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SPECIJALNA EDUKACIJA I REHABILITACIJA

- AUDITORY PROCESSING SKILLS & ACADEMIC ACHIEVEMENT
- PARENTS' EXPECTATIONS OF FORMAL SUPPORT
- LEKSIČKO-SEMANTIČKE I EGZEKUTIVNE FUNKCIJE STARIH
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Sadržaj

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Relationship between auditory processing skills and academic achievement of elementary school children

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Aim. This study aimed to determine the prevalence of auditory processing difficulties in children and to examine possible relationships between auditory processing skills and school success. *Method*. In this study, a screening test Auditory processing disorder - (*Croatian*: PSP – 1) was used to determine the prevalence of auditory processing difficulties in elementary school children in Croatia. Furthermore, correlations between screening test, grade point average, and subjective assessment scores for reading, writing, and math were analyzed. A total of 412 participants from mainstream schools were grouped based on their chronological age and grade. *Results*. The findings revealed that 12 (approximately 2.9%) participants exhibited difficulties in the assessed auditory processing tasks, which is consistent with data from other studies indicating that between 2% and 5% of children have an auditory processing disorder. Specifically, the two auditory tasks involving dichotic listening proved to be the most challenging for all participants. The results indicated that students' academic performance, as measured by grade point average and teachers' ratings of students' academic and language skills, was poorer in students having pronounced auditory processing difficulties when compared to their same-grade peers. Teacher ratings were significantly correlated with screening test scores, whereas students grade average was not. *Conclusions*. The analysis also revealed that screening total scores were significantly positively correlated with teachers' ratings of students' reading, writing, and mathematical skills. These skills also correlated highly with students' average grades. These findings corroborate the notion that auditory processing deficits are inversely correlated with academic achievement, warranting further research into the diagnosis and management of Auditory processing difficulties.

Keywords: auditory processing difficulties, children, PSP-1, teacher assessment

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Introduction

Auditory processing disorder (APD), also recognized as central auditory processing disorder (CAPD), can be defined as a deficit in the ability to process and channel information through the auditory system and is reflected in difficulty in some or all of the following auditory abilities: sound localization and lateralization; auditory discrimination; auditory pattern recognition; temporal aspects of audition and auditory performance in competing and degraded acoustic signals (American Speech-Language-Hearing Association [ASHA], n.d.). Therefore, auditory processing serves a major role in the learning process and language abilities (Bellis & Bellis, 2015). The act of processing speech is very complex, encompassing the engagement of auditory, cognitive, and language mechanisms, often simultaneously (Medwetsky, 2011). The reported prevalence of APD varies greatly in the literature. Hind et al. (2011) provided an estimate of 0.5 – 1% of APD in children and adults. Other researchers suggested that approximately 2% – 5% of school-age children have APD (Bellis, 2007; Palfery & Duff, 2007), whereas a study conducted by Musiek et al. (1990) provided data indicating a prevalence of 7% of APD in childhood. More recently, Brewer et al. (2016) suggested that the prevalence of pediatric APD might be around 10% when occurring with common comorbid developmental disorders. It is noteworthy to mention that varying diagnostic criteria for APD were employed across these prevalence studies. Several studies have explored the prevalence of suspected APD, such as a recent study that reported a 9-11% prevalence using the Dichotic Digits Test (DDT) as a screening tool for APD with a large cohort of 7-12-year-old children (Skarzynski et al., 2015). Similarly, Moloudi et al. (2018) reported a 9.8% prevalence of suspected APD in 8-to 12-year-old Iranian children based on data from an APD questionnaire and two auditory processing tests. The results of these studies indicate that a significant number of elementary school children have difficulty processing auditory information, which in turn may negatively impact their academic performance.

Commonly reported behavioral characteristics associated with APD include difficulty comprehending speech in competing or reverberant environments, issues with sound source localization, frequent requests for repetition of auditory information, misunderstanding spoken messages, sensitivity to loud sounds, difficulty following rapid speech and complex auditory directions, delays in responding to spoken instructions or exhibiting inconsistent or inappropriate responses to spoken messages, distractibility by background sounds, inconsistent or inappropriate responses to spoken instructions, inattentiveness and distractibility, and literacy difficulties (DeBonis & Moncrieff, 2008; Geffner, 2019; Hamaguchi & Tazeau, 2007). Due to the fact that there is a substantial overlap in the above-mentioned characteristics with those associated with other cognitive and linguistic disorders (American Academy of Audiology [AAA], 2010), some researchers have questioned

the validity of defining APD as a unique disorder. However, the majority of evidence supports the claim that 'APD is a deficit in neural processing that may coexist with, but is not the result of, dysfunction in other modalities' (ASHA n.d., 2005). School-age children with APDs may also present with various characteristics of language, reading, and spelling disorders as well as attention problems (Chermak et al., 1999). Well-established associations between APD and literacy and academic problems, as well as between APD and speech and language disorders, have been described in previous research (Bamiou et al., 2001; Banai & Kraus, 2006; de Wit et al., 2018; Dawes & Bishop, 2009; Dawes et al., 2009, Sharma et al., 2009). Similarly, high levels of comorbidity between APD and dyslexia (Iliadou et al., 2009; Sharma et al., 2009), specific language impairment (Ferguson et al., 2011; Miller & Wagstaff, 2011; Sharma et al., 2009), and attention disorders (Dawes et al., 2008) have been established. Given such difficulties, children with APD are at greater risk for academic difficulties and school failure (Chermak & Musiek, 2014). This is partially due to the fact that these children receive (auditory) information differently and have difficulties in memorization and recall of information, which in turn negatively affects academic and social outcomes (Yalçınkaya et al., 2009).

Due to the existence of differing guidelines and criteria and the lack of 'a gold standard' for diagnosing APD, valid diagnosis of APD in children continues to pose a challenge. Therefore, many studies have used the term 'suspected APD' or 'auditory processing difficulties' to describe individuals who have listening difficulties and score poorly on some of the assessed auditory processing tasks (de Wit et al., 2016). Despite the lack of a universally accepted definition, diagnostic criteria, and management protocol, the general public is becoming increasingly aware of the concept of APD, which has contributed to more referrals for auditory processing assessment (Bellis, 2011). Heine et al. (2016) concluded that the majority of referrals for audiological and auditory processing testing of students with APD came from school employees, including administrative staff, teachers, and special education personnel. Suspected speech and language disorders and problems in literacy and academic achievement were the most frequent reasons for making a referral for APD testing.

These reasons for referral are understandable, considering that they are observable even in mild cases of APD, especially with increasing chronological age. For example, adolescents with even mild APD have demonstrated decreased grade point average and academic performance compared to their peers (Heine & Slone, 2008). Similarly, both students diagnosed with APD and those referred for APD testing, but not diagnosed, score lower on standardized tests of reading, language, and mathematical knowledge compared with peers (Ferguson et al., 2011; Moore et al., 2010).

Findings from previous studies seem to indicate that there is a number of students enrolled in mainstream schools who do not have adequate auditory

processing skills needed for optimal achievement in literacy and language. This, in turn, limits their achievement in related academic areas. Considering that the consequences of poorer auditory processing skills can be alleviated to some extent by including modifications in the teaching process, it is crucial to estimate the proportion of students with suspected APD. Precise estimation allows for adequate support planning in the school system.

For example, in Croatia, the primary educational system consists of eight grades of compulsory elementary school. In the first four grades, the curricula of the Croatian language, mathematics, and sciences are always taught by a single teacher. The homeroom teacher creates teaching plans, delivers content and assesses students, monitors students' academic progress, and refers students exhibiting learning-disruptive difficulties to other professionals. Due to their important role in tailoring the teaching process to the individual needs of students, it is crucial to educate teachers regarding auditory processing difficulties students might have.

Research Aim

The aim of this paper was to evaluate the auditory processing skills of elementary school children (as determined by their performance on different auditory processing tasks) as a function of age and gender. Also, the aim was to determine the prevalence of auditory processing difficulties in elementary school students. Finally, this study was aimed at examining possible relationships between auditory processing skills and school success.

Methods

Variables

The following variables related to participants were used in order to assess the study aims:

Age group (determined by their chronological age);

Gender;

Teacher's rating of academic skills (reading, writing, and math) and speech and language skills;

Grade point average;

Overall performance on PSP-1 test and performance on four PSP-1 subtests: Filtered Words, Speech in Noise, Dichotic Words, Dichotic Sentences.

Participants

A total of 412 children (218 boys and 194 girls) attending grades 1 to 4 in mainstream schools in Croatia participated in the study. Children with a previously established diagnosis of hearing loss, intellectual deficits, and learning disorders were

excluded from the study. Furthermore, twenty-eight participants could not complete the auditory processing assessment in a single session due to attention problems, which subsequently led to their exclusion. The children were recruited from primary schools across Croatia. The participants were divided into four subgroups according to their grade: 125 in the first grade (M = 7.6 years, SD = 0.6 years), 100 students in the second grade (M = 8.5 years, SD = 0.5 years), 92 third grade students (M = 9.5 years, SD = 0.5 years) and 95 fourth grade students (M = 10.5 years, SD = 0.4 years).

All participants were informed of the research study in writing, and consent forms were signed by their parents. The study was approved by the institutional ethics committee.

Tests and procedures

Participants' teachers evaluated their students' reading, writing, and mathematical skills and assessed their speech and language abilities by rating each of these skills on a three-point scale (below average, average, or above average, in comparison to other classmates).

The PSP-1, a behavioral test battery used for auditory processing disorder screening, was administered to all children. This test battery contains four subtests – filtered words, speech in noise, competing (dichotic) words, and competing (dichotic) sentences – and is the only standardized behavioral assessment of auditory processing skills for children aged 5.5 – 11.5 years in Croatia. All test signals and stimuli were acoustically edited using the Adobe Audition ver. 2.0 software and stored on CD along with the calibrating sound for determining sufficient loudness. Analysis of the psychometric properties of the PSP-1 battery indicated that the four subtests demonstrate good reliability, as indexed by Cronbach's alpha values ranging from 0.650 to 0.895, and good concurrent validity, as determined using exploratory factor analysis (Hedjever et al., 2013). All subtests on the PSP-1 are verbal and use speech stimuli that are recorded on a CD and presented by a female native Croatian speaker.

The first subtest, filtered words (FW), contains two-word lists, each containing 17 words that are phonetically balanced between the ears. Before administering test items, participants heard two test items in each ear. The stimuli are presented monaurally as a series of low-pass filtered stimuli with a cutoff frequency of 1 kHz and a roll-off of 32 dB per octave. The percentage of correctly repeated words in both ears determined the score.

The second subtest, labeled speech in noise (SiN) or auditory figure-ground, is also a monaural, low redundancy task in which target words are presented over background babble noise at a greater intensity of 8dB SPL. The background noise is unintelligible babble noise of constant intensity. This subtest contains two training words per ear followed by two test series of 17 words per ear. The word stimuli for each ear are different, but phonetically balanced in each word list. The score is determined by the percentage of correctly repeated words in both ears.

Dichotic speech tasks encompassed dichotic words and dichotic sentences tasks, assessing binaural integration and separation abilities. These tests assess the central auditory nervous system and are often used in auditory processing testing (Weihing & Atcherson, 2014). In a dichotic words (DW) task, one word is presented in one ear while simultaneously presenting another word in another ear, requiring participants to divide their attention between the two ears and then report the stimuli heard in both ears. The word pairs are balanced regarding the frequency/intensity spectrum of the words as well as regarding the place and manner of consonant articulation in the word pairs. Furthermore, binaural pairs were balanced based on their duration at an accuracy level of 1 ms. The task is comprised of 60 different words, with 15 target words per ear. Prior to the test set, there are two dichotic training sets per ear. The percentage of correctly repeated words determines the score for each ear, in addition to the total subtest score for both ears.

The dichotic sentences (DS) task assesses binaural separation abilities. The participant is required to repeat the sentence heard in the designated ear after two sentences are simultaneously heard in both ears. Binaural sentence pairs are equalized based on their duration and onset at an accuracy level of 1 ms. Prior to administering the test sets, which consist of a total of 40 different sentences or 10 sentence pairs per ear, two training sets were presented for each ear. Each training set is comprised of one dichotic pair of sentences. The total subtest score is calculated as the sum of percentages of correctly repeated sentences in each ear.

Test administration

Teacher's three-point scale rating of reading, writing, mathematical skills, and speech and language abilities was obtained for each student. Also, background data for each student, including grade point average, was provided by school administrators.

Testing was conducted individually in a quiet room by a trained examiner. The PSP-1 test battery was administered in a single test session that lasted between 35 and 45 minutes, using a computer with headphones (Numark HF-125). All subtests were presented at a comfortable level of 65 dB SPL. For all participants, the four PSP-1 subtests were presented in the same order: (1) the FW test, (2) the SiN test, (3) the DD test, and (4) the DS test. In all tasks, the right ear was always assessed prior to the left ear. All participants were provided the same detailed test instructions and offered practice items to familiarize themselves with each listening task. Performance on training items was not scored nor included in the total result for each subtest. The participants were required to provide their answers orally.

Statistical analyses

Statistical analyses were performed using SPSS, version 21. Data were checked for normality using a Shapiro – Wilk test of normality and via visual inspection of normal QQ plots. The results indicated that several variables and age categories followed a skewed, non-normal distribution. Descriptive statistics were performed.

Also, the Mann–Whitney U test (MWU), Kruskal-Wallis H test, and Wilcoxon signed rank (WSR) tests were used to test for gender, ear, and age and age-specific ear differences, respectively.

Results

Descriptive statistics for each age group are presented in Table 1. Using boxplots, Figures 1a, 1b, 1c, and 1d present the results of the PSP-1 subtests divided by age group and ear, expressed as percent correct responses. On average, filtered words was the most challenging subtest, where the percentage of correct responses ranged from 54.3% to 69.4% across age groups. In contrast, the dichotic sentences subtest appears to have been the least challenging for all age groups, with scores ranging from 77.7% to 93% correct responses.

Table 1

Descriptive statistics for participant grades and performance on individual subtests and overall score on PSP-1 test

GRADE		N (M/F)	M	(%)	SD	Min.	Max.
1	FW	125	18.46	54.3	3.91	8	28
	SiN	125	18.50	66.1	2.62	13	26
	DW	125	44.02	73.4	8.22	18	57
	DS	125	15.55	77.7	3.64	4	20
	Overall	125 (65/60)	94.84		12.94	59	119
2	FW	100	20.54	60.4	4.07	10	29
	SiN	100	20.08	71.7	2.85	13	26
	DW	100	47.03	78.4	6.40	26	57
	DS	100	16.9	84.5	3.08	6	20
	Overall	100 (55/45)	101.37		13.00	67	127
3	FW	92	23.01	67.7	3.33	14	28
	SiN	92	21.87	78.1	2.67	16	27
	DW	92	49.55	82.6	5.22	27	57
	DS	92	18.45	92.2	2.04	10	20
	Overall	92 (53/39)	110.61		9.93	86	130
4	FW	95	23.61	69.4	3.04	17	33
	SiN	95	21.59	77.7	2.29	14	26
	DW	95	51.97	86.6	4.34	39	59
	DS	95	18.60	93.0	1.89	10	20
	Overall	95 (45/50)	115.13		8.42	84	130

Note: Participants were divided into four grades.

Legend: FW – Filtered Words subtest, SiN – Sound in Noise subtest; DW – Dichotic Words subtest; DS – Dichotic Sentences subtest; M – males; F – females

Descriptive analysis revealed differences between age groups for both total PSP-1 scores and subtest scores, where performance increased with age. Overall, a statistically significant difference between groups was found for the total PSP-1 score ($\chi^2(3) = 140.924$, $p < 0.001$). Post hoc tests were conducted to test pairwise comparisons on total PSP-1 score, revealing that group 2 had significantly higher scores than group 1 ($\chi^2(1) = 54.49.84$, $p = 0.017$), group 3 had significantly higher scores than group 2 ($\chi^2(1) = 82.51.24$, $p < 0.001$), and finally, group 4 performed significantly better than group 3 ($\chi^2(1) = 52.29$, $p = 0.008$). Similar trends were observed when examining the PSP-1 subtest results, presented in Figures 1a, 1b, 1c, and 1d.

No significant gender differences were found in overall PSP-1 performance (U (1) = 23 617, p = 0.154).

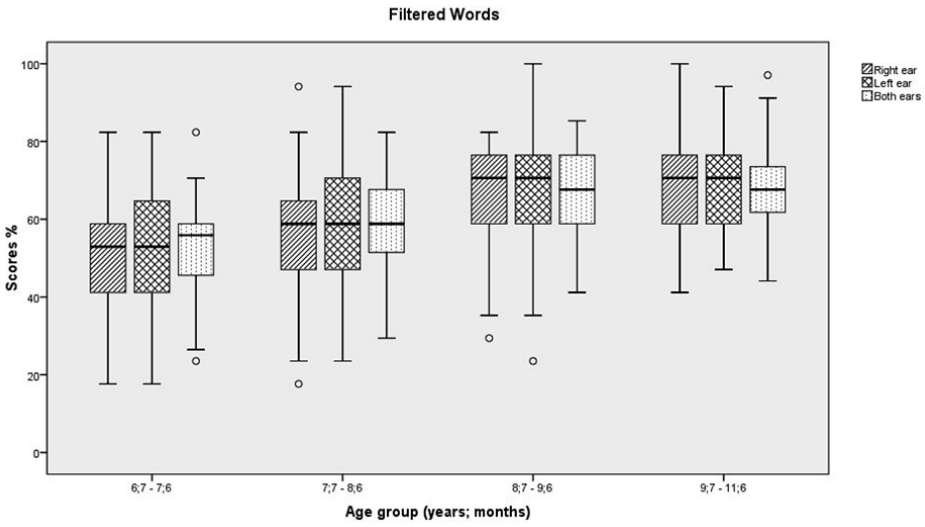
Filtered Words

In the Filtered Words subtest, post hoc pairwise comparisons revealed significant differences between all adjacent groups, exhibiting better performance with increasing age, except between the performance of the two older groups (3 and 4), where the same trend was observed but without reaching statistical significance.

No difference between genders was found on the Filtered Words subtest (U = 37935.5, p = 0.389). Finally, no significant ear differences were found on the Filtered Words subtest ($Z = -1.742$, $p = 0.082$).

Figure 1a

Performance on Filtered Words subtest by age group and ear



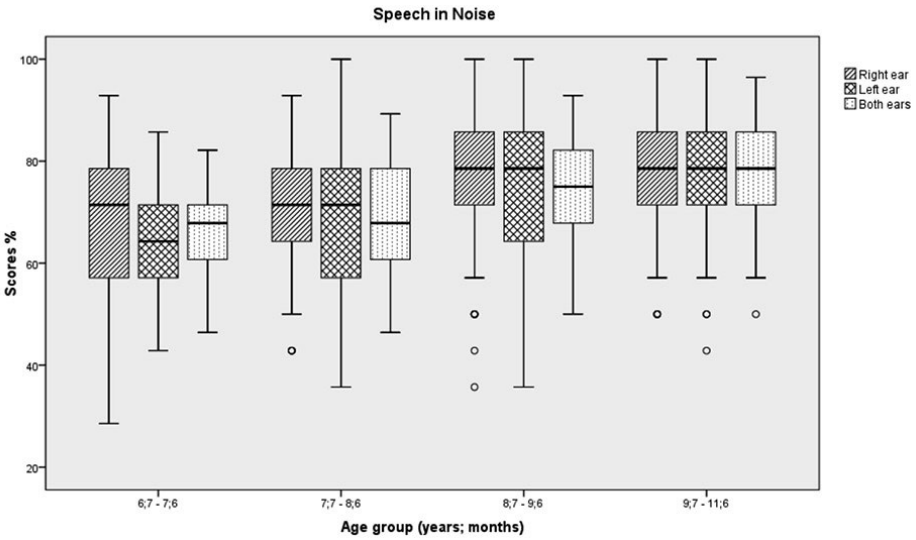
Speech in Noise

For the Speech in Noise subtest, the only significant difference was observed between groups 2 and 3 (χ^2 (1) = -59.60, p = 0.001).

Both boys and girls performed similarly in the Speech in Noise subtest (SiN, U = 36128.5, p = 0.890). Also, no differences between participants' right and left ear on this subtest were found to be statistically significant (Z = -0.851, p = 0.395).

Figure 1b

Performance on Speech in Noise subtest by age group and ear



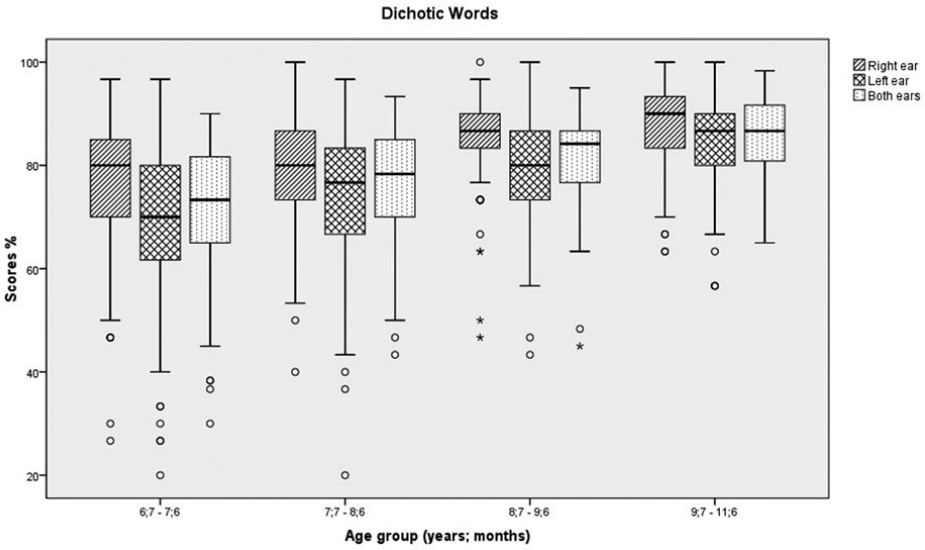
Dichotic Words

Performance on the Dichotic Words subtest was significantly different between adjacent age groups, except for the two youngest groups.

No significant gender differences were observed in the Dichotic Words subtest (U = 39286.5, p = 0.11).

Figure 1c

Performance on Dichotic Words subtest by age group and ear



Dichotic Sentences

Although performance on the Dichotic Sentences subtest was better with increasing age, the only significant difference was found between the two oldest groups.

