

PHONOLOGICAL AWARENESS IN PRESCHOOL CHILDREN WITH DEVELOPMENTAL LANGUAGE DISORDER

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ФОНОЛОШКА СВЕСНОСТ КОД ДЕЦЕ ПРЕДШКОЛСКОГ УЗРАСТА С РАЗВОЈНИМ ЈЕЗИЧКИМ ПОРЕМЕЋАЈЕМ

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ABSTRACT

Objective. To determine the level of development of phonological awareness in children with developmental language disorder at the age of five to six years compared to children with typical language development.

Methods. Ninety children aged 5 to 6, of both genders, divided into three groups, participated in the study. The Phonological Awareness Test was applied. The study was conducted during January and February 2024.

Results. The analysis of the results showed that phonological awareness deficit was not more frequently manifested in children with developmental language disorder compared to children of typical development, as well as that there was no statistically significant difference in the manifestation of phonological awareness deficit in children with developmental language disorder in relation to gender, in terms that these problems are more frequently found in boys.

Conclusion. The majority of research indicates that various components of phonological awareness in children with Developmental Language Disorder are less developed compared to their typically developing peers. However, certain studies show different results, similar to those obtained in this research; namely, that a phonological awareness deficit is more frequently observed in children with typical language development than in children with Developmental Language Disorder.

Key words: language development disorders; child; child, preschool.

INTRODUCTION

Children with developmental language disorder exhibit an altered developmental pattern of language structure. Literature data provide evidence of delays and/or difficulties in the development of phonological, lexical, morphological, and syntactic structures. However, the nature of developmental language disorder (DLD) is still not fully understood. Children manifest lexical deficits by using shorter words; they have restricted vocabulary, and evident difficulties with polysyllabic words. Grammar deficits are manifested at morphological and syntactic levels. Phonological disorders manifest as

САЖЕТАК

Циљ. Утврдити ниво развијености фонолошке свесности код деце с развојним језичким поремећајем у узрасту 5–6 година у односу на децу с типичним језичким развојем.

Методе. У истраживању је учествовало деведесеторо деце узраста 5–6 година оба пола, подељених у три групе. Примењен је тест фонолошке свесности. Истраживање је вршено током јануара и фебруара 2024. године.

Резултати. Анализа резултата у овом истраживању показала је да се дефицит фонолошке свесности не испољава чешће код испитаника с развојним језичким поремећајем него код деце с типичним развојем, као и то да не постоји статистички значајна разлика у испољавању дефицита фонолошке свесности код деце с развојним језичким поремећајем у односу на пол, у смислу да се ови проблеми чешће испољавају код дечака.

Закључак. Већина истраживања показује да су различите компоненте фонолошке свесности код деце с развојним језичким поремећајем развијене у мањој мери у поређењу са њиховим вршњацима типичног развоја. Међутим, одређена истраживања показују другачије резултате, који су слични резултатима добијеним у овом истраживању, тј. да се дефицит фонолошке свесности чешће испољава код деце с типичним језичким развојем него код деце с развојним језичким поремећајем.

Кључне речи: поремећаји у развоју језика; дете; дете, предшколско.

reversals, inversions and metatheses of phonemes in the words, and very often a larger number of sounds may be inaccurately spoken or used (1). Phonological awareness is the conscious awareness of the phonological structure of words in one's language (2), which along with phonological representation, forms a unique construct. The concept of phonological representation is an abstract one and in a broader sense it refers to storage of phonological information in the long-term memory (3). Phonemic awareness means segmenting words into phonemes and blending phonemes to form words, and it is a part of phonological awareness concept. Phonological awareness is a broader construct than phonemic awareness

(4). It is the ability to analyze and synthesize syllables and words, i.e., longer language elements than phonemes, but it also involves manipulation of phonological elements of the words. In other words, phonological awareness is defined as the ability of a child to recognize words as parts of a sentence, to identify and reproduce rhyming words, and to recognize syllables in a word (5). It is considered that phonological awareness is established when a child can develop the ability to identify and reproduce rhyming words, identify sounds in words and segment words into sounds (6).

