Children's letter naming in the year before school enrollment in the context of Croatian language and orthography

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Abstract

Early literacy refers to the skills and abilities essential to the later acquisition of reading that a child acquires before formal instruction begins (Scarborough, 2001). Two groups of factors related to the concept of early literacy are distinguished: language and environmental factors (Kuvač Kraljević et al., 2019). Among language factors, letter knowledge is the single most important predictor of successful reading (Georgiou et al., 2012; Muter & Diethelm, 2001; Torppa et al., 2006), especially in alphabetic languages with transparent orthography like Croatian. Foreign research shows that children at risk of developing reading disorders, i.e., dyslexia know fewer letters than their typically developing peers (Lyytinen et al., 2004; Puolakanaho, 2007). The aim of this study is to describe letter knowledge in Croatian-speaking typically developing and at-risk preschool children. As hypothesized, children at risk named on average fewer upper- and lowercase letters than their typically developing peers. Considering the importance of predictors of reading and the possibility of developing prevention programs in this area, it is important to understand the meaning, contexts and development of pre-skills in reading and writing.

Keywords: *early literacy; letter knowledge; transparent orthography; risk of developing reading disorders (dyslexia)*

Introduction

Nowadays, an increasing amount of research focuses on language development and its importance for reading (Bishop & Snowling, 2004; Catts & Kambi, 2005). Numerous studies are dedicated to finding typical features of language functioning in specific populations (persons with developmental language disorders, specific learning disorders, etc.), that is, deviations in the development and/or function of individual's language at the level of different linguistic components and their connection

with reading (Ivšac & Lenček, 2011). Reading and writing pre-skills are increasingly being studied in typically developing children and in children who have difficulty mastering early reading and writing, and/or who are at developmental or family risk of developing reading and writing disorders (e.g., dyslexia). Despite the growing body of research, there is still a lack of data on the reading and writing pre- skills of at-risk children. In addition, most research has been conducted on children whose first language is English. Therefore, due to differences in orthography and language typology, their results are not fully transferable to the Croatian language.

Early literacy: Letter knowledge

Early literacy refers to the skills and abilities essential to the later acquisition of reading that a child acquires early in life, before formal instruction begins (Scarborough, 2001). Two groups of factors related to the concept of early literacy can be distinguished: 1) language and 2) environmental and informal factors (Kuvač Kraljević et al., 2019). Language measures of early literacy generally refer to phonological skills and processes, narrative skills, lexical knowledge, and letter knowledge.

Letter knowledge is the single most important predictor of successful reading (Georgiou et al., 2012; Muter & Diethelm, 2001; Torppa et al., 2006), especially in alphabetic languages with transparent orthography (Anthony & Francis, 2012; Caravolas et al., 2012).

Letter knowledge requires making a connection between a visual symbol and a phonological form (Ivšac Pavliša & Lenček, 2011). It is important for children to realize that each letter has multiple identities, i.e., graphic versions (e.g., uppercase, and lowercase letters, printed and written letters, handwritten letters; Foulin, 2005). Research shows that children begin to distinguish uppercase letters earlier than lowercase letters, they learn more quickly letters that are visually easy to distinguish, or those that are visually similar in lowercase and uppercase execution (e.g., uppercase and lowercase c/v/z, etc.), and those that are common in written language. They know letters from the first half of the alphabet better than those from the second half, they master letters whose names and pronunciations match more quickly, and they are more successful in what they are taught and more often exposed to (Adams, 1990; Bracken & Crawford, 2010; Piasta et al., 2012).

The aforementioned characteristics and development course refer to typically developing children. Considerably less data is available for letter knowledge in children who are at developmental or family risk of developing reading and writing disorders. The results of foreign research show that these children, whether due to socioeconomic, cognitive, or genetic factors, know fewer letters than their typically developing peers (Lyytinen et al., 2004; Puolakanaho, 2007). Longitudinal studies indicate that their poor achievements are a predictor of reading disorders (Catts et al., 2001; Elbro & Petersen, 2004).

Consistent with one of the main theories about the cause of dyslexia - phonological processing deficit (Reid, 2016; Swan & Goswami, 1997), another most frequently mentioned language factor of early literacy is phonological awareness. It refers to the ability to manipulate the sounds in the structure of spoken language (Ehri et al., 2001), that is, to recognize, form, and manipulate the phonological units that make up a word (Chard & Dickson, 1999). According to Torppa et al. (2006), letter knowledge interacts with phonological awareness since graphemes in written language correspond to phonemes in spoken language. Foreign research (Worden & Boechler, 1990) shows that children can name letters before phonemic awareness (awareness of individual phonemes is considered a higher level of phonological awareness; Chapman, 1999) develops. However, this knowledge requires explicit instruction (Foorman et al., 2016; Paige et al., 2018). Given this, the importance of preschool curricula in promoting early literacy skills is undeniable.

