



ASSESSMENT OF PHONOLOGICAL AWARENESS IN CHILDREN WITH MILD INTELLECTUAL DISABILITY

PROCJENA FONOLOŠKE SVJESNOSTI KOD DJECE S BLAGOM INTELEKTUALNOM TEŠKOĆOM

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Original Scientific Article

Received: 08/10/2024

Accepted: 06/01/2025

ABSTRACT

Children with mild intellectual disability need highly professional treatment in order to achieve maximum functioning in the performance of daily activities in society. Phonological awareness as a prerequisite for healthy and correct speech-language development, in children with mild intellectual disability, is not sufficiently examined by special educators and speech and language pathologist in their daily practice. The aim of this research is to assess phonological awareness in children with mild intellectual disability. For the purposes of this research, 50 children with mild intellectual disability and a control group of 50 children with typical development are included. The groups are composed of students from the second to the fifth grade who attend classes in the territory of the Republic of North Macedonia. For the purposes of this research, the “SLP.Bojan - Test for Assessment of Phonological Awareness” was used as an instrument. The results show that students with mild intellectual disabilities have a significant impairment of phonological awareness compared to students with typical development. We conclude that phonological awareness, as a prerequisite for the healthy development of a large number of important segments in the child's development, should be promptly and always assessed by special educators and speech-language pathologists, as well as its disorders should be promptly and appropriately treated.

Key words: intellectual disability, phonological awareness, assessment, test

SAŽETAK

Djeci s blagom intelektualnom teškoćom potreban je visoko profesionalan tretman kako bi postigli maksimalno funkcionisanje u obavljanju svakodnevnih aktivnosti u društvu. Fonološka svjesnost, kao preduslov za zdrav i pravilan govorno-jezički razvoj, kod djece s

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blagom intelektualnom teškoćom nije dovoljno istražena od strane defektologa i logopeda u njihovoj svakodnevnoj praksi. Cilj ovog istraživanja je procjena fonološke svjesnosti kod djece s blagom intelektualnom teškoćom. U istraživanje je uključeno 50 djece s blagom intelektualnom teškoćom i kontrolna grupa od 50 djece tipičnog razvoja. Grupe su sastavljene od učenika od drugog do petog razreda koji pohađaju nastavu na teritoriji Republike Sjeverne Makedonije. Kao instrument u ovom istraživanju korišten je „SLP.Bojan – Test za procjenu fonološke svjesnosti“. Rezultati pokazuju da učenici s blagom intelektualnom teškoćom imaju značajno oštećenje fonološke svjesnosti u poređenju s učenicima tipičnog razvoja. Zaključujemo da fonološku svjesnost, kao preduslov za zdrav razvoj velikog broja važnih segmenata u razvoju djeteta, treba pravovremeno i redovno procjenjivati od strane defektologa i logopeda, te eventualne poremećaje pravovremeno i adekvatno tretirati.

Gljučne riječi: intelektualne teškoće, fonološka svjesnost, procjena, test.

INTRODUCTION

Intellectual disability is a state of interrupted and incomplete mental development that is particularly characterized by the impairment of those abilities that occur during the development period and that affect the general level of intelligence, such as: cognitive, speech, motor and social abilities (WHO, 1992). The causes of intellectual disability are divided into: prenatal (viral infections, bacterial infections, spirochete infections, parasitic diseases, exposure to toxins, consumption of certain drugs, excessive smoking, ionizing radiation, anorexia in the mother, malnutrition in the mother, endocrine disorders, others), perinatal (fetal asphyxia, intracranial hemorrhage, hyaline lung membrane in the newborn, mechanical pressures on the fetus, prematurity, others) and postnatal (infections, exposure to toxins, malnutrition, endocrine disorders, head injuries, vascular disorders, immune reaction, others). Intellectual disability is a condition that, in addition to impairing the quality of life of the individual, represents a difficulty for his family, teachers, and society. Disturbances are manifested at the level of behavior, social adaptation, speech and language, psycho-motor skills, emotions, feelings, senses, representations, attention, opinion, memory, space-time frames, will, temperament. Intellectual disability, depending on the degree of disability, is classified as: mild intellectual disability, moderate intellectual disability, severe intellectual disability, profound intellectual disability and other unspecified types of intellectual disability. The organization of inner speech, that is, the organization of linguistic thought, is a prerequisite for a person to be able to understand, perceive, think and express himself. Phonological awareness as a prerequisite for healthy and correct speech-language development, in children with mild intellectual disability, is not sufficiently examined by special educators and speech and language pathologist in their daily practice.

