistic quality of a music piece or its interpretation. She uses the terms musicality and musical ability as synonyms, and in the same way, synonymously, she treats the terms musical giftedness and musical talent (Radoš, 2010). Looking at musical ability as the basis of musical giftedness or talent, in determining the basic terms, Čudina-Obradović (1991) also takes the words talent and giftedness as synonyms. This paper supports such an approach, and in order to avoid the unnecessary terminological confusion, for the purpose of this paper, the terms musical ability, musicality and talent will be used synonymously.

The term "musical abilities" is used in this paper to denote a set of core competences, which, together, make up a more complex or general musical ability. The term "musical ability", which may also mean a single, basic musical ability, is used in the same meaning. In order to understand their meaning, the context in which they are used is important, whereupon their usage also depends on the view to the structure of musical ability - atomistic i.e. unitarian, which will be discussed hereinafter.

The definitions of musical ability were developed in an effort to find a satisfactory and acceptable way of explaining this concept, but since the issue is still open, interpretations encountered in the literature reflect a personal approach rather than scientific reasoning (Bentley, 1966). The differences are also present with regard to the importance of elementary, basic skills necessary for a stronger development of musical ability. Therefore, as the most important, Seashore (1967) mentions the sense of pitch, the sense of time, the sense of loudness, and the sense of timbre. Winner (2005) considers sensitivity to the structure of music - tonality, harmony and rhythm, to be fundamental, while Mirković-Radoš (1998) identifies the distinction of pitch, loudness and timbre,

distinction of rhythm, melodic and rhythmic memory as important elements of musical ability which are necessary, but without understanding and aesthetic sensitivity to music, insufficient for significant musical accomplishments. For Čudina-Obradović (1991) understanding the melody is the most important feature, and she links it closely with the feeling of distinguishing the pitch, but also mentions the absolute pitch as one of the important skills. Analysing the answers of 660 respondents, musicians and non-musicians aged 14-90, selected for the occasion, about their views of musical abilities, wanting to move away from the preferred traditional tests of hearing abilities, Hallam (2010) obtained the first six most common responses: the sense of rhythm, expression of thoughts and feelings through sound, the ability to understand and interpret music, communication through music, and personality. She concludes that these views of musical ability should also be taken into account in the selection procedures, along with important hearing ability, musical experience and motivation.

Overview of Relevant Research of Musical Abilities

The existence of musical abilities can be observed during early childhood (Gardner, 2010), and strong responses to musical stimuli in the early days following the birth suggest that musical development starts in the prenatal period (Radoš, 2010). Although at birth there is a biological basis for the development of musical abilities in humans, at later ages we can observe large individual differences in their development (Smolej-Fritz, 2000).

The first tests of differences in musical abilities were carried out by Galton, whose whistle, determining auditory limits, is still used today (Motte-Haber, 1990). By studying heredity he influenced succeeding researchers e.g. Seashore, and became an originator of the direction which considers musical abilities to be innate, with their development depending primarily on inherited biological predispositions (Seashore, 1967; Motte-Haber, 1990). In contrast, authors who see the role of the environment as crucial for the development of musical abilities of an individual, emphasize the quality education approach, and rich-in-music life surrounding as important. "If nothing else, the extent to which their musical talent will be publicly demonstrated depends on the environment in which one lives" (Gardner, 2010, p. 136). Apart from the fact that after years of researching musical abilities, it is clear that both genetics and environment play separate, independent roles. It is also obvious that the connectedness and interaction between heredity and environment - in varying proportions - powerfully shape elements of musical ability (Ho & Chong, 2010; Radoš, 2010), whereby basic musical skills are more hereditary determined, while complex ones are determined more by the environment and learning (Dobrota, 2012).

In addition to research into the nature of musical ability, the researchers' focus is on the discernment of its structure and organization. According to atomistic (elementaristic) theory and its main representative, Seashore, musical ability is not a unique and indivisible ability, because it consists of various natural (sensory),

hierarchically organized, independent of each other musical abilities, whereby complex abilities are formed by combining the basic ones. Therefore, it is not possible to measure any general musical ability, but only its individual components (Seashore, 1967). Starting from these assumptions, in 1919 Seashore constructed the first standardized test of musical abilities, and called it "Measures of Musical Talent" (Rojko, 1981). And, while the above mentioned atomistic theory is advocated by American psychologists, the English ones prevailingly use the unitarian approach, which treats musical ability as a whole capacity, whose individual aspects correlate with each other, and aims to establish the overall musical ability of an individual (Mirković-Radoš, 1998). Wing, a representative of this viewpoint, differentiates the general ability to perceive and an ability to make aesthetic judgments in music, but considers them different levels of the same, general musical ability - musical intelligence (Dobrota, 2012). Guided by this, Wing creates tests of musical intelligence in which the result is shown as one total value, and through factor analysis one general factor of musical ability is obtained, which is considered by Wing an additional confirmation of the theory he advocates (Mirković-Radoš, 1998).

With regard to the diversity of the existing views of the nature and structure of musical ability, English psychologist Bentley (1966) believes that in the aspect of measurement of this ability it is necessary to make certain compromises. Since there is no satisfactory way of measuring musical ability as a whole, he is committed to measuring the possible - parts of the whole which, after all, researchers, both atomists and unitarians, mainly do (Table 1).

Table 1

Overview of represented musical abilities in tests of various authors (Rojko, 1981, p. 58)

Test type	Author
Pitch	Whistler-Thorpe, Kwalwasser, Bentley, Seashore, Kwalwasser-Dykema, Wing, Ortmann
Duration	Seashore, Kwalwasser-Dykema, Ortmann
Rhythm	Seashore, Kwalwasser-Dykema, Drake, Whistler-Thorpe, Kwalwasser, Gordon, Bentley, Lundin, Wing, Schoen, Ortmann
Memory	Seashore, Kwalwasser-Dykema, Drake, Whistler-Thorpe, Gaston, Gordon, Wing, Bentley, Lowery, Ortmann, Lundin
Intensity	Seashore, Kwalwasser-Dykema, Kwalwasser, Wing
Consonance	Seashore
Timbre	Seashore, Kwalwasser-Dykema
Aesthetic judgement	Kwalwasser-Dykema, Gaston, Wing, Gordon, Schoen, Lundin, Lowery
Musical knowledge	Kwalwasser-Dykema, Gaston
Tempo	Kwalwasser, Gordon, Drake
Interest	Gaston
Harmony	Wing, Bentley, Ortmann, Lundin, Gaston, Gordon
Intervals	Lundin, Schoen
Transposition	Lundin

In considering various components of musical ability, their role and importance in the active engagement in music - singing or playing, as essential, Bentley (1966) identifies three basic musical abilities – pitch discrimination, tonal memory and rhythmic memory, and a complex one, also important – chord analysis. Considering them as a basis for further more intensive musical development, he incorporates them into his test. Emphasizing that it is not his intention to measure music ability as a whole, but rather only its listed aspects, in the construction of the test, Bentley is guided by the following assumptions:

1) the most elemental form of music is the melodic phrase or figure, which comprises tonal configuration within a rhythmic framework,
2) apprehension of melody is impossible without the ability to recall, in detail, sounds that have already been heard, and this depends upon the ability to apprehend the constituent factors of melody – pitch and time,
3) finer-than-semitone pitch discrimination is essential in singing and most instrumental playing, in order to achieve the necessary good intonation,
4) whereas the chords are not fundamental to melody, each musician should be aware of different tones of other participants in a musical performance, because the greater his awareness, the more appropriate his own contribution to the ensemble is likely to be (Bentley, 1966, p. 40).

Starting from the so-defined theoretical concepts of basic musical skills, this paper addresses the issue of their diagnosis in the context of the Bentley test of musical abilities. Because of the simple application, practicality and interculturally understandable tasks, the Bentley test appears to be very suitable for use in Croatian schools. The application of this type of tests has found its justification in practice (Radoš, 2010). Nevertheless, while interpreting the obtained results, it should be noted that they (the tests) do not measure music ability as a whole, but only some of its elements, therefore they are an important but not the only indicator of the existence of musical ability.