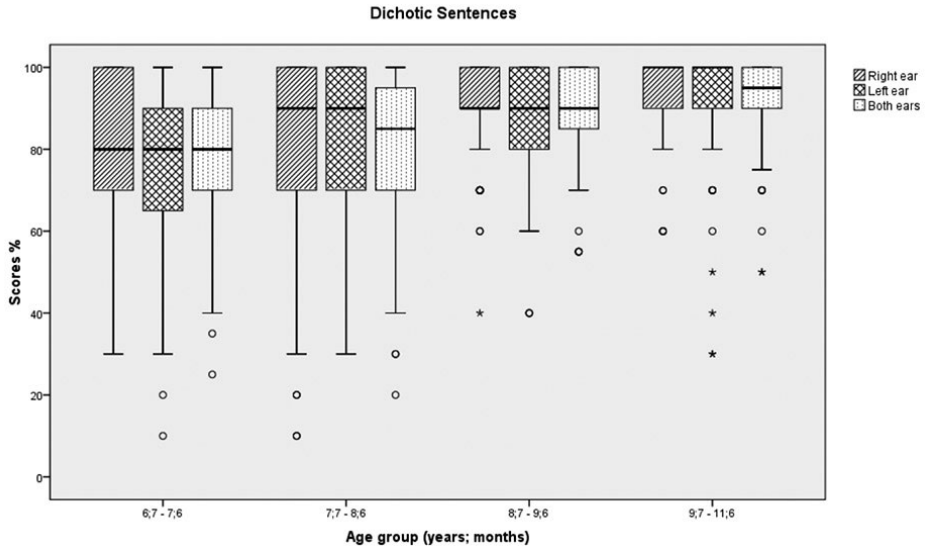
No significant difference between the performance of boys and girls on the Dichotic Sentences subtest was found (U = 39147, p = 0.12).

As expected, an ear effect in the dichotic speech tests was observed, where significantly better results in the right ear, or a right-ear-advantage (REA), was noted for Dichotic Words (Z = -8.60, p = 0.001) and Dichotic Sentences (Z = -7.22, p = 0.001) subtests. Furthermore, age-related ear differences were noted on the Dichotic Sentences task, where the right ear advantage decreased with increasing age. Although a similar trend for the Dichotic Words task could be observed, no statistically significant differences were noted for this task.

Scores on all PSP-1 subtests and the total PSP-1 score demonstrate strong positive and significant correlations (Table 2), with dichotic listening tasks exhibiting the highest correlation coefficient.

Figure 1d

Performance on Dichotic Sentences subtest by age group and ear



Relationship between the PSP-1 test results and academic achievements

As evident in Table 2, students' chronological age was strongly correlated with PSP-1 subtest scores and a total score, indicating a developmental relationship between age and auditory processing skills. Gender was not significantly correlated with total PSP–1 score, nor with PSP-1 subtest scores.

Teacher ratings of reading, writing, mathematics, and language were all significantly moderately interrelated. Also, teacher evaluations of students' reading, writing, mathematical, and language skills had significant moderate correlations with grade point averages, indicating a partial congruency between subjective and objective assessments of students' academic skills (0.334 – 0.506, $p \leq 0.01$). Furthermore, all teachers' ratings were significantly associated with PSP-1 total results. The strongest correlation was evident in teachers' ratings of students' language skills (0.305, $p \leq 0.01$) and reading ability (0.239, $p \leq 0.01$) that were significantly correlated with the PSP-1 total score. These two teachers' assessments were also significantly correlated with all four PSP-1 subtest results (please see Table 2). However, student grade point averages were not correlated with PSP-1 scores.

Table 2

Correlation between age, gender, students' grades, teacher ratings and performance on the four PSP-1 subtests and the overall PSP-1 score

	AGE	GENDER	GPA	READ	WRITE	MATH	SPEECHLANG	FW	SiN	DW	DS	PSP-1 total
AGE	-	- .012	-.197**	.086	.048	-.029	. 112*	.482**	.433**	.450**	.389**	.568**
GENDER		-	.119*	.070	.205**	-.119*	.071	.050	.011	.069	.069	.069
GPA			-	.482**	.452**	.506**	.334**	.021	-.008	.130*	.088	.094
READ				1	.539**	.472**	.442**	.112*	.128*	.247**	.195**	.239**
WRITE					1	.427**	.312**	.046	.051	.187**	.137**	.156**
MATH						1	.322**	.049	.129*	.124*	.170**	.149**
SPEECH LANG							1	.202**	.247**	.240**	.266**	.305**
FW								1	.492**	.460**	.477**	.747**
SiN									1	.343**	.364**	.636**
DW										1	.629**	.879**
DS											1	.752**
PSP-1 total												1

Legend: GPA – students grade average; Read – teacher rating of student's reading ability; Write – teacher rating of student's writing ability; Math – teacher rating of student's mathematical knowledge; Language – teacher rating of student's language skills; FW – student's score on PSP-1 Filtered Words subtest, SiN – student's score on PSP-1 Speech in Noise subtest; DW – student's score on PSP-1 Dichotic Words subtest, DS – student's score on PSP-1 Dichotic Sentences subtest, PSP-1 total – student's overall score on PSP-1

Note: * = $p \leq 0.05$; ** = $p \leq 0.01$

Case analysis of students who failed the PSP-1 test

Results on the PSP-1 subtests indicate that, overall, up to 6% of participants across the entire age range achieved scores significantly below the average (i.e., 2 standard deviations below the mean) on at least one of the subtests, suggesting that these children have auditory processing difficulties. The pattern of performance on PSP-1 subtests among these children differs from the result patterns of participants scoring within or above the average. Findings indicate that the most challenging tasks for this group appear to be dichotic listening subtests. Interestingly, there is no difference in the number of participants who 'failed' any of the subtests between age subgroups, indicating a consistent proportion of children with significant difficulty in auditory processing tasks, regardless of chronological age (Table 3).

Table 3

Number and percentage of students with results ≤ 2 SD on each PSP-1 subtest and the total score

Grade	N	Subtest 1: Filtered words	Subtest 2: Speech in noise	Subtest 3: Competing words	Subtest 4: Competing sentences	Total
		N (%)	*N (%)*	*N (%)*	*N (%)*	*N (%)*
1	125	5 (4.0 %)	3 (2.4 %)	6 (4.8 %)	9 (7.2 %)	7 (5.6 %)
2	100	4 (4.0 %)	5 (5.0 %)	6 (6.0 %)	5 (5.0 %)	4 (4.0 %)
3	92	4 (4.3 %)	1 (1.1 %)	6 (6.5 %)	5 (5.4 %)	3 (3.3 %)
4	95	1 (1.1 %)	1 (1.1 %)	2 (2.1 %)	4 (4.2 %)	3 (3.2 %)

Although these results do indicate a certain degree of auditory processing issues for a number of children, we cannot presume that these children can actually be diagnosed with auditory processing disorder. However, after applying diagnostic criteria for APD (results ≤ 2 standard deviations on at least *two* PSP-1 subtests), 12 (2.9%) participants exhibited difficulties that can be categorized as auditory processing disorder. Details regarding these participants can be found in Table 4.

Among children in the first grade, all but one of the children diagnosed with APD had a lower grade average compared to the mean grade average of other first graders (M = 4.67, SD = 0.63). Similarly, one of two second-graders diagnosed with APD had a lower grade average when compared to the mean average for all second-graders (M = 4.42, SD = 0.71). A similar trend can be observed in the results of the third and fourth-grade participants with APD, where one of the two third-graders with APD exhibited a lower grade average compared to the mean grade average (M = 4.40, SD = 0.68) and both fourth-grade participants with APD had lower grade averages compared to their peers (M = 4.12, SD = 0.84).

Table 4

Academic-related information of participants identified as having auditory processing disorder

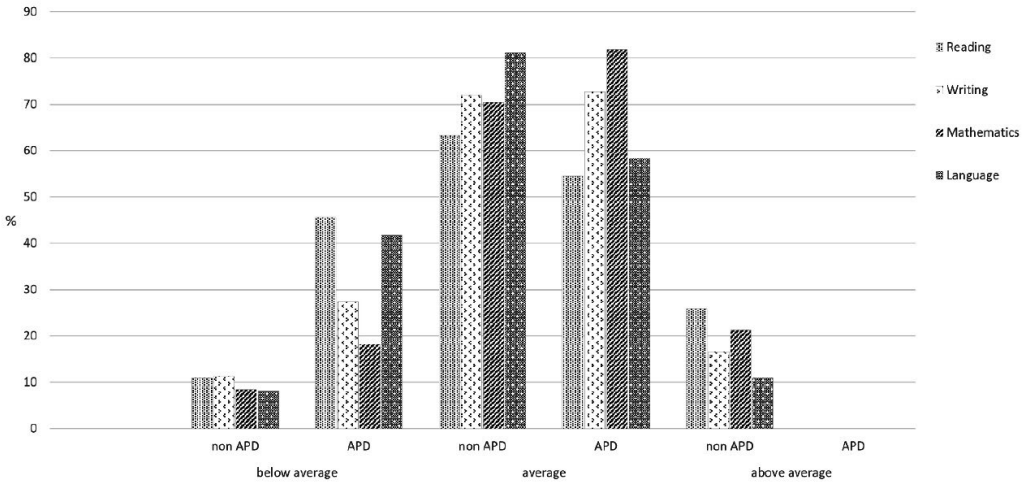
Participant #	Chronological Age	Grade	GPA	READ	WRITE	MATH	LANG
1	6.4	1	4.20	2	2	2	2
2	6.7	1	4.10	2	2	2	2
3	6.8	1	4.10	2	2	2	2
4	7.7	1	3.00	1	2	2	1
5	7.8	1	5.00	2	2	2	2
6	8.1	2	4.50	2	1	2	2
7	8.7	2	3.50	1	2	1	1
8	9.0	2	-	-	-	-	1
9	9.3	3	4.50	1	2	2	2
10	9.8	3	3.00	1	2	1	1
11	10.2	4	3.00	1	1	2	1
12	10.8	4	3.50	2	1	2	2

Legend: GPA – students grade average; Grade – current student's grade ranging from kindergarten to grade 4, READ – teacher assessment of student's overall reading skills, WRITE – teacher assessment of student's overall writing skills, MATH – teacher assessment of student's overall mathematical skills, LANG – teacher assessment of student's overall communication skills

This trend is also reflected in teacher evaluations of students' reading, writing, and mathematical abilities, as well as language skills, where the majority of participants with APD were assessed by their teachers as below average in at least one of the above-mentioned skills. Also, a much higher proportion of students rated poorly by teachers was found in the group of participants with APD than in the non-APD group, a finding that was evident in all areas evaluated by teachers (Figure 2). The greatest difference between the two groups of students (APD and non-APD) was found in teacher ratings of reading and language skills. Approximately 40% – 50% of students with APD were rated as below average in these skills, compared to only 8% – 11% of non-APD students. Interestingly, none of the 12 participants diagnosed with APD were assessed as above average in any of the assessed areas.

Figure 2

Proportions of students rated by teachers as below average, average and above average in academic-related skills



Discussion

The present study provided data on the prevalence of auditory processing difficulties in elementary school children and examined possible relationships between their auditory processing skills and academic achievement. Because children were assessed using an APD test battery without having undergone current psychological and audiological evaluation, the term 'suspected' is used cautiously here. However, because strict cutoffs were applied in the PSP-1 test battery, there is a high level of certainty that the reported percentage reflects the true APD prevalence in this population.

The findings indicated differing relative patterns of performance on the four auditory processing tasks used in this study. Children identified as having auditory processing difficulties achieved poor scores in dichotic listening tasks, including both binaural separation and integration, as compared to their performance on the other two tasks. Auditory processing difficulties become more pronounced in challenging listening situations, such as noisy backgrounds or poor acoustic environments (Sloan, 1998), which are often found in classrooms. In contrast, performance on dichotic tasks was superior in comparison to the filtered words task and speech in noise tasks for participants without auditory processing problems. In addition, the findings of this study demonstrated no gender effect, a finding that is corroborated by previous results (Fuente & McPherson, 2006; Keith, 2000; Mattsson et al., 2018; McDermott

et al., 2016; Pedersen et al., 2017). Furthermore, the findings demonstrated patterns of improved test performance and decreased score variability with age.

The results of this study indicate a right-ear advantage (REA) in both dichotic listening tasks, which is similarly consistent with other findings (Iliadou et al., 2010; Mattsson et al., 2018, Moncrieff & Wilson, 2009, Pedersen et al., 2017; Shinn et al., 2005; Vanniasegaram et al., 2004). An age-dependent reduction in the right ear advantage was also noted, also corroborating findings from other studies (Moncrieff, 2011). Both the tendency for greater REA at a younger age and a maturation-influenced decrease in REA are thought to reflect the maturation of the corpus callosum fibers (Musiek & Weihing, 2011) and a left hemisphere dominance for linguistic processing (Mattsson et al., 2018; Moncrieff, 2011). However, on a non-dichotic task in the Filtered Words subtest, better performance of the left ear was found. This might be explained by a learning effect, as the order of stimuli presentation was always right ear first, followed by left ear.

The results showed that academic performance, as measured by grade point average, was poorer in students considered as having auditory processing disorder when compared to their same-grade peers. Although there was not a significant correlation between grade point average and auditory processing skills, the majority of students with APD (8 out of 12) did have lower grade average in comparison to the mean grade average. Teachers' assessment of students' academic and language skills was moderately correlated with students' grade point averages. However, whereas teacher evaluations were significantly correlated with total PSP-1 scores, there was no correlation between grade point averages and total PSP-1 scores. Furthermore, the strongest correlation between teachers' ratings and auditory processing skills was evident in reading and language skills. This was an expected finding, since progress in these academically relevant skills is greatly affected by the often-cited symptoms of APD, such as misunderstanding spoken messages, difficulty following complex auditory directions, delays in responding to spoken instructions or distractibility by background sounds, inconsistent or inappropriate responses to spoken instructions, inattentiveness and distractibility, and literacy difficulties (Geffner, 2019). It is also interesting to note the higher proportion of students with APD who received a 'below-average' rating from their teacher in reading, writing, mathematical abilities, as well as language skills compared to ratings of their non-APD peers. The greatest difference between the two groups of students (APD and non-APD) was found in teacher ratings of reading and language skills.

These findings highlight the importance of teacher assessments in identifying school-age children who might have auditory processing problems. This study provides insight into the prevalence of APD in Croatian school-age children and emphasizes the role of teachers in identifying children suspected of APD. Classroom teachers in the lower grades (1^{st}-4^{th}) of primary

school deliver the curriculum and evaluate and monitor children's academic performance. Their broad knowledge and training in a variety of educational and associated issues enable them to successfully identify children suspected of various speech, language, and hearing problems. This study demonstrated that literacy and language skills and poor academic performance were connected to concerns regarding APD, a finding that is supported by previous findings (Heine et al., 2016). In children with APD, there is no problem with the recognition of letters (written or graphic forms). Their problems are combining the letter sounds and syllables and encoding. Moreover, there is also a problem in the process of decoding the graphic images or letters into sounds (Yalçınkaya et al., 2009). However, to ensure that children with auditory processing disorder receive comprehensive diagnostic assessment and effective treatment, a multidisciplinary team consisting of teachers, speech-language pathologists, psychologists, and parents needs to be involved (AAA, 2010; ASHA n.d., 2005); Bamiou et al., 2006; Emanuel et al., 2011). Furthermore, studies have indicated that teachers need additional training in APD symptomatology (Ryan & Logue-Kennedy, 2013) in order to be more efficient members of a multidisciplinary team involved in APD diagnostics.

Limitations and future research

Although the inclusion criteria for participation in this study included the absence of diagnosed hearing loss, intellectual deficits, and learning disorders, the authors did not carry out any formal diagnostic assessments, which might have been used to control for comorbidity of APD with language and learning disorders. Furthermore, the criteria for diagnosing APD recommended by (ASHA n.d., 2005) were followed (i.e., results of ≤ 2 standard deviations below the mean on at least two validated auditory processing tests). However, because the PSP-1, the only standardized APD test battery currently available in Croatia does not contain any subtests using non-speech sounds as stimuli, the (ASHA n.d., 2005) recommendation to use a non-verbal test was not followed. These limitations should be addressed in subsequent studies.

Conclusion

The main findings of this study confirmed the results of previous research stating the prevalence of APD in elementary school children is almost 3%. Students who did have pronounced auditory processing difficulties differed from their peers in the types of auditory tasks that were difficult. The current study also showed that these students struggled not only in processing auditory information but also tend to have poorer school success and were rated more poorly by their teachers in reading, writing, mathematics, and language skills. Therefore, findings point to the need for additional training in

APD symptomatology for elementary school (grade 1-4) teachers to become valued members of a multidisciplinary team supporting students with auditory processing disorder.

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Odnos između sposobnosti slušnog procesiranja i akademskog postignuća dece osnovnoškolskog uzrasta

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Cilj: Cilj ovog istraživanja je da utvrdi prevalenciju poremećaja slušnog procesiranja kod dece i ispita postojanje veze između veština slušnog procesiranja i uspeha u školi. *Metod*: Za utvrđivanje prevalencije poremećaja slušnog procesiranja kod školske dece u Hrvatskoj korišćen je skrining test Poremećaj slušnog procesiranja – 1 (PSP – 1). Pored toga, analizirane su korelacije između rezultata na skrinig testu, ukupne srednje ocene i rezultata subjektivnih procena čitanja, pisanja i matematičkih sposobnosti. Ukupno 412

učesnika iz redovnih škola je grupisano na osnovu hronološkog uzrasta i razreda. *Rezultati*: Rezultati ukazuju da je 12 učesnika (približno 2.9%) imalo poteškoće na zadacima slušnog procesiranja, što je u skladu sa rezultatima drugih studija prema kojima se poremećaj slušnog procesiranja javlja kod 2-5% dece. Dva zadatka vezana za dihotičko slušanje su se pokazala kao najizazovnija za sve učesnike. Rezultati pokazuju da su postignuća učenika u školi, merena ukupnom srednjom ocenom i procenama njihovih akademskih i jezičkih veština od strane nastavnika, bila lošija kod učenika sa izraženim poremećajem slušnog procesiranja u poređenju sa vršnjacima iz istog razreda. Rezultati na skrinig testu Poremećaj slušnog procesiranja značajno koreliraju sa procenama nastavnika, ali ne i sa ukupnom srednjom ocenom. *Zaključak*: Značajna pozitivna korelacija je utvrđena i između ukupnih rezultata na skrinig testu i procenama čitanja, pisanja i matematičkih sposobnosti učenika od strane nastavnika. Ove sposobnosti učenika takođe značajno koreliraju sa njihovim srednjim ocenama. Ovi nalazi potvrđuju ideju da je poremećaj slušnog procesiranja u obrnutoj korelaciji sa postignućem u školi, što opravdava dalja istraživanja vezana za dijagnozu i tretman poremećaja slušnog procesiranja.

Ključne reči: poremećaj slušnog procesiranja, deca, PSP-1, procena nastavnika

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Formal support – expectations of parents of children with disabilities

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Introduction. Parents of children with developmental disabilities receive many different forms of support, including formal support provided by professionals from different systems. *Aim.* The aim of this study was to examine the differences in expectations of the type of formal support by parents of children with developmental disabilities with regard to their sociodemographic characteristics. *Methodology.* In total, 152 parents participated in the study, out of which 63.8% were female and 36.2% were male. The participants' average age was 38 years. Data was collected using a questionnaire specifically designed for the purpose of this study, which is a component of a large-scale research study on early support provided to children with developmental disabilities and their parents. The first part of the questionnaire concerns sociodemographic characteristics, while the second part deals with the parents' expectations of the type of formal support. *Results.* The results of this study show that there is a statistically significant difference in the expectations of the type of formal support by the parents of children with developmental disabilities with regard to two sociodemographic characteristics, namely the self-evaluated financial wellbeing and the level of education. *Conclusion*. This study shows that parents with higher levels of education and better financial wellbeing have different expectations of the type of formal support than parents with lower levels of education and lower income. These differences should be, therefore, taken into account during the processes of planning and providing support.

Keywords: parents, children with developmental disabilities, formal support

Introduction

Families of children with developmental disabilities need support from the environment to be able to adequately respond to all the demands that

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occur. Parenting support represents complex activities that include a number of measures aimed at different areas of parental activity (Camović, 2018).

Social support is a key concept in the study of family functioning and may include support from a spouse, support group, neighbors, friends, professionals, and/or grandparents (Milić Babić, 2012). Social support focused on the parents' needs strengthens their feeling of competence, which in turn allows improvement of child development (Keen et al., 2010). Parental competence increases the likelihood that the parents will treat their children in a way which allows optimal child psychosocial development (Trivette & Dunst, 2005).

Social support for parents implies the availability of resources for providing support both in everyday life and in crises (Dobrotić & Laklija, 2012). Parents' satisfaction with immediate social support can oftentimes help improve the quality of family life by improving the sense of security and strengthening family bonds between the members (Greer et al., 2006, as cited in Lovell & Mason, 2012). Kraljević (2011) points out that high-quality social support can help the improvement of parental competence and skills necessary to overcome the hurdles of parenthood. Social support to parents can be provided in both formal and informal ways. Informal support includes the social network of friends, family, and various sources of information (media, literature, the Internet). It is based on solidarity and emotional relationships. Moreover, it complements the support provided by the formal services (Žganec, 1995; Wall et al., 2001). On the other hand, formal support includes a network of professionals and legislation, which should efficiently and promptly meet the parents' needs (Redmond et al., 2002). Furthermore, formal support is defined as a professional relationship wherein the professionals provide support to parents based on experience and education (Jones et al., 2009).

Parents can intensively use informal sources of support because this does not violate the privacy of the family, as with the entry of professionals into the family home (Borges & Pereira, 2019). However, once parents feel that informal support is insufficient to overcome the challenges they face, they seek formal support from professionals. Vlah et al. (2019) stated that parents of children with developmental disabilities first seek support from informal sources when faced with a new situation. But since they encounter different challenges when seeking appropriate help, parents often start looking for support from formal sources. In accordance with this, Akister and Johnson (2004) have found that parents most often look for support in solving problems (71%), advice (57%), action (21%), and information (21%) from professionals. The availability of sources of formal and informal support can be a protective factor in the prevention of negative outcomes for individual family members (Milić Babić, 2019). The formal and informal support that parents of children with developmental disabilities expect can facilitate acceptance of the new situation and empower parents to make important decisions (Vučinić et al., 2022).

In a system that is so often focused on the disability itself, it is important to shift the focus to the strength of the family. Family ideas and opinions are important for improving collaboration with professionals and providing better service to the child because there is no effective early support without an established connection with the parents (McWilliam, 2010). Quality network of social support should be provided by different systems in the society: educational system, health system, and social security system, by cooperation with other members of the society, such as different associations and religious groups, along with others who partake in the development of a certain local community (Leutar & Oršulić, 2015).