Therefore, considering the developmental outcomes of children at risk of literacy problems and academic failure, as well as the effectiveness of early and timely intervention (Siegel, 2020), it is important to demonstrate the value of letter knowledge and the specific characteristics of this segment in the context of language and script.

Aim and hypotheses

The aim of this study is to describe the characteristics of letter knowledge in Croatian-speaking typically developing and at-risk (of developing reading disorders, i.e., dyslexia) preschool children in the year before school entry. Given the importance of this parameter for reading acquisition, the purpose of this paper is to warn about the need for systematic monitoring of children at potential risk of developing reading disorders. This will be done by providing insights into the level of letter knowledge in the children studied, focusing on the need to provide opportunities for letter learning and the value of a speech and language pathologist's assessment of reading and writing pre-skills. In the Republic of Croatia, no in-depth and systematic research has been conducted to compare children at risk of developing reading disorders with typically developing children.

Hypotheses

H1: Children at risk name fewer uppercase letters on average than typically developing children.

H2: Children at risk name fewer lowercase letters on average than typically developing children.

Method

Participants

Twenty-four children at risk of developing reading disorder (dyslexia) in the year before school entry were singled out in a kindergarten in Zagreb in the 2017/2018 school year. These were children with poor performance in phonological awareness, consistent with the phonological processing deficit theory. These children were paired with a control group of their typically developing peers who attended the same kindergarten and passed screening on the basis of the entire test (all blocks). Information about the participants can be found in Table 1.

Table 1. Descriptive data on participants

GROUP	*N*	GENDER		AGE (year; month)			
		boys	girls	*M*	*SD*	Min.	Max.
RISK	24	13	11	5;9	0;5	5;10	7;06
TD	21	11	10	5;8	0;4	5;11	6;07

Note. RISK = Children at risk of developing reading disorders (e.g., dyslexia), TD = typically developing children

Measures

The test for assessing reading and writing pre-skills PredČiP (Kuvač Kraljević & Lenček, 2011) serves to assess school readiness, especially in terms of language and visual perception. It is used as a screening test in monitoring children in the regular preschool system. It consists of several tasks (subtests), including phonological awareness (syllabic and phonemic analysis and synthesis, rapid automatized naming), repetition of isolated (pseudo)words and sentences, visual perception and discrimination (recognition and tracing/copying shapes), and narration. For the purposes of this study, the Phonological Naming of Upper- and Lowercase Letters subtest was used. In the tasks, children are asked to name 30 uppercase and lowercase letters each, presented separately in a random order on a single printed sheet. Both lists contain all the graphemes of the Croatian alphabet, which means that a child can score a maximum of 60 points.

Procedure

All children were examined individually by a speech and language pathologist who speaks Croatian correctly and fluently, and, in addition to basic education, has received additional training in conducting the aforementioned test, and in evaluating and interpreting the results. The test was conducted in a quiet room without noise and other potentially disturbing factors. The examiner was previously familiar with the children he examined as a member of the professional team of the institution where the examination was conducted.

Data analysis

Data processing was performed with the program IBM SPSS Statistics - version 26. It included testing the normality of the distribution of the results for the variables Phonological Naming of Uppercase Letters and Phonological Naming of Lowercase Letters by using the Shapiro-Wilk test, and testing the differences between the groups and the descriptive statistics data.

Results

Difference between groups in Phonological Naming of Uppercase Letters Considering that the distribution of the results on the Phonological Naming of Uppercase Letters variable turned out to be normal ($p > .05$), the t-test for independent samples was used to test the difference between the two groups. Descriptive statistics data (Table 2) already indicate that typically developing children name twice as many uppercase letters than children at risk of possible reading disorders (e.g., dyslexia), and a statistically significant difference between the groups was found with a large effect size ($t(32)= 5.874$, $p < .01$, $d_{\text{Cohen}} = 1.7$).

Table 2. Difference between groups in Phonological Naming of Uppercase Letters

GROUP	*N*	*M*	*SD*	Min.	Max.
RISK	24	12.33	9.29	0	27
TD	21	24.95	3.46	18	30

Difference between groups in Phonological Naming of Lowercase Letters Considering that the distribution of the results on the Phonological Naming of Lowercase Letters variable turned out to be normal, the t-test for independent samples was used to test the difference between the two groups. Descriptive statistics data (Table 3) already indicate that typically developing children name up to three times more lowercase letters than children at risk of possible reading disorders (e.g., dyslexia), and a statistically significant difference between the groups was found with a large effect size ($t(43)= 5.631$, $p < 0.01$, $d_{\text{Cohen}} = 1.7$).