Research Aim and Tasks

The main aim of this study was to verify the metric characteristics of the Bentley test "Measures of musical abilities", on the Croatian sample of the music school students. The second aim was to compare the results obtained in this study with the results of other available relevant research of the same type, and to contribute to the debate on the nature of musical ability. In accordance with these aims, the following tasks have been defined:

- to verify the reliability and validity of the Bentley test "Measures of musical abilities",
- to compare the results obtained in this study with the results of other available and relevant research,
- to examine the relationship between the number of years of musical training and the results achieved in the test.

Sample and Method

The study included a convenience sample, a total of 84 music school students, of which 74 students of the Music School in Varaždin and 10 students of the Elementary Music School in Ludbreg, 33 boys (39.3%) and 51 girls (60.7%), with the average age 14.38 yrs. Participation was voluntary, and anonymity was ensured by a special system of codes. The procedure was performed in groups at the school, after consultation with principals, and then with teachers at these schools, after the consent for participation in the study was given by both pupils and their parents. Along with students in the part of the research related to the validation of the Bentley test, the teachers who teach instrument playing also participated.

For the purposes of this research, the sample was divided into two groups (Table 2). The first group of 46 students – group A, was composed of the sixth grade of the music school in Varaždin (36 students) and the sixth grade of the music school in Ludbreg (10 students). The second group – group B, was composed of 38 students of the preparatory stage of music education at the music school in Varaždin.

Table 2
Distribution of the sample by groups

	group A	group B	total
boys	15	18	33
girls	31	20	51
total	46	38	84
average age	13.87 yrs.	14.99 yrs.	14.38 yrs.

Students of preparatory music education (PME) are usually included in the music education in the seventh grade of primary school, but for specific subjects, such as opera singing, even later. That is why their average age in the sample is slightly higher than the age of pupils in the sixth, final grades of elementary music school (EMS), who are included in music education between their first and third grade of primary school. Students of both groups can continue their education in the secondary music school under certain conditions. The difference between the groups, which is interesting for this study, is that PME students attend music school one to two years maximum, as opposed to the sixth grade EMS students, who attend it for six years. So, it is possible to investigate the relationship between the number of years of musical training and the results obtained in the test of musical abilities.

The test "Measures of Musical Abilities", which is in the focus of interest of this work, was designed by the English psychologist Arnold Bentley, from the University of Reading, (1966). The test diagnoses the current level of basic musical abilities of children aged 7 to 14. Designed for group measurement, this test, according to the author, measures primarily elemental, inherited or unintentionally learned musical

abilities. It contains sixty items and each correct answer carries one point. The test battery consists of four subtests:

1) pitch discrimination – after listening to two tones the respondent's task is to determine whether the second tone is higher, lower or equal to the first one, whose frequency is 440 Hz; the test contains 20 items, and recording of the tone material was made on the sine-wave oscillator,
2) tonal memory – a simple melody composed of five tones within the first octave is repeated twice, the second time one tone is changed, and the respondent needs to determine which tone was changed; the test contains 10 recorded items played on the organ,
3) chord analysis - in 20 test items recorded on the organ the respondent listens to the chords (and intervals) and needs to determine the number of tones played in each particular chord (or interval)
4) rhythmic memory – in 10 items of the test respondents listen to a voice which counts in tempo mm = 70, one, two, three, four, which gives them a metric pulse; then follows a rhythmic series of four beats, which is then repeated literally or with one modified beat; the respondent's task is to determine whether the second rhythmic series is different from the first one, and if so, which beat was modified; each successive rhythmic series is played on a different organ height of tone (pitch).

The answer form for the Bentley test has four tables in which respondents enter all their answers, i.e. estimates. The sheet was prepared for the Croatian respondents and voice instructions which are on the audio CD in English, for the purposes of the research have been replaced by the instructions in the Croatian language. For music school respondents in this study, the instructions for filling tables are easy to understand, because they encounter concepts such as higher tone, lower tone, beat, chord or interval, on a regular basis. The content of the Bentley test requires no translation, because the test consists of the above-mentioned sound-tonal, intercultural understandable tasks. After listening to each task, the respondents were asked to write their answer in the space provided in the answer sheet. The interval between the two tasks was seven to eight seconds, depending on the subtest, which was sufficient time to write a response.

The teachers' evaluation sheet, made for the purposes of this research, required the instrument teachers to circle one of the suggested answers in eight multiple-choice questions with regard to their assessment of the achieved musical competence of their students (grade in the previous class, number of concert performances throughout the year, participation in competitions, learning outcomes, development of playing skills, attitude towards playing, recommendations for continuing education and student's motivation). The answers were then awarded points in a manner that a higher level of assessment of individual student achievement was awarded a higher points number. The sum of these points represents a total result of the assessment of the individual

student. In addition, added to these data were the students' solfeggio marks from the previous grade which, at the end of the test, were entered in the answer sheet.

All the data were analysed using the PSPP program, which is free and available on the internet. The statistical analysis used descriptive statistics and calculated the Cronbach alpha (α), the Kolmogorov-Smirnov Z, Pearson's correlation coefficient r and t-test.

Results

Table 3 shows the overall results that the respondents achieved on the Bentley test. Differences in results regarding gender were not obtained, neither on the test as a whole, nor on any of its subtests, which corresponds with the findings in the available literature (Bentley, 1966; Radoš, 1998; Smolej-Fritz, 2000), and therefore will not be further discussed.

Table 3

Overall results of the Bentley test and the four subtests obtained in the study

	N	M	SD	Range of scores
Bentley, total	84	46.21	5.5820	32 - 56 (max. 60)
Bentley test 1, pitch discrimination	84	16.73	2.5429	8 - 20 (max. 20)
Bentley test 2, tonal memory	84	8.40	1.2999	4 - 10 (max. 10)
Bentley test 3, chord analysis	84	12.55	3.1562	5 - 19 (max. 20)
Bentley test 4, rhythmic memory	84	8.54	1.3749	4 - 10 (max. 10)

Comparing the results of the Bentley test expressed by the mean of a number of correctly solved tasks of this research, to the results of other research of the same type, some similarities can be observed, but also some differences (Table 4). In view of the fact that the sample of this research consists of music school students, on average 14 years old, this comparison was made on an equally selected sample in another research. The research shows no major differences in the results of the first and second subtest. The differences are apparent in the lower results obtained by Smolej-Fritz (2000) – overall, and in the third and fourth subtest, and the slightly lower overall and

Table 4

Comparison of the results obtained on the Bentley test in various research studies

M Test	Bentley, 1966	Radoš, 1998	Smolej-Fritz, 2000	Brđanović, 2014
Bentley, total	48.80	49.15	42.29	46.21
Bentley test 1, pitch discrimination	16.10	17.04	16.03	16.73
Bentley test 2, tonal memory	9.30	8.65	8.26	8.40
Bentley test 3, chord analysis	15.20	14.46	12.60	12.55
Bentley test 4, rhythmic memory	8.30	9.00	5.40	8.54

lower result in the third subtest of the present research. It is hard to say why this has happened, but the answer is probably in the general cultural differences, as well as in a different way of music education in different countries.

Reliability

Checking the reliability Young (1973), using a method of halves (split-half) on a sample of 504 students in higher grades, participants in instrumental music programmes, got a reliability coefficient 0.83 for the Bentley test, and Smolej-Fritz (2000) on a sample of 195 primary school students obtained the reliability coefficient $\alpha = 0.89$, and on a sample of 241 music school students $\alpha = 0.92$. The obtained test reliability coefficient (Cronbach α) in this study was 0.74, and although slightly lower than in the studies mentioned above – which is probably due to a smaller total sample in this study – it is fully satisfactory (Rojko, 1981). Radoš (2010, p. 100) also shows agreement with this when on a sample of primary school students, using the split-half method, he gets the reliability coefficient 0.72.