Parents should actively participate in early childhood development services, alongside professionals and with the support of those who make policy and financial decisions. Also, it should be possible to flexibly combine work and family life (Milić Babić, 2019).

The high rate of involvement of parents and children in the support programs contributed to the fact that it was then that the children made the most progress (Moeller, 2000).

It is the responsibility of the system to adapt the types of support according to the expectations, needs, and backgrounds of the family.

Despite the fact that professionals and the general public frequently warn about the importance of the family environment for the upbringing of children, as well as the difficulties and challenges that modern families frequently face, very little is known about the types of formal support that parents receive, and the degree to which the received support meets the expectations of parents of children with disabilities. It is probable that the parents' expectations are largely associated with certain sociodemographic characteristics of the family.

The association between providing formal support and sociodemographic characteristics of the family has been studied through various research papers. However, the majority of those studies are focused on parents who do not have children with disabilities. As this study deals with some of the sociodemographic characteristics, it's very interesting to provide an overview of such studies. Pećnik (2013) states that parents from Croatia with a primary level of education, parents with middle socioeconomic status, and parents from Slavonia and Northern Croatia rarely choose professionals as the most desirable providers of support for parenting. There are relatively more fathers, parents with primary levels of education, and parents younger than 25 years of age that have no need for professional guidance. Addis and Mahalik (2003) report that there are clear gender differences which show that women are more likely to look for support than men. Research also shows that men are less likely to look for professional support than women when they are faced with difficult life situations (Addis & Mahalik, 2003; Lu & Argyle, 1992). As far as the level of education is concerned, research shows that parents with higher levels of education (BA or MA degree)

have thought about professional advice more than parents with primary levels of education. Parents who are more educated are probably more adept at finding new sources of information and are more focused on getting information about their child's disability and methods of working with their child. According to Pećnik (2013), parents of children with developmental disabilities, who are well informed about the existence of support services for children and parents, will use them more often. It is hypothesized that parents who are more informed about the services of early support are more likely to use that information to look for professional advice and support.

The main problem of this study is focused on the expectations of the type of formal support held by parents of children with developmental disabilities. The authors of this study were concerned whether there are any differences in expectations of the type of formal support by the parents of children with developmental disabilities with regard to certain sociodemographic factors (child's age, parents' gender and age, financial wellbeing, the level of education, and the place of residence). In this study, the type of formal support refers to the prompt communication of diagnosis and information on the child's health condition; providing information about the rights of the child and family and the ways to exercise those rights; referring parents and children to various support services and professionals; informing and educating parents to recognize child's strengths, abilities and needs; recommending treatments and methods of working with the child, and proposing individualized work with the child.

The aim of the study was to examine the expectations of the type of formal support held by parents of children with developmental disabilities with regard to the aforementioned sociodemographic characteristics.

According to that, it is hypothesized that mothers will have different expectations of the type of formal support needed by their children, as they are more involved in the process of providing the support than fathers. Furthermore, parents living in urban areas will have different expectations than those living in rural areas, as they have fewer available services in their local communities. Parents of older children will have different expectations as they already have a certain amount of experience in receiving support. Also, it is assumed that younger parents will have more information about the types of support because Internet sources are more available to them than to older parents, so their expectations are bound to be different.

Also, it is assumed that parents with better levels of education and better financial status have more available information about the needs of their children, as well as information about sources of support, new knowledge, and various types of training, and thus their expectations from the type of formal support will be different from parents with lower levels of education and lower financial status.

Methodology

The interest in examining this hypothesis arise from the assumption that there is a statistically significant difference in the expectations of parents of children with developmental disabilities regarding the type of formal support with regard to the parents' sociodemographic characteristics.

Hypothesis

A hypothesis can be put forward from the set research aim of this study:

There is a statistically significant difference in expectations of the type of formal support by the parents of children with developmental disabilities regarding sociodemographic characteristics: age and gender of the participants, self-evaluated financial wellbeing, achieved level of education, age of their child, and place of residence.

Sample

For the purpose of this study, a convenience sample of 152 participants (63.8% mothers and 36.2% fathers) was used. The participants were parents of children with developmental disabilities whose age range spans from newborns to school goers, coming from two counties in Croatia, Brod-Posavina County (68.4%) and Istra County (31.6%). The aforementioned counties were chosen according to the degree of development, with Brod-Posavina County being less developed than Istra County. Both parents from certain families partook in the study. The average age of the participants was 38 years (*M= 37.6, SD= 6.3*), and the majority of participants who took part in the study were between the ages of 31 and 40. As for the level of education, the majority of the participants achieved the high school level of education (55.9%), while the fewest participants (2%) had neither level of education achieved, i.e., they were classified as unskilled workers. What is more, 26.3% of the participants had an MA degree, 10.5% of the participants had a BA degree, and 2.6% had a post-graduate/doctoral degree. The same percentage of participants were with the primary level of education. Half of the participants were parents of children between six to eight years old (50.4%), and 40.8% of the children were diagnosed at the earliest age (up to one year of age). The majority of the participants had their own housing bought with a loan (38.2%), while some had their own housing bought without a loan (36.2%), and the fewest were those who were tenants (8.6%). More than half of the participants (60.5%) considered their housing arrangements to be adequate, whereas 4.6% considered their housing arrangements to be absolutely inadequate for living. The same percentage of the participants (46.1%) stated that they sometimes or never had financial issues, while 7.9% stated that they had serious financial issues. As it was mentioned before, both parents from certain families partook in this study Hence the number of parents is not equal to the number of children.

The majority of parents (91.4%) requested support from formal sources, and additional analysis revealed that 50% of parents with secondary school education and

37% of parents with higher education received formal support. Most parents under the age of 40 (49.3%) indicated that they received formal support. Regarding gender, 57.9% of mothers and 33.6% of fathers received formal support.

Research instrument

For the purpose of this study, which is a component of large-scale research on early support provided to children with developmental disabilities and their parents, a questionnaire intended for the parents of children with developmental disabilities was specifically designed – Questionnaire on informedness, satisfaction, and expectations of the early support for the children with developmental disabilities and their families (Šarčević Ivić-Hofman, Wagner Jakab, Kiš-Glavaš, 2015). The first part of the questionnaire was used to accumulate data about sociodemographic characteristics of the participants (gender, age, place of residence, employment status, level of education, marital status, number of children in the family, number of members of the household, housing arrangements, financial status, children's age, children's age when they were diagnosed, and the type of disability). The second part of the questionnaire collected data on: perceived social support, information, satisfaction and expectations of parents from early support services for children with developmental disabilities and their families.

The part of the questionnaire on formal support included the question:

¨What type of support do you expect from professionals?¨ Possible answers were: prompt communication of diagnosis and information on the child's health condition; providing information about the rights of the child and family and the ways to exercise those rights; referring parents and children to various support services and professionals; informing and educating parents to recognize child's strengths, abilities and needs; recommending treatments and methods of working with the child, and proposing individualized work with the child.

From six offered answers, parents had the opportunity to choose three that suited them best. The results are shown as the total number of choices for each answer offered.

Procedure

The Ethics Committee of the Faculty of Education and Rehabilitation Sciences approved this study, and therefore, the study was conducted in accordance with the Code of Ethics of the University of Zagreb (2009). Data about the number of parents of children with developmental disabilities was collected from multiple sources, such as the Croatian Institute of Public Health, kindergartens, NGOs, and the Administrative Department for Health and Social Welfare. After receiving data on the number of children with developmental disabilities, the directors of preschool institutions and heads of non-governmental organizations received a request for the participation of parents of children with developmental disabilities who are involved in the services of their institutions in the research. They were also asked to forward the questionnaires and consent forms to the parents of children with developmental disabilities.

The purpose of the research was explained to all participants through a written consent form.

According to data obtained from professional services of preschool institutions and heads of non-governmental organizations, the authors sent 211 questionnaires to parents of children with developmental disabilities. Out of a possible 211 participants, 152 participants agreed to participate in the research and filled out the questionnaires. The deadline for completing the questionnaire was two weeks. The completed questionnaires were forwarded to one of the authors of the paper by preschool institutions and non-governmental organizations via e-mail or ground mail.

Data analysis

In order to test the assumed differences in the parents' expectations, the nonparametric *Chi-squared* and *Mann Whitney* test were used to test the set hypothesis of the study.

Results

Descriptive data on the expectations of parents of children with developmental disabilities reagrding the type of formal support

In this research, parents stated their expectations about the type of formal support, which is shown in Table 1.

Table 1

Parents' expectations about the type of formal support

TYPE OF FORMAL SUPPORT	f	%
Prompt diagnosis	115	75.7
Information on children's and family rights	71	46.7
Referral to various support systems	80	52.7
Information and education on recognizing child's needs	36	23.6
Recommendations of treatments	73	48.0
Individualized work with the child	81	53.3

Descriptive data from the study indicated that 75.7% of parents expected *prompt diagnosis*; 53.3% expected *individualized work with the child*; 52.7% expected *referral to various support systems*; 48% expected *recommendations of treatments,* and 46.7% expected *information on children's and family rights.* Only 23.6% of parents expected *information and education on recognizing their child's needs.*

Results of testing differences in expectations of parents of children with developmental disabilities regarding the type of formal support with regard to sociodemographic characteristics

Mann Whitney test was used to examine the differences in parents' expectations of the type of formal support with regard to the *parents' and children's age*. Chi-squared test was used to examine the differences in parents' expectations with regard to different sociodemographic characteristics (*gender, self-evaluation of financial wellbeing, level of education, the place of residence*).

Table 2

Differences in the expectations of the type of formal support by the parents with regard to self-evaluation of financial wellbeing: Chi-squared test (N=152)

	Self-evaluation of financial wellbeing													
	SFI*				OFI**				NFI***					
Formal Support	No expectations		informed Ness		No expectations		informed Ness		No expectations		informed Ness		χ^2 (df=2)	p
	f	%	*f*	%	*f*	%	*f*	%	*f*	%	*f*	%		
Prompt diagnosis	4	33.3	8	66.7	17	24.3	53	75.7	16	22.9	54	77.1	.61	.74
Information about children's rights	1	8.3	11	91.7	39	55.7	31	44.3	44	62.9	26	37.1	12.32	.00
Referral to the early support services	7	58.3	5	41.7	38	54.3	32	45.7	27	38.6	43	61.4	4.10	.13
Information and education about recognizing child's needs	10	83.3	2	16.7	48	68.6	22	31.4	58	82.9	12	17.1	4.31	.12
Recommendation of treatments	7	58.3	5	41.7	37	52.9	33	47.1	35	50.0	35	50.0	.33	.90
Individualized work with the child	8	66.7	4	33.3	33	47.1	37	52.9	30	42.9	40	57.1	2.34	.31

Legend: *Serious financial issues; **Occasional financial issues; ***No financial issues

Mann Whitney test showed that there were no differences in the parents' expectations of the type of formal support with regard to the age of the parents and the age of the child, and the results of the Chi-squared test showed that there were no differences in the parents' expectations of the type of formal support with regard to the parents' gender and the place of residence in relation to *the prompt diagnosis, information on children's and family rights, referral to the early support services, information and education about recognizing child's strengths, abilities and needs, recommendations of treatments, and proposals of individualized work with the child*.

The findings of this study indicated that there were statistically significant differences in the expectations of the type of formal support by the parents of children with developmental disabilities with regard to certain sociodemographic characteristics, such as self-evaluation of financial wellbeing and the level of education. The following parts of this paper present tables containing results that indicate a statistically significant difference in the expectations of the type of formal support with regard to the self-evaluation of financial wellbeing and the level of education.

The results of the Chi-squared test shown in Table 2 indicated a statistically significant difference in the expectations of the type of formal support with regard to *providing parents with information about the children's rights* ($\chi^2(2) = 12.32$, $p = .00$) in relation to the self-evaluation of financial wellbeing. The majority of parents with serious financial issues expected to be informed about their children's rights and ways in which they can use those rights.

Table 3

Differences in the expectations of the type of formal support by the parents with regard to the level of education: Chi-squared test (N=152)

Formal Support	The Level of Education												χ^2 (*df*=2)	p
	AD*				HSL**				PSL***					
	No expectations		Expectations		No expectations		Expectations		No expectations		Expectations			
	f	*%*	*f*	*%*	f	%	f	%	f	%	f	%		
Information about children's rights	39	65.0	21	35.0	45	52.9	40	47.1	0	-	7	100.0	11.13	.00
Prompt diagnosis	7	11.7	53	88.3	24	28.2	61	71.8	6	85.7	1	14.3	20.25	.00
Referral to the early support services	27	45.0	33	55.0	43	50.6	42	49.4	2	28.6	5	71.4	1.48	.50
Information and education about recognizing child's needs	44	73.3	16	26.7	66	77.6	19	22.4	6	85.7	1	14.3	.72	.70
Recommendation of treatments	31	51.7	29	48.3	43	50.6	42	49.4	5	71.4	2	28.6	1.13	.60
Individualized work with the child	33	55.0	27	45.0	36	42.4	49	57.6	2	28.6	5	71.4	3.23	.20

Legend: *AD (academic degrees – doctoral degree, master's degree or bachelor's degree); **high school level of education; ***primary school level of education (includes unskilled workers as well)

The results of the Chi-squared test shown in Table 3 indicated a statistically significant difference in the expectations of the type of formal support with regard to *providing parents with information about the children's rights* ($\chi^2(2) = 11.13, p = .00$) and *receiving a prompt diagnosis* ($\chi^2(2) = 20.25, p = .00$) in relation to the parents' level of education. The majority of parents with academic degrees expected to be given prompt diagnoses from professionals. What is more, the results showed that all parents with primary levels of education expected to be informed about their children's rights.

In conclusion, according to the results, the following can be accepted: There is a statistically significant difference in expectations about the type of formal support of parents of children with developmental disabilities with regard to self-assessment of financial wellbeing and the level of education of the participants.

Discussion

The study was conducted using a sample of 152 participants (parents of children with developmental disabilities). The majority of participants were mothers. However, a certain number of fathers (36.2%) also took part in the study. The average age of the participants was 38 years, and the majority of the participants had a high school level of education, with an adequate income and financial wellbeing. The results show that the majority of the participants with serious financial issues expect the professionals to inform them about children and family rights and the ways in which they can use those rights (Table 2). Iversen et al. (2003) point out that parents of children with developmental disabilities express the need to be better informed about the systems of support services offered in the community, and Brajša-Žganec et al. (2011) state that insufficient information among parents is the result of the lack of an adequate early intervention network in Croatia.

The financial wellbeing of the family is of major importance because children with disabilities and their families receive most of the early support services from private clinics, which normally charge a fee for their services (Milić Babić & Leutar, 2013). It is to be expected that parents of children with developmental disabilities who are facing major financial difficulties will seek information about the rights that are regulated in Croatia, because realizing their rights could help to alleviate their already difficult financial situation. The problem is that information in Croatia is not systematically, up-to-date, and continuously regulated, but instead relies on the knowledge, information, and goodwill of the professionals that parents meet, or on the networking of parents who pass on information to everyone else.

Furthermore, the findings of this study show that all participants with lower levels of education expect to be informed about children's rights as a type of formal support (Table 3). Participants with lower levels of education and lower

income expect to be informed about children and family rights, presumably because they can use their rights from the social welfare system in various ways, such as: personal disability allowance, care and assistance allowance, the status of parent caretaker, psychosocial support, and early development support (NN 46/22). According to data from the Office of the Ombudsperson for Children (Ombudsperson for Children, 2019), parents are inadequately informed about their rights from the health and social care system, which can be exercised based on the degree of difficulty of the child, and also point to the lengthy duration of procedures for exercising a certain right. The family's capacity to provide appropriate support for the child's development improves as a result of the rights and services provided as part of early intervention (Ljubešić, 2004). The very first step in the process of becoming informed is parents' research of preferred information sources and their ability to find appropriate information when making decisions about their children. What is also required are service providers who have specific communication strategies and can recognize the parents' need for assistance (Tracey et al., 2018).

The findings of our study also show that participants with an academic degree(s) expect to receive a prompt diagnosis as a type of formal support (Table 3).

According to the findings, parents most often expect specialists to provide a quick diagnosis for their child. It can be assumed that parents will seek additional early support services based on the child's timely diagnosis, and that they will expect professionals to provide them with available information and practical assistance. We assume that parents with an academic degree(s) are better informed and thus more likely to seek information from various sources so that their child can be included in the diagnostic process as soon as possible. However, quite often, several years pass before the diagnosis is determined. A diagnosis provides a framework for understanding the child's difficulties and provides access to the support system (Chamak & Bonniau, 2013). Early diagnosis enables children to receive support services sooner. According to Jurin's research findings (2021), 53.4% of mostly highly educated parents of children with autism spectrum disorder stated that their children received a diagnosis within 6 months, while 24.8% of highly educated parents stated that their children received a diagnosis within a year. The author explains that because the parents were informed about the disorder and the location of the diagnostic procedure, the diagnostic process proceeded more quickly. Additionally, it was mentioned in line with our presumption that parents with higher levels of education are more knowledgeable about their child's difficulties as well as who to contact for support and diagnostic processes. Twoy et al. (2007) reported similar findings, in which 66% of highly educated parents with higher socioeconomic status who were aware of their child's disorder reported waiting at least six months or a year (91%) from the appearance of suspicion

to the final diagnosis. Also, parents are more aware of the necessity of early support for the child and its positive effect on the child's development. Parents often notice the deviations in their child's development themselves, and find the age at which the child was diagnosed very important, so as to begin with the early support services as soon as possible, but also to be able to take the child's diagnosis on board (Midence & O'Neill, 1999).

Clinical practice in Croatia has shown that parents frequently seek diagnostics outside of their place of residence (UNICEF, 2018), further complicating their financial situation because, in addition to financing the diagnostic process themselves, they must also cover travel and lodging costs. Due to the lack of team cooperation or the uncertainty of the diagnostician, parents are often referred to a team treatment in larger centers in the Republic of Croatia, most of which are located in the capital, which is very time, organizationally, and financially demanding for families who live far away from the capital, especially in dislocated areas (islands).

Conclusion

The findings of this study indicate that the level of education and the self-evaluation of financial wellbeing show a statistically significant correlation with the expectations of the type of formal support held by the parents of children with developmental disabilities. Parents with an academic degree(s) are more likely to expect some type of formal support, such as prompt diagnosis, while all parents with a lower level of education expect some type of formal support, such as information about children and family rights and how to use these rights. The majority of parents with serious financial issues expect to be informed about children and family rights and the ways in which those rights can be realized. In order to realize the rights of children with disabilities and their families, the parents must be provided with prompt and verified information about the child's developmental profile, sources of information, available forms of support, information about their rights, opportunities for early and preschool education inclusion and inclusion in further education, along with the support in parenting. For all the aforementioned to be successfully realized, there must be cooperation between parents and professionals from different systems. So as to achieve a collaborative relationship, open and equality-based communication is necessary.

The primary goal of this study was to determine what parents of children with developmental disabilities expect from formal support, and certain guidelines emerged from this.

The guidelines refer to the following:

– provision of timely and comprehensible information about the child's condition (disorder) by professionals so that parents are informed in which services they should include the child,

- timely informing parents about the rights of a child with developmental disabilities and their family, with a focus on families with a lower socioeconomic status,
- obtaining a timely diagnosis so that a child with developmental disabilities can be included in early support services as soon as possible, which means providing more places and professionals who can provide quality diagnostics and are not centralized in the capital but are located in other cities and regions of Croatia,
- providing free early support services to parents of low socioeconomic status,
- investing in various programs at the local community level (workshops, playrooms, programs of non-governmental organizations) so that they are accessible to families with a lower socioeconomic status.

Parents' expectations about the needed forms of support provide important insight for professionals during the process of planning the support, which allows better ways of meeting the parents' needs. This approach improves the cooperation between parents of children with developmental disabilities and professionals and results in more efficient support.

Ensuring the conditions for the development of early support services opens up the possibility of more accessible and timely early support services in the local community. Prompt support and high-quality services help children with developmental disabilities to further their abilities and to partake in everyday life more easily.

According to the author's knowledge, there is not enough recent research related to social support, and there is insufficient research on parents' expectations of formal support, although there are recent studies on parents' expectations of informal support (e.g., Vučinić et. al., 2022). In the Ombudsperson for Persons with Disabilities Report (2021), in 2020, UNICEF presented the results of the first comprehensive "Analysis of Early Intervention Services in Croatia" conducted by the RISE Institute (USA) with the support of the Ministry of Health. According to them, 24169 children between birth and the age of five are potential beneficiaries of early childhood support services in Croatia, and only 1 out of 8 actually receives this service. These data show that not all children with disabilities are still included in early support services and open the possibility of further research in this direction.

Therefore, this study can be an incentive for further research across the entirety of Croatia or even further, so as to accumulate more precise data on the expectations of the formal support held by the parents of children with developmental disabilities.

The study has certain methodological limitations because the generalization of the results is limited by convenience sampling – the size and type of the sample. Due to the fact that the study covered only two counties

in Croatia, the representation of other counties cannot be commented on. Moreover, mothers are far more prevalent in the study than fathers, and the same goes for parents with higher financial status. Future research should also include other Croatian counties, fathers, parents with lower financial status, parents from urban and rural regions, and those who come from dislocated parts of the country.

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Formalna podrška – očekivanja roditelja dece sa smetnjama u razvoju

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Uvod: Roditelji dece sa smetnjama u razvoju primaju različite oblike podrške, a jedan od ovih oblika je i formalna podrška koju pružaju stručnjaci iz različitih sistema. *Cilj:* Cilj istraživanja bio je da se ispitaju razlike u očekivanjima vrste formalne podrške roditelja dece sa smetnjama u razvoju, s obzirom na njihove sociodemografske karakteristike. *Metode:* U istraživanju su učestvovala 152 roditelja, od čega je 63.8% ženskog, a 36.2% muškog pola. Prosečna starost roditelja bila je 38 godina. Podaci su prikupljeni korišćenjem anketnog upitnika osmišljenog za potrebe ovog istraživanja, koje je deo šireg istraživanja o uslugama rane podrške deci sa smetnjama u razvoju i njihovim porodicama. Prvi dio upitnika odnosi se na sociodemografske karakteristike, dok se drugi deo bavi očekivanjima roditelja o vrsti formalne podrške. *Rezultati:* Rezultati ovog

istraživanja pokazuju da postoje statistički značajne razlike u očekivanjima roditelja dece sa smetnjama u razvoju o vrsti formalne podrške s obzirom na dve sociodemografske karakteristike, a to su samoprocena materijalnog stanja i stepen obrazovanja. *Zaključak:* Ovo istraživanje pokazuje da roditelji s višim stupnjem obrazovanja i boljim materijalnim stanjem imaju različita očekivanja o vrsti formalne podrške u odnosu na roditelje s nižim stupnjem obrazovanja i lošijim materijalnim stanjem. Ove razlike treba uzeti u obzir tokom procesa planiranja i pružanja podrške.