Table 3. Difference between groups in Phonological Naming of Lowercase Letters

GROUP	*N*	*M*	*SD*	Min.	Max.
RISK	24	6.67	6.76	0	21
TD	21	17.67	6.27	8	29

Discussion and conclusion

Despite numerous research studies in the last twenty years, the specificity of letter knowledge in Croatian has not been fully explored, especially in preschool children who belong to the at-risk group. Considering the importance of predictors of reading and the possibility of developing prevention programs in this area, and in order to prevent the occurrence of learning difficulties (Lenček et al., 2012), it is important to understand the meaning, contexts, and development of pre-skills in reading and writing. The aim of this study was to describe the characteristics of letter knowledge (as the single most important predictor of successful reading) in typically developing and at-risk preschool children in the year before school entry. In our country, there is little research focusing on early literacy skills and their specifics (Lenček et al., 2012; Lenček & Užarević, 2016; Kuvač Kraljević et al., 2019), and on the peculiarities of dyslexia symptomatology in the Croatian language and script (Kuna, 2021; Lenček & Anđel, 2011), and so far, none of them has dealt with an in-depth analysis of letter naming in children at risk of developing a reading disorder, i.e., dyslexia. The results of our research, as expected, show that children at risk name on average fewer upper- and lowercase letters than their typically developing peers, which is in line with the results of other research conducted abroad (Lyytinen et al., 2004, 2016; Puolakanaho, 2007; Snowling et al., 2007; Torppa et al., 2006). While reviewing descriptive statistics data, it was also found that both groups of participants name more upper- than lowercase letters, which is related to visual

simplicity (lines - straight, diagonal, circular, and their combinations) and the frequency with which children are exposed to these graphemes (Ellefson et al., 2009; Worden & Boettcher, 1990). Further descriptive data have shown that children's knowledge of complex letters (digraphs) and special letters of the Croatian Latin (letters with diacritical marks) is the lowest, which was also shown in some previous research (Lenček et al., 2021; Vuk et al., 2020). Defining and explaining the language factors that best predict later success in reading and writing, especially with respect to a given language and its orthography, is important for designing successful pre-literacy programs and intervention procedures for children with difficulties in developing and acquiring these reading and writing pre- skills (Kuvač Kraljević et al., 2014). The results of our study show that children at risk name most successfully the uppercase letters /A/, /O/, /I/, /R/, /B/, /L/, /M/, /U/, /T/, /N/ (in that order), while typically developing children name equally successfully the letters /A/, /O/, /I/, /B/, /L/, /M/, /N/, followed by the letters /T/, /C/, /K/. Thus, there is an obvious overlap between the studied groups. There is also a high degree of overlap in the letters that children are least successful in naming: children at risk perform worst in naming the letters /LJ/, /Đ/, /DŽ/, /NJ/, /Ž/, and their typically developing peers in naming the letters: /DŽ/, /Đ/, /NJ/, /Ć/, /LJ/ - there is an overlap even in 4 of the selected 5 worst results. The results of correctly named lowercase letters also show a high degree of agreement (9 out of 10 letters) among the top ten letters. The lowercase letters /l/, /đ/, /t/, /g/, /h/, /b/ are identified as the most difficult for children at risk, and /h/, /dž/, /l/, /g/, /đ/, /lj/ for their typically developing peers. It is obvious that these are forms whose graphic realization resembles other letters (e.g., /l/ and /I/), again letters with diacritical marks, and those that are rarely heard in spoken language and/or seen in written language (/đ/, /g/, /h/). The obtained results indicate the possibility of using letter knowledge tasks as one of the keys to identify children at risk of developing reading disorders, however, further longitudinal studies are needed, and it must be remembered that the at-risk sample was collected using a standardized screening test, but this does not capture all language factors, let alone environmental factors. Despite that, the results point to the need to create a curriculum with clear expectations for early literacy by more precisely identifying specific skills and knowledge that children need for later acquisition of reading and writing. In many countries with high literacy levels and transparent orthography, preschool curricula mandate letter knowledge at an early preschool age, while the Croatian preschool curriculum does not include such a requirement. Moreover, the inclusion of children in the preschool system is not required by law in Croatia (except preschool program of 250 school hours; Croatian National Law on Preschool Education, 2014). The consequences are uneven preparation of children for entering the school system and for early reading and writing, as well as difficulties in early identification of at-risk children. In order to improve literacy skills and raise literacy levels, there is a need to invest in mandatory preschool education programs. In addition, the language factors that best predict later success in reading and writing need to be well defined and explained. These are also prerequisites for successful intervention programs (Kuvač Kraljević et al., 2014).

The question of whether a child should learn letters in the preschool years is answered by scientific research, the results of which demonstrate a clear link between preschool letter knowledge and later academic success. Data on letter naming, such as which letters children find most difficult, can be used to work more intensively on individual letters and features that need to be perceptually emphasized to improve children's knowledge. Given the high demands of today's educational system, it is too late to start teaching letters in school, especially for children at risk of developing reading disorders. On the contrary, teachers should be able to focus on improving reading and learning from the first year of school by using the foundation of previous letter knowledge. If a child does not know the letters and lags behind, it will be difficult to get out of the vicious circle: they

will not like school or learning, will have poor academic results, which will lead to further negative feelings about going to school. This means that promoting (early) literacy is important not only for learning, but also for other areas of child development.

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