Unlike reliability based on internal items consistency, Bentley obtained reliability of his test using the retesting procedure on a sample of 90 students aged 9.1 to 11.9 years. The first and second tests were conducted in an interval of four months. The obtained correlation coefficient was 0.84, which was considered satisfactory by Bentley. In the same way Mirković-Radoš (1998) obtained a reliability coefficient of 0.88 in primary school and 0.94 with the music school students on the Bentley test. In this study, the reliability of the test is also tested by repeated measurements (test-retest procedure) on group A respondents (Table 5).

Table 5

The results obtained on the Bentley test/retest in group A

	N	average age	M	SD	z*	p*
Bentley test total	46	13.87 yrs.	47.22	5.505	0.733	0.655
Bentley retest total	46	14.20 yrs.	47.61	5.580	1.125	0.159

*Kolmogorov-Smirnov test

The repeated measurement was carried out in an interval of four months in relation to the former. Checking the distribution of results of the first and second measurement of group A, Kolmogorov-Smirnov test found a normal distribution of total results, as well as the pitch discrimination test results and the chord analysis test results in the first, while in the second measurement, in addition to these, a normal distribution showed the results of tonal memory test. Distribution of the tonal memory and the rhythmic memory test results in the first, and of the rhythmic memory test results in the repeated research were moved to the right, which means that these tests are relatively easy, especially for the music school students, which is also discussed by Mirković-Radoš (1998, p. 135). At the same time, the total test results and all four subtests results for group B were found to have a normal distribution.

The obtained correlation coefficient of achieved overall results in the first and second test of group A, r = 0.81 significant at 0.01 level, is considered good for group testing, and can be taken as confirmation of reliability of the Bentley test. Higher arithmetic mean of the total number of solved problems in the repeated measurement supports the idea that music education develops elementary musical abilities. In this case, those that are measured by the Bentley test.

Validity

Bentley checked the validity of the test in several ways. In a group of 314 students, he compared the scores achieved in the test with the assessments of their musical abilities obtained from teachers, and the χ^2 test showed that there is an association between these two variables. Students who were assessed as musical, scored the higher marks in the test, and those who scored lower marks had been classified as unmusical. Examining the correlation between test results and success in the music classes of 70 first grade Grammar School students, Bentley compared the test results at the beginning of the school year with the results of success in music classes for these students after 12 weeks. The correlation coefficient of the two variables was 0.94 (Bentley, 1966).

Comparing the results that the same respondents achieved first on the Bentley test, and then on the Musical Aptitude Profile - MAP test of musical abilities, devised by Edwin Gordon, which is a verified test, well established, consistent and reliable test of musical abilities intended for diagnostic and predictive purposes - Young (1973) concludes that based on the obtained data, along with the acceptance of hypothesis of criterion measure (MAP) as a valid predictor of future musical success, the Bentley test can be considered to have a moderately high validity for the same purpose although these tests seem to measure somewhat different segments of musical ability. Here Mirković-Radoš (1998, p. 134) adds that it looks like the Bentley test has a little higher validity for predicting future success in music.

Mirković-Radoš (1998) also verifies the validity of the Bentley test in her research by comparing the degree of agreement of the students' test results and a teachers' assessment of the students' abilities and establishes a significant relationship i.e. agreement, from which she concludes that the answers in the test are by no means the result of guessing. Therefore, the obtained results are considered confirmation of test validity.

In this research, the validity of the Bentley test was established in a similar manner. Musical competence achieved by students of group A was assessed by their instrument teachers. After calculating the total score expressed in points for individual students, as well as their marks in solfeggio and an instrument, the results were compared to the student score on the Bentley test. The obtained r correlations (Table 6) show a moderately high positive correlation between the variables. The significance of the resulting correlations is particularly noticeable on the rhythmic memory test results – which require further research in the future – but also on the overall test results,

while no significance was found for the correlations of the chord analysis test results and teachers' assessments.

Table 6

Correlations between the test results and teachers' assessments (Pearson's r)

	Instrument playing mark	Solfeggio mark	Instrument teachers' assessment
Bentley, total	.370*	.361*	.387**
Bentley test 1, pitch discrimination	.369*	.203	.368*
Bentley test 2, tonal memory	.346*	.062	.320*
Bentley test 3, chord analysis	.070	.257	.088
Bentley test 4, rhythmic memory	.402**	.518**	.466**

**Correlation is significant at the 0.01 level (2-tailed)
*Correlation is significant at the 0.05 level (2-tailed)

Assessment in music is, apart from music factors, also influenced by factors such as the assessor's personal equation, the halo-effect, assessor fatigue, errors of contrast or adjustment of assessment criteria to a group. In addition to the fact that the obtained results can be significantly affected by student stage fright, assessment in music schools is questionable due to a subjective experience of the seen and the heard by each individual teacher (Brđanović, 2012). Marks in music school only partially evaluate musical abilities measured on the Bentley test, while they partly evaluate other student characteristics, such as diligence and commitment, which should also be taken into consideration while observing marks as the criterion of the test validity. On the other hand, the teacher of instrument spends several hours per week over several years with a student and knows the student well, therefore, his/her assessment is a good validity criterion. Since significant positive correlation of test results with teachers' marks and an instrument teacher assessment was obtained here, consequently it can be considered a very good confirmation of the Bentley test validity.

Musical Experience and Results on the Bentley Test

In further research, the results achieved on the Bentley test in group A, students who have attended music school for six years and group B, students who have attended for, at most two years, were compared. Thereby, in contrast to the course of the research so far and the use of the results of the first measurement, the results of the second, repeated measurement with group A were used here, which reduced the average difference in age of the observed groups (group A – 14.20 yrs.; B – 14.99 yrs.). In fact, Bentley (1966) holds that abilities covered in his test are mostly inherited and independent of experience, so the respondents of approximately the same age should achieve approximately the same result on his test, which has been verified here.

Table 7

Mean differences between group A and group B (t-test)

	M (group A)	M (group B)	t	p*
Bentley, total	47.61	45.00	2.146	.035
Bentley test 1, pitch discrimination	17.37	16.63	1.425	.158
Bentley test 2, tonal memory	8.46	8.26	.709	.480
Bentley test 3, chord analysis	13.00	11.71	1.898	.061
Bentley test 4, rhythmic memory	8.78	8.39	1.248	.216

*2-tailed

All the values of the arithmetic means of the number of correctly solved tasks, in total, and in all four subtests of the Bentley test, as set out in Table 7, are higher for group A. The t-test for differences in significance of arithmetic means for independent samples showed no statistical significance in the obtained differences in subtests between groups A and B. However, as a kind of result of these differences, for the higher arithmetic mean of the total score on the Bentley test with group A, compared to group B – t-test showed statistically significant difference (t=2.146, p=0.035). It can therefore be concluded that a greater number of years of musical education plays an important role in the higher total score on the Bentley test. The conclusion is further supported by the fact that the group with the higher score – group A, on average, is about nine months younger than the group with the lower score – group B.

As already mentioned, Bentley believes that scores on his test do not depend on prior learning, but are exclusively the consequences of inherited abilities, which is obvious in his opinion on the inherent basic musical abilities. Today, however, it is clear that the influence of other factors on the Bentley test results – e.g. experience in testing, learning and motivation, however, cannot be ignored (Good, Aggelton, Kentridge, Barker, & Neave, 1997), as confirmed by the results of this research which indicate that musical training also develops elemental musical abilities.