Dessemontet and Chambrier (2015) in their research *“The role of phonological awareness and letter-sound knowledge in the reading development of children with intellectual disabilities”* included 129 children with mild or moderate intellectual disability between the ages of 6 and 8 where who were administered an academic achievement test. Findings indicated that phonological awareness and letter-sound knowledge at 6-8 years of age predicted progress in word and non-word reading after one school year and two school years after controlling for IQ, age, expressive vocabulary, spoken language, and type of placement.

Phonological awareness and letter-sound knowledge at 6-8 years of age also predicted progress in reading comprehension after one school year and two school years. These findings suggest that training phonological awareness skills combined with explicit phonics instruction is important to foster reading progress in children with mild and moderate ID with unspecified etiology.

In the research “Exploring Phonological Awareness Skills in Children With Intellectual Disability” (Dessementent, Chambrier, Martinet & Moser, 2017) the phonological awareness skills of 7 to 8 year old children with intellectual disability were compared to those of 4 to 5 year old children with typical development who were matched for early reading skills, vocabulary, and gender. Children with intellectual disability displayed a marked weakness in phonological awareness. Syllable blending, syllable segmentation, and first phoneme detection appeared to be preserved. In contrast, children with intellectual disability showed a marked weakness in rhyme detection and a slight weakness in phoneme blending. Two school years later, these deficits no longer remained. The findings from this research suggest that children with intellectual disability display an atypical pattern in phonological awareness that changes with age.

In the research “The influence of phonological awareness on students' reading difficulties” (Bogdanovski & Stanojkovska-Trajkovska, 2024) are included 50 students with reading difficulties, among which there are students with mild intellectual disability, and a control group of 50 students without any reading difficulties with typical development. An assessment of phonological ability was performed in all subjects. The results show that a large number of respondents with reading difficulties have impaired phonological awareness in all its segments - phonemic discrimination, verbal memory, analysis and synthesis of words, rhyming words, and rapid naming. In comparison with the control group, a significant difference was observed in the obtained results ($p < 0.05$).

The aim of this research is to assess phonological awareness in all its segments - phonemic discrimination, verbal memory, analysis and synthesis of words, rhyming words, and rapid naming, in children with mild intellectual disability who attend classes in the territory of the Republic of North Macedonia, as well as the results obtained to be compared with the results obtained from the assessment of the phonological awareness in subjects with typical development, how would we find out if the phonological ability, as a prerequisite for good speech and language development, is damaged in people with intellectual disabilities, and if it should be actively treated during special education and speech therapy treatments.

MATERIAL AND METHODS

Participants

For the purposes of this research, 50 children with mild intellectual disability and a control group of 50 children with typical development are included. The groups are composed of students from the second to the fifth grade who attend classes in the territory of the Republic of North Macedonia. Out of a total of 50 students with mild intellectual, 5 attend the second grade (10%), 8 attend the third grade (16%), 17 attend the fourth grade (34%) and 20 attend the fifth grade (40%). The control group is composed of 50 students with typical

development, of which 5 attend the second grade (10%), 8 attend the third grade (16%), 17 attend the fourth grade (34%) and 20 attend the fifth grade (40%).

Design and procedures

The research took place in the period from December 2023 to August 2024. The assessment of phonological awareness, for both groups, took place in GASPAP - a center for psychophysical health. Some of the respondents with mild intellectual disabilities have already attended or are attending special education and/or speech therapy treatments in the same center for psychophysical health. The parents of all respondents have been informed about the objectives of the research and the benefits thereof, and they have voluntarily included their children in the research. Personal data is not displayed in the research, as the anonymity of the respondents would be preserved. After completing the assessment of the phonological awareness among the respondents, the results were collected, grouped, compared, computerized and statistically analyzed.

