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Communication Behaviors of Preschool Children with and without Hearing Loss Born in Hearing Families

Zachowania komunikacyjne dzieci w wieku przedszkolnym z uszkodzonym słuchem oraz słyszących urodzonych w rodzinach słyszących

Keywords:
communication of hearing impaired children, communication behavior, speech development, hearing impairment, preschool age

Summary: The purpose of the article is to show the differences in the level of communication of preschool children with profound and severe hearing impairment and children in the hearing norm. All the studied groups of children come from hearing families. Based on the research, the level of language skills of children with profound and severe hearing impairment was determined and compared to the level obtained by hearing children, thus determining the degree of speech development (normative, delayed or disturbed) of the children in the study group. The obtained results confirmed the existence of quantitative and qualitative differences between the children belonging to the studied groups. The analysis of individual subcategories showed the existence of an interesting relationship. An important role is played by the "mode match," which is a community of language experiences between a hearing-impaired child and their hearing mother, not the level of verbal functioning of children per se.

Słowa kluczowe: komunikacja dzieci z uszkodzonym słuchem, zachowania komunikacyjne, rozwój mowy, wada słuchu, wiek przedszkolny

Streszczenie: Celem artykułu jest ukazanie różnic w poziomie komunikacji dzieci przedszkolnych z głęboką i znaczną wadą słuchu oraz porównanie ich poziomu z poziomem dzieci w normie słuchowej. Wszystkie wyodrębnione grupy pochodzą z rodzin słyszących. Na podstawie badań ustalono poziom umiejętności językowych dzieci z głęboką i znaczną wadą słuchu i porównano go z poziomem osiągniętym przez dzieci słyszące, co umożliwiło określenie stopnia rozwoju mowy (normatywny, opóźniony czy zaburzony u dzieci z grupy badanej). Uzyskane wyniki potwierdziły istnienie różnic ilościowo-jakościowych pomiędzy dziećmi należącymi do badanych grup. Analiza poszczególnych podkategorii wykazała ciekawą zależność: ważniejszą rolę odgrywa „dopasowanie językowe" (*mode match*), czyli wspólnota doświadczeń językowych pomiędzy dzieckiem niedosłyszącym a jego słyszącą matką, niż poziom funkcjonowania werbalnego dzieci *per se*.

Introduction

According to the 2014 report of the Central Statistical Office of Poland, *The State of Health of the Polish Population*, in "the group of children aged 0–5 years, i.e., in the most important period for speech development, as much as 90% of permanent hearing damage is congenital. Only a half of children with a congenital hearing defect have an etiological factor damaging their hearing. This means that neither doctors nor parents have grounds to suspect a child's hearing problem in these cases" (GUS, 2016).

It should also be remembered that over 90% of children with hearing impairment are born in hearing families, which, as demonstrated by literature and the results of own research, affects all their members and the relationships between them.

The above data on young hearing-impaired children show the social scale of the problem. The greater the knowledge about this disorder – its impact on the child's situation, their family, environment and, hence, their educational perspective – the greater the possibility of providing assistance.

The subject of this study is the analysis of communication behaviors of children with severe and profound hearing impairment. The research aims

to provide empirical premises enabling conclusions about the determinants of the language functioning of hearing-impaired preschool age children and their hearing peers.

In the 1950s, a heated debate began about the nature of language. Its main participants, and simultaneously representatives of disparate theories, were Noam Chomsky and Burrhus Frederic Skinner (Bokus & Shugar, 2007). According to Chomski's nativist theory, universal rules covering grammars and phonologies of all languages are determined from birth, and language experience is used to "trigger" the right subset of rules; developmental change in language skills is seen as biological development, similar to the growth of body organs, rather than a learning process. According to Skinner, on the other hand, language is acquired explicitly, and its formation in a child is associated with the process of providing feedback and external control over behavioral reinforcement (Bokus & Shugar, 2007).

