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EXECUTIVE FUNCTIONS AND ACHIEVEMENTS IN ART EDUCATION IN CHILDREN WITH MILD INTELLECTUAL DISABILITY

This paper reports the results of analyzing the relation between executive functions and achievements in Art education in children with mild intellectual disability. The sample consists of 51 children with mild intellectual disability of both sexes, aged between 10 and 14. Executive functions are tested by means of cognitive flexibility tests, inhibitory control tests, and working memory tests. The research results indicate significant relations between some aspects of cognitive flexibility, motor inhibitory control and nonverbal working memory and achievements in Art education.

***Key words**: executive functions, mild intellectual disability, Art education*

The development of drawing depends on the maturity of abilities which determine drawing skills. These are primarily visuospatial and motoric abilities, including basic mechanisms of attention, memory and thinking. Another important factor in the development of drawing skills is the socio-cultural context in which drawing develops, since the respectability of artistic expression and freedom of expression in a certain environment influence creativity and motivation to draw.

Our previous research has shown that more than half of examinees with learning disabilities considerably deviate from age

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appropriate standards on subtest Drawing, which emphasizes the significance of drawing as a dimension of cognitive development. Even though correlation with other tests is not always significant enough to consider drawing a reliable criterion for intellectual maturity, it can be an important indicator of cognitive and graphomotor development (Gligorović, Radić Šestić, 2010).

Depending on the applied methodology, the research on drawings made by individuals with intellectual disability reveals contrary results. Some authors point out qualitative differences in the development of drawing, which are manifested in disproportion of elements, lack of spatial organization, limited number of details, and/or presence of irrelevant and bizarre details. The results of other studies point out slow development of drawing, but not qualitative differences, and mention human figure as the most apparent difference in comparison with children of similar mental age. It is believed that the development of drawing does not exceed the stage of intellectual realism (Anderson, 1994) in the majority of individuals with intellectual disability, even though it can contain elements of higher developmental stages (Henley, 1992).

The results of our earlier research on the characteristics of drawings made by individuals with mild and moderate intellectual disabilities aged between 10 and 50, in which we used the drawing of human figure, dynamic drawing, freestyle drawing, and a drawing called "lunch", do not indicate the existence of qualitative differences in the development of drawing when compared to general population. Conventional-segmented type of human figure drawing, characterized by clearly segmented regions, is the most frequent in examinees (32.1%), while the frequency of continuous contour drawing, i.e. drawing contours of the whole figure or its main parts, is somewhat lower (30.86%). It has been established that most (85.19%) human figure drawings by individuals with intellectual disabilities are characterized by problems with proportion, which are usually manifested in a disproportion between the length of limbs and head, and/or a disproportion between torso and head size and the rest of the body. Although it is believed that disproportion occurs due to poor spatial organization, disproportion of human figure due to adding parts of face or lack of space is rarely seen on drawings by examinees with intellectual disability. Thus, it is possible that their problems with proportion are related to the integration of determining

characteristics as a whole Even though most examinees master the drawing of conventional human figure, it can be noticed that most of them draw only basic elements. Thus, it is possible that problems with proportion and the attempt to draw basic body parts well make it difficult to draw details, and that there is a problem with integrating potential details into a systemized whole. Figures of unusual size or eccentrically positioned figures were not noticed on the drawings, so deviations from relatively centered figure which takes up about half of the paper can be interpreted as problems with organizing space or as the expression of a person's adopted drawing scheme regardless of the paper size. The analysis of dynamic drawings has shown that most drawings by individuals with intellectual disability do not represent action. This ability develops after the age of seven in typically developed children, while the ability to realistically represent object movement develops together with the appearance of dynamic mental images about the age of 9 or 10. More than half of the examinees' drawings are static without any indication of movement. Transitory stage, which includes signs of movement but without clear or adequate body modification, is present in a bit less than a third of the examinees. Only 10.96% of individuals with intellectual disability show the ability to represent movement. Their drawings show the modification of body parts position according to the performed action. Most examinees represent the elements in their drawings in canonical form, schematically and from different angles (e.g. a side view of a horse and a front view of a horseman), and they treat every element as independent of others in spatial terms, which is typical for the intellectual realism. Drawings with all the elements drawn from the same angle appear in only 5.08% of the examinees, which undoubtedly indicates the inability to plan and organize elements while drawing. The effect of figure transparency, which appears while drawing structurally integrated objects and partly or completely screened objects, has been noticed on most drawings by individuals with intellectual disability. Similarly to typically developed children by the age of 8, transparency of figures in the examinees usually develops due to the attempt to draw all defining parameters of an object, or due to the order in which they draw (Gligorović, Buha Đurović, 2009).