Conclusion

In this paper, the first use of the Bentley test "Measures of Musical Abilities" in Croatia, on a sample of music school students test showed good metric characteristics, so there is no obstacle to its use in testing and research of the observed population, with a note that future research should include regular elementary school students. In addition, today's technical possibilities in relation to the time of the test creation are much better, so, although the test was transferred to a CD (Bentley, 2007) and quite suitable for use, the sound material, though, should be brushed up a little in order to "reflect the development of technology since 1966 to the present" (Mills, 1984, p. 104).

The Bentley test is suitable for determining the level of basic musical abilities, even with seven-year-olds, for which purpose, for instance, this test is still used today in British schools (Mills, 1980; Rosebery School, 2014). The test could find its place in practical application in Croatia, since the selection process of musically gifted students and their guidance towards engaging in music lacks such a standardized measurement instrument.

Findings on the importance of a greater number of years of music education in achieving higher scores on the Bentley test are the theoretical contribution of this study to the existing knowledge about the nature of musical abilities and indicate the importance of the role of the environment, in this case the school, in developing elemental musical abilities.

According to what has been presented in this paper, the Bentley test of musical abilities can successfully diagnose the level of existing elemental musical abilities that it measures, but it is not the intent - nor is it possible to do with a single test - to determine one's overall musical potential. Therefore, in defining musical abilities of an individual and predicting their future potential reach in the field of music, there is a whole array of factors that should be taken into account in order to make such a prediction reliable and valid, and the test of musical abilities is just one of them.

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Provjera metrijskih karakteristika Bentleyeva testa glazbenih sposobnosti na hrvatskom uzorku učenika glazbene škole

Sažetak

Teorije i istraživanja glazbenu sposobnost nastoje objasniti ponajprije kao urođenu ili stečenu, kao cjelovitu, odnosno sastavljenu od više elementarnih sposobnosti, premda je za zadovoljavajuće definiranje te sposobnosti (ili tih sposobnosti) neophodan pluralizam pogleda, teorija i istraživanja. Test Mjere glazbenih sposobnosti Arnolda Bentleya dijagnosticira trenutni stupanj osnovnih glazbenih sposobnosti djece dobi 7 do 14 godina. U ovom je radu taj test prvi put primijenjen u Hrvatskoj. Provjerom metrijskih karakteristika testa na hrvatskom uzorku učenika glazbene škole dobiven je koeficijent α od 0,74, te test-retest postupkom r od 0,81, što govori o zadovoljavajućoj pouzdanosti testa. Utvrđene značajnosti korelacija rezultata učenika postignutih na testu i procjena učeničkih sposobnosti od nastavnika, kao i njihova umjereno visoka pozitivna povezanost, potvrda su valjanosti testa. U odnosu na rezultate drugih dostupnih relevantnih istraživanja u ovom je istraživanju dobiven niži rezultat testa analize akorda i niži ukupan rezultat Bentleyeva testa, za što razlog valja potražiti u općim kulturnim razlikama, kao i u različitom načinu glazbenog obrazovanja u različitim zemljama. Dobiveni rezultati pokazuju i da je veći broj godina glazbenog školovanja značajan za viši ukupan rezultat na Bentleyevu testu.

Ključne riječi: *glazba; Glazbena škola u Varaždinu; pouzdanost testa; valjanost testa.*

Uvod

Raznolikost ljudskih sposobnosti u mnogim je kulturama potakla ideju o potrebi njihova razumijevanja i provjere, kako bi se prepoznali i odabrali pojedinci čije su specifične karakteristike pretpostavka za uspješno obavljanje određenih poslova ili zadataka (Motte-Haber, 1990). Izbor je rađen na različite načine, ovisno o sposobnostima koje su u pojedinom društvu smatrane važnima. U Kini se tako, u razdoblju od 7. do početka 20. stoljeća, provodio poseban sustav ispita za prijem u državnu službu. Ispit je imao nekoliko razina, a od kandidata se tražilo pisanje poezije,

eseja i odgovaranje na pitanja o različitim kineskim povijesnim tekstovima. Uspjeh na najvišoj razini testa osiguravao je dobivanje položaja u carskoj službi i ugled u društvu (Gardner, Kornhaber, i Wake, 1999). Za razliku od toga, mnoge tradicionalne kulture odgovorne položaje prepuštaju svojim starijim i iskusnijim članovima, jer ih zbog njihova znanja nastalog na iskustvu smatraju za to najsposobnijima (Gardner i sur., 1999). Znanstveni pristup u istraživanju i uspoređivanju različitosti ljudi postao je moguć zahvaljujući snažnom razvoju znanstvene psihologije potkraj 19. stoljeća. Pitanja i metode istraživanja, te pretpostavke o naslijeđenim i urođenim sposobnostima koje su postavili još starogrčki filozofi, dobili su tako novi kontekst (Gardner i sur., 1999). Danas se ispitivanjem i utvrđivanjem razlika u osjetnim, intelektualnim, socijalnim i drugim sposobnostima bavi diferencijalna psihologija, koristeći pritom različite psihometrijske metode (JLZ, 1955-1964, sv. 6). Usko povezana s općom psihologijom, ona pruža značajnu pomoć na brojnim područjima ljudskog djelovanja, između ostalog kod izbora zanimanja ili kod selekcijskih postupaka prilikom zapošljavanja, a značajnu primjenu ima i u odgoju i obrazovanju.

Sposobnosti su dinamične, a ne statične ljudske karakteristike, te se one razvijaju putem aktivnosti, što prilikom njihova istraživanja treba imati na umu. Osim toga, zbog njihove mnogobrojnosti, raznovrsnosti i isprepletenosti u obavljanju različitih aktivnosti, svaka je podjela sposobnosti uvjetna (Poljak, 1982).

Definirajući sposobnost Poljak (1982, str. 15) smatra kako taj pojam ukazuje na kvalitetu ličnosti koja je formirana tako da uspješno obavlja neku djelatnost – rad, aktivnost ili funkciju. Prema načinu obavljanja aktivnosti on sposobnosti dijeli na fizičke i mentalne, a prema područjima aktivnosti dijeli ih na:

- senzorne ili perceptivne – temelje se na senzornoj aktivnosti i obuhvaćaju sposobnosti osjetnog doživljaja
- manualne ili praktične – odnose se na spretnost u različitim praktičnim aktivnostima
- sposobnosti izražavanja – omogućavaju usmeno, pismeno, umjetničko i drugo izražavanje
- intelektualne ili mentalne (inteligencija) – kao najvažnije sposobnosti čine osnovu za razvoj svih ostalih.

Pojam sposobnost može također biti tumačen kao skup prirođenih i stečenih uvjeta koji omogućavaju vršenje neke aktivnosti, odnosno uvjetuju neki oblik ponašanja (JLZ, 1955-1964, sv. 7, str. 129-130). Dva su polazišta za ispitivanje tako definiranih sposobnosti. S jedne strane provjeravaju se osnovne pretpostavke sposobnosti, kao što su pamćenje, razumijevanje, koncentracija i sl., a s druge strane pod vidom tih sposobnosti ispituje se sposobnost za konkretne aktivnosti – npr. za sviranje trube ili igranje tenisa. Kao rezultat interakcije tih istraživanja nastaju različiti instrumenti za analizu konkretnih sposobnosti – različiti testovi i sama sposobnost postaje sinonim za uspješno rješavanje određenog testa.