Ključne reči: roditelji, deca sa smetnjama u razvoju, formalna podrška

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Leksičko-semantičke sposobnosti i egzekutivne funkcije kod starijih osoba

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Uvod: Razvoj savremenog društva doveo je do produžetka životnog veka, a time i do povećanja broja starih osoba. S obzirom na to, poslednjih godina se dosta pažnje posvećuje ispitivanju kognitivnih sposobnosti u ovoj populaciji. U fokusu istraživanja su promene u jeziku, egzekutivnim funkcijama i pamćenju. *Cilj:* Cilj ove studije je utvrđivanje leksičko-semantičkih sposobnosti i egzekutivnih funkcija kod ljudi starijih od 65 godina. *Metode:* Uzorak je činilo 30 ispitanika od 66 do 85 godina, koji su prema godinama života podeljeni u dve grupe. U prvu grupu uključeno je 16 ispitanika iz kategorije „rane starosti" (od 66 do 75 godina), a u drugu 14 ispitanika iz kategorije „srednja starost" (od 76 do 85 godina). U uzorku je bilo 13 ispitanika sa završenom osnovnom školom i 17 ispitanika sa završenom srednjom i visokom školom. Za procenu leksičko-semantičkih sposobnosti primenjeni su Semantički test i Test verbalne fluentnosti, a za procenu egzekutivnih funkcija Strup test. *Rezultati:* Rezultati su pokazali da se ispitanici različitih starosnih kategorija ne razlikuju u postignućima na testovima leksičko-semantičkih sposobnosti. Međutim, utvrđene su razlike u postignućima u odnosu na nivo obrazovanja. Osobe sa srednjim i visokim nivoom obrazovanja bile su uspešnije na navedenim testovima. Na testu egzekutivnih funkcija utvrđene su razlike u postignućima između ispitanika različitih starosnih kategorija i nivoa obrazovanja. *Zaključak:* Naši rezultati pokazuju da su egzekutivne funkcije osetljivije na godine starosti u poređenju sa leksičko-semantičkim sposobnostima.

Ključne reči: leksičko-semantičke sposobnosti, egzekutivne funkcije, starije životno doba

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Napomena: Rad je nastao kao rezultat istraživanja na projektu „Evaluacija tretmana stečenih poremećaja govora i jezika" (br. 179068), koji finansira Ministarstvo prosvete, nauke i tehnološkog razvoja Republike Srbije.

Uvod

Napredak savremene civilizacije i društva doveli su do produženja životnog veka na globalnom nivou (Birmančević, 2021). Kao rezultat toga, značajno je povećan broj starih ljudi. Starost predstavlja poslednju fazu razvoja u životu čoveka, koja se obično povezuje sa 65. godinom života. Pored hronološkog doba, starost se determiniše promenama na somatskom i socijalnom planu. Iako postoje neslaganja oko preciznog određivanja periodizacije starosti, većina gerontologa smatra da starosno doba počinje posle 65. godine (Vuković, 2019a). Prema godinama života razlikuju se tri kategorije starosti: rana starost (od 66. do 75. godine); srednja starost (od 76. do 85. godine) i pozna ili kasna starost (preko 85. godine života).

Istraživanja poslednjih decenija demantuju ranija shvatanja o neprestanom gubitku moždanih ćelija posle 20. godine i pokazuju da se formiranje sinapsi odvija u svakom životnom dobu (Karper, 2004). Ovi nalazi implicitno pokazuju da stariji ljudi ne moraju da ispoljavaju pad kognitivnih sposobnosti. Međutim, empirijski podaci ipak pokazuju da se nakon 65. godine mogu uočiti određene promene u psihičkom i kognitivnom funkcionisanju. Te promene nastaju usled višedecenijskog starenja organizma i ne treba da se izjednačavaju sa poremećajem ili bolešću (Vuković, 2019a). Empirijske studije ukazuju na varijabilne nalaze promena koje se javljaju u starijem životnom dobu. Ove razlike u nalazima mogu biti rezultat niza faktora: genetskih, sredinskih, emocionalnih, socioekonomskih, nivoa obrazovanja, kao i načina života (Baghel et al., 2019).

Dosadašnji empirijski podaci pokazuju da se u starosti javaljaju teškoće u prisećanju informacija u domenima prospektivne i retrospektivne memorije, što potencijalno može da uzrokuje i smetnje u prisećanju reči. Takođe, uočavaju se teškoće u prizivanju informacija iz semantičke memorije (Vuković, 2019a). Pored toga, evidentiraju se promene u egzekutivnim funkcijama u vidu smanjene zainteresovanosti i bezvoljnosti (Stošljević, 2015). Promene se uočavaju i u brzini obrade informacija, egzekutivne kontrole i radne memorije. Takođe, starije osobe mogu da ispolje slabiju sposobnost pamćenja liste reči, konteksta ili detalja nekog događaja (Zelinski et al., 2011). Nadalje, rezultati primene *Mini mental testa* pokazuju da sa povećanjem godina života dolazi do pada opštih kognitivnih sposobnosti (Vuković, 2019a)

Uprkos tome što mozak tokom života trpi određene promene u strukturama i funkcijama, smatra da se da oblasti odgovorne za jezik ostaju relativno stabilne u starijem životnom dobu (Shafto & Tyler, 2014). Međutim, empirijski podaci ipak ukazuju na određene promene u jezičkom funkcionisanju kod starijih osoba. Opisuju se deficiti auditivnog razumevanja jezika, koji mogu biti povezani sa senilnom nagluvošću, ali i sa generalnim slabljenjem kognitivnih sposobnosti. U domenu jezičke produkcije uočavaju se varijabilna postignuća na testovima imenovanja i verbalne fluentnosti.

Pokazano je da uspešnost na ovim zadacima zavisi od vrste reči, frekventnosti reči, personalne relevantnosti i nivoa obrazovanja ispitanika (Caramazza & Hillis, 1991; Vuković, 2019a). Takođe je pokazano da sa starošću dolazi do pada morfosintaksičkih sposobnosti (Vuković i Jerkić, 2021).

Pregled literature o jezičkim i kognitivnim funkcijama kod starih osoba pokazuje da je pažnja istraživača usmerena na procenu radne memorije i njene uloge u jezičkom funkcionisanju. Radna memorija omogućava privremeno skladištenje jezičkih informacija, što podržava efikasnost produkcije i razumevanja jezika. Pokazano je, na primer, da smanjenje obima verbalne radne memorije, deficiti u inhibitornim procesima i pažnji mogu da utiču na auditivno razumevanje jezika kod starijih ljudi. U prilog tome su podaci o prisustvu smetnji u razumevanju govornog jezika kod starih osoba, nezavisno od stanja sluha (Shneider at al, 2002; Vuković, 2019a). Lalović i Jovović (2013) su takođe utvrdili da sa starošću dolazi do slabljenja radne memorije i egzekutivnih funkcija. Ovi autori navode da, upravo zbog uticaja egzekutivnih funkcija i radne memorije, performanse na zadacima verbalne fluentnosti predstavljaju važan pokazatelj kognitivnog starenja. Naime, na zadacima verbalne fluentnosti od ispitanika se traži da, nakon datog stimulusa za produkciju, organizuje sopstvenu strategiju pretraživanja i izvrši izbor adekvatnih leksičkih jedinica iz semantičke memorije, vodeći pritom računa da se one ne ponavljaju. Iako se zadaci verbalne fluentnosti tradicionalno primenjuju za procenu egzekutivnih funkcija, pojedini autori navode da dominantnu ulogu u ovim tipovima test-zadataka ima sposobnost obrade jezika (Whiteside et al., 2016). Takođe, verbalna fluentnost koristi se kao jezički zadatak prilikom mapiranja moždanih oblasti, tj. određivanja neuroloških supstrata jezika (Kircher et al., 2011), kao i prilikom ispitivanja dominantnosti jezika kod bilingvalnih osoba (Pino Escobar et al., 2018; Shishkin & Ecke, 2018).

Pojedini autori ističu da se u osnovi sposobnosti generisanja reči na određeni glas (fonološka fluentnost) i u okviru određene semantičke kategorije (semantička fluentnost) nalaze dva različita mehanizma. Dok se fonološka fluentnost oslanja na znanje vokabulara (koji ostaje relativno očuvan u starosti), semantička fluentnost se uglavnom oslanja na brzinu leksičkog pretraživanja i strategije vizualizacije koje podržavaju kontrolisano prizivanje, što slabi kod ljudi s povećanjem godina života (Gordon et al., 2018).

Budući da empirijski podaci pokazuju da u starosti dolazi do pada pojedinih jezičkih i kognitivnih funkcija, za predmet ovog rada odabrano je ispitivanje leksičko-semantičkih sposobnosti i egzekutivnih funkcija kod starijih osoba. Pored performansi u ispitivanim oblastima jezika i kognicije, zanimao nas je i odnos leksičko-semantičkih i egzekutivnih sposobnosti u ovoj populaciji.

Cilj istraživanja

Osnovni cilj ovog istraživanja je utvrđivanje leksičko-semantičkih sposobnosti i egzekutivnih funkcija kod starijih osoba. Takođe, nastojali smo da ispitamo razlike u leksičko-semantičkim sposobnostima i egzekutivnim funkcijama u odnosu na godine starosti i nivo obrazovanja ispitanika.

Metod

Uzorak

U istraživanju je učestvovalo 30 ispitanika od 66 do 85 godina (*AS* = 73.3, *SD* = 6.7). Uzorak su sačinjavale neurološki zdrave osobe, bez slušnih i nekorigovanih vizuelnih deficita, bez govorno-jezičkih deficita i podataka o prisustvu mentalnih poremećaja. Prema godinama života ispitanici su podeljeni u dve grupe. Prvu grupu činilo je 16 ispitanika iz kategorije „rana starost", a drugu grupu 14 ispitanika koji su prema godinama života pripadali kategoriji „srednja starost". Nivo obrazovanja ispitanika uključenih u uzorak kretao se od završene osmogodišnje škole do fakulteta. Grupe su bile ujednačene prema stepenu obrazovanja ($\chi^2 = 0.53$; $df = 1$; $p = 0.47$). Svim ispitanicima maternji jezik je srpski.

Instrumenti i procedura prikupljanja podataka

Za testiranje leksičko-semantičkih sposobnosti primenjeni su Semantički test i Test verbalne fluentnosti. Semantički test služi za procenu upotrebe i poznavanja značenja reči u okviru četiri leksičke kategorije: homonima, antonima, sinonima i metonima (Vladisavljević, 1983). Test se sastoji od 40 ajtema, koji su podeljeni u četiri navedene kategorije, po 10 reči u svakoj kategoriji. Svaki tačan odgovor vrednovao se jednim poenom. Za kategorije homonima, sinonima i metonima tražilo se generisanje što većeg broja odgovora na zadatu stimulus-reč. Svaki dodatni tačan odgovor za datu stimulus-reč vrednovao se jednim dodatnim poenom. U kategoriji antonima od ispitanika je tražena produkcija samo jednog tačnog odgovora, te nije bilo moguće ostvariti više od jednog poena po ajtemu. Kada bi ispitanik u kategoriji antonima produkovao negaciju na podsticajnu reč, ispitivač je beležio 0.5 poena. Za odsustvo odgovora i pogrešan odgovor ispitanik nije dobijao poene. Rezultati su se sabirali posebno za svaku kategoriju reči, a zatim za sve četiri kategorije zajedno. Na taj način izračunat je ukupan skor na testu.

Verbalna fluentnost je ispitivana putem zadatka fonemske i semantičke fluentnosti. Kod testiranja fonemske verbalne fluentnosti od ispitanika se zahtevalo da navede što veći broj reči sa značenjem koje počinju glasovima „K", „M" i „S" (Vuković, 2019b). Na početku testiranja ispitanicima je objašnjeno da se isključuju vlastita imena i imena geografskih pojmova. Za ispitivanje semantičke fluentnosti korišćen je test „Nabrajanje životinja" iz Bostonske baterije testova za afazije (Boston Diagnostic Aphasia Examination – BDAE; Vuković, 2016; 2019b). Od ispitanika je

traženo da produkuje što veći broj reči koje označavaju imena pripadnika životinjske vrste. Vreme za izvršenje zadatka iznosilo je 90 sekundi, a ukupni skor predstavljao je broj reči produkovanih za 60 sekundi, u kojima je ispitanik bio najproduktivniji. Nakon isteka vremena iz odgovora su eliminisane perseveracije i drugi neadekvatni odgovori (ista kategorija, samo mladunci, npr. krava – tele).

Za procenu egzekutivnih funkcija primenjen je Dan/Noć Strup test (Gligorović i sar., 2015). Test se sastoji od 50 ajtema, raspoređenih proizvoljno, u okviru dve zasebne mape. Ajtemi se sastoje od ilustracija Meseca i Sunca. Počinje se od prve mape, uz davanje instrukcije ispitaniku da kada vidi sliku Meseca izgovori noć, a kada vidi sliku Sunca izgovori dan. Na drugoj mapi instrukcije su bile suprotne. Od ispitanika je traženo korišćenje opozita prilikom imenovanja slika Meseca i Sunca. Preciznije, kada vidi sliku Meseca ispitanik treba da izgovori dan, a kada vidi sliku Sunca noć. Beleženo je vreme, posebno za svaku mapu. Prvi deo Strup testa bodovan je na sledeći način: za odgovor u roku od 30 i manje sekundi ispitanik je dobijao 4 poena; za odgovor u roku od 31–55 sekundi 2 poena, a za odgovor u roku od 56 ili više sekundi ispitanik je dobijao 0 poena. Drugi deo Strup testa bodovan je na sledeći način: za odgovor u roku od 45 i manje sekundi ispitanik je dobijao 4 poena; za odgovor u roku od 44–69 sekundi dobijao je 2 poena, a za odgovor u roku od 70 ili više sekundi 0 poena. Maksimalni mogući broj poena na oba zadatka je 8. Najpre su izračunati poeni za svaki deo Strup testa, a ukupni skor predstavljao je zbir poena postignutih na prvom i drugom delu.

Istraživanje je realizovano tokom 2021. i 2022. godine. Ispitanike su činile osobe iz okruženja autora rada. Nakon što su ispitanici prihvatili da dobrovoljno učestvuju u istraživanju, date su im detaljne instrukcije u okviru Semantičkog testa, Testa verbalne fluentnosti i Strup testa, kao i primeri za vežbu. Testiranje je započeto kada su ispitanici u potpunosti razumeli način rešavanja zadataka primenjenih testova. Ispitivanje je izvršeno individualno u domu ispitanika, i to u prostoriji izolovanoj od buke. Vreme potrebno za kompletiranje testova iznosilo je od 10 do 15 minuta po ispitaniku.

Metode statističke obrade podataka

Za obradu podataka korišćen je Statistički paket za društvene nauke (IBM SPSS Statistics 23). Primenjene su metode deskriptivne statističke analize, kao i testovi statističkog zaključivanja: jednofaktorska analiza varijanse za ponovljena merenja, Šidakov postupak, Pirsonov koeficijent korelacije i t-test za nezavisne uzorke. Kao nivo statističke značajnosti uzeta je vrednost $p < .05$.

Rezultati

Radi utvrđivanja vrednosti postignuća ispitanika iz uzorka na Semantičkom testu, korišćene su metode deskriptivne statistike koje su prikazane u Tabeli 1.

Tabela 1

Deskriptivni podaci postignuća ispitanika na subtestovima Semantičkog testa

Subtest	*AS*	*SD*	*Min*	*Max*
Homonimi	12.63	3.67	8	20
Antonimi	8.58	1.18	6	10
Sinonimi	10.30	3.56	5	17
Metonimi	13.16	4.43	6	20
Ukupan skor	44.80	11.04	28	64

Napomena: AS – aritmetička sredina; SD – standardna devijacija; Min – minimum; Max – maksimum

Ukupan skor na Semantičkom testu kretao se od 28 do 64 ($AS = 44.80$, $SD = 11.04$). Primenom jednofaktorske analize varijanse za ponovljena merenja utvrđeno je da postoji statistički značajan efekat između subtestova: homonima, sinonima i metonima ($F = 12.18$; $df = 2$; $p =< .001$). Šidakovim postupkom ispitane su statistički značajne razlike kombinacija parova od ova tri subtesta. Utvrđeno je da se subtest sinonima ($AS = 10.30$) statistički značajno razlikovao ($p < .05$) u odnosu na subtestove homonima ($AS = 12.63$) i metonima ($AS = 13.16$), tj. da su ispitanici imali najlošija postignuća na subtestu sinonima. Postignuća ispitanika na subtestu antonima nisu se upoređivala zbog drugačijeg bodovanja odgovora.

U Tabeli 2 prikazane su deskriptivne vrednosti koje se odnose na postignuća ispitanika na Testu verbalne fluentnosti.

Tabela 2

Deskriptivni podaci postignuća ispitanika na Testu verbalne fluentnosti

Subtest	*AS*	*SD*	*Min*	*Max*
K	12.63	3.67	8	20
M	8.58	1.18	6	10
S	10.30	3.56	5	17
Semantička	13.16	4.43	6	20
Ukupan skor	45.93	14.90	20	95

Napomena: AS – aritmetička sredina; SD – standardna devijacija; Min – minimum; Max – maksimum

Ukupan skor na Testu verbalne fluentnosti kretao se od 20 do 95 ($AS = 45.93$, $SD = 14.90$). Primenom jednofaktorske analize varijanse za ponovljena merenja utvrđeno je da postoji statistički značajan efekat između testova verbalne fluentnosti ($F = 64.75$; $df = 3$; $p < .001$). Šidakovim postupkom vršeno je ispitivanje postojanja statistički značajne razlike pri kombinaciji parova sva četiri testa (zadaci Testa fonemske verbalne fluentnosti za slova K, M, S i Testa semantičke fluentnosti). Test semantičke fluentnosti ($AS = 13.16$) se statistički značajno razlikovao ($p < .001$) u odnosu na rezultate Testa

fonemske verbalne fluentnosti (*AS* = 12.63; *AS* = 8.58; *AS* = 10.30). Preciznije, ispitanici su bili uspešniji na Testu semantičke fluentnosti nego na zadacima Testa fonemske verbalne fluentnosti.

Deskriptivne vrednosti postignuća ispitanika na Strup testu prikazane su u Tabeli 3.

Tabela 3

Deskriptivni podaci postignuća ispitanika na Strup testu

Subtest	*AS*	*SD*	*Min*	*Max*
Prvi deo	3.80	0.61	2	4
Drugi deo	3.20	0.99	2	4
Ukupan skor	7	1.36	4	8

Napomena: AS – aritmetička sredina; SD – standardna devijacija; Min – minimum; Max – maksimum

Na Strup testu raspon ukupnog skora kretao se od 4 do 8 (*AS* = 7, *SD* = 1.36). Najniži broj poena imala su tri ispitanika (10%), a najviši broj poena imalo je 18 ispitanika (60%). Visoka vrednost aritmetičke sredine ukazuje da su ispitanici bili veoma uspešni na ovom testu. Niska vrednost standardne devijacije ukazuje da su rezultati ispitanika bili uglavnom raspoređeni oko srednje vrednosti, što potvrđuje uspešnost ispitanika na ovom testu.

Povezanost između leksičko-semantičkih sposobnosti i egzekutivnih funkcija

Tabela 4

Korelacije između leksičko-semantičkih sposobnosti i egzekutivnih funkcija

Leksičko-semantičke sposobnosti	Egzekutivne funkcije
Semantički test	$r = .61^{**}$
Test verbalne fluentnosti	$r = .63^{**}$

Napomena: r – koeficijent korelacije; **p < .01

Pirsonovim koeficijentom korelacije ispitana je povezanost skorova na Testu verbalne fluentnosti i Strup testu. Dobijeni rezultati ukazuju na postojanje statistički značajne povezanosti umerenog intenziteta između postignuća na ova dva testa ($r = .63$; $p < .001$). Smer korelacije je pozitivan, što znači da porast vrednosti Testa verbalne fluentnosti prati porast vrednosti Strup testa i obrnuto (Tabela 4).

Primenom istog statističkog postupka uočena je statistički značajna pozitivna povezanost umerenog intenziteta između postignuća na Semantičkom testu i Strup testu ($r = .61$; $p < .001$). (Tabela 4). Rezultati impliciraju ka mogućoj

povezanosti leksičko-semantičkih sposobnosti i egzekutivnih funkcija kod ispitanika starijih od 65 godina.

Razlike u postignućima ispitanika različitih starosnih kategorija na Semantičkom testu, Testu verbalne fluentnosti i Strup testu

Primenom t-testa za nezavisne uzorke nije uočena statistički značajna razlika između srednjih vrednosti postignuća na Testu verbalne fluentnosti i kategorija starosti ($t = 0.29$, $df = 28$, $p = .77$), kao ni između postignuća na Semantičkom testu i kategorija starosti ($t = 0.15$, $df = 28$, $p = .87$). Ispitanici su bili usklađeni u postignućima na zadacima za procenu leksičko-semantičkih sposobnosti bez obzira na godine starosti.

Razlike u postignućima ispitanika različitih starosnih kategorija na Strup testu prikazane su u Tabeli 5.

Tabela 5

Razlike u postignućima ispitanika različitih starosnih kategorija na Strup testu

Subtest	Kategorija starosti	*AS*	*SD*	*t*	*df*	*p*
Prvi deo	Rana	4	0.00	2.01	28	.05
	Srednja	3.75	0.85			
Drugi deo	Rana	3.62	0.80	2.77	28	< .05
	Srednja	2.71	0.99			

Napomena: AS – aritmetička sredina; SD – standardna devijacija; t – test; df – stepeni slobode; p – nivo značajnosti

Podaci prikazani u Tabeli 5 pokazuju da su se ispitanici statistički značajno razlikovali u postignućima u odnosu na godine starosti. Ispitanici iz kategorije srednja starost bili su manje uspešni u odnosu na ispitanike iz kategorije rane starosti na drugom, kognitivno zahtevnijem delu Strup testa ($t = 2.77$, $df = 28$, $p = .01$).