The analysis of characteristics of drawings by individuals with intellectual disability indicates the dominance of intellectual realism

as a manifestation of the stage of preconceptual thinking, and not of the qualitative difference when compared to typically developed persons. Most tasks demonstrate problems with integrating elements into a whole, planning, spatiotemporal organization of drawings, and selection of relevant parameters from a group of defining parameters. This poses the question of the development of basic mechanisms of executive functions and their influence on the quality of drawing expression.

AIMS

- Determining the relation between the development of cognitive flexibility and achievements in Art education in children with mild intellectual disability.
- Determining the relation between the level of inhibitory control and achievements in Art education in children with mild intellectual disability.
- Determining the relation between the level of working memory development and achievements in Art education in children with mild intellectual disability.

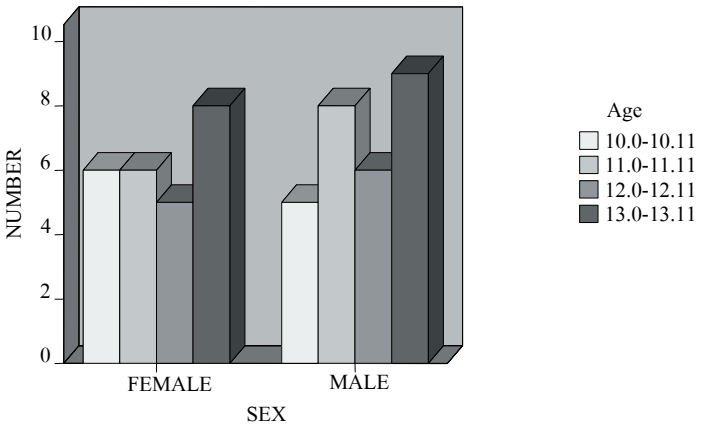
METHOD

Sample Description

The sample consists of 51 children with mild intellectual disability of both sexes, from four Belgrade elementary schools. The criteria for selecting the examinees were: mild intellectual disability (IQ 50 – 70), age between 10 and 14, and absence of bilingualism. The following chart represents the structure of the sample according to sex and age.

The sample consists of 25 (47.2%) girls and 28 (52.8%) boys with mild intellectual disability. Most examinees (32.1%) are children aged between 13 and 13.11, 26.4% are children aged between 12 and 12.11, 20.8% are children aged between 11 and 11.11, and also 20.8% are children aged between 10 and 10.11. Statistical analysis has not revealed any significant relation either between age and grade in Art ($p=0.772$), or between sex and grade in Art ($p=0.518$).

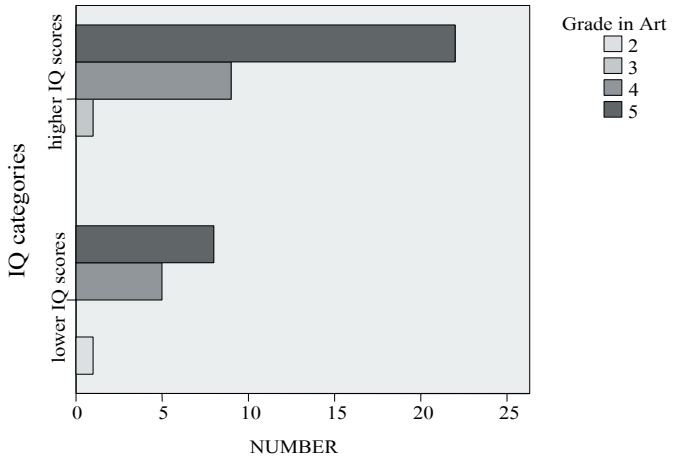
Chart 1 Sample distribution according to sex and age



