

Original article

Reading ability of young school-age children

**Mile Vuković¹,
Rada Reljić Trivković²,
Sladjana Čalasan³**

¹University of Belgrade, Faculty of Special Education and Rehabilitation, Belgrade, Serbia

²Primary school "Jovan Dučić", Šekovići, The Republic of Srpska, Bosnia and Herzegovina

³University of East Sarajevo, Faculty of Medicine Foca, The Republic of Srpska, Bosnia and Herzegovina

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Corresponding author:

Mile Vuković, PhD
Visokog Stevana 2, 11000 Belgrade
mvukovic.dr@gmail.com

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Summary

Introduction. Reading is a complex linguistic and cognitive ability, acquired through learning. Children of typical development in the first four years of school completely master the reading skill. However, some children may have difficulty learning to read despite their preserved intellectual abilities and adequate training. The aim of this paper is to determine the reading ability and to identify reading disorder in children of younger school age.

Methods. The sample consisted of 123 students of third, fourth and fifth grade of elementary school. The three-dimensional reading test - the text "One Snowy Day" was used. Reading speed, reading accuracy and reading comprehension were assessed.

Results. Slow reading was identified in 35.3% of third graders and 22.2% of fourth graders. Deficits in reading accuracy were observed in 8.8% of third grade students. Delays in the development of reading comprehension were identified in most of the examined students. On the whole, our results showed that there is no statistically significant difference in reading ability between boys and girls.

Conclusion. A significant number of children is late in mastering reading skills. Given that reading speed increases significantly with age, and the number of errors decreases, we expect that many slow readers will reach an appropriate reading speed, and that most of the children who showed unexpected number of errors will master accurate word decoding. Since comprehension deficits were identified in the majority of respondents, we conclude that a significant number of children did not reach the developmental stage in which reading becomes a means of learning.

Keywords: reading, reading speed, accuracy in reading, reading comprehension, young school age

Introduction

Reading is a complex language activity acquired through active learning. At the same time, it is a cognitive activity that we learned the most about by studying acquired reading disorders in adults with brain damage. Thanks to empirical data on reading disorders in people with acquired dyslexia and aphasia, several theoretical models of reading have been proposed [1]. A common feature of these models is the distinction of different reading pathways.

Analyzing different models of reading, Vuković [1] stated that the visual characteristics of a written word are processed through two readings pathways: phonological (indirect) and lexical (direct). When using the phonological path, the visual forms of the written word are connected with the corresponding image in the mental lexicon after the grapheme-phonemic conversion, i.e. indirectly. On the other hand, when using the lexical path of reading, visual forms of words are connected with the corresponding image in lexical memory through meaning, or the written word is recognized immediately after connecting with the visual image in orthographic lexicon, without relying on its meaning [1]. Differences in the ability to read different types of words, as well as the appearance of different types of reading errors in people with acquired dyslexia and aphasia, speak in favour of the two distinct pathways of processing written language symbols [2, 3].

Reading is a demanding cognitive ability, whose adoption process takes a relatively long time. One of the key preconditions for the development of reading is having a developed spoken language. Metalinguistic awareness, or the ability to think about language and manipulate its structural characteristics, is especially important [4]. Phonological awareness, i.e. general knowledge about the phonetic structure of language, is crucial for reading – in particular, phonemic awareness (knowledge that spoken words are composed of individual phonemes that can be analyzed and manipulated) [5]. This is supported by numerous empirical studies, which established the connection between different aspects of phonological awareness and early reading development [6, 7, 8, 9, 10]. In addition to phonological awareness, Čolić and Vuković [11] found that the awareness of grammatical structure of a sentence (syntactic awareness) is also an important early reading predictor.

