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Development of Phonological Awareness and Letter Knowledge in Bosnian Preschool Children

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Abstract

A study was carried out on a group of 505 preschool children. The children were given tests measuring their phonological discrimination, rhyme, initial phoneme detection and letter knowledge. In general, phonological discrimination and initial phoneme tasks are easier than the rhyme task. As children increased in age, phonological awareness and letter knowledge both increased. There are differences in phonological awareness between children according to their number of letter known. Letter knowledge is associated with all phonological measures and all variables of phonological awareness were good predictors of letter knowledge.

Keywords: Phonology, Letter knowledge

1. Introduction

Phonological awareness is the awareness of basic units of sound and is measured in terms of the ability to compare and manipulate the units of speech within words and syllables (Shah, 2002). It is the ability to carry out mental operations on these units. Phonological awareness is not reading, it is not phonics, it is the awareness of words as entities separate from the meanings attached to them (Denton, Hasbrouck, Weaver, & Riccio, 2000). Different researchers argued that phonological awareness describes children's developing sensitivity to the sublexical, segmental structure of the phonological domain of language, including sensitivities to larger and smaller units (Justice, Bowles, & Skibbe, 2006). Geudens (2006) referred to “phonological awareness” in a general sense as an umbrella term and used the term “sensitivity” instead of “awareness” to refer to tasks that do not require breaking up the speech stream intentionally (implicit phonological knowledge). The term “explicit phonological awareness” was used whenever he referred to tasks that require the ability to break up the continuous speech stream and identify and isolate phonological units intentionally (explicit phonological knowledge).

Children learn about the sound structure of the language and build the necessary phonological awareness skills for reading success during the preschool years (Pullen & Justice, 2003). Studies indicate that young children can be taught phonological awareness and that improvement in phonological awareness relates to better reading outcomes (Johnston, McDonnell, & Hawken, 2008).

Prior to any explicit tuition in alphabetic knowledge, phonological sensitivity develops at the larger grain sizes—syllables, onsets, and rhymes (Goswami, 2002). Anthony et al. (2003) investigated the order of acquisition of phonological sensitivity skills in English among preschool and kindergarten children. Children generally mastered word-level skills before they mastered syllable-level skills, syllable-level skills before onset–rime skills, and onset–rime-level skills before phoneme-level skills, controlling for task complexity. It is still unclear which progression follows development of phonological awareness in Bosnian, a language with a transparent orthography. Transparent orthographies are those where spelling-sound rules are fairly simple (Rodrigo et al., 2004), the grapheme-phoneme correspondence is one to one, and opaque are those where one phoneme corresponds to several graphemes, and one grapheme can correspond to several phonemes (Serrano & Defior, 2004). In the hypothetical classification of participating languages relative to the dimensions of syllabic complexity (simple, complex) and orthographic depth (shallow to deep) (Seymour, Aro, & Erskine, 2003), it is represented that orthographies closer to the transparent end are Finish, Greek, Italian, Spanish, and those closer to the opaque end are English, Danish, French. Consistency in sound-letter associations and primarily one-to-one phoneme-grapheme correspondence makes Bosnian a transparent orthography. In Bosnian, each word has as many letters as the voices during pronunciation. Exceptions are the Latin letters lj, nj, dž (Jahic, 1998). These voices are marked as diagraphs (Halilovic, 1995).

The discovery of the relationship between phonological awareness and the process of learning to read is one of the most important contributions of the last 30 years of research in

the domain of the acquisition of literacy (Silva & Alves-Martins, 2002).

Different authors concluded that there is a potentially causal link between phonological awareness skill and early literacy acquisition (Badian, 1998; Aro et al., 1999; Harm, McCandliss, & Seidenberg, 2003; Pullen & Justice, 2003; Wendy, 2007; Figen & Gozde, 2008). Poor readers have impaired phonological abilities prior to learning to read (McNeil, 2001). In the study of Holopainen, Ahonen & Lyytinen (2001) children who had acquired phonological awareness, most were already able to read or became readers very quickly. Importance of phonological skills in acquisition of reading skills is shown in different languages, in English, Polish, Spanish, Chinese (Bogdanowicz, 2003; Anthony et al., 2006; Anthony, Williams, McDonald & Francis, 2007; So & Siegel, 1997).

The National Reading Panel's 2000 report to the U.S. Congress concluded that phonological awareness instruction has moderate and significant effects on reading and spelling abilities and that explicit instruction is beneficial for typically developing children, for young children at risk for reading difficulties, and for poor readers (Anthony & Francis, 2005).