The aim of this study was to determine the developmental level of phonological awareness in children with developmental language disorder aged 5 to 6 years in comparison with children with typical language development.

Phonological skills include the use of phonological representations along with conscious and metacognitive skills, fast and serial identification, and working and short-term memory (7, 8).

PATIENTS AND METHODS

The target population in this study were children with developmental language disorder aged 5 to 6 years. The study included a total of 90 children of both genders. They were divided into three groups: control group 1, control group 2, and experimental group. The experimental group consisted of 30 children with developmental language disorder, who were undergoing speech and language therapy and met the inclusion criteria – 12 girls and 18 boys. The control group 1 included 30 children with typical language development – 15 boys and 15 girls. The control group 2 comprised 30 children, 15 girls and 15 boys, who were in the process of diagnostic assessment for potential speech-language disorders, and who had not yet begun treatment.

RESULTS

For the assessment of phonological awareness, the FONT test (Subotić-Knežević 2011) was applied (9). It consists of eight tasks/subscales, each containing six items (including instructions): a) blending syllables, b) syllables segmentation, c) identifying the initial syllable, d) recognizing rhyme, e) phoneme segmentation, f) identifying the final phoneme, g) phoneme deletion, h) phoneme substitution. Children were instructed that they would hear words presented in a slow manner and in segments. They were asked to merge them and articulate the given words. All tasks within this test were given to the children orally, and the speech therapist recorded the answers using a right-wrong principle. A non-response was considered a wrong answer. This instrument has

Table 1. Distribution of wrong answers by subscales.

Item	Wrong answer	
	f	%
Blending syllables	69	12
Syllables segmentation	91	16.9
Identifying the initial syllable	116	21.5
Recognizing rhyme	107	19.8
Phoneme segmentation	140	25.9
Identifying the final phoneme	116	21.5
Deletion of the initial phoneme	159	29.4
Phoneme substitution	247	45.7

demonstrated good internal consistency reliability (Cronbach's $\alpha = .94$).

As illustrated in Table 1, participants in our study gave the largest number of wrong answers to the Phonemic substitution item (45.7%), and the smallest number of wrong answers to the Blending syllables item (69%).

Phonological awareness deficit, according to the instrument of the FONT test, is identified by achieving a low score (48 max). Having in mind that children with DLD were undergoing speech and language therapy, and children with typical language development (TLD) and those in control group 2 were in the process of diagnosis, then according to $M=34.33$, $SD=8.47$, children with DLD exhibited a higher level of phonological awareness than children with TLD ($M=31.33$, $SD=9.90$), and a lower level than children in control group 2, who were undergoing the process of diagnosis for potential speech-language disorders and had not yet begun treatment ($M=44.17$, $SD=2.49$).

The critical value for 95% confidence interval (the mean standard error) was ± 1.96 . Thus, Table 2 shows that there was no mean standard error over the critical value for all three groups (Control group 1 – TLD, Control group 2 – process diagn., and Experimental group – DLD). These results demonstrate no phonological awareness deficit among children with DLD included in this study. The participant sample was divided into three groups (Control group 1 – TLD, Control group 2 – process diagn., and Experimental group – DLD), and the study focused on speech-language disorders present in the group of children with DLD, while absent in children with TLD and not diagnosed in the control group 2. Thus, the potential association between language disorders and phonological awareness was examined in these two groups – children with TLD (1) and children with DLD (3). Further, by selecting cases, group 2 was excluded, and only these two groups (TLD and DLD) were statistically analyzed. The results of the correlation are presented using point-biserial correlation (Table 3).

According to the nominal variable (groups of participants) and interval variable (phonological awareness), the point-biserial correlation (rp. bis), by the

Table 2. Test results (phonological awareness) in all groups of participants.