Children are gradually and systematically taught to read, beginning with the first grade of elementary school. However, there are some indicators of reading skills development even in the preschool period. From the developmental point of view, mastering the skill of reading goes through three phases: logographic, alphabetical and orthographic [12]. In the *logographic* phase, which is characteristic of preschool age, the so-called pseudo-reading occurs [13]. During this period, the child pretends to read picture books, the text of which he usually knows by heart. One gets the impression that a child at that age has some level of awareness of the text. Preschool children process words as wholes, or as any other visual symbol, although they recognize some letters. Furthermore, in this phase, there is an awareness of parts of language; prerequisite skills for reading such as phonological awareness develop. The *alphabetic* phase begins in the first year of school and it is a characteristic of early reading. It implies the development of phonological decoding through learning graphemes and their connection with phonemes, i.e. the child's ability to connect the right speech sound with a particular letter. The next phase in the development of reading is *orthographic* phase, where the ability to directly recognize words appears. At this stage, the child no longer processes the word segments, but the word as a whole. Thus, the orthographic phase is characterized by fluent reading, which usually occurs after two or three years of systematic training. Fluent reading is achieved by improving word decoding, through frequent repeating of words from text to text. It should be borne in mind, however, that in this period, learning by listening is still more effective than learning by reading. Therefore, it is recommended that at this stage, adults read material which is above the level of children's reading competence. It is usually considered that children at the age of nine go to the next stage when they become able to use reading as a means of learning.

In this phase, the children successfully master new words and syntactic forms; they are able to answer questions and discuss the content which was read [13]. In other words, a nine-year-old child of typical development, who has undergone systematic training, can understand texts from textbooks and other books corresponding to their age. This level of development is expected after four years of learning to read.

Having in mind the stated facts about reading and the importance of reading for learning, as well as the fact that there is little data on the children reading ability in the Republic of Srpska, this paper aims to examine reading skills of children in lower grades of elementary school. Our goal was to determine the speed of reading, accuracy in reading and reading comprehension. We also wanted to identify difficulties in reading.

Method

The sample included 123 respondents (55 boys and 68 girls), aged 8–10, of the third, fourth and fifth grade of the elementary school “Jovan Dučić” in Šekovići, the Republic of Srpska.

The criteria for inclusion were: the respondent has to attend third, fourth or fifth grade; they have undergone systematic, conventional reading training; they have average or above-average intellectual abilities. The criteria for exclusion were: presence of evident neurological, sensory and bodily impairments. The research was realized in the first semester of the school year 2020-21, after obtaining the consent of the school administration, parents and students.

The three-dimensional reading test - the text “One Snowy Day” [14], which is adapted to the Ijekavian dialect of the Serbian language, was used to assess reading. The test was conducted individually. Prior to testing,

the purpose of the test was explained to each subject. The respondents were first asked to read the given text aloud. The examiner measured the reading time (this was used to assess reading speed) and recorded errors (to assess reading accuracy). Afterwards, the respondents were asked to retell the text. During the retelling, the examiner recorded the facts that the respondents managed to reproduce (which was used to assess reading comprehension).

Statistical Package for Social Sciences for Windows, version 23.0, 2015 (SPSS) was used in the analysis and data processing. Firstly, descriptive statistical methods were used to obtain central measure and variance. Kolmogorov-Smirnov test showed that sample does not follow normal distribution (K-S, $Z = 2.98$, $Z1 = 1.60$, $Z2 = 3.86$, $p < .001$, $p1 = 0.01$, $p2 < .001$), therefore nonparametric χ^2 test and Mann-Whitney U test were used. Pearson’s coefficient was used to determine the correlation between the examined variables. Values less than $p < 0.05$ were considered statistically significant.

Results

Table 1 presents the results of reading speed in third, fourth and fifth grade students. The number and percentage (in brackets) of the respondents who were within the minimum, maximum and average reading time are shown [15].

The data in Table 1 show that, as expected, third-grade students needed the most time to read, while fifth-grade students read the given text the fastest. It was also shown that a significant percentage of third and fourth grade children did not reach the appropriate reading speed. We determined that there is a statistically significant difference in reading speed between students of the examined school age ($\chi^2 = 21.835$; $df = 6$; $p = 0.001$).

Table 1. Distribution of respondents according to reading speed

Grade	Minimum	Average	Maximum	Disorder	Total of respondents
3rd	2 (5.9)	10 (29.4)	10 (29.4)	12 (35.3)	34
4th	12 (27.3)	10 (22.7)	12 (27.3)	10 (22.7)	44
5th	14 (31.1)	15 (33.3)	16 (35.6)	0 (0.0)	45
Total	28 (22.8)	35 (28.5)	38 (30.9)	22 (17.9)	123

$\chi^2 = 21.835$; $df = 6$; $p = 0.001$

Number and percentage of respondents are shown (% in brackets)

The results in Table 2 show that the respondents from all three grades made reading errors. However, only in the third grade we found students who, according to the number of errors, could be classified as having reading disorder.