Different authors noted that in conjunction with phonological awareness, factors of letter knowledge may also be among the predictors of literacy skill (Pennington & Lefly, 2001; Holopainen, Ahonen & Lyytinen, 2001; Shah, 2002; Lyytinen, Aro & Holopainen, 2004; Puolakanaho et al., 2007; Torppa, Lyytinen, Erskine, Eklund, & Lyytinen, 2010; Skibbe, McDonald, Morrison, & Jewkes, 2011). Researchers also have reported a relation between letter knowledge and phonological skills prior to the onset of formal reading instruction (Burgess & Lonigan, 1998; Carroll, 2004), and between these skills in the preschool period and subsequent reading skills at school age (Molfese et al., 2006). When children have emerging knowledge about print, they are acquiring the ability to name letters and the knowledge that letters are associated with sounds (Landry, Swank, Smith, Assel, & Gunnewig, 2006).

Johnston, Anderson & Holligan (1996) found that only children with some letter knowledge showed any success on a phoneme awareness task, and that letter knowledge was more closely related to phoneme awareness than rhyme awareness was. In the research carried out by Bowey (1994) both novice readers and nonreaders high in letter knowledge were sensitive to phonemic units. Children classified as novice readers were higher in phonological sensitivity than nonreaders.

Most research on development of phonological awareness and letter knowledge, and relation between these skills, reported in international journals has been carried out among English speakers. Less is published within orthographically regular language contexts.

In the present study, we investigated the progress of development of phonological awareness and relation with letter knowledge, in a group of preliterate 4,6 to 5,6 years old children, for the language with regular orthography (Bosnian).

Our study addressed the following questions:

1) Do children have developed phonological awareness before learning to read?

2) What does progression follow development of phonological awareness in preschool children for a language with a regular orthography?

3) Is letter knowledge related to the development of phonological awareness?

2. Methods

2.1 Participants

The sample consisted of typically developing preschool children (N = 505; 249 girls and 256 boys) from 10 different places in Bosnia and Herzegovina, the cities with approximately 28,000 to 765,000 inhabitants.

Participants ranged in age from 4:6 (years: months) to 6:5 and attended preschool institutions. For analysis purposes, the children were divided into 6- month age groupings (groupings in years: months: 4:6 – 4:11, 5:0-5:5, 5:6-5:11, 6:0-6:5). The number of children per group and the number of boys and girls per group are provided in Table 1.

The sample contained children from a wide range of socioeconomic circumstances. All children had not been exposed to formal reading instruction and were monolingual native speakers of Bosnian.

Table 1. Number of children in each group

	4:6 – 4:11	5:00-5:5	5:6-5:11	6:00-6:5
Boys	58	70	68	60
Girls	66	62	63	58
Total	124	132	131	118

2.2 Procedure

Management of preschool institutions informed parents of children participating in preschool programs at 13 different institutions in 10 different places and asked them for participation of their children in this survey. All parents gave permission for that. Each child was tested individually by trained speech-language therapists at the child's preschool institution in a room near the child's classroom. The phonological matching tasks were presented in a fixed order. Phoneme discrimination matching task was presented first, then rhyme matching task, then the initial-phoneme task and finally the letter knowledge task. All of tasks were presented in separate sessions.

Tasks from the Dyslexia Early Screening Test – Second Edition (DEST-2) (Nicolson & Fawcett, 2004), adopted in Bosnian language by Duranovic (2008), were used to measure phonological awareness and letter knowleadge. It was intention on assessing children's phonological skills which are connected with future reading success (with dyslexia).

2.2.1 Phonological discrimination

The child was presented with pairs of one-syllable words, and asked to say if they were the same or different. We turned away from the child as we said the words, so that child couldn’t pick up cues by watching our lips and spoke clearly while trying not to over-emphasis the

pronunciation. The three pairs of words were said from the practice with about a half-second gap. In three practice trials, the child got response whether they were right or wrong, but in the main test the child didn't have any response about his or her answer. Words differ in terms of the initial or final consonant. Words were presented in a single block of 9 trials with the most trials differing by initial feature (e.g. ''bas'' vs. ''pas''). The score was the total number correct in the main test.