Razlike u postignućima ispitanika različitog nivoa obrazovanja na Semantičkom testu, Testu verbalne fluentnosti i Strup testu

U Tabeli 6 prikazana su postignuća ispitanika na primenjenim testovima u odnosu na nivo obrazovanja.

Rezultati su pokazali da postoje statistički značajne razlike između srednjih vrednosti postignuća kako na testovima leksičko-semantičkih sposobnosti, tako i na testu egzekutivnih funkcija između ispitanika različitog nivoa obrazovanja. Osobe sa srednjim i visokim nivoom obrazovanja bile su uspešnije na svim navedenim testovima.

Tabela 6

Razlika u postignućima ispitanika različitog nivoa obrazovanja na korišćenim testovima

Test	Subtest	Stepen obrazovanja	*AS*	*SD*	*t*	*df*	*p*
Semantički test	Homonimi	Osnovno	9.61	1.98	5.66	28	< .01
		Srednje/visoko	14.94	2.9			
	Antonimi	Osnovno	7.76	1.28	-4.09	28	
		Srednje/visoko	9.2	0.58			
	Sinonimi	Osnovno	7.84	2.23	-4.09	28	
		Srednje/visoko	12.17	3.26			
	Metonimi	Osnovno	9.61	2.66	-5.37	28	
		Srednje/visoko	15.88	3.49			
Test verbalne fluentnosti	Fonemska fluentnost	Osnovno	23.38	6.35	-3.16	28	< .01
		Srednje/visoko	36.76	14.12			
	Semantička fluentnost	Osnovno	12.3	2.49	-4.47	28	
		Srednje/visoko	19	5.46			
Strup test	Prvi deo	Osnovno	3.53	0.87	-2.18	28	< .01
		Srednje/visoko	4	0			
	Drugi deo	Osnovno	2.46	2.87	-4.46	28	
		Srednje/visoko	3.76	0.66			

Napomena: AS – aritmetička sredina; SD – standardna devijacija; t – test; df – stepeni slobode; p – nivo značajnosti

Diskusija

U ovoj studiji istraživane su leksičko-semantičke sposobnosti i egzekutivne funkcije kod osoba starijih od 65 godina. Osnovni cilj istraživanja bilo je utvrđivanje statusa leksičko-semantičkih sposobnosti i egzekutivnih funkcija u odnosu na starosno doba i nivo obrazovanja ispitanika.

Rezultati našeg istraživanja pokazali su da godine starosti nisu značajno uticale na postignuća ispitanika na testovima leksičko-semantičkih sposobnosti (Semantičkom testu i Testu verbalne fluentnosti). Prema tome, nije pokazano da leksičko-semantičke sposobnosti slabe sa povećenjem godina života ispitanika. Slični rezultati utvrđeni su i u studiji u kojoj su ispitivane jezičke sposobnosti ispitanika starosti od 17 do 80 godina (Soarez & Otriz, 2009). Autori ove studije utvrdili su da su ispitanici stariji od 51 godinu imali više skorove na subtestu pronalaženja leksema u poređenju s mlađim ispitanicima. Dalja analiza naših

rezultata pokazala je da nisu utvrđene statistički značajne razlike u postignućima na testovima verbalne fluentnosti između ispitanika različitih starosnih kategorija. Razlike u postignućima odraslih starih i mladih ispitanika na Testu verbalne fluentnosti nisu utvrđene ni u drugim studijama. Tako Lalović i Jovović (2013) navode da nije bilo značajnih razlika na najjednostavnijim zadacima verbalne fluentnosti između ispitanika starosti od 18 do 27 godina i ispitanika starosti od 60 do 85 godina. Međutim, autori su utvrdili da su mlađi ispitanici bili statistički značajno uspešniji na zadatku semantičke fluentnosti. U ranijim istraživanjima takođe je pokazano da kod starih osoba dolazi do pada semantičke verbalne fluentnosti, što je povezano sa padom brzine obrade informacija (Elgamal, et al., 2011). Što se tiče sposobnosti razumevanja i upotrebe semantičkih obeležja reči (sinonimije, homonimije, metonimije i antonimije) rezultati našeg istraživanja pokazuju da su stare osobe najlošije rezultate pokazali u kategoriji sinonima. Ovaj podatak sugeriše da je sinonimija složeniji jezički zadatak od ostalih semantičkih kategorija. Putem sinonima iskazuju se najfinije značenjske nijanse, jer izbor pojedinog sinonima određuje njegova specifičnost u odnosu na ostale reči sličnog značenja (Dragićević, 2010; Vuković, 2012).

Dodatna analiza rezultata našeg istraživanja pokazala je da postignuća na testovima leksičko-semantičkih sposobnosti zavise od nivoa obrazovanja. Drugim rečima, ispitanici s višim nivoom obrazovanja imali su veća postignuća na zadacima leksičko-semantičkih sposobnosti u poređenju s ispitanicima nižeg obrazovnog nivoa. Rezultati drugih empirijskih studija takođe su pokazali da sposobnost pronalaženja leksičkih jedinica ostaje stabilna i do 80. godine u grupi ispitanika sa visokim obrazovanjem (Welch et al., 1996). Prema tome, može se reći da viši nivo obrazovanja doprinosi očuvanom pristupu leksikonu i izboru leksičkih jedinica kod starijih ljudi.

Prema rezultatima našeg istraživanja, postignuća na testu za procenu egzekutivnih funkcija zavise od starosti ispitanika. Preciznije, ispitanici iz kategorije „srednja starost" imali su niža postignuća od ispitanika iz kategorije „rana starost". Shodno tome, naši rezultati su u saglasnosti sa rezultatima drugih empirijskih studija kojima je pokazan pad pojedinih komponenti egzekutivnih funkcija kod starih osoba (Christensen, 2001). Takođe, rezultati našeg istraživanja ukazuju na uticaj nivoa obrazovanja na postignuća na Testu egzekutivnih funkcija. Ispitanici višeg nivoa obrazovanja bili su uspešniji u poređenju sa ispitanicima koji su imali manje godina formalnog obrazovanja. U prilog našim nalazima su i nalazi drugih autora koji navode da kod starih osoba nižeg nivoa obrazovanja dolazi do većeg pada kognitivnih funkcija (Christensen, 2001).

Dalja analiza rezultata našeg istraživanja ukazuje na povezanost leksičko-semantičkih sposobnosti i egzekutivnih funkcija kod starijih osoba. Povezanost ovih dveju sposobnosti uočena je kako na zadacima razumevanja reči i njihove upotrebe (Semantički test), tako i na zadacima generisanja reči na zadati glas ili semantičku kategoriju (testovi verbalne fluentnosti). O

povezanosti leksičko-semantičkih sposobnosti i egzekutivnih funkcija govore i drugi autori koji su istraživali odnos komponenti egzekutivnih funkcija i sposobnosti pronalaženja leksičkih jedinica. U studiji koja je obuhvatila 82 ispitanika starija od 60 godina utvrđeno je da je performansa na zadacima verbalne fluentnosti povezana s obimom vokabulara i kapacitetom radne memorije (Shao et al., 2014). Rezultati druge studije, kojom je obuhvaćeno 246 ispitanika od 55 do 84 godine, pokazali su da fleksibilnost predstavlja prediktor uspešnosti odgovora na zadacima imenovanja (Higbdy et al., 2019). Na povezanost leksičko-semantičkih sposobnosti i egzekutivnih funkcija ukazuje i Vuković (2016), ističući da loša performansa na zadacima verbalne fluentnosti može biti povezana sa sniženjem kognitivne fleksibilnosti, što se uočava kod pacijenata s oštećenjem mozga i afazijom.

Zaključak

Kategorije starosti nisu se pokazale kao značajan faktor razlika u postignućima ispitanika na Semantičkom testu i testovima verbalne fluentnosti. Drugim rečima, ispitanici rane starosti nisu se statistički značajno razlikovali u pogledu postignuća na primenjenim testovima od grupe ispitanika koji su pripadali kategoriji srednje starosti. Prema tome, naši nalazi pokazuju da leksičko-semantičke sposobnosti ne opadaju značajno sa povećanjem godina života.

Egzekutivne funkcije su se pokazale vulnerabilnijim na godine starosti u odnosu na leksičko-semantičke sposobnosti. Stariji ispitanici imali su niža postignuća na Strup testu u poređenju s mlađim ispitanicima.

Utvrđena je povezanost između leksičko-semantičkih sposobnosti i egzekutivnih funkcija kod starijih ljudi.

Stepen obrazovanja pokazao se kao značajan faktor razlike u postignućima ispitanika, kako na testovima leksičko-semantičkih sposobnosti, tako i na testu egzekutivnih funkcija. Ispitanici višeg obrazovnog nivoa bili su uspešniji na oba testa.

Najzad, želimo da istaknemo da naši rezultati, kao i rezultati drugih empirijskih studija, ukazuju na pad određenih kognitivnih funkcija (uključujući i jezik) kod starijih ljudi. S obzirom na to nameće se potreba podsticanja i pružanja podrške za kognitivno angažovanje i osnaživanje adaptivnih sposobnosti osoba starijeg životnog doba.

Ograničenje ove studije je relativno mali uzorak. Takođe, u budućim studijama bilo bi značajno da se uporede rezultati ispitanika koji pripadaju kategoriji starih sa rezultatima ispitivanja odraslih osoba srednjeg ili mlađeg životnog doba. Primena drugih testova za procenu egzekutivnih funkcija, kao što su Viskonsin test sortiranja karata ili Test ostavljanja traga (Trail making test), na primer, mogla bi da doprinese jasnoj slici egzekutivnih sposobnosti kod starih.

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Lexical-semantic abilities and executive functions in the elderly

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Introduction. The development of modern society has led to an increase in the life expectancy, and thus to a significant increase in the number of elderly people. Therefore, in recent years a lot of attention has been paid to the examination of cognitive abilities in this population. The research focuses on changes in language, executive functions and memory. *Aim*. This study aimed to determine lexical-semantic abilities and executive functions in persons over the age of 65. *Methods.* The sample included 30 people ranging in age from 66 to 85. The respondents were divided into two age categories, with 16 respondents from the "young old" category and 14 respondents in the "middle-old and oldest-old" category. The sample included 13 respondents who had finished elementary

school and 17 respondents who had finished secondary or higher/university education. The Semantic Test and the Verbal Fluency Test were used to assess lexical-semantic abilities. To assess executive functions, the Stroop test was used. *Results.* The results have shown that respondents with different age categories do not differ in their achievements on tests for the assessment of lexical-semantic abilities. However, differences in achievements were determined in relation to the level of education of the respondents. People with a higher educational level were more successful on the mentioned tests. Furthermore, the results show a difference in achievement on the test for assessing executive functions based on age and level of education. *Conclusion.* These findings indicate that executive functions are more sensitive to age than lexical-semantic abilities.

Keywords: lexical-semantic abilities, executive functions, elderly

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Odnos tehnike čitanja i fine motorike kod učenika mlađeg školskog uzrasta

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Uvod: Uloga motorike u veštini čitanja nije toliko očigledna, te je i znatno ređe proučavana. Rezultati pojedinih istraživanja ukazuju na to da je veza između motorike i čitanja prisutna i da zavisi od ispitivane motoričke komponente. *Cilj:* Cilj istraživanja je da se utvrdi povezanost vizuomotoričke koordinacije i vizuomotoričke integracije sa tehnikom čitanja kod učenika mlađeg školskog uzrasta. *Metode:* Uzorkom je obuhvaćeno 103 ispitanika uzrasta od devet do 11 godina. Za procenu tehnike čitanja korišćena je skala Likertovog tipa sa četiri deskriptora, kojima su obuhvaćeni najčešći tipovi problema tokom čitanja. Fina motorika je procenjena subtestovima *Akadija testa razvojnih sposobnosti – Vizuomotorička koordinacija i mogućnost sleda* i *Crtanje oblika*. Kao kovarijati odabrani su inteligencija, radna memorija i inhibitorna kontrola. Inteligencija je procenjena *Ravenovim progresivnim matricama*, radna memorija zadatkom *Raspon cifara unazad*, a inhibitorna kontrola *Kreni/stani zadatkom*. *Rezultati:* Primenom hijerarhijske regresione analize utvrđeno je da su vizuomotorička koordinacija i radna memorija nezavisni prediktori tehnike čitanja. Vizuomotorička koordinacija objašnjava 5.2% varijanse, nakon što je uklonjen uticaj inteligencije i bazičnih egzekutivnih funkcija. Vizuomotorička integracija nije razmatrana kao prediktor tehnike čitanja pošto je utvrđeno da sa njom nije statistički značajno povezana. *Zaključak:* U razmatranju značaja fine motorike potrebno je analizirati pojedinačne komponente, jer rezultati ovog, kao i prethodnih istraživanja, ukazuju na to da nisu svi aspekti fine motorike podjednako značajni činioci razvoja veštine čitanja. U kontekstu prevencije teškoća u usvajanju čitanja bilo bi poželjno primenjivati aktivnosti kojima bi se stimulisao razvoj fine motorike i radne memorije već od predškolskog uzrasta.

Ključne reči: čitanje, vizuomotorička koordinacija, vizuomotorička integracija, egzekutivne funkcije, inteligencija

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Uvod

Čitanje je kompleksna veština čije usvajanje zavisi od niza različitih sposobnosti i veština. Veština čitanja je često ispitivana iz ugla različitih lingvističkih i kognitivnih sposobnosti koje su nesumnjivo od velike važnosti za njeno usvajanje (Buha i Gligorović, 2021), ali je uloga motorike, pošto nije toliko očigledna, znatno ređe proučavana. Na moguću vezu između motorike i čitanja ukazuje veća učestalost motoričkih teškoća kod dece sa disleksijom, kao i prisustvo problema čitanja kod dece sa razvojnim poremećajem koordinacije. Kod dece sa disleksijom često su prisutni problemi održavanja ravnoteže, izvođenja brzih pokreta i motornog učenja, kao i teškoće u oblasti fine motorike – manipulativne spretnosti, preciznosti pokreta i vizuomotoričke integracije (Gouleme et al., 2015; Marchand-Krynski et al., 2017; Okuda et al., 2014; Rochelle & Talcott, 2006). S druge strane, veliki broj dece sa razvojnim poremećajem koordinacije čak i na adolescentskom uzrastu ispoljava teškoće prilikom dekodiranja i vizuelnog prepoznavanja reči (Harrowell et al., 2018).

Sistematskim pregledom istraživanja uočeno je da je veza između motorike i čitanja prisutna i u tipičnoj populaciji i da zavisi od ispitivane motoričke komponente. Najčešće se kao značajna komponenta izdvaja vizuomotorička integracija, dok su dokazi o značaju motoričke preciznosti manje jednoznačni (Macdonald et al., 2018).

Vizuomotorička integracija definiše se kao sposobnost koordinacije pokreta vođenih vizuelnim informacijama i obično se procenjuje zadacima kopiranja geometrijskih figura, simbola ili slova/reči (Buha i Gligorović, 2021; Carlson et al., 2013). Kopiranje je sekvencionalna aktivnost koja počiva na razlaganju percipiranog modela na delove, a potom integraciji tih delova u celinu, što zahteva interakciju grafičke reprodukcije i enkodiranja prostornih odnosa (Dansilio & Charamelo, 2005). Za razliku od aktivnosti vizuomotoričke integracije, motorička preciznost zasniva se na tešnjoj saradnji oka i šake, odnosno vizuomotoričkoj koordinaciji, a neophodna je tokom izvođenja pokreta (npr. u zadacima trasiranja) koji zahtevaju konstantnu vizuelnu povratnu informaciju (fidbek) oka i spacijalnu preciznost (Gowen & Miall, 2006).

Uočena veza između fine motorike i čitanja mogla bi biti posredovana kognitivnim sposobnostima. Naime, rezultati nekih studija ukazuju na to da su inteligencija, pažnja i egzekutivne funkcije značajni činioci i veštine čitanja i motoričke kontrole (za pregled istraživanja videti Suggate et al., 2018). U tom smislu veza između fine motorike i čitanja mogla bi biti indirektna – izraz posrednog uticaja neke od kognitivnih sposobnosti. Rezultati dosadašnjih (malobrojnih) istraživanja u kojima je ispitivan potencijalni udeo „trećeg faktora" u formiranju odnosa između fine motorike i čitanja su protivrečni (npr. Becker et al., 2014; Carlson et al. 2013; Chung et al., 2018; Pitchford et al., 2016; Suggate et al., 2018; Suggate et al., 2019).

Ovo istraživanje usmereno je na ispitivanje odnosa fine motorike (vizuomotoričke integracije i vizuomotoričke koordinacije) i tehnike čitanja, uz kontrolu uticaja inteligencije i egzekutivnih funkcija (inhibitorne kontrole i radne memorije). Imajući u vidu da je većina dosadašnjih istraživanja bila prospektivnog tipa – usmerena na ispitivanje značaja fine motorike ispitane na predškolskom uzrastu za usvajanje veštine čitanja u školskom periodu – ovo istraživanje je fokusirano na procenu oba pomenuta domena na istom uzrastu / edukativnom nivou.

Cilj istraživanja

Cilj istraživanja je da se utvrdi povezanost vizuomotoričke koordinacije i vizuomotoričke integracije sa tehnikom čitanja kod učenika mlađeg školskog uzrasta.

Metode

Uzorak

Uzorkom je obuhvaćeno 103 ispitanika, 52 dečaka (50.5%) i 51 devojčica (49.5%), uzrasta od devet do 11 godina (*AS* = 9.81, *SD* = 0.56). Ispitanici pohađaju III (48.5%) i IV razred (51.5%) u dve osnovne škole sa teritorije šireg centra Beograda. Dečaci i devojčice su relativno ravnomerno zastupljeni u oba razreda ($\chi^2(1) = 0.089$, $p = .845$). Uzorkom nisu bila obuhvaćena deca koja imaju evidentirane smetnje u razvoju i čiji je skor na testu inteligencije (*Ravenove progresivne matrice*) bio ispod 25. percentila.

Instrumenti

Podaci o uzrastu i razredu preuzeti su iz školske dokumentacije.

Veština čitanja

Za procenu tehnike čitanja, koja uslovljava i prethodi otkrivanju značenja pročitanog (Vladisavljević, 1991), korišćena je skala sa četiri deskriptora (Tabela 1). Kao deskriptori su odabrani najčešći tipovi problema koji se pojavljuju kod dece sa teškoćama u čitanju u srpskoj ortografiji (videti Buha i Gligorović, 2021). Skala je Likertovog tipa, sa pet nivoa ocenjivanja (nikada = ocena 5, retko = ocena 4, ponekad = ocena 3, često = ocena 2 i uvek = ocena 1). Teorijski maksimum iznosi 20 poena (odlična veština čitanja), a minimum 4 (izražene teškoće u čitanju).

Tabela 1

Skala teškoća u čitanju

Teškoće čitanja		Nikada	Retko	Ponekad	Često	Uvek
1)	Čitanje je nefluentno (slovo po slovo; sporo, neautomatizovano)					
2)	Brka slova (i brojeve) koji slično izgledaju (npr. *b/d*; *b/p*; *m/n*; *s/z*; *š/ž*; *u/m*; *ő/ò*; *u/y*) ili slično zvuče (*d/t*; *k/g*; *b/p*)					
3)	Slova i/ili slogove dodaje (*brada–barada*; *mrkva–markva*; *brod–borod*), izostavlja (*brod–brd*); premešta (npr. *vrata–trava*; *brod–brdo*), ili zamenjuje reči – pogađa *(mračni–mačka*; *suva–sutra*)					
4)	Pri čitanju izgubi/preskoči red ili se vraća na već pročitani red					

Proverom unutrašnje saglasnosti Skale utvrđeno je da Kronbahova alfa iznosi .93, što govori o njenoj dobroj pouzdanosti.

Fina motorika

Za procenu fine motorike upotrebljeni su odgovarajući subtestovi *Akadija testa razvojnih sposobnosti* (*Acadia Test of Developmental Abilities*; Atkinson et al., 1972): subtest *Vizuomotorička koordinacija i mogućnost sleda*, koji se sastoji od raznovrsnih tipova zadataka trasiranja i subtest *Crtanje oblika*, u kome se od ispitanika traži precrtavanje geometrijskih figura različite složenosti. Zadaci u okviru primenjenih subtestova ocenjivani su prema opisanoj proceduri datoj u priručniku ovog testa. U obradi podataka korišćeni su sirovi skorovi; svaki subtest nosi maksimalno 20 poena (viši skor označava bolje sposobnosti).

Kovarijati

Kao kovarijati odabrane su kognitivne sposobnosti koje su istraživački potvrđene kao značajni činioci veštine čitanja – intelektualne sposobnosti i bazične egzekutivne funkcije (radna memorija i inhibitorna kontrola).

Inteligencija je procenjena primenom *Ravenovih progresivnih matrica* (*Raven's Progressive Matrices*/ RPM; Raven et al., 1998). U analizi rezultata korišćen je sirovi skor (broj tačnih odgovora) s obzirom na to da uobičajeni način prikazivanja rezultata (percentilni rangovi) ograničava mogućnost finije diskriminacije postignuća ispitanika.

Za procenu *radne memorije* upotrebljen je zadatak *Raspon cifara unazad* (detaljnije u Buha, 2016), u kome se od ispitanika očekuje ponavljanje niza

prezentovanih cifara rastuće složenosti (od tri do osam cifara u nizu) i to obrnutim redosledom. Zadatak se sastoji od ukupno 18 ajtema. Beleži se broj tačnih odgovora, te se teorijski raspon kreće od 0 do 18.

Inhibitorna kontrola procenjena je primenom *Kreni/stani zadatka* (*Go/No-Go Task*, Spinella & Miley, 2004), koji se sastoji od dva dela – jedan koji zahteva konfliktni motorički odgovor i drugi u kome se očekuje da ispitanik ne reaguje na dogovoreni signal (detaljnije u Buha, 2016). Beleži se broj i vrsta grešaka. U ovom istraživanju kao glavna varijabla korišćen je ukupan broj grešaka sa oba dela zadatka, te viši rezultat ukazuje na niži nivo razvoja inhibitorne kontrole.

Procedura

Inicijalni uzorak formiran je na osnovu saglasnosti direktora škola, pismenog odobrenja roditelja/staratelja i dobrovoljnog pristanka učenika da učestvuju u istraživanju. Procena fine motorike i inteligencije obavljena je grupnim testiranjem u učionicama, dok je procena radne memorije i inhibitorne kontrole rađena individualno, u zasebnoj prostoriji škole. Primenom ekskluzivnih kriterijuma (evidentirane smetnje u razvoju i skor na testu inteligencije ispod 25. percentila) izvršen je finalni izbor ispitanika, nakon čega su nastavnici popunili *Skalu teškoća u čitanju*.