Glazbena sposobnost

Glazbena se sposobnost može ostvariti na različite načine. Netko dobro svira ili pjeva, netko komponira, aranžira ili dirigira, a netko ima razvijenu sofisticiranu glazbenu percepciju i sposobnost estetske prosudbe glazbe. Bentley (1966, str. 14) smatra kako se za sve te pojedince, aktivne sudionike glazbenog iskustva, može reći da posjeduju glazbenu sposobnost, za razliku od onih koji takvu sposobnost nemaju – premda je razlikovne karakteristike njihovih sposobnosti teško opisati. Seashore (1967, str. 2) glazbenu sposobnost određuje kao posjedovanje kapaciteta za slušanje, osjećanje i razumijevanje glazbe i, najčešće, za neki oblik glazbenog izraza, što rezultira usmjeravanjem prema glazbi. U svojoj definiciji Teplov (1966, str. 25, prema Mirković-Radoš, 1998, str. 16) glazbenu sposobnost tumači kao „kvalitativno originalnu kombinaciju svih sposobnosti od kojih zavisi mogućnost uspješnog bavljenja glazbenom aktivnošću". Prema Radoš (2010, str. 54) srž muzikalnosti čini sposobnost estetskog doživljaja glazbe te osjetljivost na afektivnu vrijednost i umjetničku kvalitetu glazbenog djela ili njegove interpretacije. Pojmove muzikalnost i glazbena sposobnost ona koristi kao sinonime, a na isti način – sinonimno, tretira i pojmove glazbena darovitost i glazbeni talent (Radoš, 2010). Čudina-Obradović (1991), gledajući na glazbenu sposobnost kao na osnovu glazbene nadarenosti ili talenta, u određivanju osnovnih pojmova također riječi talent i nadarenost navodi kao istoznačnice. Takvom se pristupu priklanja i ovaj rad, pa će se u želji izbjegavanja nepotrebnih terminoloških nedoumica za potrebe rada pojmovi glazbena sposobnost, muzikalnost i glazbeni talent koristiti kao istoznačnice.

Pojam „glazbene sposobnosti" u ovom se radu upotrebljava za označavanje skupa temeljnih sposobnosti koje zajedno čine neku složeniju ili opću glazbenu sposobnost. U istom se značenju koristi i pojam „glazbena sposobnost", koji, osim toga, može podrazumijevati i neku pojedinačnu, temeljnu glazbenu sposobnost. Za njihovo razumijevanje važan je kontekst u kojem se koriste, a upotreba im također ovisi i o pogledu na strukturu glazbene sposobnosti – atomističkom, odnosno unitarističkom, o čemu će biti riječi u nastavku rada.

Definicije glazbene sposobnosti nastale su u težnji pronalaženja zadovoljavajućeg i većini prihvatljivog načina objašnjenja tog pojma, no kako je to pitanje i dalje otvoreno, tumačenja koja se susreću u literaturi više odražavaju osobni pristup nego znanstveno promišljanje (Bentley, 1966). Razlike su također prisutne i u pogledu na važnost elementarnih, temeljnih sposobnosti neophodnih za snažniji razvoj glazbene sposobnosti. Tako Seashore (1967) kao najvažnije navodi osjećaj za visinu tona, osjećaj za vrijeme, osjećaj za glasnoću i osjećaj za tonske boje. Winner (2005) temeljnim smatra osjetljivost na strukturu glazbe – tonalitet, harmoniju i ritam, a Mirković-Radoš (1998) izdvaja razlikovanje visine, jačine i boje tona, razlikovanje ritma, melodijsku i ritmičku memoriju, kao osnovne elemente glazbene sposobnosti koji su nužni, ali, bez razumijevanja i estetske osjetljivosti za glazbu, nedovoljni za značajnija glazbena postignuća. Čudina-Obradović (1991) najvažnijim vidi razumijevanje melodije uz

što tijesno veže i osjećaj za razlikovanje visine tona te kao jednu od također važnih sposobnosti navodi i apsolutni sluh. Hallam (2010), analizirajući odgovore prigodno izabranih 660 ispitanika, glazbenika i neglazbenika starosti 14 do 90 godina o njihovu viđenju glazbene sposobnosti, želeći napraviti odmak od preferiranih tradicionalnih testova slušnih sposobnosti, kao prvih šest najčešćih odgovora dobiva: osjećaj za ritam, izražavanje misli i osjećaja zvukom, sposobnost razumijevanja i interpretiranja glazbe, komunikacija glazbom, osobnost. Ona zaključuje kako te poglede na glazbenu sposobnost valja također uzeti u obzir prilikom selekcijskih postupaka, uz naravno važne slušne sposobnosti, glazbeno iskustvo i motivaciju.

Pregled relevantnih istraživanja glazbenih sposobnosti

Postojanje glazbenih sposobnosti opaža se već u najranijoj dječjoj dobi (Gardner, 2010), a snažne reakcije na glazbene podražaje u prvim danima nakon rođenja upućuju na zaključak da glazbeni razvoj počinje još u prenatalnom razdoblju (Radoš, 2010). No, premda pri rođenju kod ljudi postoji biološka osnova za razvoj glazbenih sposobnosti, u kasnijoj dobi dolazi do velikih individualnih razlika u njihovu razvoju (Smolej-Fritz, 2000).

Prva testiranja razlika glazbenih sposobnosti provodio je Galton, a njegova zviždaljka kojom se utvrđuju slušne granice koristi se i danas (Motte-Haber, 1990). Proučavajući nasljednost, on je utjecao na kasnije istraživače, primjerice Seashorea, te je začetnik pravca koji glazbene sposobnosti smatra urođenim i njihov razvoj ovisan ponajprije o naslijeđenim biološkim predispozicijama (Seashore, 1967; Motte-Haber, 1990). Suprotno tome, autori koji ulogu okoline vide kao presudnu za razvoj glazbenih sposobnosti pojedinca ističu kvalitetan obrazovni pristup te život u okolini bogatoj glazbom kao važne. „Ako ništa drugo, od okoline u kojoj netko živi ovisno je u kojoj mjeri će svoju glazbenu nadarenost javno pokazati" (Gardner, 2010, str. 136). No, osim što je nakon godina istraživanja glazbenih sposobnosti jasno da u njihovu razvoju i geni i okolina imaju određenu zasebnu, međusobno neovisnu ulogu, također se pokazuje da i povezanost i međudjelovanje naslijeđa i okoline - u različitim omjerima - snažno oblikuje elemente glazbene sposobnosti (Ho i Chong, 2010; Radoš, 2010), pri čemu su bazne glazbene sposobnosti više određene nasljeđem, a složenije okolinom i učenjem (Dobrota, 2012).

Osim istraživanja prirode glazbene sposobnosti, zanimanje znanstvenika usmjereno je i pronicanju njezine strukture i organizacije. Prema atomističkoj (elementarističkoj) teoriji i njezinu glavnom predstavniku, već spominjanom Seashoreu, glazbena sposobnost nije jedna jedinstvena i nedjeljiva sposobnost, jer se sastoji od različitih elementarnih (senzornih), hijerarhijski organiziranih, međusobno neovisnih glazbenih sposobnosti, pri čemu složenije sposobnosti nastaju kombiniranjem osnovnih. Zato nije moguće mjeriti neku opću glazbenu sposobnost, već samo njezine pojedinačne komponente (Seashore, 1967). Polazeći od tih postavki, Seashore je još 1919. godine konstruirao prvi standardizirani test glazbenih sposobnosti uopće te ga nazvao

„Mjere muzičkog talenta" - „Measures of Musical Talent" (Rojko, 1981). I dok navedenu atomističku teoriju zagovaraju američki psiholozi, kod engleskih prevladava unitaristički pristup, u kojem se glazbena sposobnost tretira kao jedna cjelovita sposobnost, čiji pojedini aspekti međusobno koreliraju, te se teži utvrđivanju ukupne glazbene sposobnosti pojedinca (Mirković-Radoš, 1998). Wing, predstavnik tog pravca, razlikuje opću sposobnost opažanja i sposobnost estetske prosudbe glazbe, ali ih smatra različitim razinama iste, opće glazbene sposobnosti – glazbene inteligencije (Dobrota, 2012). Vodeći se time Wing izrađuje testove glazbene inteligencije na kojima se rezultat iskazuje jednom ukupnom vrijednošću te faktorskim analizama dobiva jedan opći faktor glazbene sposobnosti, što smatra dodatnom potvrdom teorije koju zastupa (Mirković-Radoš, 1998).