Group	N	min	max	M	SD	SEM	95% CI	
Control group 1 – TDL	30	16	44	31.33	9.90	1.81	27.64	35.03
Control group 2 – process diagn.	40	47	47	44.17	2.49	0.46	43.24	45.10
Experimental group – DLD	30	18	46	34.33	8.47	1.55	31.17	37.49

Table 3. Results of point-biserial (rp.bis) correlation.

Gender	Correlation
1. Groups of participants	1
2. Test results (phonological awareness)	0.17

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 4. Descriptive statistics of phonological awareness according to gender of children.

Gender	N	Me	IQR
Male	15	31	19
Female	15	35	13

Spearman's method ($rp.bis = 0.17$, $p > .05$), showed no significant statistical correlation between speech-language disorders and phonological awareness deficit in children with language disorders (DLD) and children without language disorders (TLD).

Prior to conducting the Mann-Whitney test for potential differences in DLD according to the child's gender, we removed the split file for gender. The results showed no significant difference in expressing phonological awareness deficit in children with DLD in terms of gender ($U = 80.500$, $p > .05$). This leads to a conclusion that the statement phonological awareness deficit is more frequently found in boys cannot be confirmed.

DISCUSSION

The principal aim of this study was to determine the level of developmental phonological awareness in children with developmental language disorder aged 5 to 6 years compared to children with typical language development.

One study applied the FONT test in children with typical language development and it was not possible to distinguish between less and more demanding tasks by which phonological awareness in children with speech-language disorders could be examined. It was assumed that a larger number of tasks would be difficult for children with language disorders to accomplish, regardless of age (10).

Studies that investigated phonological awareness in children with developmental language disorders have shown that these children achieve significantly poorer results in executing various types of tasks related to phonological awareness than children with typical language development (TLD).

In English-speaking context, for assessment of phonological awareness in children the following tests are applied: Phonological Awareness Test-2 – PAT-2 (from 5 to 9.11 years) (Robertson & Salter, 2018), The Sutherland Phonological Awareness Test – Revised SPAT-R (Neilson, 2003), Comprehensive Test of Phonological Processes – CTOPP (Wagner et al., 1999) and Pre-Literacy Skills Screening - PLSS (Crumrine & Lonegan, 1999), as well as screening tests, such as Phonological Awareness Screening Test – PAST (Kilpatrick, 2016) (11).

Farquharson et al. in their study from 2014 determined a similar pattern of phonological processing in both children with and children without language disorders regarding the task of repetition and deletion of sounds in words and non-words, although children with DLD showed weaker performance than children with TLD. Children with DLD were most successful when completing tasks on phonologically similar words and when the first and the last two sounds were different. The authors have underscored that the differences between children with TLD and children with DLD is generally quantitative and not qualitative in nature (Farquharson et al., 2014). (12).

A study by Australian authors made a more thorough comparative analysis of phonological awareness between children with DLD and children with TLD. Children with TLD were matched with their peers by age (one subgroup) and by language skills (another subgroup). The authors discovered that children with DLD were more successful in performing tasks on rapid naming than their younger language-matched children, but performed worse than their age-matched TLD peers. Regarding tasks on phonological short-term memory, working memory, and phonological representations, they also demonstrated weaker performance than both subgroups of children with TLD (13).

The analysis of results showed that children with typical language development (TLD) who were undergoing speech and language treatment had a higher level of phonological awareness than children with typical language development, but lower than children in control group 2, i.e., than children who were undergoing diagnostic assessment for potential speech and language disorders and had not yet begun treatment. The results of this study related to phonological awareness of children with DLD and children with TLD, although unexpected in this investigation, were in agreement with findings from other studies (11). These studies found that children with

DLD had the same pattern of phonological processing as children without language disorder when performing tasks of repetition and deletion of sounds in words and non-words, although children with DLD performed worse than children with TLD. Children with DLD were more successful in completing tasks of phonologically similar words and when the first and last two sounds differed. The authors emphasized that the differences between children with TLD and those with DLD were generally quantitative and not qualitative in nature.

Additionally, children with DLD showed a lower level of phonological awareness than children in control group 2, who were undergoing diagnostic assessment for potential speech-language disorders and had not yet started treatment.