Age/Grade H=1.123, df=3, p=0.772
Sex/Grade H=0.418, df=1, p=0.518

Average IQ in the sample is 63.17. The examinees were divided into two groups according to their achievement on IQ tests – a group with higher IQ and a group with lower IQ. Chart 2 represents the structure of examinees according to these two groups and their grade in Art.

Chart 2 Sample distribution according to IQ and grade in Art



H=0.666, df=1, p=0.414

Statistical analysis has not revealed any significant relation between intellectual ability and achievement in Art in examinees from our sample (p=0.414).

ACQUIRING DATA

The analysis of the documentation from pedagogical and psychological department and the assessment of executive functions were used in acquiring data.

Accepted variables

Data on age, intellectual abilities, bilingualism and grades in Art was acquired from the documentation from pedagogical and psychological departments of schools.

Tested variables

Executive functions were tested by means of cognitive flexibility tests, inhibitory control tests, and working memory tests.

Assessment of cognitive flexibility

The ability to create and change the principles of categorization is assessed by means of Wisconsin Card Sorting Test (WCST). The task is to classify a sequence of cards according to one out of three classifying principles (color, shape, and number) which successively take turns, and on which the examinee has to reach a conclusion based on the examiner's reaction on the previous answer. The testing material consists of two decks of cards (64 cards in each deck). The variables selected for the purpose of this research are: the number of achieved categories (6 maximum), the number of used cards, the number of cards used to complete the first category, the number of correct answers, the number of incorrect answers, the number of perservative responses, the number of perservative errors, and the number of interrupted sets.

Visual conceptual tracking is assessed by means of Trail Making Test (TMT), which consists of two parts. The first part is used for assessing conceptual tracking ability and linking random numbers. The second part is used for assessing complex conceptual tracking, i.e. the flexibility to change a mental set. Testing material consists of a sheet of paper with drawn circles containing numbers (from 1 to 13) and Cyrillic letters (from A to J). The examinees are required to

alternately connect numbered and lettered circles according to the following pattern 1-A -2-B-3-V etc. Time needed to complete the task and the number of errors are recorded.

Assessment of inhibitory control

Verbal domain of inhibitory control is assessed by means of Day/Night version of Stroop test, which was selected to avoid the influence that lack of automatization in reading can have on results. The test consists of two parts, with 50 small illustrations arranged in 5 lines on two sheets of paper size A4, so that there are 5 items in each line. In the first part of the test a child is told to name white cards with a picture of sun as "day", and black cards with a picture of moon and stars as "night". In the second part of the test the child is expected to ignore the representative content of a card and name the cards as opposites (to name the card which represents day as "night" and vice versa). Time and the number of errors are recorded for each art.

Go/no Go task, which consists of two parts, is used to assess motor domain of inhibitory control. Conflicting Motor Response Test is the first part of the task, in which the examinees are required to make the opposite response to the one presented by the examiner. The second part of the task is withholding motor response, in which the examinee has to withhold a reaction to the agreed signal while imitating the given model. Each set consists of 30 items. The number of incorrect responses and latency between instruction and execution are recorded.

Assessment of working memory

The second part of Auditory Memory subtest of ACADIA Test of Developmental Abilities is intended for the assessment of memorizing increasing sequences of numbers which are verbally presented, and recognizing a number and its position in the sequence, i.e. verbal working memory. The examinees are required to listen to a sequence of numbers, and then decide which number comes before another one. The number of correct answers out of possible 12 is recorded.