Measures

For the purposes of phonological awareness assessment, SLP.Bojan - Test for Assessment of Phonological Awareness (Bogdanovski, 2022) was used, which examines all segments of phonological awareness - phonemic discrimination, verbal memory, analysis and synthesis of words, rhyming words, and rapid naming. Phonemic discrimination is assessed through vocal repetition of 126 examples of combinations consisting of two words that differ from each other by only one sound, that is, phoneme. A formula for the degree of phonological disorder is applied for the assessment. Verbal memory, analysis and synthesis of words, rhyming words, and rapid naming are assessed according to the given tests as poor ability, partially good ability or good ability for the specific phonological ability. Any observed disorder of phonological awareness indicates exactly that phonological disorder that should be further treated through speech therapy and/or special education treatments.

Statistical Analysis

Data from the assessment are collected, grouped and presented as percentages after computer processing. Comparison of data and statistically significant difference was calculated using chi-square test. Statistical analyses were performed using the IBM SPSS Statistics program.

RESULTS AND DISCUSSION

The results showed significant differences between the groups of respondents. The results of the evaluation of the phonemic discrimination ability (PDA) showed that out of a total of 50 students with mild intellectual disabilities, 9 have a slight impairment of the phonemic discrimination ability (18%), 24 have a moderate impairment of the phonemic discrimination ability (48%), and 17 have a severe impairment of the phonemic discrimination ability (34%). The results of the evaluation of the phonemic discrimination ability in the control group

showed that out of a total of 50 students with typical development, 11 have a slight impairment of the phonemic discrimination ability (20%), 0 have a moderate impairment of the phonemic discrimination ability, and 0 have a severe impairment of the phonemic discrimination ability. The chi-square statistic is 48.0745. The p -value is < 0.00001 . The result is significant at $p < .01$ (table 1).

Table 1. Difference between assessment of phonemic discrimination ability between the group of students with mild intellectual disabilities and the control group of students with typical development

Groups	Slight impairment of PDA	Moderate impairment of PDA	Severe impairment of PDA
Students with MID	9 (18%)	24 (48%)	17 (34%)
Students with TD	11 (22%)	0 (0%)	0 (0%)

The results obtained from this test of phonemic discrimination ability indicate that children with mild intellectual disability have a significant impairment of phonemic discrimination ability compared to children with typical development from the control group, which indicates that the impairment of this ability in persons with mild intellectual disability has a negative impact on speech-language development, perception and understanding of speech from the environment, thinking, reading, writing, and many other segments in development. Compared with the results of the research *"Exploring Phonological Awareness Skills in Children With Intellectual Disability"* (Dessement et al., 2017), which indicate that the respondents have a weakness in recognizing the first and last phoneme of the words, it is confirmed that the ability for phonemic discrimination in children with mild intellectual disability is impaired and it should always be evaluated by special educators and speech-language pathologists, and it should be treated promptly.

The assessment of verbal memory shows that out of a total of 50 students with mild intellectual disabilities, 8 have good verbal memory (16%), 23 have partially good verbal memory (46%), and 19 have poor verbal memory (38%). The assessment of verbal memory in the control group of 50 students with typical development shows that 44 have good verbal memory (88%), 6 have partially good verbal memory (12%), and 0 have poor verbal memory (0%). The chi-square statistic is 104.8774. The p -value is < 0.00001 . The result is significant at $p < .01$. (table 2).

Table 2. Difference between assessment of verbal memory between the group of students with mild intellectual disabilities and the control group of students with typical development

Groups	Good verbal memory	Partially good verbal memory	Poor verbal memory
Students with MID	8 (16%)	23 (46%)	19 (38%)
Students with TD	44 (88%)	6 (12%)	0 (0%)

The results of this assessment show that there is a significant difference in the quality of verbal memory between students with mild intellectual disabilities and students with typical development. This indicates that children with mild intellectual disability face difficulties in speech-language development and remembering the speech from the environment, which further affects the mastering of school skills. The results of the research “*Verbal working memory in children with mild intellectual disabilities*” (Van den Molen et al., 2007), indicate that the children with mild intellectual disability have an intact automatic rehearsal, but perform poorly on phonological-loop capacity. It is confirmed that the ability for verbal memory in children with mild intellectual disability is impaired and it should always be evaluated by special educators and speech-language pathologists, and it should be treated promptly.

The results of the assessment of the ability to analyze and synthesize words show that out of a total of 50 students with mild intellectual disability, 14 have a good ability to analyze and synthesize words (28%), 28 have a partially good ability to analyze and synthesize words (56%), and 8 have poor ability to analyze and synthesize words (16%). From the control group of a total of 50 students with typical development, 43 have good ability to analyze and synthesize words (86%), 7 have partially good ability to synthesize words (14%), and 0 have poor ability to synthesize words (0%). The chi-square statistic is 67.9408. The p -value is < 0.00001 . The result is significant at $p < .01$. (table 3).