Our findings demonstrated that children with DLD had lower phonological awareness than children in control group 2, who were in the process of diagnostic assessment and had not yet begun treatment.

Furthermore, our results revealed no statistically significant correlation between speech and language disorders and phonological awareness deficit. These results coincide with those obtained in another study (14), where no statistical correlation was found regarding speech and language disorders and phonological awareness deficit.

Contrary to this conclusion, Čolić in her research found that preschool children with DLD demonstrated statistically significantly worse results in performing complex tasks of phonological awareness (rhyming, phoneme deletion, phoneme substitution, phoneme segmentation, phoneme synthesis and words) compared to children with TDL. However, the author emphasized that children with DLD had successfully completed tasks that required simple aspects of phonological processing (analysis and synthesis of words into syllables and words), probably due to the developed phonological memory, although these children exhibited lower level of overall performance than that of children with TLD (14).

The results obtained in our study showed that the most challenging tasks for children were those involving phoneme substitution. We assume that the task of substitution is cognitively more complex in terms of engagement of auditory memory alone, without visual support. Phoneme substitution does not mean changing the length of words (for e.g. Niš-miš, novac-lovac), but requires an explicit understanding and perception of sound segments in words, and, hence, cognitive processes in this case are more demanding for children with regard to all or majority of other tasks from the test. These results are in agreement with the results presented by other studies (15).

The comparison of performance between male and female participants on the FONT test showed no

statistically significant differences between the two groups. These results align with findings reported in other studies (10, 16). The difference between performance among girls and boys has been presented in other studies. Girls' better performance has been attributed to their superior verbal skills that can influence better skills in early reading and writing abilities (17).

Elements of phonological awareness develop in the same developmental sequence but at different dynamics in these two groups of children. It can be concluded that, during the preschool period children with DLD have developed phonological memory that enables them to perform simpler phonological processing tasks, such as segmenting words to phonemes and syllables and blending phonemes and syllables in words. On the other hand, the process of complex phonological processing of words in preschool children with DLD is not developed.

Another assumption why such results have been obtained is that one potential factor not taken into consideration in this study refers to the possible effects of socioeconomic status (SES) on accomplished average performance in phonological awareness. Previous research has emphasized the importance of SES, both in isolation (18), and in interaction during the growing process. Additionally, all children in our sample were from larger urban environments, and hence, their average performance may limit the generalizability of the results achieved by children from smaller urban environments, which would require explicit empirical analysis. Nevertheless, although all that has been stated can limit the comparison and generalization of the average performance, distinguishing between less and more demanding tasks, as well as considering the importance of cognitive processes that develop along with age, are essential in performing different tasks on phonological awareness (19).

The analysis of the findings in this study indicated that deficits in phonological awareness were not more prevalent among children with developmental language disorder (DLD) compared to their typically developing peers. Furthermore, no statistically significant gender differences were observed, suggesting that such difficulties were not more frequent in boys than in girls.

Nevertheless, several limitations should be acknowledged. The relatively small sample size constrains the extent to which the results can be generalized to the broader population. In addition, the cross-sectional design limits the ability to capture potential long-term trajectories in the development of phonological awareness.

Overall, the better performance observed among children with DLD in this study can largely be attributed to the extended duration of speech and language therapy, as the participants were assessed at the final stage of their therapeutic intervention.

According to empirical findings, simpler tasks, such as the analysis and synthesis of sounds and syllables in words, do not pose a significant challenge for children with DLD. It can be concluded that the better task performances achieved by children with DLD are a result of prolonged speech and language therapy, i.e. these children are in the final phase of speech and language treatment.

The analysis of the results obtained in this study has shown that phonological awareness deficit is not more prevalent in children with DLD compared to children with TLD. In addition, there was no statistically significant difference in the occurrence of phonological awareness deficit in children with DLD based on gender, and these problems are more frequently found in boys.

ABBREVIATIONS

DLD – developmental language disorder

TLD – typical language development

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