Nonverbal working memory is assessed by means of Odd-one-out span. The testing material consists of stimulus cards with 3 figures drawn on them (two identical and one similar to the other two) and a sheet of paper size A4 with rectangles divided in three parts where each part corresponds to the position of figures on a card. The examinees are required to recognize the odd figure in a set of three, and then, on the answer sheet, mark its position in the set. Testing starts with a range of two sets of figures, while the maximum range is five sets. Presentation of three stimulus cards is planned for each range. The number of correct answers out of possible 12 is recorded.

Measures of central tendency, measures of variability, and parametric and nonparametric analysis of variance are used in statistical analysis of the obtained data.

RESEARCH RESULTS AND DISCUSSION

Cognitive flexibility and achievements in Art education

Cognitive flexibility is the ability to create and flexibly change concepts, i.e. abstract principle of solving tasks. The main prerequisite for cognitive flexibility is the ability to recognize differences, which develops around the age of 3 or 4, when a child starts to form general categories, followed by subcategories, on the basis of object features such as size, shape, color, etc. Recognizing the principles of sorting and categorizing objects is first achieved by using one criterion or one distinctive feature. Then, the ability to group objects according to two criteria develops around the age of 4 or 5, while the ability to group objects according to three distinctive features develops between the ages of 5 and 7 (Smidts et al., 2004). However, the preoperative period is dominated by intuitive thinking, based on perceptual characteristics of objects, which makes it difficult to vary the criteria for object classification. Thus, the grouping is rigid and followed by difficulties in changing principles. It is only with the development of operative classification, around the age of 8 or 9, which imply class inclusion, that the ability to abstract and vary criteria for symmetrical relations develops.

Cognitive flexibility in children with mild intellectual disability has been assessed by means of Wisconsin Card Sorting Test (WCST) and Trail Making Test (TMT).

Table 1 shows the results of WCST according to selected variables.

Table 1 – WSCT results in children with mild intellectual disability

WCST	Min	Max	Mean	SD	Variance
Achieved categories	1	6	3.69	1.691	2.860
Total number of cards	92	128	123.31	9.563	91.460
Correct responses	45	94	74.47	10.788	116.374
Incorrect responses	19	83	48.84	15.653	245.015
Perservative responses	8	106	31.75	17.360	301.354
Perservative errors	8	81	27.63	13.387	179.198
Nonperservative errors	2	52	20.73	10.718	114.883
Interrupted sets	0	5	1.80	1.249	1.561
The number of cards used to complete the first category	10	46	14.53	6.546	42.854

According to Table 1, the mean of achieved categories in the examinees from our sample is 3.69 (which in typically developed children corresponds to the age of 6.5). The minimum result is 1 and the maximum is 6 categories (out of possible 6), which indicates a significant variability of the results. The average value of perservative responses is 31.75, perservative errors 27.63, and non-perservative errors 20.73.

Table 2 illustrates statistically significant parameters identified by analyzing the relation between the achievements on WCST and a grade in Art in children with mild intellectual disability.

Statistical analysis has revealed a significant relation between achievements in Art education and the number of achieved categories and perservative responses. Non-perservative errors, number of interrupted sets, correct responses, incorrect responses, total number of cards, the number of cards used to complete the first category, and perservative errors are not statistically significant for a grade in Art.

Table 2 –WCST results and achievements in Art education

Grade in Art		N	Mean	SD	Min	Max
WCST–achieved categories	2	2	2.00	.000	2	2
	3	4	1.50	.577	1	2
	4	14	4.00	1.840	1	6
	5	29	3.93	1.486	2	6
	Total	49	3.67	1.676	1	6
F=3.92, df=3, p= 0.04						
WCST–perservative responses	2	2	41.50	4.950	38	45
	3	4	56.50	36.847	19	106
	4	14	25.29	12.797	9	53
	5	20	120.50	11.293	92	128
	Total	49	31.27	16.879	8	106
F=4.78, df=3, p<0.00						

The number of achieved categories depends on the ability to maintain the existing criterion, flexibly transfer to a new criterion, and inhibit irrelevant criteria. According to the results, this significantly influences success in Art. Cognitive flexibility problems may be manifested as rigidity, perservativity, and stereotypy, both in conceptualization and in regulation of graphic (motor) aspect of drawing expression.