We also found a statistically significant difference in terms of the number of reading errors between students of the examined school age ($\chi^2 = 32.954$; $df = 8$; $p < 0.001$). Thus, our findings show that the number of reading errors decreases significantly with age.

Table 2. Distribution of respondents according to the number of errors

Grade	Minimum	Average	Maximum	Disorder	Total of respondents
3rd	12 (35,3)	14 (41,2)	3 (5,3)	2 (8,8)	34
4th	37 (84,1)	3 (6,8)	4 (9,1)	0 (0,0)	44
5th	28 (62,2)	9 (20)	8 (17,8)	0 (0,0)	45
Total	77	26	15	2	123

$\chi^2 = 32.954$; $df = 8$; $p < 0.001$

Number and percentage of respondents are shown (% in brackets)

The data in Table 3 show that the majority of our respondents reproduced a minimal number of facts, which clearly indicated difficulties in reading comprehension. There was no statistically significant difference in reading comprehension between students of the examined school age ($\chi^2 = 0.777$; $df = 2$; $p = 0.678$). Thus, in statistical terms, reading comprehension did not improve significantly from the third to the fifth grade.

Tables 4, 5 and 6 show the results of reading in male and female subjects of the third, fourth and fifth grade, obtained using the Mann-Whitney U test.

The test results showed that there was no statistically significant difference between boys and girls in the third grade in reading speed ($U = 140.00$; $p = .89$), reading comprehension ($U = 110.00$; $p = .25$) and the number of errors ($U = 120.00$; $p = .39$).

The test results showed that there was no statistically significant difference between boys and girls in the fourth grade in reading speed ($U = 237.00$, $p = .99$), reading comprehension ($U = 187.50$, $p = .22$) and the number of errors ($U = 237.00$, $p = .99$).

The test results showed that there was no statistically significant difference between

boys and girls in the fifth grade in reading speed ($U = 171.00$, $p = .08$), reading comprehension ($U = 199.00$, $p = .26$) and the number of errors ($U = 210.00$, $p = .33$).

The results of the correlation analysis showed that in all students of the exam-

ined age there is a statistically significant ($p < 0.001$) moderate positive correlation between reading comprehension and reading speed for the third ($r = 0.588$), fourth ($r = 0.536$) and the fifth grade ($r = 0.662$) respondents.

Table 3. Distribution of respondents according to reading comprehension

Grade	Minimum	Average	Total of respondents
3rd	34 (100)	0 (0,0)	34
4th	43 (97,8)	1 (2,3)	44
5th	44 (97,8)	1 (2,2)	45
Total	121	2	123

$$\chi^2 = 0.777; df = 2; p = .678$$

Number and percentage of respondents are shown (% in brackets)

Table 4. Reading, third grade

GENDER	N	READING SPEED		READING COMPREHENSION		READING ERRORS	
		Mdn	IQR	Mdn	IQR	Mdn	IQR
male	16	81.00	92	3.00	2	1.50	5
female	18	90.00	54	2.00	2	2.50	9
Mann-Whitney U Test		$U = 140.00; p = .89$		$U = 110.00; p = .25$		$U = 120.00; p = .39$	

Table 5. Reading, fourth grade

GENDER	N	READING SPEED		READING COMPREHENSION		READING ERRORS	
		Mdn	IQR	Mdn	IQR	Mdn	IQR
male	19	52.00	23	4.00	3	0	0
female	25	50.00	41	3.00	2	0	0
Mann-Whitney U Test		$U = 237.00, p = .99$		$U = 187.50, p = .22$		$U = 237.00, p = .98$	

Table 6. Reading, fifth grade

GENDER	N	READING SPEED		READING COMPREHENSION		READING ERRORS	
		Mdn	IQR	Mdn	IQR	Mdn	IQR
male	19	48.00	20	4.00	1	0	5
female	26	41.00	21	4.00	2	0	3
Mann-Whitney U Test		$U = 171.00, p = .08$		$U = 199.00, p = .26$		$U = 210.00, p = .33$	

Discussion

In this study, reading was examined in the third, fourth and fifth grade elementary school students. Our intention was to determine reading ability and identify reading disorders. With this aim, reading speed, reading accuracy, and reading comprehension were assessed. The results showed that 35.3% of the third and 22.2% of the fourth graders read slowly, or below the level expected for their age. When it comes to the number of errors, or the accuracy of reading, the deviation was determined only in the third grade students (8.8%), while the fourth and fifth grade students were within the expected norms. In terms of reading comprehension, respondents in all three grades were able to reproduce only a minimal number of test-predicted facts. According to our findings, there is a significant positive correlation between reading speed and reading comprehension.