Table 3. Difference between assessment of analysis and synthesis of words between the group of students with mild intellectual disabilities and the control group of students with typical development

Groups	Good analysis and synthesis	Partially good analysis and synthesis	Poor analysis and synthesis
Students with MID	14 (28%)	28 (56%)	8 (16%)
Students with TD	43 (86%)	7 (14%)	0 (0%)

A significant difference is observed in the results obtained by the two groups. The results show that students with mild intellectual disability have significant difficulties in the ability to analyze and synthesize words, compared to students with typical development. The assessment of word rhyming ability shows that out of a total of 50 students with mild intellectual disabilities, 7 have good word rhyming ability (14%), 23 have partially good word rhyming ability (46%), and 20 have poor word rhyming ability (40%). Of the control group of typically developing students, 43 have good rhyming ability (86%), 6 have partially good rhyming ability (12%), and 1 has poor rhyming ability (2%). The chi-square statistic is 106.152. The p -value is < 0.00001 . The result is significant at $p < .01$. (table 4).

Table 4. Difference between assessment of word rhyming ability between the group of students with mild intellectual disabilities and the control group of students with typical development

Groups	Good word rhyming ability	Partially good word rhyming ability	Poor word rhyming ability
Students with MID	7 (14%)	23 (46%)	20 (40%)
Students with TD	43 (86%)	6 (12%)	1 (2%)

The difference between the obtained results of the assessment of the ability to rhyme words between the two groups is significant. It indicates that students with mild intellectual disability have a pronounced phonological disorder at the level of the ability to rhyme words. The results of the research *"Exploring Phonological Awareness Skills in Children With Intellectual Disability"* (Dessementent et al., 2017) show that children with mild intellectual disability have weakness in rhyme detection, which is confirmed by this research. This indicates that the ability to rhyme words should always be assessed and treated by speech and language therapists and special educators. As with other segments of phonological awareness among students with mild intellectual disabilities, pronounced difficulties are observed with the rapid name ability. Out of a total of 50 students with mild intellectual disabilities, 12 have good rapid naming ability (24%), 21 have partially good rapid naming ability (42%), and 17 have poor rapid naming ability (34%). From the control group of students with typical development, 38 have good rapid naming ability (76%), 8 have partially good rapid naming ability (16%), and 4 have poor rapid naming ability (8%). The chi-square statistic is 54.7904. The p -value is < 0.00001 . The result is significant at $p < .01$. (table 5).

Table 5. Difference between assessment of rapid naming ability between the group of students with mild intellectual disabilities and the control group of students with typical development

Groups	Good rapid naming ability	Partially good rapid naming ability	Poor rapid naming ability
Students with MID	12 (24%)	21 (42%)	17 (34%)
Students with TD	38 (76%)	8 (16%)	4 (8%)

The assessment of rapid naming ability shows that there is a significant difference between the two groups, indicating that students with mild intellectual disability have a significant impairment of rapid naming ability compared to students with typical development. According to some studies, the deficit rapid automatized naming skills should be added to the explanations of their frequent reading difficulties, which might open new remediation possibilities (Chambrier et al., 2021). People with mild intellectual disability have difficulties in speech-language development, motor development, school skills, social interactions, and a number of other areas important for good functionality of the individual and his integration in society. Phonological awareness, as a prerequisite for healthy speech-language development, which distinguishes humans from other living beings, is impaired in these individuals. Hence, assumption is that phonological awareness disorder is one of the biggest obstacles in people with developmental disorders, including people with mild intellectual disability.

CONCLUSION

The results from this research show that students with mild intellectual disability have a significant impairment of phonological awareness compared to students with typical development. Phonological awareness, as a prerequisite for the healthy development of a large number of important segments in the child's development, should be promptly and always assessed by special educators and speech-language pathologists, as well as its disorders should be promptly and appropriately treated. We expect the treatment of phonological disorders to contribute to a significant improvement of phonological awareness, which will have an impact on the overall improvement of the condition of children with mild intellectual disability. We also expect that this scientific research will be an incentive for a large number of researchers to continue research on this issue, which will be of great importance both for our science and for all persons with mild intellectual disability.

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