The first part of Trail Making Test (TMT) engages mainly visual attention, visuomotor coordination, and motor activity. The second part includes complex conceptual tracking, i.e. alternate interchange of two conceptual sets. Table 3 shows Trail Making Test (TMT) results in children with mild intellectual disability.

Table 3 – TMT results in children with mild intellectual disability.

TMT	Min	Max	Mean	SD	Variance
TMT 1 - time	31.91	715.15	108.1886	103.92881	10801.197
TMT 2 - time	114.62	685.18	297.3847	137.68234	18956.426
TMT 1 i 2 time difference	66.16	536.62	201.5831	104.20941	10859.601
TMT 2 – number of errors	0	5	1.29	1.384	1.917

According to Table 3, the average time for doing the first part of TMT is 108.19s, and for the second part 297.38s, which clearly indicates the difficulties in fast conceptual interchange in doing the second part. The errors range between 0 and 5, with the average value of 1.29. When compared to typically developed children, the children with mild intellectual disability need considerably more time to do the second part of TMT, and they make more errors (Buha Đurović, 2010).

Table 4 shows statistically significant parameters identified by analyzing the relation between the achievements on TMT and a grade in Art in children with mild intellectual disability.

Table 4 –TMT results and achievements in Art education

Grade in Art		N	Mean	SD	Min	Max
TMT 2 – number of errors	2	1	2.00	.	2	2
	3	2	2.00	.000	2	2
	4	14	1.07	1.207	0	4
	5	30	1.27	1.461	0	5
	Total	47	1.26	1.343	0	5
F=2.928, df=5, p=0.02						

Statistical analysis has revealed a significant relation between achievements in Art education and the number of errors in doing the second part of Trail Making Test, while time parameters are statistically unimportant. This result could have been expected given that the second part of TMT, which requires the ability to quickly transfer from one conceptual set to the other, is extremely difficult for majority of our examinees.

Inhibitory control and achievements in Art education

The term inhibitory control is used to denote mechanisms of interference control and modulating or terminating activities in progress, which are the basis of some other cognitive components, such as attention, working memory, understanding, planning,

regulation of motivation and emotion (Brocki, Bohlin, 2004, Eisenberg et al., 2004).

In assessing inhibitory control, "Day-Night" Stroop Test has been used to assess verbal aspect of inhibitory control, and Go/no Go task to assess nonverbal aspect of inhibitory control.

Selective focusing on one aspect of a stimulus and disregarding the other predominant one is necessary for successfully completing the Stroop Test. The inhibition of predominant response becomes more effective after the age of six, by gradual increase in correct responses and reduction of latency time at early school age and possibly later (Welsh, 2002). Table 5 shows the results of Stroop test according to defined variables.

Table 5 –Stroop Test results in children with mild intellectual disability

STROOP	Min	Max	Mean	SD	Variance
STROOP 1 time	27	93	50.12	15.315	234.538
STROOP 1 number of errors	0	5	.75	1.254	1.573
STROOP 2 time	36	141	69.65	24.198	585.520
STROOP 2 number of errors	0	21	3.72	4.559	20.784
Stroop2 interference	.34	1.35	.7448	.27143	.074

According to data in Table 4, the average time of verbal identification of stimulus in the first part of the test is 50.12s, while the time is much longer in the second part of the test – 69.65s, in which it is required to inhibit the predominant stimulus and identify another target stimulus.

Statistical analysis of Stroop test results and achievements in Art education has not revealed a statistically significant relation, which is somewhat surprising, especially for the first part of the test where required attention selectivity.

Table 6 shows the results of assessing the motor aspect of inhibitory control by means of Go/no Go task, in which the examinees are expected to stop an activity on the agreed signal, or to react opposite to the given model.