Both approaches were based on assumptions about three basic parameters: (1) biological adaptation with which children begin language learning; (2) the nature of language experience; (3) the nature of developmental change. Based on the argument of incentive poverty, Chomsky argued that the linguistic information received by a child is incomplete, devoid of essential elements, and therefore, it is necessary to postulate information determined from birth. On the other hand, Skinner saw speech as another example of efficient behavior, which, like any other behavior, is shaped by feedback and reinforcement from parents. The essence of this dispute was, therefore, the postulates related to the superiority of innate, instinctive, genetically conditioned behaviors, i.e., nature, over experience, behaviors learned through contact with the environment, i.e., nurture. Nowadays, it is assumed that behavior manifests itself under the influence of both the genetic plan and the environment (Bokus & Shugar, 2007). According to the interactive model, which assumes the interplay of development and learning, development enables and even provokes learning, while learning accelerates and supports development. This view is the closest to the work of Lev Vygotsky (1971) and his theory of the "zone of proximal development," which depicts development on two levels. The first is the level of development already achieved by the child, while the other is what is within their reach. The zone of proximal development is the difference between these two levels. According to Vygotsky, stimulation of the environment which slightly exceeds the current level of development provokes learning, which, in turn, provokes further development (Vygotsky, 1971, p. 521).

Children from all cultures also have – as in the case of perceptive abilities – a universal path of speech development. A dynamically developing child acquires a language during the first seven years of their life, learning it spontaneously through contact with parents and their environment. It is a specific kind of interaction of the genetic program with environmental influences. It should be emphasized that today there is a shift away from the habit of determining developmental periods with rigidly set beginnings and ends – which limit learning to a specific time frame of speech development – in favor of "periods of sensitivity," when contact with specific information may be more effective than at other times. Poorna Kushalnagar (2007) claims that the period of sensitivity refers to the learning process which is limited primarily by time or other factors resulting, for example, from hormonal management. In addition, she suggests that restrictions on later speech acquisition may be due to changes that have occurred in higher mental processes as a result of prior learning. The resulting neural connections can cause some kind of interference effect regardless of the precisely determined time frame.

Perception and performance skills are listed as factors conditioning the development of language, communication and cultural competence. The first of these includes, above all, properly functioning physical, musical and phonemic hearing, thanks to which we receive, identify and understand the sounds that reach us (Grabias, 1994). Perceptual skills are the basis for the development of all language skills and precede implementation skills. Disturbances in the development of auditory functions in the early stages of a child's development can lead to delays in the acquisition of the language system or manifest as speech underdevelopment. The delays that occur most often affect independent expression and are both quantitative – the range of passive and active vocabulary is below chronological age – and qualitative – there are numerous and various irregularities (articulative and semantic ones, misunderstanding of commands, etc.).

In children with hearing impairment, articulation irregularities are manifested in the wrong pronunciation of sounds. The qualitative symptoms of disorders of articulation of sounds include mogilalia, paralalia and deformation. Danuta Emiluta-Rozya (1994) claims that in younger children (8–10 years) with 30–80 dB hearing loss, paralalia and deformations are most often observed (16–17%), with mogilalia affecting 11% of them. Hyperrhinolalia is also often observed (17%). Difficulties in phonemic production concern consonants (21%) and, less often, vowels (12%). The least incorrect phonemic production has been noticed in mastering those sounds which allow for visual-sensory

control. These are oral vowels and compact consonants, articulated in the front of the mouth.

In children with hearing impairment, difficulties in differentiating speech sounds lead to incorrect articulation because the acoustic image of the word is distorted. A child who does not hear their own voice does not control their speech audibly. This applies in particular to the use of such elements of speech as the tempo and melody of speaking, and the arrangement of stresses. The articulation of most children with profound hearing impairment, in addition to the symptoms listed above, is characterized by the following features:

- asynchronous palatalization,
- tendency towards voicing (e.g., of consonants in the word-final position) or devoicing,
- simplification of consonant groups and no inter-word similarities,
- nasalization of oral phones or no nasality in nasal phones,
- irregularities in emphasizing statements, no differentiation between stressed and unstressed syllables,
- slower and monotonous tempo of speech,
- additional articulation (Gunia, 2006, p. 117).

Among people with hearing impairment, numerous voice disorders (audiogenic dysphonia) are often observed. Phoniatric analysis (Szkiełkowska, 2019) has shown that the voice of deaf people can be devoiced, dull and hard. The ability to maintain phonation at the same level is impaired, its time is shortened. Voice formation is accompanied by excessive tension; the extent of voice creation is narrowed.