2.2.2 Rhyme Detection

For Rhyme Detection, the child indicates whether two words spoken by the examiner rhyme. First, we tried to explain what is rhymes, that words rhyme if they have the same sound at the end. After that, four pairs of words were used for practice. Each pair of words in the practice was told with about half a second between them. The child was asked to say „yes" or „no" after each practice pair is spoken. The child was corrected if she/he got it wrong. In the main test, eight pairs of one-syllable or two-syllable words were used. The child did not get the response if he or she did that right or wrong. The score was the total number correct in the main test.

2.2.3 Initial phoneme

The child was asked to tell the first sound in a word spoken by the examiner. There were three items for practice and five test items. If the child had difficulty with the task at the practice stage, we helped them by thinking of another world and by stressing the initial letter. We didn't spend more than 2 minutes helping them. For the main test we did not give any feedback or any help. The score was the total number correct in the main test.

2.2.4 Letter Naming

The letters were presented on the card, one row for practice and three rows for the main test. The child was asked to give the letter name for 10 lowercase letters (10 second limit per letter). If the child responded with the letter's name, the child wasn't asked if he or she knew its sound, because the basic principle of writing in Bosnian language is phonemic - alphabetical principle, which simply means that you write what you hear. According to this principle each phoneme in a spoken word is written by a defined sign (grapheme) which is always represented by the same letter. The early letters in this test (t, s, d, e) are among those first learned, while others represent those typically learned later (Nicolson & Fawcett, 2004). For the practice we told the child the right answer if necessary and for the main test we didn't give any response.

3. Results

3.1 Summary Data for the Phonological Awareness Tasks

The means and standard deviations for each of the phonological matching tasks and letter knowledge are shown in Table 2. Mean scores showed that there was improvement in development of each phonological skill every six months. Each succeeding group achieved higher means than the preceding one. The percentage of children by their score on each of the tasks is also shown in Table 2. It can be seen from the percentage of children that the

phonological discrimination and initial phoneme tasks were easier than the rhyme task. The development of phonological awareness follows the progression of phonological discrimination, then identification initial phoneme, then rhyme detection. The score for rhyme detection improved with each succeeding age group, although even 6-years-olds had some difficulties with this task. Only 25% of children at age 6:0 – 6:5 scored the best result.

Half 4-year-olds (4:6-4:11) didn't know any letter. Scores on the letter knowledge task improved with each succeeding group. It can be seen from the percentage of children that the development of letter knowledge isn't finished in 6-years-olds (6:0-6:5) who had not been exposed to formal reading instruction, because only 44,4% of children this age knew all letters and 7,8% of them didn't know any letter.

Table 2. Means (and Standard Deviations) and Frequencies for Each of the Phonological Matching Task and Letter Knowledge for Four Age Groups

Variable	Children age 4:6-4:11	Children age 5:00-5:5	Children age 5:6-5:11	Children age 6:0-6:5
Phonological discrimination				
M (SD)	5.19 (2.87)	6.08 (2.78)	7.11 (1.99)	7.40 (1.62)
0	15.7%	11.7%	2.0%	0%
1-3	8.6%	4.3%	2.7%	2.5%
4-6	35.7%	28.4%	25.8%	21.2%
7-9	40.00%	55.6%	69.5%	76.3%
Rhyme detection				
M (SD)	1.34 (2.07)	2.15 (2.40)	3.50 (2.79)	4.50 (2.53)
0	64.2%	45.3%	30.8%	12.0%
1-3	16.4%	22.7%	11.2%	24.0%
4-6	17.9%	26.0%	39.3%	39.0%
7-8	1.5%	6.0%	18.7%	25.0%
Initial Phoneme				
M (SD)	1.22 (1.68)	2.88 (2.23)	4.31 (1.63)	4.37(1.32)
0	55.9%	33.1%	6.0%	5.2%
1-3	30.9%	12.7%	14.9%	10.3%
4-5	13.2%	54.2%	79.1%	84.5%
Letter knowledge				
M (SD)	1.26 (1.74)	3.06 (2.97)	5.30 (3.36)	6.45 (3.20)
0	50.00%	27.5%	10.1%	8.7%
1-4	42.60%	43.8%	32.9%	15.7%
5-7	7.40%	18.1%	25.5%	31.3%
8-10		10.6%	31.5%	44.3%

The analysis was performed on the data from the analysis of the phonological matching task in order to verify that preschool children differ with respect to the development of

phonological awareness and letter knowledge by the age. To address this we carried out a one-way ANOVA. One-way ANOVA was undertaken separately for each task, involving the four groups. This analysis has one factor: age. The region of significant difference between the four groups was for all tasks ($p < 0.05$). There was a main effect of age for phonological discrimination $F=18,11$, p =0,00, for detection of rhyme $F=29,06$, p =0,00, for detection initial phoneme $F=60,68$, p =0,00, and for the letter knowledge, F=57.552, p= 0,00.