Table 6 – Go/no Go task results in children with mild intellectual disability

Go/no Go	Min	Max	AS	SD	Variance
Number of incorrect conflicting responses	0	29	8.40	6.362	40.481
Latency errors – conflicting response	0	21	3.54	4.465	19.940
Imitative errors – conflicting response	0	16	4.87	4.773	22.785
Incorrect inhibitory response	0	14	4.92	4.082	16.661
Latency errors – inhibitory response	0	6	1.02	1.244	1.549
Commission errors – inhibitory response	0	9	2.60	2.795	7.814
Omission errors – inhibitory response	0	7	1.31	1.755	3.080

The data in Table 6 indicates that the means of errors in the group of tasks regarding conflicting response (8.40) is much higher than the average value of errors in the group of inhibitory response, i.e. response which is expected to be withheld (4.92). It is obvious that our examinees find it easier to complete inhibitory response tasks, as one of the easiest levels of inhibitory control where a choice is made between responding and not responding. Motor aspect of inhibitory control develops earlier than the verbal one in typically developed children as well, which is around the age of 6 or 7 (Welsh, 2006).

Table 7 shows statistically significant parameters identified by analyzing the relation between the achievements on Go/no Go task and a grade in Art in children with mild intellectual disability.

Statistical analysis of Go/no Go task results and the achievements in Art education has revealed a statistically significant relation between the total number of errors in conflicting response and the number of latency errors in inhibitory response. There is a considerable number of latency errors in simpler mechanisms of inhibitory control relevant for postponing activities, which is clearly reflected on drawing expression. The established relation between more complex motor inhibitory control and achievements in Art education indicates that children with intellectual disabilities find it difficult to detach themselves from given schemes, models and

themes in drawing expression. This is consistent with the results of freestyle drawing analysis in individuals with intellectual disability, which has indicated a poor selection of themes and standardized drawing completely subordinate to the learned pattern, where some of the drawings are an obvious replica of recently covered material (Gligorović, Buha Đurović, 2009).

Table 7 – Go/no Go task results and achievements in Art education

Gade in Art		N	Mean	SD	Min	Max
Go/n Go – number of incorrect answers in conflicting response	2	2	8.00	11.314	0	16
	3	4	12.50	4.796	6	17
	4	14	9.07	7.947	0	29
	5	30	7.23	5.431	0	18
	Total	50	8.20	6.366	0	29
F=2.079, df=19, p=0.03						
Go/no Go – number of latency errors in inhibitory response	2	2	3.00	4.243	0	6
	3	4	1.25	1.893	0	4
	4	14	.57	1.016	0	3
	5	30	1.07	.907	0	3
	Total	50	1.02	1.253	0	6
F=2.506, df=5, p<0.00						

Statistical analysis of Go/no Go task results and the achievements in Art education has revealed a statistically significant relation between the total number of errors in conflicting response and the number of latency errors in inhibitory response. There is a considerable number of latency errors in simpler mechanisms of inhibitory control relevant for postponing activities, which is clearly reflected on drawing expression. The established relation between more complex motor inhibitory control and achievements in Art education indicates that children with intellectual disabilities find it difficult to detach themselves from given schemes, models and themes in drawing expression. This is consistent with the results of freestyle drawing analysis in individuals with intellectual disability, which has indicated a poor selection of themes and standardized drawing completely subordinate to the learned pattern, where some

of the drawings are an obvious replica of recently covered material (Gligorović, Buha Đurović, 2009).

Working memory and achievements in Art education

Working memory is a multicomponent system which enables active storing and manipulating information that is being processed at that moment. The basis of working memory is central executive system, which is in charge of manipulating current information and coordinating the activity of two modality-specific components of working memory – phonological loop (a system for short-term storage of verbal information) and visuo-spatial sketchpad, which is in charge of short-term storage of visuospatial information (Bedli, 2004). Table 8 shows the results of assessing verbal and nonverbal working memory.