Further analysis of the obtained results showed that the reading speed significantly increased with school age, and the number of reading errors decreased. These findings speak in favour of the typical development of reading skills in most of our respondents, viewed from the perspective of decoding written texts. This is supported by the fact that none among the fifth-grade children had reading speed and accuracy below the expected level. In other words, our findings show that after three years of learning children can fully master the reading skill. The results support the author's finding that learning to read takes at most four years [16, 17], after which a new phase begins where reading becomes a learning tool. According to this, the fifth grade students included in our study were expected to show good results in reading comprehension. However, this was where our fifth-grade respondents demonstrated very poor achievement. In addition to the poor result, we must point out that, in terms of reading comprehension, the fifth grade respondents

did not significantly differ from the third and fourth grade respondents. As to the cause of the poor development of reading comprehension among our respondents, we cannot give a precise answer at this time. However, we can conclude that the majority of the fifth-grade respondents have not reached the expected stage in the development of reading, or they do not use reading as a learning tool. This is in agreement with the results of previous research, which has also found that most children at the end of the first cycle of education still do not use their reading skill as a learning tool [18, 19, 20].

From the point of view of reading development, phonological and orthographic decoding abilities lead to the recognition of words which, in typical development, is manifested in fluent reading. However, to understand the text, processes that connect semantic, syntactic and reference relations between words, phrases and sentences are necessary [21]. In other words, reading comprehension results from the development and coordinated use of language skills (translation of the written word into phonological code - decoding, vocabulary and knowledge of grammar) and cognitive functions (working and short-term memory, reasoning and monitoring) [21, 22]. The connection between cognitive abilities and reading comprehension is also shown in results of studies that found deficits in executive functions [23], as well as working memory deficits in children and adults with developmental reading disorder [24, 25]. Considering this relationship, the assessment of reading comprehension should be made in relation to the quality of working memory and executive functions, which is left as a challenge for future research.

According to the findings of some authors, the reason for poorer achievements in reading comprehension and insufficient use of reading competence for learning, partly lies in inadequate educational system [20]. Examining the development of reading liter-

acy in the first four grades of primary school, the authors of the study found that most children at the end of the fourth grade are not fully ready to use reading as a learning tool. Therefore, we believe that in the mentioned period, much more attention should be paid to enabling children to use the acquired reading skill as a learning tool.

When it comes to the prevalence of developmental reading disorder, the data differ depending on the school age. Previous studies have shown that 12.96% of the second, third and fourth grade students have reading difficulties [26]. Similar data are found in a recent study of the second and third grade children, where the presence of dyslexia was found in 13.7% of respondents [27]. By comparing the results of these two researches, it could be concluded that there was a slight increase in reading disorders in children who speak Serbian. On the other hand, the results of other research indicate the presence of reading disorder in a significantly smaller percentage of children. Specifically, Čolić [28] determined the presence of dyslexia in 5.3% of fourth grade students. These results suggest that age is a very important variable when considering the presence of a developmental dyslexia.

According to the traditional point of view, the children should go through at least two years of systematic training before any reading difficulties found can be characterized as a disorder. It should be borne in mind that in languages with “shallow” (transparent) orthography – such as Serbian, in which the phonemes and graphemes have a very regular and consistent relationship, and the rules of writing are clear – developmental disorder of reading occur in a smaller percentage of cases than in languages with “deep” (non-transparent) orthography (English or French for example) in which the relationship between grapheme and phoneme is complex and inconsistent. When determining the presence of reading disabilities of the children whose

mother tongue is Serbian, a good starting point can be the fact that developmental dyslexia occurs in about 5% of Slavic children.

The results of our study showed that a number of lower primary school respondents are late in mastering the reading skill. Bearing in mind the results of the fifth grade students, we expect most of our lower grade respondents to successfully master this skill. However, they can also be expected to have problems in the transition to the phase of using reading as a learning tool.

The presence of difficulties and poorer development of reading comprehension in the respondents of our sample cannot be attributed to the developmental reading disorder. Since almost all children included in the sample had poor achievement in reading comprehension, these results may be related to a number of diverse factors. On the one hand, it is possible that insufficient attention is paid to the development of reading literacy in the education system. On the other hand, weaker lexical-semantic abilities as well as minor deviations in the development of cognitive functions related to reading are possible.