Obrada podataka

Postignuće ispitanika predstavljeno je deskriptivnom statistikom (aritmetička sredina, standardna devijacija, minimum i maksimum). Normalnost raspodele skorova proverena je primenom Kolmogorov–Smirnov testa i analizom *Z* skora. Statistički pokazatelji Kolmogorov–Smirnov testa i veličina *Z* skora (> ± 3.29 za uzorke veće od 50 ispitanika, Kim, 2013) ukazuju na to da jedino postignuća na varijabli inhibitorne kontrole (*Kreni/stani zadatak*, $D = 1.53$, $p = .018$) i *Skali teškoća u čitanju* ($D = 2.67$, $p = .000$) značajno odstupaju od normalne distribucije. Imajući u vidu da su parametrijske metode dovoljno robustne na odstupanja od normalnosti raspodele (Rasch & Guiard, 2004), u analizama statističkog zaključivanja korišćeni su t-test za nezavisne uzorke, dvofaktorska analiza varijanse, Pirsonov koeficijent korelacije i hijerarhijska višestruka regresija. Dodatno je računata i veličina efekta (Koenov *d* i Koenov f^2) za statistički značajne rezultate. Rezultati primenjenih metoda provereni su i uključivanjem transformisanih varijabli inhibitorne kontrole i veštine čitanja primenom logaritam10 metode (a u slučaju skorova *Skale teškoća u čitanju* dodatno uz *reflect* funkciju). Skorovi *Skale teškoća u čitanju* transformisani su i primenom *reflect & inverse* funkcije (Tabachnick & Fidell, 2013). U svim slučajevima dobijeni su gotovo identični rezultati, što je potvrdilo opravdanost primene parametrijskih metoda i u slučaju izostanka normalnosti raspodele.

Rezultati

Prema oceni nastavnika 44.7% učenika ostvaruje maksimalni skor od 20 poena na *Skali teškoća u čitanju*, a u okvirima proseka ispitanog uzorka (skor u rasponu od 14 do 20 poena) nalazi se 82.5% učenika (n = 85). Odstupanje za jednu *SD* (skor ispod 14 poena) registrovano je kod 17.5% ispitanika (n = 18). Na osnovu kriterijuma odstupanja za jednu *SD* uzorak je podeljen u dve grupe: grupu dece koja imaju teškoće u čitanju i grupu dece čija se veština čitanja kreće u okvirima proseka za dati uzrast i razred. Deca koja su označena kao loši čitači u proseku ostvaruju 10.8 poena (*SD* = 2.04), dok dobri čitači ostvaruju 8 poena više (*AS* = 18.73, SD = 1.79) (detaljnije u Tabeli 2). U grupi dece čija veština čitanja odstupa za jednu *SD* nešto je više dečaka (10.7% *vs*. 6.8%), no ova razlika u distribuciji nije statistički značajna (χ^2 = 0.98, df = 1, p = .321).

Tabela 2

Mere deskriptivne statistike postignuća na Skali teškoća u čitanju i svim primenjenim zadacima/testovima, kao i razlike među grupama ispitanika

	Grupa u celini		Učenici sa teškoćama u čitanju		Učenici sa dobrom veštinom čitanja		t(101)
	Raspon	*AS* (*SD*)	Raspon	*AS* (*SD*)	Raspon	*AS* (*SD*)	
Skala teškoća u čitanju	7–20	17.35 (3.52)	7–13	10.83 (2.04)	14–20	18.73 (1.79)	-16.60**
VMK	6–20	13.85 (3.46)	6–19	11.65 (3.36)	6–20	14.34 (3.30)	-3.24*
VMI	5–18	11.03 (2.98)	6–14	10.17 (2.00)	5–18	11.21 (3.13)	-1.36
IK	0–20	6.53 (4.39)	2–19	8.61 (4.60)	0–20	6.09 (4.24)	2.25*
RM	2–12	5.91 (2.16)	2–8	4.39 (1.91)	2–12	6.24 (2.07)	-3.47*
RPM	16–51	34.02 (7.60)	18–41	29.78 (6.99)	16–51	34.92 (7.46)	-2.68*

Legenda: **p < .001; *p < .05; IK – inhibitorna kontrola; RM – radna memorija; RPM – Ravenove progresivne matrice; VMK – vizuomotorička koordinacija; VMI – vizuomotorička integracija

Detaljnijom analizom utvrđeno je da je nefluentno (sporo, neautomatizovano) čitanje često ili uvek karakteristično za 8.7% učenika. Zamena sličnih slova (po izgledu ili zvučnosti) tokom čitanja često se ili uvek javlja kod 5.9% ispitanika, dok se dodavanje slova/slogova, premeštanje ili njihovo ispuštanje tokom čitanja često/uvek javlja kod 6.8% učenika. Isto toliko dece tokom čitanja preskače red ili se vraća na već pročitani deo.

Proverom efekta pola i edukativnog iskustva na nivo ovladanosti tehnikom čitanja nisu utvrđene statistički značajne razlike između dečaka i devojčica (t(101) = 1.59, p = .115), niti između učenika III i IV razreda (t(101) =

1.44, p = .153). Takođe, ni hronološki uzrast ispitanika nije značajno povezan sa procenjenim karakteristikama čitanja (r = .14, p = .165).

U Tabeli 2 su, pored osnovnih deskriptivnih pokazatelja *Skale teškoća u čitanju*, prikazana i postignuća ispitanika na svim primenjenim testovima/zadacima, kako za grupu u celini, tako i za poduzorke definisane na osnovu postignuća na *Skali teškoća u čitanju*. Primenom t-testa za nezavisne uzorke poređene su grupe različitog nivoa čitanja prema postignuću na primenjenim zadacima/testovima fine motorike i kognitivnih sposobnosti.

Deca koja, prema oceni nastavnika, ispoljavaju teškoće u čitanju, ostvaruju značajno lošije rezultate na subtestu *Vizuomotorička koordinacija i mogućnost sleda* (d = .81), na zadacima inhibitorne kontrole (d = .57) i radne memorije (d = .93), kao i na testu inteligencije (d = .71). Na zadatku vizuomotoričke integracije, odnosno kopiranja geometrijskih figura (subtest *Crtanje oblika*), nisu utvrđene statistički značajne razlike u postignuću između dve grupe ispitanika, iako ispitanici sa teškoćama u čitanju pokazuju nešto lošije rezultate.

Pol nije značajan činilac postignuća na primenjenim zadacima/testovima: vizuomotorička koordinacija (t(101) = -0.94, p = .348), vizuomotorička integracija (t(101) = 0.10, p = .921), radna memorija (t(101) = 0.04, p = .967), inhibitorna kontrola (t(101) = -0.37, p = .714) i inteligencija (t(101) = -0.44, p = .662). Takođe, primenom dvofaktorske analize varijanse nije utvrđeno prisustvo interakcije pola i nivoa ovladanosti veštinom čitanja ni na jednoj ispitivanoj varijabli: vizuomotorička koordinacija (F(1, 99) = 0.99, p = .321), vizuomotorička integracija (F(1, 99) = 0.09, p = .767), inteligencija (F(1, 99) = 0.25, p = .621), radna memorija (F(1, 99) = 0.32, p = .572), inhibitorna kontrola (F(1, 99) = 3.13, p = .080).

Ispitivanjem razlika u postignuću u zavisnosti od edukativnog iskustva, odnosno razreda koji ispitanici pohađaju, utvrđeno je da su učenici III i IV razreda relativno ujednačeni u svim ispitivanim domenima: vizuomotorička koordinacija (t(101) = 1.91, p = .275), vizuomotorička integracija (t(101) = 1.36, p = .176), inteligencija (t(101) = -1.06, p = .290), radna memorija (t(101) = -0.24, p = .811), inhibitorna kontrola (t(101) = 1.23, p = .222). Dodatno, nije utvrđeno prisustvo interakcije između razreda i nivoa ovladanosti veštinom čitanja ni na jednoj ispitivanoj varijabli: vizuomotorička koordinacija (F(1, 99) = 0.30, p = .586), vizuomotorička integracija (F(1, 99) = 2.03, p = .157), inteligencija (F(1, 99) = 2.46, p = .120), radna memorija (F(1, 99) = 2.32, p = .131), inhibitorna kontrola (F(1, 99) = 1.49, p = .226).

Kako bismo proverili da li fina motorika predstavlja nezavisan prediktor veštine čitanja, kontrolišući uticaj kognitivnih sposobnosti (inteligencije i egzekutivnih funkcija), u narednom koraku primenjena je hijerarhijska višestruka regresija. Prethodno je primenom Pirsonovog koeficijenta korelacije izvršena provera međusobne povezanosti nezavisnih varijabli (Tabela 3).

Pol i nivo edukacije nisu razmatrani kao značajni prediktori jer prethodnim analizama nije utvrđeno da su značajni faktori postignuća ni na jednoj od posmatranih varijabli.

Tabela 3

Povezanost veštine čitanja, fine motorike i kognitivnih sposobnosti

Varijable	Čitanje	RPM	VMK	VMI	IK
RPM	.24**	/			
VMK	.36***	.27**	/		
VMI	.13	.30**	.29**	/	
IK	-.30**	-.35***	-.37***	-.30**	/
RM	.39***	.43***	.21*	.07	-.28**

Legenda: ***$p < .001$; **$p < .01$; *$p < .05$; Čitanje – Skale teškoća u čitanju; RPM – Ravenove progresivne matrice; VMK – vizuomotorička koordinacija; VMI – vizuomotorička integracija; IK – inhibitorna kontrola; RM – radna memorija

Postignuća na zadacima fine motorike (vizuomotoričke koordinacije i vizuomotoričke integracije) međusobno su značajno povezana, kao i postignuća na zadacima egzekutivnih funkcija (radne memorije i inhibitorne kontrole). U oba slučaja reč je o niskoj korelaciji ($r < .30$), što ukazuje na to da primenjeni zadaci procenjuju zasebne konstrukte. Inteligencija je statistički značajno povezana sa svim nezavisnim varijablama – sa postignućem na zadacima fine motorike ostvaruje korelacije niskog intenziteta, a sa egzekutivnim funkcijama umerenog. Inhibitorna kontrola značajno je povezana sa oba zadatka fine motorike, dok radna memorija ostvaruje statistički značajnu vezu jedino sa postignućem na zadatku vizuomotoričke koordinacije. Konačno, veština čitanja povezana je sa svim varijablama, izuzev sa uspehom na zadatku vizuomotoričke integracije. Imajući to u vidu, vizuomotorička integracija nije uzeta dalje u razmatranje kao prediktor veštine čitanja.

Tokom postupka primene hijerarhijske višestruke regresije u prvom koraku su, kao prediktori, uneta postignuća na testu inteligencije i zadacima inhibitorne kontrole i radne memorije. Ovaj model objašnjava oko 19% varijanse nastavničke ocene veštine čitanja. Nakon unošenja rezultata vizuomotoričke koordinacije u drugom koraku, modelom kao celinom objašnjeno je oko 24% ukupne varijanse ($F(4, 98) = 7.92$, $p \leq .000$). Veličina efekta (f^2) za model u celini iznosi 0.32, što se može interpretirati kao model umerene jačine (Cohen, 1988). Kvalitet vizuomotoričke koordinacije objasnio je dodatnih 5.2% varijanse, nakon što je uklonjen uticaj inteligencije i bazičnih egzekutivnih funkcija (Tabela 4).

Tabela 4

Rezultati hijerarhijske višestruke regresije za veštinu čitanja

	B	95% CI		SE B	β	R^2	ΔR^2
		LB	UB				
RPM	.02	-.09	.11	.05	.04		
IK	-.16	-.31	.00	.16	-.19*	.19	.19***
RM	.52	.20	.85	.08	.32**		
RPM	.00	-.09	.10	.05	.00		
IK	-.09	-.25	.06	.08	-.12	.24	.05**
RM	.50	.18	.82	.16	.30**		
VMK	.25	.06	.45	.10	.25**		

Legenda: ***p< .001; **p < .01; *p < .05; RPM – Ravenove progresivne matrice; IK – inhibitorna kontrola; RM – radna memorija; VMK – vizuomotorička koordinacija

U konačnom modelu kao statistički značajni nezavisni prediktori izdvojili su se radna memorija (p = .003) i vizuomotorička koordinacija (p = .011). Drugim rečima, deca koja imaju veći kapacitet radne memorije ili bolju vizuomotoričku koordinaciju uspešnije vladaju veštinom čitanja.

Diskusija

Cilj ovog istraživanja bio je usmeren na utvrđivanje povezanosti između fine motorike i tehnike čitanja. Dobijeni nalazi do izvesne mere u skladu su sa rezultatima prethodnih istraživanja koji ukazuju na značajnu ulogu fine motorike u ovladavanju veštinom čitanja (Chung et al., 2018; Pienaar et al., 2014; Pitchford et al., 2016; Suggate et al., 2019). U razmatranju ovakvog nalaza neki autori (npr. Bellocchi et al., 2017; Carlson et al. 2013) navode mogućnost da je veza između fine motorike i čitanja indirektna – posredovana zajedničkom kognitivnom osnovom, koja bi u ovom slučaju bila odgovorna i za kvalitet fine motorike i za nivo ovladanosti veštinom čitanja. Našim istraživanjem ispitana je potencijalna medijatorska uloga intelektualnih sposobnosti i bazičnih egzekutivnih funkcija (radne memorije i inhibitorne kontrole) za koje je prethodno utvrđeno da su značajno povezani i sa finom motorikom i sa veštinom čitanja. Primenom hijerarhijske regresione analize otkriveno je da su vizuomotorička koordinacija i radna memorija samostalni prediktori veštine čitanja, a slični rezultati dobijeni su i u populaciji kineske dece (Chung et al., 2018), kao i na uzorku dece predškolskog uzrasta iz Severne Amerike (Becker et al., 2014). Iako su pomenuti autori kao reprezent fine motorike razmatrali jedino vizuomotoričku integraciju, njihovi rezultati upućuju na to da fina motorika u širem smislu, pored egzekutivnih funkcija, predstavlja značajan činilac usvajanja veštine čitanja. Ovakvi nalazi ne podržavaju hipotezu „trećeg faktora", ali treba imati na umu da ni u jednoj nama dostupnoj studiji nije istovremeno ispitivan širi set kognitivnih sposobnosti za koje je utvrđeno da

značajno doprinose razvoju fine motorike i veštine čitanja. Jedan od faktora važnih za obe ispitivane oblasti u ovom istraživanju predstavlja okulomotorna kontrola (Chau et al., 2021; Gowen & Miall, 2006; Kasisopa et al., 2016). Ona omogućava pokretanje očiju na brz, stabilan i koordinisan način, obezbeđujući time binokularnu preciznost u fiksiranju ciljnog stimulusa neophodnu za praćenje reči tokom čitanja, kao i za vizuomotoričke aktivnosti (Hung, 2006). Istraživanja pokazuju da se kod osoba sa disleksijom tokom čitanja uočavaju drugačiji pokreti očiju u odnosu na tipičnu populaciju, a razlike su registrovane u trajanju fiksacija (zaustavljanja pokreta očiju), dužini sakada (skokovitih pokreta očiju), kao i u broju onih sakada koje su nekarakteristične za proces čitanja (Franzen et al., 2021). Takođe, atipična okulomotorna kontrola uočena je i kod dece sa razvojnim poremećajem koordinacije (Sumner et al., 2018). U tom svetlu neko naredno istraživanje moglo bi da pokuša da odgovori na pitanje da li je uočeni odnos između fine motorike i veštine čitanja posredovan okulomotornom kontrolom.

U literaturi se navodi nekoliko drugih mehanizama koji bi mogli da objasne vezu između fine motorike i čitanja. Prema jednom od njih bolja fina motorika omogućava deci da budu više uključena u različite edukativne aktivnosti (npr. eksploracija i manipulacija predmetima), koje dalje doprinose razvoju niza kognitivnih sposobnosti i specifičnih akademskih veština. Ova funkcionalistička hipoteza predstavlja jedno od mogućih objašnjenja veze između gnozije prstiju i veštine računanja (videti Penner-Wilger & Anderson, 2013), kao i povezanosti fine motorike i leksičkih sposobnosti (Suggate & Stoeger, 2017), a razmatra se i u kontekstu veštine čitanja. Funkcionalistički ugao sagledavanja povezanosti fine motorike i čitanja počiva na ideji da bolja sposobnost/veština u jednom domenu omogućava više prakse ili sticanje specifičnih iskustava, što se dalje odražava na razvoj kognitivnih sposobnosti važnih za usvajanje/bogaćenje znanja i akademskih veština (Iverson, 2010; Suggate & Stoeger, 2017). Posmatrajući ulogu pojedinačnih komponenata fine motorike, rezultati većine istraživanja ističu vizuomotoričku integraciju u prvi plan, dok je značaj vizuomotoričke koordinacije manje evidentan. Imajući u vidu da aktivnosti kopiranja na predškolskom uzrastu često obuhvataju i kopiranje slova i kratkih reči, pretpostavlja se da je veza vizuomotoričke integracije i veštine čitanja posredovana grafomotornim aktivnostima. Učenje i uvežbavanje pisanja slova i reči vodi ka boljem mapiranju njihovih vizuelnih reprezentacija, što kasnije može pospešiti usvajanje veštine čitanja (Cameron et al., 2016). U prilog ovoj tezi govore rezultati studije rađene na uzorku od preko tri hiljade predškolaca, koji ukazuju na to da su aspekti fine motorike povezani sa grafomotoričkim aktivnostima značajniji prediktor veštine čitanja u drugom razredu osnovne škole od manipulativne spretnosti (Dinehart & Manfra, 2013). Takođe, jednom skorašnjom studijom kojom je obuhvaćeno oko 800 bilingvalnih prvaka utvrđeno je da se, za razliku od kopiranja geometrijskih

figura i crtanja ljudske figure, kao značajan prediktor čitanja izdvaja samo uspeh na zadatku pisanja slova (Mohamed & O'Brien, 2022). Veza između sposobnosti kopiranja simbola/slova i čitanja uočena je kod osoba različitog uzrasta, nezavisno od vrste pisma (alfabetsko, logografsko ili slogovno) i nivoa ortografske transparentnosti (Bhide, 2018; Cameron et al., 2012; Chung et al., 2018; Suggate et al., 2018). Za razliku od istraživanja drugih autora, našim istraživanjem dobijeni su donekle različiti podaci – loši i dobri čitači imaju slično razvijenu veštinu kopiranja geometrijskih figura (vizuomotoričku integraciju), dok se međusobno značajno razlikuju u preciznosti trasiranja (vizuomotoričkoj koordinaciji). Ovakav nalaz ukazuje na to da grafomotorne aktivnosti u užem smislu (kopiranje slova) nisu jedino moguće objašnjenje veze između fine motorike i čitanja.

Funkcionalistička hipoteza bliska je konceptu pod nazivom Metjuov efekat (engl. *Matthew effect*), poznatom i pod izrekom „bogati postaju bogatiji, a siromašni siromašniji" (Duff et al., 2015; Stanovich, 1986). U kontekstu ovog fenomena, deca koja imaju teškoće u izvođenju finih motoričkih veština mogu izbegavati aktivnosti koje zahtevaju njihov angažman, te vremenom one sve više zaostaju u odnosu na veštine njihovih vršnjaka. Osim što se teškoće u domenu fine motorike produbljuju, izbegavanjem finih motoričkih aktivnosti deca umanjuju opus različitih iskustava koja mogu imati veliki značaj za razvoj drugih sposobnosti i veština. Taj proces može biti obrnut i dvosmeran – aktivnost čitanja je često odbojna deci koja imaju teškoće u ovom domenu, te izbegavanjem čitanja umanjuju prilike za uvežbavanje svih onih veština koje učestvuju u procesu dekodiranja, između ostalih i okulomotorne kontrole (Goswami, 2015).

Veza između fine motorike i čitanja može se objasniti i neurološkim mehanizmima, imajući u vidu da brojne studije rađene u različitim kliničkim populacijama (npr. Moretti et al., 2002) njihov zajednički imenitelj pronalaze u funkciji malog mozga. Iako je cerebelum prvenstveno važan za motoriku, istraživanja pokazuju da učestvuje i u nemotoričkim funkcijama, kao što su obrada perceptivnih (Baumann et al., 2015), emocionalnih (Adamaszek et al., 2017) i jezičkih informacija (Mariën & Borgatti, 2018). U nedavnoj studiji na bazi funkcionalne magnetne rezonance uočeno je da su različiti regioni malog mozga uključeni i u proces čitanja, te da od jačine cerebro-cerebelarnih veza zavisi brzina i fluentnost čitanja (Li et al., 2022). Treba napomenuti da mali mozak učestvuje i u okulomotornoj kontroli (Zee & Walker, 2009) koja, kao što je rečeno, omogućava praćenje vizuelnih stimulusa (npr. reči, simbola ili objekata) i tešnju saradnju oka i šake (Chau et al., 2021).

Ograničenja

Imajući u vidu da su uzorkom obuhvaćeni samo ispitanici iz dve beogradske škole iz šireg centra grada, rezultati ovog istraživanja ne mogu se generalizovati na populaciju dece III i IV razreda osnovne škole.

Istraživanjem je obuhvaćen relativno uzak uzrasni raspon ispitanika. Iako rezultati prethodnih istraživanja ukazuju na to da je fina motorika značajan prediktor veštine čitanja i na predškolskom i početnom osnovnoškolskom uzrastu, interesantno bi bilo proveriti da li se prediktivna vrednost fine motorike menja u zavisnosti od uzrasta, odnosno edukativnog iskustva deteta. U tom smislu narednim istraživanjem bilo bi dobro obuhvatiti decu od predškolskog doba do kraja osnovnoškolskog uzrasta.

U nekom budućem istraživanju bilo bi poželjno analizirati i komponente socioekonomskog statusa (pojedinačno ili u vidu kompozitnog skora), te proveriti njihov potencijalni uticaj na odnos između veštine čitanja i kvaliteta fine motorike.