These voice and suprasegmental speech characteristics in people with severe and profound hearing impairment indicate that the lowering of the threshold of auditory sensitivity has an impact on the physiology of speech organs, including the functioning of the respiratory, phonatory and articulatory apparatus (Lorenc, 2019).

Research by Alicja Rakowska (1992) on the development of the grammatical system in deaf children showed that their lexical resource is dominated by primary words, i.e., nouns (signifying persons, things, plants, objects and animals from the immediate surroundings) and verbs (signifying the most frequently performed activities, in the second person). Observed difficulties in mastering the lexical system include secondary words (adjectives, adverbs), demonstrative words (pronouns), time order words (numerals), as well as conjunctions, particles. and prepositions. The most commonly used adjectives are words

for color, shape, size and weight. They define sensory features perceived by sensory impressions. Assessment adjectives are rare. The first place adverbials to appear are "here" and "there" and adverbs indicating the time and manner in which an activity was performed. The children master the pronouns "I" and "my" but find demonstrative pronouns (you, he) difficult. They use conjunctions only sporadically – as they mostly use simple sentences – and the range of particles is limited to "not" and "do/does." Lidia Geppert (1968) stated that children with profound hearing impairment rarely include prepositions in a sentence. She pointed out that they give prepositions the meaning of nouns, have difficulty differentiating the meaning of graphically or semantically similar prepositions ("*na*" and "*nad*" – i.e., on/over) and grasping the use of a preposition as descriptive of a relation between two objects (instead, they treat it as a sign of relationship between themselves and the object; they do not understand the abstract meaning of prepositions).

On the other hand, the research of Zdzisław Kurkowski (1996) shows that there is a significant variation in the mastery of vocabulary by six-year-old children with damaged hearing organs. He showed that 11.5% of the surveyed children did not use words at all, and 7.7% uttered only partial forms of words or expressive and onomatopoeic lexemes. Kurkowski also claims that none of the children studied mastered the passive and active vocabulary characteristic of a six-year-old; most of the children had only reached the level of speech development of a three-year-old (Kurkowski, 2001).

Irregularities in the mastery of the language system by children with profound hearing impairment also apply to the grammatical aspect. Restrictions resulting from a hearing impairment can cause disturbances in understanding and building statements, generalizing, abstracting and understanding metaphors and proverbs. Simple, single and undeveloped sentences prevail. The theoretical knowledge of case and conjugation endings developed in the process of hearing and speech therapy is not enough to foster their correct use in spontaneous speech, which is why the children's statements are characterized by agrammatism, errors and incorrect structure (Kurkowski, 2001).

The ability to abstract and generalize is a specific function of speech that leads to organizing and classifying the infinite diversity of the world. Generalization is one of the thought processes closely related to speech development whose different level in hearing and deaf children determines the specificity of thought processes (generalization in particular). Conceptual thinking is a generalized reflection of reality. Words as carriers of concepts play a crucial

role in this respect. The lack of generalization is concretization. This type of understanding is often found in deaf children because they do not produce associations consistent with the meaning of a word as a concept in which important features of an object would be represented (Stachyra, 2001).

In summary, after Kazimiera Krakowiak, the most common characteristic features of the language system of children with profound, prelingual hearing loss are:

1) poor passive and active vocabulary;
2) the content of words determined on the basis of limited communication experience, narrowing or expanding the content and scope of words;
3) deficiencies in archaic, specialist and literary vocabulary;
4) deficiencies in abstract vocabulary, a tendency to create neologisms, abstract neosemantism, resulting from the compensation of language deficiencies;
5) difficulties in determining the stylistic function of words, in understanding their emotional color and expressive value;
6) difficulties in understanding the metaphorical value of a word;
7) misunderstanding phraseology;
8) grammatical errors in the area of inflection: difficulties in choosing declination and conjugation paradigms, no inflectional endings, ignorance of inflectional exceptions and irregular forms, difficulties with pronoun conjugation;
9) grammatical errors in the area of syntax (subject-verb agreement, case government), priority given to single and compound sentences, difficulties in building complex – particularly subordinate – sentences, overuse of structures with a rigid word order;
10) brachylogy resulting from a pictorial understanding of the world caused by the dominance of visual perception;
11) difficulties in maintaining temporal consistency of text elements (Krakowiak, 2006; 2012).