S obzirom na različitost postojećih viđenja prirode i strukture glazbene sposobnosti, engleski psiholog Bentley (1966) smatra kako su na području mjerenja te sposobnosti potrebni određeni kompromisi. Budući da nema zadovoljavajućeg načina mjerenja glazbene sposobnosti kao cjeline, on se zalaže za mjerenje mogućeg – dijelova te cjeline, što uostalom istraživači, kako atomisti tako i unitaristi, uglavnom i čine (Tablica 1).

Tablica 1

U razmatranju različitih komponenti glazbene sposobnosti, njihove uloge i značaja u aktivnom bavljenju glazbom – pjevanju ili sviranju, Bentley (1966) kao neophodne izdvaja tri bazične glazbene sposobnosti – razlikovanje visine tona, pamćenje tonova i pamćenje ritma, te jednu složeniju, također važnu – analizu akorda. Smatrajući ih osnovom za daljnji snažniji glazbeni razvoj, uvrštava ih u svoj test. Naglašavajući kako mu nije namjera mjeriti glazbenu sposobnost u cjelini nego samo ove navedene njezine aspekte, Bentley se u konstrukciji testa vodi slijedećim pretpostavkama:

1) najelementarnija glazbena forma je melodijski oblik ili fraza, koju čini tonska struktura unutar nekog ritamskog okvira
2) melodija se ne može shvatiti bez sposobnosti detaljnog prisjećanja odslušanih tonova, što ovisi o sposobnosti razumijevanja baznih elemenata melodije – visine i trajanja (tonova)
3) razlikovanje manjih intervala od pola stupnja, bitno je i za pjevanje i za sviranje na većini instrumenata, jer omogućava postizanje dobre intonacije
4) iako akordi nisu osnovni činilac melodije, svaki izvođač treba biti svjestan različitih tonova drugih sudionika glazbene izvedbe, jer što je veća ta svijest, to je veći doprinos muziciranju u ansamblu (Bentley, 1966, str. 40).

Polazeći od tako definiranih teorijskih postavki o osnovnim glazbenim sposobnostima, ovaj se rad bavi problematikom njihova dijagnosticiranja u kontekstu Bentleyeva testa glazbenih sposobnosti. Zbog jednostavne primjene, praktičnosti i međukulturalno razumljivih zadataka Bentleyev se test čini vrlo pogodnim za korištenje u hrvatskim školama. Primjena testova tog tipa našla je opravdanje u praksi (Radoš, 2010), ali

pri interpretaciji dobivenih rezultata valja imati na umu kako oni (testovi) ne mjere glazbenu sposobnost u cjelini, već samo neke njezine elemente, pa su važan, ali ne i jedini pokazatelj postojanja glazbene sposobnosti.

Cilj i zadaci istraživanja

Osnovni je cilj ovog istraživanja bio provjeriti metrijske karakteristike Bentleyeva testa „Mjere glazbenih sposobnosti" na hrvatskom uzorku učenika glazbene škole. Drugi je cilj bio usporediti rezultate dobivene u ovom istraživanju s rezultatima istovrsnih dostupnih relevantnih istraživanja te dati doprinos raspravi o prirodi glazbene sposobnosti. U skladu s tako formuliranim ciljevima definirani su sljedeći zadaci:

- provjeriti pouzdanost i valjanost Bentleyeva testa „Mjere glazbenih sposobnosti"
- usporediti rezultate dobivene u ovom istraživanju s rezultatima drugih dostupnih relevantnih istraživanja
- ispitati odnos broja godina glazbenog školovanja i postignutih rezultata na testu.

Uzorak i metoda

Istraživanje je obuhvatilo prigodan uzorak, ukupno 84 učenika glazbene škole, od čega 74 učenika Glazbene škole u Varaždinu i 10 učenika Osnovne glazbene škole u Ludbregu, 33 učenika (39,3%) i 51 učenicu (60,7%), prosječne dobi 14,38 godina. Sudjelovanje je bilo dobrovoljno, a anonimnost je osigurana posebnim sistemom zaporki. Postupak je proveden grupno u školi, nakon dogovora s ravnateljima, a zatim i s učiteljima navedenih škola te nakon što su za sudjelovanje u istraživanju suglasnost dali učenici i njihovi roditelji. Osim učenika, u dijelu istraživanja vezanom za provjeru valjanosti Bentleyeva testa sudjelovali su i učitelji koji ih poučavaju instrument.

Nakon što je promatran u cjelini, uzorak je za potrebe istraživanja podijeljen u dvije grupe (Tablica 2). Prvu grupu od 46 učenika - grupu A, zajedno čine šesti razred glazbene škole u Varaždinu (36 učenika) i šesti razred glazbene škole u Ludbregu (10 učenika). Drugu grupu - grupu B, čini 38 učenika pripremnog stupnja glazbenog obrazovanja glazbene škole u Varaždinu.

Tablica 2

Učenici pripremnog glazbenog obrazovanja (u nastavku PGO) uključuju se u glazbeno obrazovanje najčešće u sedmom razredu osnovne škole, a za specifične predmete poput solo pjevanja i kasnije. To je razlog što je njihova prosječna dob u uzorku nešto viša od dobi učenika šestih, završnih razreda osnovne glazbene škole (u nastavku OGŠ), koji se u glazbeno školovanje uključuju između prvog i trećeg razreda osnovne škole. I jedni i drugi pod određenim uvjetima mogu školovanje nastaviti u srednjoj glazbenoj školi, a razlika među grupama interesantna za ovo istraživanje jest u tome što učenici PGO glazbenu školu pohađaju jednu do najdulje dvije godine, za razliku od učenika šestog razreda OGŠ, koji tu školu pohađaju šest godina, pa je tu

moguće istražiti odnos broja godina glazbenog školovanja i postignutih rezultata na testu glazbenih sposobnosti.

Test Mjere glazbenih sposobnosti -„Measures of Musical Abilities", koji je interes ovog rada, konstruirao je engleski psiholog sa sveučilišta u Readingu, Arnold Bentley (1966). Test dijagnosticira trenutni stupanj osnovnih glazbenih sposobnosti djece dobi od 7 do 14 godina. Predviđen za grupno mjerenje test, prema autoru, mjeri ponajprije elementarne, urođene ili nenamjerno naučene glazbene sposobnosti. Sadrži ukupno šezdeset zadataka i svaki točan odgovor donosi jedan bod. Test se sastoji od četiri podtesta:

1) razlikovanje visine tona - ispitanik nakon odslušana dva tona ima zadatak odrediti je li drugi ton viši, niži ili jednak prvom tonu, koji je frekvencije 440 Hz; test sadrži 20 zadataka, a snimka tonskog materijala napravljena je na sinusno-valnom oscilatoru
2) pamćenje tonova – jednostavna melodija sastavljena od pet tonova u okviru prve oktave ponavlja se dvaput, drugi put jedan je ton izmijenjen, a ispitanik određuje o kojem je tonu riječ; test sadrži 10 snimljenih zadataka odsviranih na orguljama
3) analiza akorda – u 20 zadataka testa snimljenih na orguljama ispitanik sluša akorde (i intervale) i određuje koliko je tonova odsvirano u svakom pojedinom akordu (ili intervalu)
4) pamćenje ritma – u 10 zadataka ovog testa ispitanici najprije čuju glas koji broji u tempu mm = 70, jedan, dva, tri, četiri, što im daje metrički puls; zatim slijedi ritamski niz od četiri dobe, koji se zatim još jednom ponavlja doslovno ili s izmjenom na jednoj dobi; zadatak je ispitanika odrediti je li drugi ritamski niz drugačiji od prvog i ako jest, na kojoj se dobi desila promjena; svaki sljedeći ritamski niz svira se na drugoj tonskoj visini na orguljama.