Table 8 – Results of assessing working memory in children with mild intellectual disability

Working memory	Min	Max	Mean	SD	Variance
Verbal working memory	0	10	2.70	2.599	6.753
Nonverbal working memory	0	10	4.64	2.474	6.119

According to data in Table 8, the average values of assessing verbal working memory (2.70) are considerably lower than the average results of nonverbal working memory (4.64). The examinees from our sample have achieved maximum 10 out of possible 12 points on both tasks. The capacity of verbal working memory in children with mild intellectual disability is considerably smaller than the capacity of typically developed children of the same age, while the results of assessing nonverbal working memory are similar to the ones in typically developed children (Riggs et al., 2006).

Table 9 shows statistically significant parameters identified by analyzing the relation between the achievements on working memory tests and a grade in Art in children with mild intellectual disability.

Table 9 – Results of assessing working memory and achievements in Art education

Working memory		N	Mean	SD	Min	Max
Nonverbal working memory	2	2	1.50	2.121	0	3
	3	4	2.00	1.414	1	4
	4	15	5.40	2.324	1	9
	5	30	4.90	2.398	1	10
	Total	51	4.69	2.494	0	10
F=3.61df=3, p=0.02						

Statistical analysis has revealed a significant relation between nonverbal working memory and achievements in Art education. Verbal working memory has not proved to be a significant parameter of achievement in this area. The identified relevance of nonverbal working memory for drawing expression is completely expected, especially since the tasks, such as "odd one out", are based on visual discrimination. However, bearing in mind verbal reinforcements associated with planning (verbal equivalents to the characteristics of the object being drawn) and realizing (verbal equivalents to spatial relations of the elements of drawing) the act of drawing (Toomela, 2002), the absence of significant relation between verbal working memory and achievement in Art is surprising. It is possible that due to the noticeable dissociation of verbal and nonverbal working memory, children primarily rely on a more developed ability, i.e. nonverbal working memory. Research results which emphasize the importance of working memory in the process of acquiring academic knowledge and skills by considering it an important predictor of success at school (Alloway & Alloway, 2009), indicate the need for a more profound insight into the specifics of the development of its verbal and nonverbal aspects in children with intellectual disability.

CONCLUSION

By analyzing the relation between the level of the development of basic components of executive functions and achievements in Art education in children with mild intellectual disability, we have come to the following conclusions:

In the field of cognitive flexibility:
- Significant relation has been identified between achievements in Art education and the number of achieved categories ($p=0.04$) and perservative responses ($p=0.03$), while other parameters are not statistically significant.
- Significant relation has been identified between achievements in Art education and the number of errors in the second part of Trail Making Test ($p=0.02$), while time parameters are not statistically significant.

In the field of inhibitory control:
- Statistically significant relation between verbal aspect of inhibitory control and achievements in Art education has not been identified.
- Analysis of the relation between motor aspect of inhibitory control and achievements in Art education has revealed a statistically significant relation between the total number of errors in conflicting response ($p=0.03$) and the number of latency errors in inhibitory response ($p<0.00$).

In the field of working memory:
- Statistically significant relation has been identified between nonverbal working memory and achievements in Art education ($p=0.02$)
- Statistically significant relation between verbal working memory and achievements in Art education has not been identified.

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EGZEKUTIVNE FUNKCIJE I POSTIGNUĆA U NASTAVI LIKOVNE KULTURE KOD DECE SA LAKOM INTELEKTUALNOM OMETENOŠĆU

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SAŽETAK

U ovom radu su prikazani rezultati analize odnosa između nivoa razvoja egzekutivnih funkcija i uspeha u nastavi likovne kulture kod dece sa lakom intelektualnom ometenošću. Uzorak čini 51 dete sa lakom intelektualnom ometenošću, oba pola, uzrasta 10 – 14 godina. Egzekutivne funkcije su ispitane testovima za procenu kognitivne fleksibilnosti, inhibitorne kontrole i radne meorije.

Rezultati istraživanja ukazuju na značajnu povezanost nekih aspekata kognitivne fleksibilnosti, motoričkog domena inhibitorne kontrole i neverbalne radne memorije sa uspehom u nastavi likovne kulture.

Ključne reči: egzekutivne funkcije, laka intelektualna ometenost, nastava likovne kulture

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