However, one should always keep in mind the individual differences between children with hearing impairment and the factors affecting their development.

Methodological assumptions of own research

The purpose of the research was to assess the level of communication skills of pre-school children with hearing impairment from hearing families and

to compare it with the level of communication skills of pre-school children within the hearing norm from hearing families. The research question to be answered was: What are the differences in the level of communication behaviors between the tested preschool children with profound and severe hearing impairment from hearing families and preschool children within the hearing norm also from hearing families?

The hypothesis adopted in the work assumed a higher rate in the level of children's communication behaviors within the hearing norm, in comparison with deaf children, and no differences in the level of communication behaviors between children with severe and profound hearing impairment.

To conduct an individual analysis of children's communication behavior, systematic direct observation was used as a technique for gathering information. An observation sheet – the Communication Behavior Assessment Card (KOZK) of a child with hearing impairment developed by Kazimiera Krakowiak and Maria Panasiuk (1992) – was used as a research tool. The goal of the card is to learn about the current abilities and difficulties in phonic and gesture-mimic communication or to "make a categorized description and assessment of the behavior of a child with hearing impairment used to communicate with the environment. It contains 30 categories of communication behaviors characteristic of the child's communication system during the development of communication" (Krakowiak & Panasiuk, 1992, p. 19). Twenty-four categories represent equivalent or complementary behaviors associated with the use of phonic (oral) signs: pre-linguistic and linguistic (12 categories), and behaviors associated with the use of gesture-mimic signs: "natural," i.e., used by all people, and sign language gestures (12 categories). Other categories include communication behaviors in which one or another type of sign can be used, including writing. Each category consists in a five-step continuum of tasks, scaled in accordance with the phase process of the child's acquisition of communication competence (Krakowiak & Panasiuk, 1992, p. 19). The card has the form of a pie diagram. Filling it consists of circling the appropriate pie sectors which mark the child's partial skills determined on the scale. The card is completed on the basis of careful observation of the child's behavior.

Due to the damaged hearing organ and resultant incomplete reception of acoustic information (especially before the use of a hearing aid or cochlear implant or in the initial period of use of these devices), the children naturally and spontaneously engage the visual channel to supplement the data from a communication source. Having difficulties in providing information, they

also intuitively incorporate natural gestures, facial expressions and pantomime into their repertoire of vocal behaviors, in order to complete the message. This type of communication is not a structured system or the effect of a planned learning process. Rather, it is a consequence of the child's need to communicate with the environment, albeit in its simplified, "pre-linguistic" form. The main task of such activities is "interactive efficiency," i.e., effectiveness in achieving the goal of the messages sent and received by the child. Assuming that the level of gesture/sign behaviors assessed in the work represent a pre-verbal, complementary form of messaging, which is replaced by phonic or sign language over time, the analysis concerned only a group of children with hearing impairment in whom the discussed ways of communication were observed.

In order to conduct the research, the following criteria for selection for the study group of children from the ages of three to five years were set:

1) severe and profound sensory-neural hearing loss, bilateral, congenital, detected in neonatal screening and confirmed by audiological, objective brainstem evoked potentials (ABR);
2) use of hearing aids and early start of hearing and speech improvement (before 6 months of age);
3) regular rehabilitation (1–2 times a week) conducted in specialist counseling centers for children with hearing impairment based on the phonic (auditory-verbal) method, assuming, among others, early auditory education, development of verbal communication supported by lip reading and elements of global reading;
4) intellectual norm (normal psychomotor development in smaller children) confirmed by psychological tests carried out in parent centers, no additional deficits;
5) hearing parents who do not use sign language.

The study was to be carried out in a group of 150 children, of which 108 remained, meeting all the conditions assumed above after the final selection. For the purposes of the research, two experimental groups were distinguished: children with profound hearing impairment (**test group No. 1 – E1**), and children with severe hearing impairment (**test group No. 2 – E2**).