List za odgovore Bentleyeva testa ima četiri tablice u koje ispitanici upisuju sve svoje odgovore, tj. procjene. List je priređen za hrvatske ispitanike, a glasovne upute koje su na audio CD-u na engleskom, za potrebe istraživanja zamijenjene su uputama na hrvatskom jeziku. Učenicima glazbene škole, ispitanicima u ovom radu, upute za ispunjavanje tablica lako su razumljive, jer se oni u nastavi redovito susreću s pojmovima kao što su viši ton, niži ton, doba, akord ili interval, koji se koriste u testu. Sadržaj Bentleyeva testa ne zahtijeva prijevod, jer se test sastoji od ranije opisanih zvučnih-tonskih, međukulturalno razumljivih zadataka. Ispitanici su nakon svakog pojedinog odslušanog zadatka trebali upisati svoj odgovor na za to predviđeno mjesto u listu za odgovore. Razmak između dva zadataka iznosi sedam do osam sekundi, ovisno o podtestu, što je za upisivanje odgovora sasvim dovoljno.

U Listi učiteljskih procjena, izrađenoj za potrebe ovog istraživanja, od učitelja instrumenta tražilo se zaokruživanje jednog od ponuđenih odgovora u osam pitanja višestrukog izbora, s obzirom na njihovu procjenu postignute glazbene kompetencije učenika koje poučavaju (ocjena u prethodnom razredu, broj nastupa tijekom godine,

sudjelovanje na natjecanjima, savladavanje programa, razvijenost sviračkih vještina, stav prema sviranju, preporuka za nastavak školovanja i motivacija učenika). Odgovori su zatim bodovani na način da je višem stupnju procjene pojedinih učenikovih postignuća dodijeljen veći broj bodova. Zbroj tih bodova predstavlja ukupan rezultat procjene za pojedinog učenika. Dodatno, podacima su pridružene ocjene učenika iz solfeggia iz prethodnog razreda, koje su oni po završetku testiranja upisali u anketni list.

Svi podaci obrađeni su programom PSPP, koji je slobodno dostupan na internetu. U statističkoj obradi podataka korištena je deskriptivna statistika te računat Cronbach alpha (α), Kolmogorov-Smirnov z, Pearsonov koeficijent korelacije r i t-test.

Rezultati

U Tablici 3 prikazani su ukupni rezultati koje su ispitanici postigli na Bentleyevu testu. Razlike u rezultatima s obzirom na spol nisu dobivene ni na testu u cjelini, ni na bilo kojem njegovu podtestu, što se podudara s rezultatima u dostupnoj literaturi (Bentley, 1966; Radoš, 1998; Smolej-Fritz, 2000), pa neće biti dalje raspravljano.

Tablica 3

Usporedbom rezultata Bentleyeva testa izraženog aritmetičkim sredinama broja točno riješenih zadataka ovog, s rezultatima drugih istovrsnih istraživanja, uočavaju se određene sličnosti, ali i razlike (Tablica 4). S obzirom na to da uzorak ovog istraživanja čine učenici glazbene škole prosječne dobi oko 14 godina, ova je usporedba rađena s jednako selekcioniranim uzorkom drugih istraživanja. U rezultatima prvog i drugog podtesta među istraživanjima nema veće razlike. Razlike su vidljive u manjim dobivenim rezultatima Smolej-Fritz (2000) – ukupnom, kao i u trećem i četvrtom podtestu, te u nešto manjem ukupnom i manjem rezultatu trećeg podtesta ovog istraživanja. Zašto je do toga došlo, teško je reći, no vjerojatno se odgovor nalazi u općim kulturalnim razlikama, kao i u različitom načinu glazbenog obrazovanja u različitim zemljama.

Tablica 4

Pouzdanost

Provjeravajući pouzdanost Young (1973) je metodom polovina (split-half) na uzorku 504 učenika viših razreda, sudionika instrumentalnih glazbenih programa, za Bentleyev test dobio koeficijent pouzdanosti 0,83, a Smolej-Fritz (2000) na uzorku 195 učenika osnovne škole koeficijent pouzdanosti α=0,89 te na uzorku 241 učenika glazbene škole α=0,92. Dobiveni koeficijent pouzdanosti testa (Cronbach α) u ovom istraživanju iznosi 0,74, pa iako je nešto manji nego u navedenim istraživanjima – do čega je vjerojatno došlo zbog manjeg ukupnog uzorka ovog istraživanja – on sasvim zadovoljava (Rojko, 1981), s čime se slaže i Radoš (2010, str. 100), kada na uzorku učenika osnovne škole metodom polovina dobiva koeficijent pouzdanosti 0,72.

Za razliku od pouzdanosti na temelju unutrašnje dosljednosti čestica, pouzdanost svog testa Bentley je utvrdio retestnim postupkom na uzorku od 90 učenika dobi od

9,1 do 11,9 godina. Prvo i drugo testiranje proveo je u razmaku od četiri mjeseca. Dobiveni koeficijent korelacije iznosio je 0,84, što je Bentley smatrao zadovoljavajućim. Mirković-Radoš (1998) na isti je način za Bentleyev test dobila koeficijent pouzdanosti 0,88 kod učenika osnovne škole i 0,94 kod učenika glazbene škole.

U ovom istraživanju pouzdanost testa također je provjerena ponovljenim mjerenjem (test-retest postupak) na ispitanicima grupe A (Tablica 5).

Tablica 5

Ponovljeno mjerenje provedeno je u odmaku od četiri mjeseca u odnosu na prvo. Provjerom distribucije rezultata prvog i drugog mjerenja grupe A Kolmogorov-Smirnovim testom, utvrđena je normalnost raspodjele ukupnih rezultata te rezultata testa razlikovanja visine tona i testa analize akorda u prvom, dok su u drugom mjerenju uz te, normalnu raspodjelu pokazali i rezultati testa pamćenja tonova. Raspodjele rezultata testa pamćenja tonova i ritma u prvom te pamćenja ritma u ponovljenom istraživanju pomaknute su udesno, što znači da su ti testovi relativno lagani, pogotovo za učenike glazbene škole, o čemu govori i Mirković-Radoš (1998, str. 135). Istodobno, za ukupne rezultate testa i rezultate sva četiri podtesta grupe B nađena je normalna raspodjela.

Dobiveni koeficijent korelacije postignutih ukupnih rezultata prvog i drugog testiranja grupe A, r=0,81 značajan na nivou 0,01, smatra se dobrim za grupni test te se može prihvatiti kao potvrda pouzdanosti Bentleyeva testa. Viša aritmetička sredina ukupnog broja riješenih zadataka u ponovljenom mjerenju podupire tezu kako se glazbenim školovanjem razvijaju i elementarne glazbene sposobnosti, u ovom slučaju one koje mjeri Bentleyev test.

Valjanost

Valjanost testa Bentley je provjerio na više načina. U grupi od 314 učenika usporedio je ostvarene rezultate na testu i procjene njihovih muzičkih sposobnosti dobivene od učitelja, a χ^2 test je pokazao da postoji povezanost te dvije varijable. Učenici koji su procijenjeni kao muzikalni postigli su i bolje rezultate na testu, dok su oni s lošijim rezultatom testa, prethodno bili procijenjeni kao nemuzikalni. Ispitujući korelaciju rezultata na testu i uspjeha u glazbenoj nastavi 70 učenika prvog razreda srednje škole, Bentley je rezultate testiranja na početku školske godine usporedio s rezultatima uspjeha u glazbenoj nastavi tih učenika nakon 12 tjedana. Koeficijent korelacije te dvije varijable iznosio je 0,94 (Bentley, 1966).