Iako je utvrđeno da nastavnička procena teškoća u učenju visoko korelira sa ocenama učenika dobijenim na kontrolnim zadacima iz srpskog jezika (Gligorović i Buha, 2016), naredne studije mogle bi da provere rezultate ovog istraživanja primenom direktne procene veštine čitanja. U tom smislu bilo bi poželjno primeniti različite tipove zadataka (čitanje izolovanih reči različite složenosti i frekventnosti, pseudoreči i kraćeg teksta). Neki autori su utvrdili da je fina motorika značajno povezana i sa razumevanjem pročitanog (npr. Suggate et al., 2019), što bi moglo biti posredovano nivoom ovladanosti tehnikom čitanja. Iako su različiti aspekti čitanja (tačnost, brzina i razumevanje) međusobno značajno povezani, treba imati u vidu da se na osnovu procene pojedinačnog aspekta čitanja ne može sasvim pouzdano zaključivati i o drugim domenima (Banković i sar., 2021). Stoga bi budućim istraživanjima trebalo, osim tehnike čitanja, obuhvatiti i ispitivanje odnosa razumevanja pročitanog i različitih komponenata fine motorike.

Zaključak

Rezultati ovog istraživanja ukazuju na to da su vizuomotorička koordinacija i tehnika čitanja međusobno značajno povezane. Kada se razmatra značaj fine motorike, potrebno je analizirati pojedinačne komponente, jer rezultati ovog, kao i prethodnih istraživanja, ukazuju na to da nisu svi aspekti fine motorike podjednako značajni činioci razvoja određenih sposobnosti i veština (u ovom slučaju čitanja). Za razliku od rezultata većine drugih istraživanja koji ukazuju na važnost vizuomotoričke integracije, ovom studijom izdvojena je vizuomotorička koordinacija kao značajan korelat i prediktor veštine čitanja, nezavisan od intelektualnih sposobnosti i egzekutivnih funkcija. Radna memorija takođe se izdvojila kao značajan nezavisan prediktor veštine čitanja.

Nalazi eksperimentalnih studija ukazuju na to da, primenom određenih vidova tretmana, radna memorija i fina motorika mogu biti unapređene (npr. Akin, 2019; Rojas-Barahona et al., 2015), te bi, u kontekstu prevencije teškoća u usvajanju čitanja, bilo poželjno primenjivati aktivnosti kojima bi se stimulisao razvoj ovih oblasti već od predškolskog uzrasta.

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The relationship between reading skills and fine motor abilities in younger school-age children

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Introduction. The role of motor skills in reading seems counter-intuitive, and thus it has played a minor role in studies on predictors of reading skills. The results of some studies indicate that the connection between motor skills and reading is present and that it depends on the examined motor component. *Objective.* The aim of this research was to determine the relation between visuomotor coordination and visuomotor integration with reading skills in younger school-age students. *Methods.* The sample included 103 participants aged 9 to 11 years. A Likert-type scale with four descriptors covering the most common types of problems during reading was used to evaluate reading skills. Fine motor skills were assessed with the subtests of the Acadia Test of Developmental Abilities – *Visuomotor Coordination and Sequencing* and *Figure Copying.* Intelligence, working memory, and inhibitory control were selected as covariates. Intelligence was assessed by Raven's Progressive Matrices, working memory by the Digit Span Backward task, and inhibitory control by the Go/NoGo task. *Results.* Hierarchical regression analysis showed that visuomotor coordination and working memory are independent predictors of reading skills. Visuomotor coordination explains 5.2% of the variance

after removing the influence of intelligence and basic executive functions. A *statistically significant relationship between* visuomotor integration and reading skills was not found, so visuomotor integration was not considered a predictor in further analysis. *Conclusion*. When considering the importance of fine motor skills, it is necessary to analyze its individual components, because the results of this, as well as previous studies, indicate that not all aspects of fine motor skills are equally important factors in the development of reading skills. In the context of preventing difficulties in learning to read, it would be desirable to apply activities that would stimulate the development of fine motor skills and working memory from preschool age.

Keywords: reading skills, visuomotor coordination, visuomotor integration, executive functions, intelligence

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Značaj sporta za pripadnike zajednice gluvih

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Uvod: Karakteristika sporta da, pored unapređenja fizičkih sposobnosti, pomaže i socijalizaciju osoba koje ga upražnjavaju, čini ga veoma značajnim sistemom aktivnosti u životu gluvih i nagluvih. S obzirom na to da su gluvi i nagluvi često marginalizovani od tipične populacije, učešće u sportskim aktivnostima može u velikoj meri doprineti njihovoj vidljivosti, a time i inkluziji u većinsku društvenu zajednicu. Važno je naglasiti da gluvoća ili nagluvost pojedinca ne predstavljaju ograničavajući faktor za njegovo bavljenje sportom ukoliko je očuvana funkcija centra za ravnotežu. *Cilj:* Cilj ovog rada je da putem analize dostupne literature pruži sistematski uvid u mogućnosti gluvih da participiraju u sportskim aktivnostima, kao i da ukaže na značaj koji sport može da ima u njihovim životima. *Metode:* Deskriptivna, analiza, sinteza, evaluacija sadržaja. *Rezultati: S*port predstavlja značajnu komponentu u životu mnogih gluvih i nagluvih osoba. Gluve i nagluve osobe mogu se baviti sportom u okviru organizovanih aktivnosti, samostalno, rekreativno, ali i profesionalno. Profesionalni gluvi i nagluvi sportisti imaju mogućnost da se takmiče na specijalizovanim takmičenjima, koja su namenjena osobama sa ometenošću ili samo gluvima i nagluvima, kao i na takmičenjima na kojima nastupaju prevalentno tipični sportisti. *Zaključak:* U cilju postizanja inkluzije gluvih važno je koristiti potencijal koji imaju sportske aktivnosti kao podjednako dostupne i gluvim osobama, i pripadnicima tipične populacije.

Ključne reči: sport, gluvi i nagluvi, takmičenja, socijalizacija, inkluzija

Uvod

Sport zauzima značajno mesto u životu savremenog čoveka. Bavljenje sportom predstavlja masovnu pojavu koja može u velikoj meri uticati na kvalitet života ljudi. Veliki broj pripadnika različitih društvenih zajednica upražnjava neki vid sportskih aktivnosti u određenim periodima života ili tokom čitavog njegovog trajanja. Rodić (2021) ističe da je socijalna univerzalnost jedna od karakteristika sporta i generalno fizičke kulture. Ona se ogleda u tome što

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u sportskim aktivnostima mogu ravnopravno učestvovati pripadnici svih slojeva društva.

Anastasovski (2014) smatra da su fizička aktivnost, fizička kondicija i kontinuitet u aktivnostima veoma značajni za održavanje zdravlja ljudi svih uzrasta te da je to jedan od razloga zbog kojih sport predstavlja globalni fenomen, koji je bio i jeste zastupljen u svim istorijskim periodima i na svim kontinentima. Najčešće se razlikuje pet pojavnih oblika (područja) sporta, koji zbog svojih razlika zahtevaju posebna sredstva i metode izvođenja. To su: 1. edukativni sport (sport u školi / školski sport), 2. selektivni sport (takmičarski sport), 3. rekreativni sport (sportska rekreacija), 4. terapijski i rehabilitacijski sport i 5. invalidski sport (Rodić, 2021). Pored samog sporta, i navijanje predstavlja neodvojivi deo sportskih manifestacija budući da je zastupljeno kod pripadnika svih nacija, kultura i religija (Anastasovski, 2014).

Sport se, dakle, smatra globalnim kulturnim, medicinskim i medijskim fenomenom koji ima moć da spaja sve ljude sveta, a samim tim i ljude koji imaju neku ometenost. On može da ima značajnu ulogu u životima i zajednicama osoba sa ometenošću, baš kao što je značajan i u životima pripadnika tipične populacije (Stanković, 2001). Sport obuhvata sve oblike fizičke aktivnosti i uključuje igru, vežbanje, rekreaciju, organizovani, povremeni ili takmičarski sport, autohtoni sport ili igre koje doprinose fizičkoj kondiciji, mentalnom blagostanju i društvenoj interakciji (Atherton et al., 2001). Sportske aktivnosti su značajne jer utiču na kognitivne sposobnosti, povećanu pažnju, samopouzdanje, koncentraciju, usvajanje vrednosti, stavova i navika, samostalnost i socijalizaciju (Foster et al., 2019) i mogu doprineti osnaživanju ljudi sa ometenošću na svim poljima.

Istorija pamti mnogobrojne primere osoba sa ometenošću koje su se uspešno bavile sportom, a sportske aktivnosti često su se koristile i u njihovoj rehabilitaciji. Uspesi u sportu osobama sa ometenošću daju podsticaj i veru u vlastite sposobnosti, a time i osećaj potpunijeg i kvalitetnijeg života. Kamelska i Mazurek (Kamelska & Mazurek, 2015) smatraju da pozitivni efekti sporta poboljšavaju kvalitet života i tipičnih i osoba sa različitim ometenostima. Međutim, samo prisustvo ometenosti, pogotovo ukoliko je reč o telesnim ometenostima, može uticati na neaktivnost ili na smanjenu želju za bavljenjem sportskim aktivnostima (Frey & Chow, 2006; Wrotniak et al., 2006).

Status sporta u zajednici gluvih

Sport predstavlja jedno od moćnijih sredstava kohezije u zajednici gluvih. Stjuart (Stewart, 1991) smatra da je sport gluvih društvena institucija koja okuplja gluve osobe na način koji deluje kao sistem podrške – to je društvena mreža i vaspitni sistem koji promoviše vrednosti zajednice gluvih. Gluvi i nagluvi imaju očuvan potencijal za učestvovanje u sportu i fizičkim aktivnostima. Njima sport predstavlja sredstvo za međusobno razumevanje

i interakciju, ali i za rehabilitaciju, socijalizaciju i socijalnu identifikaciju sa tipičnom populacijom (Arsić i Stanković, 2014). Za mnoge gluve osobe participacija u određenom sportu ili pridruživanje sportskom klubu može biti primarno sredstvo socijalizacije (Stewart & Ellis, 2005; Johnson, 2014, prema Povlakić Hadžiefendić & Mahmutović, 2019). Sport je pogodan kanal za socijalizaciju gluvih osoba zbog jednakih uslova u kojima i osobe koje čuju i gluve osobe mogu međusobno da sarađuju. Gluvima sport ne pruža samo uživanje, već i društvenu povezanost i uključenost u društvena zbivanja, što je ključno za opstanak, razvoj i napredak zajednica gluvih (Ammons, 2008). U pogledu ljubavi prema sportu gluvi se ne razlikuju od tipične populacije. Iako istraživanja o društvenom i kulturnom aspektu sporta kod gluvih nisu frekventna, izveštavanja o sportskim aktivnostima gluvih redovno su zastupljena u medijima, kao i u časopisima za gluve. Dorovolomo (Dorovolomo, 2015) navodi tri glavne motivacije gluvih za učestvovanje u sportskim aktivnostima: želja da budu igrači (društveni poriv), želja da budu navijači (emocionalni poriv), ili želja da budu osobe koje organizuju takmičenja (samopotvrđivanje, lični i grupni identitet).

Postoji niz unutrašnjih i spoljnih faktora koji mogu uticati na postignuća gluvih sportista. Faktori koji se smatraju veoma značajnim odnose se na komunikaciju, konkurentske vrednosti i intrapersonalni pritisak da se osoba takmiči i da pobedi. Putem sporta, kao elementa društvenog funkcionisanja, gluve osobe uspostavljaju i održavaju međusobne kontakte i oslobađaju se pritisaka koji nosi savremeni način života. Značaj bavljenja gluvih sportom ogleda se i u tome što u tim trenucima svakodnevne prepreke sa kojima moraju da se nose padaju u drugi plan (Stewart, 1991). Učestali problemi gluvih, kao što su nizak nivo samopoštovanja, neadekvatno obrazovanje, teškoće pri zapošljavanju, diskriminacija i negativna percepcija okruženja zbog nemogućnosti uspostavljanja kvalitetne komunikacije, često ostaju po strani dok uživaju u sportskim aktivnostima (Dorovolomo, 2015). Stjuart i Elis (Stewart & Ellis, 2005) navode da sportske aktivnosti gluvih služe različitim ličnim interesima i potrebama ove populacije, kao što su, na primer, njihovo psihološko i fizičko jačanje. Psihološki im je značajna mogućnost preuzimanja uloga, ne samo takmičara već i organizatora, rukovodilaca, različitog pomoćnog osoblja, ali i gledalaca. Tako se, kao i zahvaljujući fizičkom jačanju, osnažuju njihov identitet i samopoštovanje, a povećava im se i samopouzdanje i osećanje doprinošenja napretku zajednice u kojoj žive. Gluvi su ponosni na to što mogu da upražnjavaju sport i sportske aktivnosti kao i svako drugi. Uostalom, i istorijski razvoj sporta kod gluvih pokazao je da su oni sposobni ne samo da uživaju u sportskim aktivnostima već i da ih organizuju i da u njima imaju vodeću ulogu (Arsić i Stanković, 2014).

Odsustvo čula sluha ne sprečava gluve sportiste da budu konkurentni i da se bave sportovima kojima su posvećeni i koji ih ispunjavaju. Ipak, iako im gluvoća ne ograničava bavljenje sportskim aktivnostima, gluvi se često mogu

suočiti sa problemima u komunikaciji. Najčešće je u pitanju komunikacija sa saigračima, trenerima, ili sa sudijama (Houinato, 2017). Isaković i Kovačević (2015) navode da se, budući da je verbalno izražavanje i razumevanje verbalne poruke gluvima otežano, oni radije izražavaju putem znakovnog jezika, čime se nenamerno još više izdvajaju iz društvenog života zajednice. Činjenica da sportisti koji su gluvi i nagluvi imaju određenih poteškoća u razvoju konkretnih socijalnih veština može da utiče na njihov odnos sa drugim članovima tima, kao i na međusobnu interakciju u toku sportskih aktivnosti. Najčešće se javljaju teškoće na planu usmeravanja i održavanja pažnje, zatim uspostavljanja kontakta pogledom, kao i nesporazumi usled nejasnih objašnjenja i nerealnih očekivanja (Arsić, 2020). Vuljanić i saradnici (2017) smatraju da proces socijalizacije u sportu predstavlja veliki izazov za gluve sportiste, iako oni vole da se takmiče i sa gluvima, i sa sportistima koji čuju. Stjuart (Stewart, 1991) smatra da gluvi sportisti ipak više vole da treniraju i takmiče se sa drugim gluvim sportistima zbog mogućnosti da neometano komuniciraju pre, tokom i nakon treninga/utakmice. Tu se naročito uočava značaj njihovog, znakovnog jezika, jer je to „maternji jezik" gluvih, koji osobe koje mogu da čuju uglavnom ne poznaju. Ovaj jezik povezuje gluve i doprinosi očuvanju njihog ličnog identiteta i osećaja pripadnosti, jer kada gluvi sportisti međusobno komuniciraju, svi oni imaju potpuni pristup komunikaciji (Stewart, 1991). Prema Radić Šestić i saradnicima (2020), vizuelno iskustvo i jezička komunikacija koja se na njemu zasniva predstavljaju dva ključna aspekta kulture gluvih.

Veliki uticaj na gluve sportiste ima društvena klima, kao i organizacija takmičenja koja pred njih postavlja različite zahteve. Bitni faktori su i podrška porodice i okruženja, zatim stepen socijalizacije, ali i pritisak da se asimiluju, čemu se gluvi uglavnom opiru. Kao što je već istaknuto, sport se smatra moćnim sredstvom inkluzije gluvih u širu društvenu zajednicu (Bailey, 2005; Stewart, 1991; Stewart & Ellis, 1999). Iako inkluzija gluvih i nagluvih sportista u sportske organizacije jeste od velikog značaja (Karademir, 2015), njihov pristup sportskim aktivnostima se još uvek najčešće ostvaruje putem škola i klubova za gluve, kao i zahvaljući kontaktima sa gluvim prijateljima. Rankin (Rankin, 2012) ističe da mnogi autori navode da gluve i nagluve osobe manje učestvuju u sportskim aktivnostima nego ljudi koji čuju.

Takmičenja u kojima se gluvi sportisti nadmeću sa onima koji čuju predstavljaju veliki doživljaj za gluve. U tim trenucima zbog korišćenja znakovnog jezika gluvi osećaju ponos i pripadnost svojoj kulturi, ali im taj jezik obezbeđuje i korisnu prednost budući da predstavlja interni način komunikacije koju pripadnici konkurentskih timova ne razumeju (Dorovolomo, 2015). Ipak, gluvi i nagluvi se najčešće takmiče u okviru sopstvene zajednice gluvih, jer im se retko ukazuje prilika da se takmiče sa onima koji čuju. Kada se to dogodi, međusobno razumevanje gluvih i čujućih uglavnom bude otežano, mada gotovo nikada ne predstavlja nepremostivu prepreku (Stewart & Ellis, 2005).

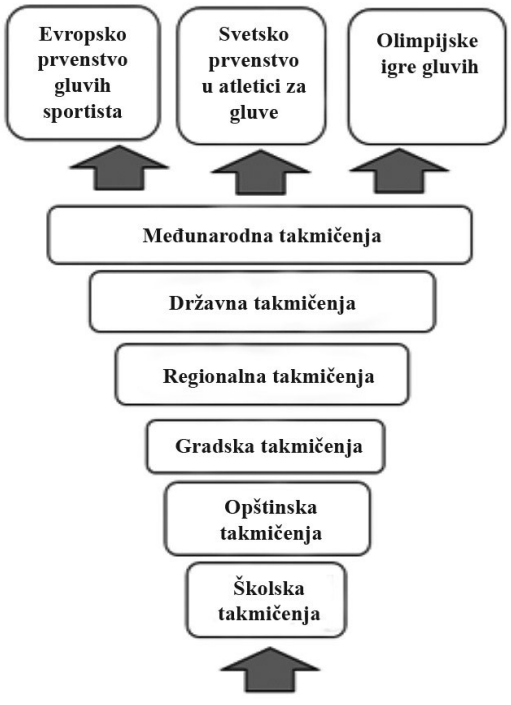
Organizacije i takmičenja gluvih i nagluvih sportista

U kalendaru sportskih takmičenja posebno mesto zauzimaju takmičenja za osobe sa ometenošću. *Paraolimpijske igre* (*Paralympic Games*), koje su nesumnjivo najpoznatije takmičenje ovog tipa, predstavljaju *Olimpijske igre* za sportiste sa oštećenjem vida ili sa fizičkim oštećenjima. Gluvi sportisti se mogu takmičiti na *Paraolimpijskim igrama* samo ukoliko imaju neku pridruženu ometenost (Clark & Mesch, 2018), ali oni zato imaju svoje posebne igre, koje se nazivaju *Olimpijske igre gluvih* (*Deaflympic*).

Mogućnosti participacije gluvih u sportskim takmičenjima donekle se različito opisuju u Srbiji i inostranstvu. Tako Džons (Jones, 2022) predviđa da se gluvi takmiče isključivo sa pripadnicima opšte populacije sve do međunarodnih takmičenja. Na tom, najvišem nivou gluvi sportisti se mogu takmičiti ili u okviru specijalizovanih takmičenja za gluve (*Evropsko prvenstvo gluvih sportista*, *Svetsko prvenstvo u atletici za gluve* i *Olimpijske igre gluvih*), ili na takmičenjima namenjenim opštoj populaciji. U Srbiji se gluvi, prema Arsiću (Arsić, 2020), uglavnom takmiče na specijalizovanim takmičenjima za gluve, koja se mogu organizovati na nivou škole, opštine, grada, regiona ili države, iako mogu da učestvuju i na takmičenjima namenjenim opštoj populaciji.

Slika 1

Dijagram toka takmičenja za gluve



Na slici 1 prikazan je dijagram toka koji se odnosi na specijalizovana takmičenja za gluve osobe dostupna takmičarima iz Srbije, a koji je generisan na osnovu podataka koje su u svojim radovima predstavili Arsić (2020) i Džones (Jones, 2022). Pored prikazanih međunarodnih takmičenja, važno je napomenuti da postoje i takmičenja šireg regionalnog značaja koja nisu namenjena evropskim takmičarima, kao što su Azijsko-pacifičke igre gluvih, Afričko prvenstvo gluvih u atletici, Južnoamerički šampionat za gluve, Australijske igre gluvih itd.

Sportski klubovi gluvih su se, istorijski gledano, pojavljivali i razvijali sličnom dinamikom kao i druge organizacije gluvih (društva, klubovi, crkvene organizacije). Gluvi su prvo počeli da organizuju takmičenja lokalnog karaktera, a kasnije i nacionalna, kao i takmičenja protiv timova iz drugih zemalja, što je bila učestala praksa, naročito u Evropi. Prvo veliko takmičenje gluvih sportista, *Međunarodne tihe igre* (*International Silent Games)*, održano je u Parizu 1924. godine (Rankin, 2012). To takmičenje ujedno je predstavljalo i prvu veliku sportsku manifestacija osoba sa ometenošću, u kojoj je učestvovalo 124 sportista iz devet zemalja. Zatim su se letnje *Igre* održavale na svake četiri godine (sa prekidom tokom Drugog svetskog rata). Zimske *Igre* prvi put su održane u Austriji 1949. godine, kada je učestvovalo 33 sportista iz pet država (Amons, 2008). Sjedinjene Američke Države postale su prva neevropska zemlja koja se pridružila Međunarodnom komitetu za sport gluvih (*International Committee of Sports for the Deaf* – ICSD), 1935. godine. Značajna je činjenica da ova organizacija ima najdužu istoriju među sportskim organizacijama osoba sa ometenošću, kao i da su igre koje se danas nazivaju *Olimpijske igre gluvih* nastale mnogo pre *Paraolimpijskih igara* (osnovanih 1948. godine). Međunarodni olimpijski komitet (MOK), osnovan 1894, priznao je 1955. godine ICSD kao međunarodnu federaciju sa olimpijskim statusom. Sedamdeset peta godišnjica organizacije proslavljena je 1999. i ubrzo nakon toga, 2001. godine, MOK je zvanično priznao novo ime *Igara – Olimpijske igre gluvih* (*Deaflimpics*). Za razliku od drugih igara za sportiste sa ometenošću, kojima upravljaju i koje organizuju osobe bez ometenosti, ove igre gluve osobe same osmišljavaju i realizuju (Ammons, 2008). Samo gluvi imaju pravo da budu članovi odbora i izvršnih organa ICSD (koji je upravno telo za letnje i zimske *Olimpijske igre gluvih*). Organizacija *Olimpijskih igara gluvih* imala je 2021. godine rekordan broj zemalja članica – 119 (www.deaflympic.com), ali je taj broj smanjen na 118 nakon što je 2022. godine Ruskoj Federaciji zabranjeno učešće iz političkih razloga. Prema podacima Sportskog saveza Srbije na 24. *Letnjim Olimpijskim igrama gluvih*, koje su održane od 1. do 15. maja 2022. godine u Brazilu, Srbija je učestvovala sa 23 takmičara i trenera u rukometu, streljaštvu i tenisu, koji su ostvarili zapažene rezultate (https://sportskisavezsrbije.rs/veliki-uspeh-srbije-na-oi-gluvih). Kada se ovi podaci uporede sa podacima Olimpijskog komiteta Srbije, prema kojima se

na *Letnjim olimpijskim igrama* u Tokiju (održanim od 23. jula do 8. avgusta 2021) takmičilo 87 sportista iz Srbije iz 15 grana sportova (https://oks.org.rs/takmicenja/tokio-2020/), nameće se zaključak da je udeo sportskih disciplina u kojima se gluvi sportisti mogu takmičiti značajno manji. Ipak, ukoliko se podaci posmatraju u odnosu na brojnost populacije gluvih i čujućih, ne bi se moglo zaključiti da se profesionalnim sportom bavi značajno manje gluvih osoba u odnosu na čujuće osobe. Zanimljivi su podaci da su gluve takmičarke tradicionalno manje zastupljene na *Olimpijskim igrama gluvih* u odnosu na gluve takmičare (Clark & Mesch, 2018), kao i da su *Letnje olimpijske igre* u Tokiju u pogledu takmičara iz Srbije bile najizbalansiranije po zastupljenosti polova.