The **control group (KS)** consisted of 50 normally developing children in the hearing norm and at the same age.

The experimental groups were selected from the population under the care of specialist outpatient clinics for children with hearing impairment. Children were from Mazovia (Specialist Outpatient Clinic for Rehabilitation

of Children and Youth with Hearing Impairment, 4 Białostocka St., Warsaw; Polish Foundation for Assisting Hearing Impaired Children – ECHO, 22 Białobrzeska St., Warsaw), Małopolska (Polish Association of the Deaf, Specialist Diagnosis and Rehabilitation Center) Children and Youth with Hearing Disabilities, 23 Żółkiewskiego Street, Nowy Sącz), Podkarpacie (Association of Parents and Friends of Children with Hearing Disabilities, 57 Korczyńska Street, p. 326, Krosno), Greater Poland (NZOZ Specialist Hearing and Speech Rehabilitation Center, 19 Kordeckiego Street, Kalisz), and Podlasie (Specialist Speech Therapy Clinic at the Independent Public Health Care Center, 190 Lipowa St., Hajnówka). The control group was selected from among children attending kindergartens in Mazovia. The observation included two individual classes with a child and group classes, which lasted a total of about four hours. The examination of children from both groups was carried out in the facilities with the consent of their mothers.

Own research results

The results of the Communication Behavior Assessment Card obtained in the course of the research were developed, distinguishing the following subscales:

1. Overall assessment of communication skills,
2. Assessment of phonic (oral) behavior,
3. Assessment of gesture-mimic behavior,
4. Communication preference factor.

The analysis of the results included three examined groups, i.e., children with profound hearing impairment (experimental group No. 1 – E1), those with severe hearing impairment (experimental group No. 2 – E2) and children in the hearing norm (KS). Due to the specificity of the communication behaviors of children with hearing impairment, the summary of results regarding gesture-mimic communication methods applies only to the experimental groups (E1 and E2).

Ad 1. General assessment of communication skills

In order to obtain the value of the general level of development of children's communication skills, an algorithm was added that sums the points obtained in individual categories: (A + b + c + … + s + b1 + c1 + … + m1).

The maximum possible result is 150 (30 × 5 = 150). In the examined group of children with profound hearing impairment (E1), the lowest result was 28 (minimum) – 1.3%; the highest was 93 (maximum) – 1.3%; in the group of children with severe hearing impairment (E2), the results were, respectively, 26 (minimum) – 3%, and 79 (maximum) – 6.1%. Children within the hearing norm (KS) obtained 100%.

A score below 60% of the maximum assessment of general communication skills was achieved by 40% of children with profound hearing impairment and 48.5% of children with severe hearing loss. According to Krakowiak (1992), this result means that the child is able to establish and maintain contact with the closest social environment, which gives them the opportunity to meet their basic communication needs. It is worth noting, however, that the overall level of communication skills in the studied group is underestimated due to their weaker functioning in the gesture-mimic category, as a result of the preference given to the phonic method of communication. The distribution of general communication skills in the studied groups is as follows (Figure 1):