Table 3. Results of the analyses of variance for the Phonological Matching Tasks for Four Age Groups

	Sum of Squares	df	Mean Square	F	Sig.
Phonological discrimination	303.402	3	101.134	18.292	.000
Rhyme detection	544.409	3	181.470	29.290	.000
Initial phoneme	589.887	3	196.829	60.829	.000
Letter knowledge	1542.061	3	514.020	57.552	.000

3.2 Summary data for the development of the phonological awareness according to the number of letters known

This article aims to elucidate relationship between letter knowledge and phonological awareness by considering development of three sub-skills of phonological awareness depending of children's letter knowledge. Means showed that scores on all tasks improved with each succeeding group. We can see that children who didn't know any letter achieved minimal levels of skills in rhyme and initial phoneme detection, but level of phonological discrimination skill was satisfactory.

Table 4. Means (and Standard Deviations) for Each of the Phonological Matching Task according to the number of letters known

Variable	Number of letters known: 0	Number of letters known: 1-4	Number of letters known: 5-7	Number of letters known: 8-10
Phonological Discrimination M (SD)	5.10 (2.91)	6.24 (2.60)	7.25 (1.68)	7.71 (1.56)
Rhyme Detection M (SD)	1.95 (2.45)	2.10 (2.37)	3.64 (2.61)	4.44 (2.78)
Initial phoneme M (SD)	1.51 (2.04)	2.89 (2.14)	4.53 (1.41)	4.68 (.80)

We carried out ANOVA with the number of letters known as the independent variable and either the results of analysis for each of the phonological matching task as the dependent

variables. We obtained a figure of F=21.08, p = .00 for the phonological discrimination task, F=17.41, p = .00, for the rhyme detection task, and F=60.37, p = .00 for the initial phoneme task. There were statistically significant differences in all tasks between the four groups. As Table 5 shows, children who knew more number of letters had significantly better phonological skills than children who knew less number of letters.

Table 5. Results of the analyses of variance for the Phonological Matching Tasks according to number of letters known

	Sum of Squares	df	Mean Square	F	Sig.
Phonological Discrimination	443.711	4	110.928	21.083	.000
Rhyme Detection	449.289	4	112.322	17.407	.000
Initial phoneme	714.177	4	178.544	60.372	.000

3.3 Relationships Among the Tasks

Correlations among the letter knowledge and phonological awareness variables are shown in Table 6. The phonological tasks were all intercorrelated. Letter knowledge was significantly associated with all phonological measures (absolute value of correlation coefficients ranged from 0.38 to 0.57).

Table 6. Correlations Between the Letter Knowledge Tasks and the Phonological Awareness Variables

	Phonological discrimination	Rhyme detection	Initial phoneme	Letter knowledge
Phonological discrimination	1	.381	.406	.383
Rhyme detection	.381	1	.380	.376
Initial phoneme	.406	.380	1	.573
Letter knowledge	.383	.376	.573	1

We investigated the power of phonological awareness in predicting letter knowledge. Our goal is to observe if the development of phonological discrimination, detection of rhyme and initial phoneme can lead to reasonably accurate prediction of letter knowledge. Our initial analysis of the correlation of the phonological matching tasks showed a strong positive correlation. This suggests a strong linear relationship among the variables considered. Accordingly, we constructed a linear regression model which determined the prognostic validity of predictive variables whose values are derived by assessment of phonological awareness in relation to the criterion variable letter knowledge. From the Table 7 we can see

that multiple R is 0.630 and statistic significant which indicates a good prediction of the predictor variables with the criterion variable. R Square explained percentage of variance between the predictors and criteria with 39.7%. From the individual values of predictors or partial correlation coefficients, predictors for the criterion variable letter knowledge are all variables of phonological awareness. It can be concluded that all variables of phonological awareness for the total sample were good predictors of letter knowledge.