Olimpijske igre gluvih održavaju se odvojeno od *Olimpijskih igara*, u različitim godinama, što se odnosi i na zimske i na letnje igre. Iako je u prvim *Igrama* učestvovalo samo devet zemalja, tokom proteklih decenija sportska zajednica gluvih značajno je porasla, što je uticalo i na porast broja učesnika takmičenja, kao i država iz kojih dolaze. *Olimpijske igre gluvih* konstantno su rasle i po broju sportova u kojima se takmičilo (Rankin, 2012). Danas one uključuju dvadeset dva letnja sporta i šest zimskih sportova. Za razliku od ranijih vremena takmičenja se više ne održavaju u tri sportske discipline: vaterpolu, ronjenju i umetničkoj gimnastici (www.deaflympic.com). Ova manifestacija omogućava gluvim sportistima međunarodnu sportsku saradnju, posebno prilagođenu njihovim kulturnim, socijalnim i komunikacijskim potrebama. Na poslednjim letnjim *Igrama*, koje su održane 1–15. maja 2022. u Brazilu, bilo je ukupno 2401 gluvih učesnika iz 73 države (www.deaflympic.com). Neka od značajnih takmičenja gluvih bila su upriličena i u Srbiji. *XI svetske igre gluvih* **(***XI World Games of the Deaf***)** održane su u Beogradu od 9. do 16. avgusta 1969. godine. Tada su učestvovale 33 nacionalne selekcije sa 1189 sportista koji su se takmičili u 14 sportskih disciplina. Na fudbalskim takmičenjima gluvih reprezentacija gluvih Srbije osvojila je prvo mesto 1961. u Helsinkiju, zatim 1965. u Vašingtonu i 1969. godine u Beogradu (Arsić, 2020).

Prema podacima Ipsosa iz 2021. godine, na osnovu istraživanja sprovedenog u 29 svetskih država najpopularnije sportske aktivnosti u svetu su: fitnes, trčanje, biciklizam, fudbal i plivanje (https://www.ipsos.com/en/global-views-to-sports-2021). Podaci o najpopularnijim sportovima u populaciji gluvih nisu transparentni, iako se na osnovu disciplina koje obuhvataju *Olimpijske igre gluvih* može zaključiti da se afiniteti gluvih ne razlikuju od afiniteta osoba tipičnog razvoja. Na primer, u SAD se kao popularni sportovi kod gluvih izdvajaju: bejzbol, softbol, košarka, fudbal, odbojka, plivanje i hokej na ledu, što su sportovi koji su srazmerno popularni i u opštoj populaciji (Turkington & Sussman, 2004). Takođe, kriket je izuzetno popularna igra i kod gluvih i kod Indijaca tipičnog razvoja, dok, na primer, kod stanovnika Balkana za njega ne vlada nikakvo interesovanje, bez obzira na slušni status.

Interesantno je da je rvanje, koje se smatralo tradicionalnim sportom gluvih još od antičkog perioda (Savić, 2007), u savremenom svetu često potiskivana sportska disciplina gluvih zbog neulaganja finansijskih sredstava u ovaj sport.

Pregledom internet stranica brojnih sportskih udruženja gluvih u Srbiji može se zaključiti da se gluvi danas takmiče u mnogim sportskim disciplinama, kao što su: fudbal, pikado, stoni tenis, sportski ribolov, rukomet, streljaštvo, tenis, šah, kuglanje… Arsić (2014) navodi da su u Srbiji na nivou školskog sporta popularne discipline: trčanje, skok u vis, skok u dalj, bacanje kugle, mali fudbal, košarka i odbojka, što odgovara zaključcima Hartmana i saradnika (Hartman et al., 2011) koji ističu da su gluva deca uspešnija u igrama sa loptom, u poređenju sa drugim vrstama sportskih aktivnosti.

Karakteristike gluvih sportista

Prema shvatanju Grindstafa (Grindstaff, 2007), gluvi sportisti čine jedinstvenu i karakterističnu kulturnu grupu. Međutim, dosadašnji pokušaji da se prepoznaju i razumeju njihove specifičnosti bili su sporadični i nedovoljno učestali, što predstavlja značajan propust, budući su se mnogi gluvi takmičili na različitim, pa i najvišim nivoima sportskih takmičenja. Pod pojmom *gluvi sportista* podrazumeva se sportista sa oštećenjem sluha, odnosno gluva, nagluva ili osoba sa kohlearnim implantom koja se bavi sportom. Jedino ograničenje odnosi se na to da oštećenje ne sme biti manje od 55 dB na boljem uhu, u okviru prosečne frekvencije govora na 500, 1000 i 2000 Hz. Ukoliko su ovi uslovi zadovoljeni, gluvi sportista može učestvovati na međunarodnim sportskim takmičenjima gluvih, na kojim je tokom takmičenja zabranjeno korišćenje slušnog aparata ili spoljnjeg dela kohlearnog implanta (ICSD, 2016) s obzirom na to da i upotreba amplifikatora i kohlearna implantacija predstavljaju efikasne načine prevazilaženja oštećenja sluha (Radić-Šestić i sar., 2018).

Stjuart (Stewart, 1991) smatra da ovakvi uslovi mogu uticati na postignuća gluvih sportista, kao i na ograničavanje njihovih mogućnosti učešća na takmičenjima gluvih. Naime, zajednice gluvih se često suočavaju sa logističkim problemima prilikom organizovanja takmičenja upravo zbog ograničenog broja učesnika. Često se događa da se shvatanja i klasifikacije oštećenja sluha razlikuju na međunarodnom, nacionalnom, regionalnom, pa čak i na lokalnom nivou. Na primer, sportista sa lakim oštećenjem sluha može se kvalifikovati za takmičenje na lokalnim ili regionalnim sportskim događajima za gluve, ali mu možda neće biti dozvoljeno da učestvuje na nacionalnim i međunarodnim takmičenjima jer ne ispunjava minimalne uslove oštećenja sluha potrebne za viši nivo takmičenja. Džons (Jones, 2020) smatra da je potrebno obezbediti ravnopravnost učešća gluvim sportistima na takmičenjima za gluve i da je važno isključiti mogućnost korišćenja aparata i implanata.

Ipak, on insistira da gluvi nisu i da ne bi trebalo da budu ograničeni da koriste svoja pomagala na takmičenjima u kojima učestvuju zajedno sa osobama koje čuju, jer bi to trebalo da predstavlja njihov lični izbor. On ističe da se u oblasti sporta gluvim osobama pruža čitav niz različitih mogućnosti, budući da mogu da se takmiče na redovnim sportskim aktivnostima i takmičenjima, kao i na posebnim takmičenjima za gluve.

Vuljanić i saradnici (2017) navode da gluvi smatraju da su, prvenstveno zbog specifičnog načina komunikacije, za njih bolji i pravedniji uslovi učestvovanja na takmičenjima koja su namenjena samo gluvima. Navode da gluvi ipak insistiraju na tome da moraju imati mogućnost izbora vrste takmičenja u kojima žele da učestvuju (izuzetak predstavlja situacija kada su ograničeni nekom fizičkom ometenošću, ili kada im je oštećen vestibularni sistem) i da učestvovanje na takmičenjima tipične populacije gluvima omogućava procenu svojih sportskih performansi, promociju i šire prepoznavanje gluvih u svetu sporta. Mnogi gluvi sportisti treniraju i takmiče se sa sportistima koji čuju jer im je teško da pronađu druge gluve sportiste sa kojima bi trenirali ili se takmičili. Pored toga, motiv za uključivanje gluvih u sportske aktivnosti tipičnih sportista može biti i uživanje u izazovu takmičenja sa njima (Stewart et al., 1991). Nadmetati se kao pojedinac ili kao deo ekipe gluvih protiv sportista koji čuju predstavlja veliki doživljaj za gluve sportiste. Ipak, u takvim situacijama moguće je da dođe do komunikacijskog jaza, što može rezultirati pojavom frustracije i anksioznosti gluvih. Gluvi sportisti se mogu osećati nesigurno jer nemaju potpuni pristup uputstvima i povratnim informacijama kao što imaju sportisti koji čuju (Dorovolomo, 2015).

Kurkova i saradnici (Kurkova et al., 2010) navode da se gluvi i nagluvi sportisti najradije takmiče sa drugim gluvim osobama i da takmičenja sa pripadnicima tipične populacije često izbegavaju. Jedan od razloga može biti i to što jedinstveni kulturni identitet gluvog sportiste podrazumeva mnogo više od želje za konkurencijom – to je proslava zajednice gluvih (DePauw & Gavron, 2005). Takođe, gluvi sportisti koji su uključeni u sportske klubove zajedno sa osobama koje čuju često navode da se osećaju zapostavljenim od trenera, da ih oni izbegavaju ili nemaju strpljenja da ih saslušaju. Zbog toga nije iznenađujuće što se gluvi radije opredeljuju za odvojeno treniranje, sa sebi sličnima, gde se osećaju uključeno i gde su prihvaćeni (Ellis, 2001; Stewart, 1991). S druge strane, s obzirom na to da učešće u sportu zajedno sa pripadnicima tipične populacije ima važnu ulogu u inkluziji gluvih sportista u većinsku zajednicu, upražnjavanje sportskih aktivnosti u segregacionim uslovima može negativno uticati na njihovu socijalizaciju. Ipak, činjenica je da ne postoji jedinstven pristup pitanju učestvovanja gluvih u raznim vrstama takmičenja. Gluvi ljudi su međusobno različiti, kao što su različiti i njihovi načini komunikacije, pa se neki sportisti odlučuju za takmičenja gluvih jer to omogućava priliku za druženje i upoznavanje drugih gluvih osoba, a drugi

biraju da se takmiče sa osobama koje čuju jer smatraju da to predstavlja veći izazov, omogućava im viši prestiž i obezbeđuje širi spektar protivnika (Jones, 2020).

Sport u zajednici gluvih ima dvostruku ulogu: ulogu takmičarske aktivnosti i ulogu promocije društvene interakcije. U današnjem društvu, u kojem je sport visoko cenjena aktivnost, mnogi ljudi i ne znaju da postoje klubovi i takmičenja za gluve i nagluve osobe (Houinato, 2017). Ipak, kao što je već naznačeno, gotovo sve sportske aktivnosti i organizacione forme koje postoje za osobe koje čuju, paralelno postoje i za gluve i nagluve sportiste. U Srbiji postoje mnogi sportski savezi osoba sa ometenošću, npr: Paraolimpijski komitet Srbije, Sportski savez invalida Srbije, Sportski savez invalida Vojvodine, opštinske organizacije registrovane za sport i rekreaciju osoba sa ometenošću, sportski savezi i društva gluvih, klubovi, družine, sekcije itd., a nije zanemarljiv ni broj osoba sa ometenošću koje se samostalno bave sportsko-rekreativnim aktivnostima (Program razvoja sporta za sve u AP Vojvodini za period 2017–2020. godine, 2016).

Nažalost, pouzdani podaci o broju gluvih i nagluvih osoba koje se bave sportskim aktivnostima nisu dostupni ni kada je u pitanju rekreativni, ni profesionalni sport. Lauf (Lauff, 2011, prema Karić i Kordić, 2022) navodi da brojni nalazi istraživanja ukazuju da je, načelno gledano, procenat osoba sa ometenošću koje upražnjavaju sportske aktivnosti mali. Elis i saradnici (Ellis et al., 2014) na osnovu rezultata svog istraživanja zaključuju da su gluva deca manje uključena u fitnes aktivnosti nego deca tipičnog razvoja, što se odražava i na njihov telesni status. Rezultati novijih istraživanja iz Bosne i Hrvatske (Povlakić Hadžiefendić & Mahmutović, 2019; Vuljanić, 2015) ukazuju da su gluvi i nagluvi mladi značajno manje uključeni u sportske aktivnosti od njihovih vršnjaka tipičnog razvoja. Aterton (Atherton, 2007) konstatuje da su gluvi koji se aktivno bave sportom malobrojni, što se odražava i na njihovu zastupljenost u profesionalnom sportu. Ajriš i saradnici (Irish et al., 2018) ističu da rezultati studije sprovedene u Engleskoj otkrivaju da samo 9.7% gluvih Engleza upražnjava neku vrstu sportske aktivnosti na nedeljnom nivou u trajanju od 30 minuta, što je najmanji procenat u odnosu na sve druge osobe sa ometenošću. Kada se ovi podaci uporede sa podacima Eurostata iz 2019. godine, koji kažu da približno 44% stanovnika Evropske unije bar jednom nedeljno upražnjava neku vrstu sportskih aktivnosti, dok jedna trećina stanovnika ovim aktivnostima na nedeljnom nivou posvećuje bar 150 minuta (https://ec.europa.eu/eurostat-explained/index.php?title=Statistics_on_sport_participation), može se zaključiti da su gluvi u značajno manjoj meri uključeni u sportske aktivnosti nego osobe tipičnog razvoja.

Prepreke za bavljenje gluvih sportom i mogućnosti za njihovo prevazilaženje

Iako gluve osobe vole sport, one se, nažalost, suočavaju sa mnogim preprekama koje ih ograničavaju u postizanju željenih rezultata. Uklanjanje nekih od prepreka sportski klubovi, treneri ili kapiteni timova verovatno nikada ozbiljnije nisu ni razmatrali, a moguće je da bi, uz malo podrške, određene teškoće mogle da se sasvim ukinu ili bar umanje, što bi omogućilo gluvima da budu uspešniji u sportu. Džons (Jones, 2020) ističe postojanje fizičkih, psiholoških, tehničkih i socijalnih prepreka koje otežavaju učešće gluvih u sportskim aktivnostima. Kao fizičku prepreku navodi, na primer, poremećaj ravnoteže (što pogađa veoma mali broj gluvih); u psihološke prepreke nisko samopouzdanje (koje često karakteriše gluve), introvertnost i povišenu anksioznost; tehničkim preprekama smatra nerazumevanje pravila sporta i instrukcija trenera, neopažanje auditivnih signala važnih za aktivnosti i nemogućnost komunikacije sa saigračima; socijalne prepreke odnose se na nemogućnost učestvovanja u diskusiji, odbacivanje ili čak i maltretiranje od saigrača, nerazumevanje konverzacije itd. Amons (Ammons, 2009) ističe da u literaturi nema mnogo podataka o medicinskom aspektu uticaja gubitka sluha na bavljenje sportom. Poznato je, na primer, da oštećenje nekih delova vestibulokohlearnog nerva vodi ne samo do senzorineuralnog gubitka sluha, već može biti povezano i sa problemima ravnoteže, što može ograničiti ili potpuno onemogućiti bavljenje sportom gluvih i nagluvih (Soori et al., 2019). Srećom, kao što je već navedeno, ovakve tegobe ne pogađaju veliki broj gluvih osoba.

Sport gluvih razlikuje se od sportova drugih osoba sa ometenošću. Gluvi, pogotovo na Zapadu, sebe ni ne smatraju osobama sa ometenošću, već pripadnicima lingvističke manjine. Oni ističu da se od tipične populacije razlikuju samo u odnosu na stanje sluha, što je različitost koju smatraju nadoknadivom (Radić-Šestić i sar., 2021). Pripadnici zajednice gluvih smatraju da biti gluv pre može predstavljati prednost nego nedostatak (Radić-Šestić i sar., 2015). Stoga se pravila različitih sportova ne prilagođavaju gluvima, već se promene odnose isključivo na način komunikacije učesnika u sportskim aktivnostima (Atherton et al., 2001). Na primer, na takmičenjima gluvih sudije mogu da koriste zastavice, signalizaciju rukom ili razne svetlosne signale, a postoji i mogućnost skretanja pažnje dodirivanjem sportiste po ramenu. U toku je i razvoj tehnologije startnih svetala, sistema koji koriste LED svetla (Jones, 2020). Ukoliko je potrebno učiniti takmičenje dostupno gluvima, neophodno je da sudije, treneri i saigrači planiraju dodatno vreme za davanje instrukcija gluvima, kao i da savladaju bazičnu terminologiju znakovnog jezika. Ovo je veoma značajno jer, iako gluvi i nagluvi sportisti učestvuju u svim vrstama sportova uz malo ili nimalo modifikacija, oni se najčešće žale upravo na komunikacione barijere sa saigračima, trenerima i sudijama (Houinato, 2017).

Nije lak zadatak za gluve istovremeno praćenje npr. protivničkih igrača, lopte i signala svojih saigrača. Gluvi i nagluvi sportisti se u komunikaciji sa drugim akterima sportskih događaja oslanjaju prvenstveno na njihove izraze lica, kontakt očima, govor tela i signale date rukama. Iako sudije koriste pištaljke, gluvi igrači su, prirodno, usmereni na vizuelne znakove koji su sastavni deo sportskog događaja (Houinato, 2017).

Slušna pomagala (amplifikatori i kohlearni implantati) pomažu gluvima i nagluvima da percipiraju govor i različite ambijentalne zvukove. Ipak, u toku sportskih aktivnosti gluvi sportisti ih najčešće skidaju. Slušni aparati i kohlearni implanti predstavljaju veoma osetljivu elektronsku opremu, pa prilikom bavljenja zahtevnijim fizičkim aktivnostima postoji rizik da budu slomljeni ili da ispadnu iz predviđenog položaja, da budu slučajno oštećeni, naročito prilikom bavljenja kontaktnim sportovima ili sportovima koji zahtevaju jači intenzitet. Zbog toga se prilikom bavljenja sportom gluvima preporučuje korišćenje zaštite za glavu uvek kada je to moguće, ili uklanjanje pojedinih delova slušnih pomagala. Britanska grupa za kohlearne implantate (British Cochlear Implant Group, 2019) naglašava da je pri bavljenju određenim sportovima (npr. skakanje sa motkom ili skakanje u vis) poželjno ukloniti sve spoljne delove kohlearnog implanta, jer postoji veliki rizik od udaranja glavom o podlogu. Rizični su i sportovi koji se odvijaju na pesku ili vodi, jer postoji mogućnost kontaminacije amplifikatora ili implanta. Naročito je važno uklanjanje svih spoljnih jedinica prilikom učestvovanja u vodenim sportovima. Zbog svega toga se pojedine gluve osobe odlučuju da učestvuju u sportskim aktivnostima bez pomagala. Međutim, postoje i oni koji više vole da ih nose, jer se tako osećaju sigurnijima, naročito kada učestvuju u sportskim aktivnostima tipične populacije, mogu da čuju uputstva sudija, trenera ili sugestije saigrača.

Zaključak

Nesporno je da je 21. vek, vek inkluzije osoba sa ometenošću. Budući da inkluzija predstavlja proces uključivanja osoba sa ometenošću u sve društvene aktivnosti zajednice, a da je sport primamljiva društvena aktivnost i pripadnicima tipične, i pripadnicima populacije gluvih i nagluvih, napori usmereni ka što ranijem uključivanju gluve i nagluve dece u lokalne sportske klubove mogli bi višestruko koristiti celokupnom društvu. Iako gluve osobe mogu postići satisfakciju i učestvovanjem u brojnim takmičenjima koja su namenjena gluvima, uključivanje u sportske aktivnosti zajedno sa tipičnim osobama doprinelo bi njihovoj socijalizaciji, kao i izgradnji samopouzdanja i pospešivanju takmičarskih mogućnosti. S druge strane, pripadnici tipične populacije imali bi mogućnost da se upoznaju sa gluvima i nagluvima, njihovim talentima, sposobnostima i eventualnim ograničenjima, što bi pomoglo sprečavanju formiranja potencijalnih predrasuda. Pospešivanje kontakata ljudi

koji se međusobno razlikuju po različitim osnovama predstavlja odličnu bazu za unapređenje društva u pravcu razvoja tolerancije i potpunog prihvatanja pripadnika manjinskih populacija. Pružanje jednakih mogućnosti svima, bez obzira na njihove različitosti, predstavlja, pored moralne, i zakonsku obavezu savremenog društva, a inkluzija osoba sa ometenošću se najlakše može ostvariti upravo putem aktivnosti u kojima njihova ometenost ne predstavlja realnu prepreku za učestvovanje, kao što je slučaj kod gluvih i nagluvih osoba kada se bave sportom.

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The importance of sport for members of the deaf community

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Introduction. Apart from developing physical skills, a characteristic of sport is that it also helps the socialization of the persons who do it. Thus, it is a rather significant system of activities in the lives of people who are deaf or hard of hearing. Considering the fact that these persons are often marginalized by the typical population, participating in sports activities may contribute to their visibility to a great extent and thus to their inclusion in the social community. It is important to underline that an individual's deafness or being hard of hearing does not represent a limiting factor for their doing sports if the function of the center of gravity is preserved. *Objective.* The aim of this work was to provide a systematic insight into the possibilities of the deaf to participate in sports activities through the analysis of the available literature, as well as to indicate the importance that sports can have in their lives. *Methods.* The descriptive method, analysis, synthesis, and content evaluation were used. *Results.* Sports are an important component in the lives of many deaf and hard-of-hearing people. Deaf and hard-of-hearing persons may do sports as part of organized activities, independently, for recreational purposes, but also professionally. Professional deaf and hard-of-hearing athletes have the possibility of taking part in specialized competitions which are intended for persons with disabilities or only for deaf and hard-of-hearing persons, as well as in competitions in which predominantly typical athletes participate. *Conclusion.* In order to achieve the inclusion of the deaf, it is important to use the potential of sports activities as equally accessible to deaf people and members of the typical population.

Keywords: sport, the deaf and the hard of hearing, competitions, socialization, inclusion

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