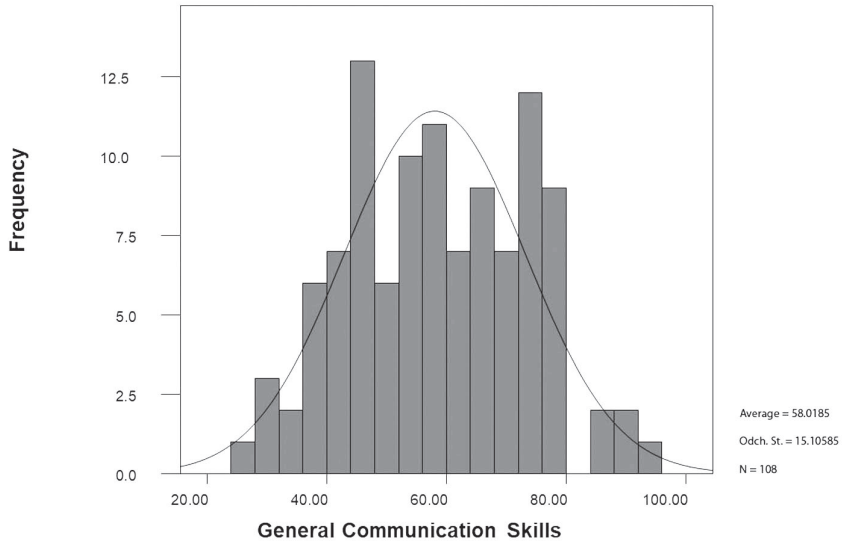

Figure 1.
Distribution of general communication skills in a group of children with hearing impairment.
Source: own research.

Ad 2. Assessment of phonic (oral) behaviors

The algorithm used to assess the level of development of phonic behaviors consisted of adding up the points obtained in categories B, C, D and E of the subscale of the assessment of phonic behaviors. The maximum score is 60 (12 × 5 = 60).

In the examined group of children with profound hearing impairment (**E1**) the lowest result was 10 (minimum) – 1.3%, the highest 60 (maximum) – 1.3%. Forty-five percent of the group scored 30 (50% of the subtest). Among children with severe hearing impairment (**E2**), the results were, respectively: 10 (minimum) – 3% and 52 (maximum) – 9.1%, while 31% presented phonic skills at 50%. In the control group (**KS**), the results were as follows: 34 (minimum) – 2%, 60 (maximum) – 50%.

A score below 60% of the maximum assessment of general communication skills was achieved by 44% of children with profound hearing impairment (E1) and 57.6% of children with severe hearing loss (E2). According to Krakowiak (1992), this result means "advanced speech development comparable to the speech development of a hearing child in the third year of life, and sufficient to establish and maintain verbal contact with the loved ones" (Krakowiak & Panasiuk, 1992, p. 56). Achieving a lower grade means an earlier phase of speech development and the dominance of pre-linguistic forms of phonic communication.

In order to determine whether hearing impairment affects the level of the children's phonic behaviors, a one-way analysis of variance was used, in which the independent variable is the depth of hearing impairment and the dependent variable is the level of phonic behavior. The main effect of the analyzed variables was $F(2.155) = 64.703$; $p < 0.001$ (Table 1).

Table 1
Subscale averages of the level of phonic behaviors in relation to the depth of hearing impairment

Study groups	Study group 1 **E1**		Study group **E2**		Control group **KS**		F	p
	$\bar{x}$	s	$\bar{x}$	s	$\bar{x}$	s		
Level of phonic behaviors	33.57	13.35	36.48	12.46	56.32	5.75	64.703	0.000*

* $p < 0.05$ (statistically significant difference).
Source: own research.

According to the analysis of the effects of interactions in the t-test (*post hoc*), children in the auditory norm have a higher level of phonic behaviors $\bar{x}$ = 56.32, when compared to children with profound hearing impairment $\bar{x}$ = 33.57; p < 0.000, and with severe hearing impairment $\bar{x}$ = 36.48; p < 0.000. There was no statistically significant difference between children with profound and severe hearing impairment, p < 0.624.

The negative impact of a child's profound and severe hearing impairment on the level of phonic behaviors has been proven based on the conducted tests. A significantly lower level of phonic behaviors was found in the group of children with profound and severe hearing impairment when compared to children in the auditory norm (main effect), and no significant differences in the level of phonic behavior between experimental groups Nos. 1 and 2.

Ad 3. Assessment of gesture-mimic behaviors

The level of gesture and mimic behavior development in children was examined on the basis of the sum of points obtained in individual categories: B1, C1, D1, and E1. The maximum possible result was 60 (12 × 5 = 60), similarly to the assessment of phonic behaviors.

In the group of children with profound hearing impairment (E1) the lowest result was 2 (minimum), which is 1.3% of the entire subtest, the highest was 38 (maximum), i.e., 1.3% of the whole subtest. Ninety-six percent of the examined group did not exceed half of the points in the subtest. The children with severe hearing impairment (E2) obtained successively: a minimum of 4 – 9% of subjects, a maximum of 24 – 3% of subjects.