Table 7. Linear regression analysis of variable letter knowledge

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.695	.622		-2.727	.007
	Phonological discrimination	.168	.062	.120	2.719	.007
	Rhyme detection	.183	.055	.143	3.327	.001
	Initial phoneme	.743	.071	.459	10.527	.000

Multiple R	R Square	F	Sig.
.630	.397	67.914	.000

4. Discussion

We explored the early stages of the development of phonological awareness among a large group of preschool children ranged in age from 4:6 to 6:5. There is no information about the early development of phonological skills in Bosnian and how these developments relate to letter knowledge. The present study gives evidence about the early phonological abilities that are important for learning to read.

In this study preschool children differed with respect to the development of phonological awareness by the age. Each succeeding group achieved higher means on all phonological tasks than the preceding one. The results in the study of Lonigan, Burgess, Anthony & Barker (1998) also indicated that as children increased in age, phonological sensitivity both increased in absolute terms and became more stable. McDowell, Lonogan & Goldstein (2007) conducted cross-sectional quantitative study included a total of 700 participants between 2 and 5 years of age. Results indicate that age contributed unique variance to the prediction of phonological awareness.

In this study 31,3% of 6-year-olds could name 8-10 letters and 44,3% could name 5-7 letters. One possible explanation for these results is that children did not have problem to name the early letters which are among those first learned, but most of them had a problem to name letter which are typically learned later. These results are not in line with results carried out in English language. West, Denton & Germino-Hausken (2000) reported statistics on a sample

of 22,000 children from kindergarten through fifth grade. At kindergarten entry, 66% of the children could name upper- and lowercase letters of the alphabet; 29% recognized the beginning sounds of words. In this study 84,5% of 6-year-olds could recognize initial phoneme of words. The orthography of a particular language could have an impact on phonological development. As different orthographies have different rules for mapping written symbols onto sounds, the consistency of such mappings in a given language may influence how a learner's phonological awareness development proceeds. In transparent languages the phoneme unit may become a highly salient unit much sooner than in opaque languages (Geudens, 2006). Data from different languages showed that speakers of transparent languages perform much better on phoneme tasks than English speakers (see Ziegler & Goswami, 2005, Table 1). Also, the results for Indonesian, an orthographically transparent language, in general indicate that the phoneme is the prominent phonological unit in the early acquisition of reading and spelling (Winskel & Widjaja, 2007).

Anthony & Lonigan (2004) examined the relation of sensitivity to rhyme with other forms of phonological awareness. Rhyme sensitivity was indistinguishable from phonemic, segmental awareness, and global phonological sensitivity in younger children. In the present study children developed skills of phonological discrimination and detection of initial phoneme before rhyme awareness. Rhyme detection was the most difficult task for the children of all ages. Big improvement in detection of initial phoneme is noted in children age 5:0-5:5 with regard to 4-year-olds. The largest percent of children at age 5:6-5:11 and 6-year-olds (6:0-6:5) were the most successful in detection of initial phoneme. These results are obtained for language with regular orthography and are not in line with results which are got for English, where children master rhyming skills at the age of 4 to 5. Phoneme awareness skills appeared to be most difficult (Liberman, Liberman, Mattingly, & Shankweiler, 1980). During the preschool and early school years, children progress through three levels of phonological awareness: from awareness of syllables to awareness of onsets and rhymes and finally to phoneme awareness (Goswami & Bryant, 1990). The research carried out by Wendy (2007) also proposed that phonological awareness develops along a continuum of linguistic awareness beginning with syllables and moving towards the smallest level of the phoneme. Several more studies also found that children's rhyme skills developed earlier than their phoneme skills (Carroll, Snowling, Hulme & Stevenson, 2003; Cataldo & Ellis, 1988).

Both rhyme and alliteration reflect children's ability to consider the sound structure of language as separate from meaning. Rhyme refers to two words' sharing of a rhyme structure, whereas alliteration refers to two words' sharing of a phoneme in the initial, medial, or final position. Rhyme instruction should begin with easier tasks such as rhyme recognition and move to more difficult tasks such as rhyme generation (Pullen & Justice, 2003). In this study we used easier task- rhyme recognition. Although children had the lowest results in rhyme detection, there were significant differences in acquision of this skill between the four groups and improved with each succeeding age group. Nicolson & Fawcett (2004) argued that there are large differences in rhyme detection ability pre-school, so if a child has just started school the test is often better used as a counter-indicator, that is, if the child can do the rhyme test at age 5, he/she is not likely to be dyslexic. The findings in the study of Jimenez & Ortiz (1994)

reveal that onset and rhyme awareness and phonemic awareness is higher in good readers than in disabled readers and non-readers.