It needs to be mentioned that our research was conducted during the COVID-19 pandemic, when most of the classes with students involved in the study were conducted online. This has led to a lack of interactive teaching in which students would be more often encouraged to retell and answer questions related to the texts. It is possible that such learning circumstances have also contributed to the weaker development of reading literacy. Negative impact of COVID-19 was also noticed by other authors [29].

On the whole, our results showed that there is no statistically significant difference in reading ability between boys and girls. This finding is in line with the findings of authors who state that gender does not have a significant impact on the occurrence of developmental dyslexia [27, 30].

Conclusion

We identified a number of the third and fourth grade children who were late in the development of reading. In the third grade, this delay is manifested in slow reading and the appearance of a large number of errors. Fourth graders showed poorer results only in reading speed. In the fifth grade, no difficulties were recorded in either of these two reading characteristics. These data suggest the possibility that most of our third and fourth grade respondents will reach the expected reading speed and accuracy in reading. However, the possibility that a small number of

respondents will develop reading disorder cannot be excluded.

Our results showed the presence of difficulties in reading comprehension in most of the respondents included in the study. It was also shown that in the span between the third and fifth grade there was no significant improvement in reading comprehension. This finding suggests that children after four years of training have not reached the stage of development in which reading becomes a learning tool.

Finally, our results showed that, on the whole, there is no statistically significant difference in reading ability between boys and girls.

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Ethical approval. The Teacher's Council of the Primary school "Jovan Dučić" in Šekovići, the Republic of Srpska, approved the study and informed consent was obtained from

all individual respondents. The research was conducted according to the Declaration of Helsinki.

Conflicts of interest. The authors declare no conflict of interest.

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Sposobnost čitanja kod dece mlađeg školskog uzrasta

Mile Vuković¹, Rada Reljić Trivković², Slađana Čalasan³

¹Univerzitet u Beogradu, Fakultet za specijalnu edukaciju i rehabilitaciju, Beograd, Srbija

²Osnovna škola „Jovan Dučić“, Šekovići, Republika Srpska, Bosna i Hercegovina

³Univerzitet u Istočnom Sarajevu, Medicinski fakultet Foča, Republika Srpska, Bosna i Hercegovina

Uvod. Čitanje je složena jezička i kognitivna sposobnost, koja se stiče učenjem. Deca tipičnog razvoja u prve četiri godine školovanja u potpunosti ovladavaju veštinom čitanja. Međutim, kod neke dece mogu da se ispolje teškoće u učenju čitanja uprkos očuvanim intelektualnim sposobnostima i adekvatnoj obuci. Cilj ovog rada je utvrđivanje sposobnosti čitanja i identifikovanje smetnji u čitanju kod dece mlađeg školskog uzrasta.

Metode. Uzorak su činila 123 učenika trećeg, četvrtog i petog razreda osnovne škole. U istraživanju je korišćen Trodimenzionalni test čitanja – tekst „Jedan snežni dan“. Procenjivani su brzina čitanja, tačnost u čitanju i razumevanje pročitnog.

Rezultati. Sporo čitanje identifikovano je kod 35,3% učenika trećeg i 22,2% učenika četvrtog razreda. Odstupanja u tačnosti čitanja uočena su kod 8,8% učenika trećeg razreda. Kašnjenje u razvoju razumevanja pročitnog identifikovano je kod većine ispitanih učenika. U celini gledano, nisu utvrđene značajne razlike u sposobnosti čitanja između dečaka i devojčica.

Zaključak. Na osnovu rezultata istraživanja može se zaključiti da značajan broj dece kasni u savladavanju tehnike čitanja. S obzirom da se brzina čitanja sa uzrastom značajno povećava, a broj grešaka smanjuje, očekujemo da će veći broj učenika koji su sporo čitali dostići brzinu čitanja koja odgovara njihovom uzrastu, kao i da će određen broj dece koja su ispoljila neočekivan broj grešaka ovladati tačnim dekodiranjem reči. Budući da su smetnje razumevanja identifikovane kod većine ispitanika, možemo zaključiti da znatan broj dece nakon četvorogodišnje obuke nije dostigao fazu u razvoju u kojoj čitanje postaje sredstvo učenja.

Ključne reči: čitanje, brzina čitanja, tačnost u čitanju, razumevanje pročitnog, mlađi školski uzrast