These results indicate a very low level of the mastery of the ability to communicate in sign language in both studied groups, obstructing the making and maintaining of contact, as well as indicating the dominance of pre-linguistic, "intuitive" forms of gesture-mimic communication.

Ad 4. Preference factor of the manner of communication

The preference coefficient characterizes the quantitative advantage of a particular type of communication and is expressed by the following value: $Wp = {}^{\bar{x}\,fn}/_{\bar{x}\,gm}$ where Wp is the preference coefficient, $\bar{x}\,fn$ – the arithmetic mean of the phonic behavior, and $\bar{x}\,gm$ – the arithmetic mean of the gesture-mimic behaviors of the studied groups.

The analysis of the obtained results in the group of children with profound hearing impairment (E1) showed the dominance of gesture-mimic communication only in 17.3%, and the preference for the phonic type of communication in 82.7% of the group. In children with severe hearing loss (E2), this disproportion was even greater: in 9% gesture-mimic messages prevailed, and 91% preferred the phonic way of communication.

The T-test showed no statistically significant differences in the communication preference coefficient $T = 0.143$; $p < 0.142$ between experimental groups No. 1 (E1) and No. 2 (E2). Children from both examined groups used phonic language much more often. Therefore, one can formulate a general conclusion about the dominance of verbal communication in the studied groups of children with profound and severe hearing impairment.

Conclusions

In order to create a comprehensive picture of the level of language functioning of the studied children, the conclusions are presented in order of the categories assessed:

1) A statistically significant difference was found in the following categories: phonic behavior ($p < 0.000$); preference coefficient ($p < 0.000$) between children with profound and severe hearing impairment and children in the hearing norm. In addition, the presence of a statistically significant difference in the gesture-mimic behavior category ($p < 0.02$) between children from experimental group 1 and 2 was determined. A significantly higher level of gesture-mimic behavior was observed in the group of children with profound hearing impairment. There was no interaction effect on hearing impairment and general communication skills ($p < 0.866$); the level of phonic behavior ($p < 0.624$) and the preference factor ($p < 0.142$) between children with profound and severe hearing impairment.

2) No interaction effect was found on the depth of hearing impairment and general ability to communicate, level of phonic behavior and level of gesture-mimic behavior, as well as preference factor in groups of pre-school children with profound and severe hearing impairment. Only a slightly negative tendency in the level of phonic behaviors and gesture-mimic behaviors was noted. Children with profound hearing impairment achieved slightly lower results in these two categories when compared to children with severe hearing impairment.

Based on the conducted research, an answer to the research question was obtained, which was: Is there a difference in the level of communication behavior between pre-school children with a profound and severe hearing impairment from hearing families and pre-school children within the hearing norm also from hearing families?

The answer requires an analysis of the results on two levels. Comparing the results obtained in the subscales of the Communication Behavior Assessment Card for hearing impaired children (Experimental Groups No. 1 and 2), no statistically significant differences were found. Only delays in speech development were seen, mainly concerning the acquisition and development of passive and active vocabulary. When adopting an indicative framework for the periodization of speech learning, it can be concluded that the developmental stages in the studied groups of children with hearing impairment are shifted by about a year or two when compared to normative development. The depth of the hearing impairment (profound vs. severe) in this case does not influence the number of words learned; the development proceeded in a similar way, with a slight tendency for higher results in the group of children with severe hearing impairment.

However, statistically significant differences were found in the level of language functioning of children with hearing impairment compared to children with normal hearing.

It can thus be concluded that profound and severe hearing impairment negatively affects the level of language behavior of pre-school children from hearing families.

Discussion

The results of own research confirmed previous reports on the level of language development of children with hearing impairment. The delay in speech development of children with profound and severe hearing impairment compared to their hearing peers has been proven.

In the literature on the subject, studies on the level of communication development of deaf children indicate different degrees of deviation from normal patterns (from minimal to significant differences) (Geers, Brenner, Nicholas, Uchanski, Tye-Murray & Tobey, 2002; Geers, 2003).

In the works of Geers (2003) focusing on the language development of children whose families decided to introduce oral communication, attention

was drawn to significant delays in the acquisition of speech compared to children in the auditory norm, especially in the field of speech expression (both quantitative and qualitative differences were found). There were no differences in the level of communication behaviors between groups of children with severe and profound hearing loss (Geers, 2003), which was confirmed by the results of the study presented here.