Aro et al. (1999) tried to explain differences between English and transparent languages in line that the relevance of specific phonological abilities to developing reading skills might depend on the features of the orthography. They stated that in a language with an irregular orthography like English, the pronunciation is unpredictable at the level of single letters but more predictable at the level of larger units such as rhymes. The acquisition of reading skill is enhanced if a child is aware of those units of spoken language that are represented in a regular, transparent way. Therefore, awareness of large units such as rhymes would be an important predictor of reading skills in English, but not in a language with regular orthography like Finnish, which is transparent at the level of single letters.

In the present study 40% of 4-years-olds did not have problem in phonological discrimination. This task was the most easer for this group of children. The results of Tamashige et al. (2008) also suggest that syllabic discrimination of phonemes in the Japanese phonological system is established by age 4 years which is consistent with the literature regarding syllabic discrimination in the English language. Treiman, Broderick, Tincoff & Rodriguez (1998) found that preschoolers and kindergartners were more likely to mistakenly judge that a syllable began with a target phoneme when the initial phoneme of the syllable differed from the target only in voicing, than when it differed in place of articulation or in both place and voicing.

This article had aim to investigate relationship between letter knowledge and phonological awareness by considering development of three sub-skills of phonological awareness depending of children's letter knowledge. Results showed differences between children in phonological awareness according to their number of letter known. Geudens (2006) stated similar results of different researches where preliterate children who have very low letter knowledge and no reading ability do not seem to be able to manipulate phonemes.

Learning the names of letters and the sounds they represent provides a concrete way to attend to phonemes, given that phonemes do not have physical reality independent of each other (Anthony & Francis, 2005). In the study conducted by Muter & Diethelm (2001) letter knowledge was a strong predictor of reading skills in English and non-English speaking children. Results in the study Lonigan, Burgess & Anthony (2000) indicated that letter knowledge in the late preschool period, indexed by knowledge of both letter names and letter sounds, predicted 72% of the variance in kindergarten and first-grade children's letter knowledge. In this study, there is significant association between letter knowledge and all phonological measures, and all variables of phonological awareness were good predictors of letter knowledge. Authors Torppa, Pokkeus, Laakso, Eklund, & Lyytinen (2006) found for English that phonological sensitivity predicted delayed letter knowledge and Shah (2002) found that letter-sound knowledge is a critical skill in attaining a better phonological awareness. In Finnish, language with regular orthography (like in Bosnian) practically every phoneme corresponds to one letter. Consequently, these somewhat abstract units of spoken language are concretely and consistently marked with single letters in writing, making the

phonemes explicit for the beginning reader. In the case of Finnish, phonemic awareness might be more closely related to letter knowledge and might develop simultaneously with it (Aro et al., 1999).

Results in the study of Naslund & Schneider (1996), for German, language with transparent orthography, indicated the primacy of phonological awareness in predicting later literacy. Combining phonological awareness training with instruction in letter-sound knowledge has powerful effects on subsequent literacy achievement (Schneider, Roth & Ennemoser, 2000). In the present study it is also shown that phonological awareness is good predictor of letter knowledge.

5. Conclusion

The results of the present study suggest that development of preschool phonological awareness is different for Bosnian transparent language than for English. Differences between development of phonological awareness in Bosnian and English can be explained by varied spelling-to-sound consistency. In English one letter or letter cluster can have multiple pronunciations whereas in Bosnian it is always pronounced the same way, in English a phoneme can have multiple spellings, whereas in Bosnian it is always spelled the same way. It is relatively easy to learn about phonemes if one letter consistently maps onto one and the same phoneme or if one phoneme consistently maps to one and the same letter. It is relatively difficult to learn about phonemes if a letter can be pronounced in multiple ways and if a phoneme can be spelled in multiple ways (Ziegler & Goswami, 2005).

Children's phonological awareness in Bosnian started with development before learning to read. As children increased in age, phonological awareness and letter knowledge both increased. The phonological discrimination and initial phoneme tasks are easier than the rhyme task. The development of phonological awareness follows the progression of phonological discrimination, then identification initial phoneme, then rhyme detection. There are differences in phonological awareness between children according to their number of letter known. Letter knowledge is associated with all phonological measures and all variables of phonological awareness were good predictors of letter knowledge.

These results are unique for Bosnian language. They give evidence about development of aspects of phonological awareness in preschool children that are important for reading acquisition and their link with letter knowledge. Further research would be needed to include more phonological awareness tasks to get broader picture about development of phonological skills in Bosnian.

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