Uspoređujući rezultate koje su isti ispitanici postigli prvo na Bentleyevu testu, a zatim na Musical Aptitude Profile – MAP testu glazbenih sposobnosti Edwina Gordona, koji je provjeren, uhodan, dosljedan i pouzdan test glazbenih sposobnosti za dijagnostiku i za prognostičke svrhe – Young (1973) zaključuje kako se na temelju dobivenih podataka, uz prihvaćanje pretpostavke o kriterijskoj mjeri (MAP) kao valjanom prediktoru budućeg glazbenog uspjeha, može smatrati da Bentleyev test

ima umjereno visoku valjanost za istu namjenu, premda se čini da ti testovi mjere donekle različite segmente glazbene sposobnosti. Ovdje Mirković-Radoš (1998, str. 134) dodaje kako izgleda da Bentleyev test ima nešto veću valjanost za predviđanje budućeg uspjeha u glazbi.

Valjanost Bentleyeva testa u svom istraživanju i Mirković-Radoš (1998) provjerava usporedbom stupnja slaganja učeničkih rezultata na testu i učiteljskih procjena sposobnosti učenika te utvrđuje značajnu povezanost, odnosno slaganje, iz čega zaključuje da odgovori na testu nikako nisu rezultat pogađanja, pa dobivene rezultate smatra potvrdom valjanosti testa.

I u ovom je istraživanju valjanost Bentleyeva testa utvrđena na sličan način. Glazbenu kompetenciju koju su postigli učenici grupe A, procjenjivali su njihovi učitelji instrumenta. Učiteljske procjene nakon izračunavanja ukupnog rezultata pojedinog učenika izražene su u bodovima i – kao i učeničke ocjene iz solfeggia i instrumenta, uspoređene s učenikovim rezultatom na Bentleyevu testu. Dobivene korelacije r (Tablica 6) pokazuju umjereno visoku pozitivnu povezanost varijabli. Značajnost korelacija posebno je izražena kod rezultata testa pamćenja ritma – što je potrebno detaljnije istražiti u budućim radovima – ali i kod ukupnih rezultata testa, a u korelacijama rezultata testa analize akorda i učiteljskih ocjena/procjena nema značajnosti.

Tablica 6

Kod ocjenjivanja u glazbi osim glazbenih, ulogu imaju i drugi čimbenici poput osobne jednadžbe ocjenjivača, halo-efekta, zamora ocjenjivača, pogreške kontrasta ili prilagođavanja kriterija ocjenjivanja grupi. Pored toga što na dobivenu ocjenu može značajno utjecati trema učenika, kod ocjenjivanja u glazbenim školama upitan je i kriterij ocjenjivanja zbog subjektivnog doživljaja viđenog i odslušanog od strane svakog pojedinog učitelja (Brđanović, 2012). Ocjene u glazbenoj školi samo dijelom vrednuju glazbene sposobnosti koje se mjere Bentleyevim testom, a dijelom vrednuju i druge osobine učenika, primjerice marljivost ili zalaganje, pa to također treba imati u vidu kod promatranja ocjena kao kriterija valjanosti testa. S druge strane učitelj instrumenta s učenikom provodi nekoliko sati tjedno tijekom više godina i dobro ga poznaje pa su njegove procjene dobar kriterij valjanosti. Kako su ovdje dobivene značajne pozitivne korelacije rezultata testova i s ocjenama i s procjenom učitelja instrumenta, to se može smatrati vrlo dobrom potvrdom valjanosti Bentleyeva testa.

Glazbeno iskustvo i rezultati na Bentleyevu testu

U nastavku istraživanja uspoređeni su postignuti rezultati na Bentleyevu testu učenika grupe A, koji glazbenu školu pohađaju šest godina i učenika grupe B, koji glazbenu školu pohađaju do dvije godine. Pri tom su, za razliku od dosadašnjeg tijeka istraživanja i korištenja rezultata prvog mjerenja, ovdje korišteni rezultati drugog, retest mjerenja grupe A, čime je smanjena razlika prosječne dobi promatranih grupa

(grupa A – 14,20 god.; grupa B – 14,99 god.). Bentley (1966) naime smatra da su glazbene sposobnosti obuhvaćene njegovim testom većinom urođene i neovisne o iskustvu, prema čemu bi ispitanici približno jednake starosti trebali ostvariti i približno jednak rezultat na njegovu testu, pa je to ovdje provjereno.

Tablica 7

Vrijednosti svih aritmetičkih sredina broja točno riješenih zadataka, ukupno i u sva četiri podtesta Bentleyeva testa, kao što je iz Tablice 7 vidljivo, više su u grupi A. T-test značajnosti razlika aritmetičkih sredina za nezavisne uzorke nije pokazao statističku značajnost dobivenih razlika kod podtestova između grupe A i B, ali je, kao svojevrstan rezultat tih razlika, za višu aritmetičku sredinu ukupnog rezultata Bentleyeva testa grupe A u odnosu na grupu B – t-test pokazao statističku značajnost razlike ($t = 2{,}146$; $p = 0{,}035$). Iz dobivenih se rezultata stoga može zaključiti da je veći broj godina glazbenog školovanja značajan za viši ukupan rezultat na Bentleyevu testu. Zaključak dodatno podupire podatak kako je grupa s višim rezultatom – grupa A, u prosjeku oko devet mjeseci mlađa od grupe s nižim rezultatom – grupe B.

Kao što je već rečeno, Bentley smatra da rezultati postignuti na njegovu testu ne ovise o prethodnom učenju, već su isključivo posljedica urođenih sposobnosti, što proizlazi iz njegova stava o urođenosti temeljnih glazbenih sposobnosti. Danas je međutim jasno da utjecaj drugih faktora na rezultate Bentleyeva testa, npr. iskustvo u testiranjima, učenje ili motivaciju, ipak nije moguće zanemariti (Good, Aggelton, Kentridge, Barker, i Neave, 1997), što potvrđuju i rezultati ovog istraživanja koji ukazuju na to da glazbeno školovanje razvija i elementarne glazbene sposobnosti.

Zaključak

U ovom je radu, prvoj primjeni Bentleyeva testa Mjere glazbenih sposobnosti u Hrvatskoj, na uzorku učenika glazbene škole test pokazao dobre metrijske karakteristike, pa nema zapreka za njegovo korištenje u testiranju i istraživanju promatrane populacije, uz napomenu kako bi budućim istraživanjima trebalo obuhvatiti i učenike redovne osnovne škole. Osim toga, današnje tehničke mogućnosti u odnosu na vrijeme nastajanja testa neusporedivo su bolje pa bi, premda je test prebačen na CD (Bentley, 2007) i sasvim prikladan za korištenje, zvučni materijal ipak trebalo još malo dotjerati da „reflektira razvoj tehnike od 1966. godine do danas" (Mills, 1984, str. 104).

Bentleyev je test pogodan za utvrđivanje razine elementarnih glazbenih sposobnosti već kod sedmogodišnjaka, za što se, primjerice, taj test u britanskim školama i danas koristi (Mills, 1980; Rosebery School, 2014). Svoje mjesto u praktičnoj primjeni test bi mogao naći i u Hrvatskoj, jer u postupku odabira glazbeno nadarenih učenika i njihovu usmjeravanju prema bavljenju glazbom nedostaje jedan takav standardizirani mjerni instrument.

Pokazatelj značajnosti većeg broja godina glazbenog obrazovanja za postizanje

višeg rezultata na Bentleyevu testu teorijski je doprinos ovog istraživanja postojećim spoznajama o prirodi glazbenih sposobnosti i upućuje na značajnu ulogu koju okolina, u ovom slučaju škola, ima u razvoju elementarnih glazbenih sposobnosti.

Prema svemu iznesenom Bentleyev test glazbenih sposobnosti može uspješno dijagnosticirati razinu postojećih elementarnih glazbenih sposobnosti koje se njime mjere, ali mu nije namjera – niti je to jednim testom moguće učiniti – odrediti nečiji ukupni glazbeni potencijal. Zato kod definiranja glazbene sposobnosti pojedinca i predviđanja njegovih budućih mogućih dosega na glazbenom području treba u obzir uzeti cijeli niz faktora koji takvo predviđanje čine pouzdanim i valjanim, a test glazbenih sposobnosti samo je jedan od njih.

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