The delay in speech development in the group of children with hearing loss observed in the research is not significant, however, the methodological difficulty makes it impossible to accurately estimate this deviation from the norm. At this point, a postulate should be submitted regarding the need to create a full diagnostic tool adapted to the needs, capabilities and limitations of deaf children. The value of the tool used in this study is certainly high, but Polish speech therapy for the deaf and hard of hearing lacks more accurate quantitative measures for assessing the language functioning of young children with hearing impairment.

The level of a child's language competence, regardless of what form it takes (phonic or sign language), turns out to be a prognostic for the child's positive development and their relationship with their mother. Having analyzed many studies, Cristian Vaccari and Marc Marschark (1997) stated that "successful early communication is an important component of the socio-emotional development of deaf children" (Vaccari & Marchark, 1997, p. 797).

The research results presented in the paper show a definite dominance of phonic behaviors, whereas gesture-mimic behaviors have only a supporting function, especially in the early stages of speech development. After a comprehensive analysis of the results, it turned out that the group of children with profound hearing impairment included natural gestures and facial expressions in their repertoire of early phonic behaviors to complement the content of messages more often. This is an "intuitive" form of gesture-supported contact, which is not a non-verbal language system. As expected, the developmental replacement of gestures with phonic language was also observed, which was determined on the basis of the changing proportions of the "preference factor" of the way of communication: the higher the level of competence in the phonic language, the lower the level of gesture-mimic behaviors in a child.

Regarding the preferred language system, research results indicate that the language used to communicate with the child (spoken or sign) is a low indicator for child development (Polat, 2003; Yoshinaga-Itano, 2003). It was found that "the method of communication (sign or phonic language) as such

is not a decisive factor in language development or cognitive and social skills" (Yoshinaga-Itano, 2003, p. 25). Much more prognostic for development is the so-called language "mode match" between a child and their mother. Attention is paid to the role of parents' natural language in developing their child's communication skills (Wallis, Musselman & MacKay, 2004). There is a strong, positive ratio of the quantity and quality of the child's early language experiences related to parental speech, which affects their further development. In deaf families who are fluent in sign language, children acquire it in a spontaneous and natural way, reaching subsequent stages of speech development comparable to hearing children. Moreover, some studies comparing the speech development of children with hearing impairment from families using phonic or sign language emphasize that children of parents who also use this system reach subsequent stages of development earlier than hard of hearing children whose parents teach them phonic language. However, Wallis et al. (2004) found that the hearing-impaired children of hearing parents who have been oriented towards the phonic language since birth achieve language development at a similar level to that of children using sign language, and that they have better speech communication skills when compared to children who use sign language (Wallis et al., 2004).

The high preference rate of language in the phonic form among children with hearing impairment from hearing families asserted in this work confirms the direction of therapeutic interventions used in Poland (based on "mother's speech") and is a positive prognostic factor for the child's development and their relations with hearing parents.

The results of own research presented in the article show a high level of therapeutic impact on children, and the direction of therapy focused on the development of phonic language as the most appropriate (in the context of hearing parents and "language matching"). The language development of hearing-impaired children should be monitored to capture possible difficulties and to adjust the time, expectations and methods of interaction for children with additional disabilities. With such dynamic development of available technical solutions supporting hearing and the effectiveness of therapy, it would be worth assessing in detail the current state of speech development of deaf and hearing impaired children, to determine the occurrence of possible qualitative or quantitative differences – delays, state of speech underdevelopment, articulation distortions (auditory dyslalia) – or, perhaps, recognize that it is comparable to the development of children's speech within the hearing norm.

At this point, it is again necessary to pay attention to the need to create a tool to study the state of speech development of young children with a damaged hearing organ (especially during the first six years of their life), not only taking into account the specificity of the disorder, but also adapted to the changing standards of audiological and therapeutic interactions (e.g., early and detailed diagnosis and cochlear implantation, availability of early therapeutic programs, as well as public or integration educational institutions adapted to the needs of the hearing-impaired child).

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