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PART TWO
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INTRODUCTION

The content of the book *Developing language competency in hearing and speech disorders* is very much driven by contemporary achievements in understanding the significance of communication skills of people with hearing and speech disorders. For the last two decades there have been many changes in supporting the language development of this group. Digital hearing aids, cochlear implantation and developments in understanding the linguistic development of deaf and hard of hearing persons have dramatically changed their abilities to participate in phonic language discourse, both in their native and foreign languages. Hence we find the topic important and relevant.

Today, more so than in the past, teachers and therapeutics must know the results of the latest research. Consequently they need to use innovative methods and strategies in the acquisition of a language. The book sets out to explore and define the nature of the process of native and foreign language learning by people with hearing and speech disorders. Just as importantly the text seeks to focus on presenting diagnostic methods, principles and forms of new speech therapy approaches and teaching strategies that may be used in practice.

The book will appear at a time when the discussion about the rights of the deaf and hard of hearing persons to good quality education is very topical. There are different definitions and approaches that give the idea of “good quality education” a practical meaning. For the authors of this book, it means first of all education based on developing real communication skills, both in the students native and in foreign languages.

The first part of the book is entitled *Developing language skills in native language communication* and consists of 6 chapters. These deal with different innovative aspects of speech and language disorders, beginning with prenatal conditions of good speech and language development, from issues of diagnosis and therapy of some unique conditions, like minimal pair disorders or cleft palate to

issues of social, pedagogical and psychological support for patients with hearing and speech disorders and their families.

Dorota Kornas-Biela, a psychologist and specialist in the field of prenatal education, wrote chapter 1. This chapter focuses on pre- and perinatal auditory experiences and their importance in the development of the child. She begins the chapter with a short review of the significance of the woman's well being during the pregnancy period. It has been for many years considered an important factor of the child's well being. The child's prenatal well-being includes also a harmonious development of his/her senses. Today it is well known that children before birth are able to detect, differentiate and respond to sounds; they are also sensitive to music and their parents' voices. These abilities even make it possible to diagnose the child's hearing before its birth. The author concludes that prenatal acoustic experiences are important for the child's later development. Even in the womb children should be protected from negative effects of intense sounds, sounds and pulses issued by electric and electronic devices and instruments.

Chapter 2 is concerned with disorders of speech in children with cleft palate and cleft lip and was written by Danuta Pluta-Wojciechowska. This medical condition is connected with the risk of speech and communication disorders that are conditioned variously by anatomical disorders, biological dysfunctions and social and personal factors, such as parents' attitude to the child's disability or the child's self-confidence in communication with others. In many cases an additional disorder is diagnosed : this is hypoacusia, which narrows the child's ability to hear speech sounds, differentiate them and respond to them. The therapy of children with cleft palate and cleft lip should be integral. The author postulates that it should include the following aspects: monitoring the general child's motor and orthofacial development, checking the breathing habits and establishing the proper ones, monitoring the feeding habits and problems, stimulating the hearing perception, developing phonological skills according to the child's age and supervising the sounds and speech production from the very early stages of life.

Chapter 3 was written by Ewa Muzyka-Furtak and identifies the problem of diagnosing the issue of minimal speech disorders in children with hearing loss. The problem of minimal speech disorders may occur in the speech of children with slight hearing loss and also in those with moderate or severe impairment who – thanks to intensive and successful therapy, well adjusted hearing aids or cochlear implants – have achieved a high level of language and communication competence. The author argues that the problem of minimal speech disorders cannot be under-estimated as even such small speech disorders may be educationally important. The chapter presents empirical data relating to the problem and recommendations for speech therapy of this disorder.

Chapter 4 by Anita Lorenz addresses the issue of dynamic visualization in studies of contemporary Polish pronunciation. The chapter opens with a brief survey of selected traditional and contemporary methods applied in the research on articulation. The main focus of the chapter is on the EMA (*Electromagnetic Articulography*) systems that are used to determine the position of sensors in an alternating electromagnetic field. This method makes it possible to obtain an objective, quantitative and qualitative description of contemporary Polish pronunciation. The method may be used both to set out a model pronunciation and diagnose deferent pronunciation problems observed mainly in speech production of persons with hearing loss.

Chapter 5 is devoted to the psychosocial situation of families bringing up children with hearing loss. It was written by Aleksandra Borowicz and discusses such issues as family social situations, psychological conditions of family members and parental stress factors. This last issue is presented in great detail and describes the impact of parental stress on the parents' psychosocial functioning and their parental tasks. The author concludes that there is an urgent need for introducing special programs for social support to this group of families.

Chapter 6 covers the issue of the necessity of compensatory Polish language classes for deaf university students. They usually begin their studies presenting relatively low levels of communication skills. They use different modes of communication and speech is not always the preferred one. University studies create a new educational situation. A high level of speaking and writing skills is indispensable for independent studying and taking exams. The chapter presents the students' most common difficulties in writing texts in Polish and also educational methods and techniques for Polish language classes for the deaf.

The second part of the book, entitled *Developing language skills in foreign language communication* addresses the issue of developing language skills in foreign language communication. This is an important feature of contemporary therapy and education. Two or three decades ago the main objective of work with students with hearing and speech disorders was to support them in mastering the basis of their native language to enable rudimentary communication. Today these barriers have been overcome. Even in case of severe and profound hearing and speech disorders, we seek solutions to develop not only communication in the student's native language, but also in their foreign language competency.

Chapter 7 is the first one in the second part of the book and was written by a Serbian teacher and researcher, Iva Udarevic. It shows the research methodology and teaching practice for teaching English as a foreign language to deaf and hard of hearing students in Serbia. The author starts with setting the background of education of the deaf and hard of hearing students in her country, continuing with a detailed description of her school, the "Stefan Decanski" Centre in Bel-

grade, Serbia. The central part of the chapter consists of a detailed description of English teaching as a foreign language methodology in primary and secondary schools. The author also discusses the role of international programs in strengthening the students' motivation for learning foreign languages.

Chapter 8 was prepared by Ewa Domagała-Zyśk. It deals with the complicated issue of teaching foreign languages to students with hearing loss and autistic spectrum disorder. (ASD) The chapter is based on the author's personal experience of teaching an 18-year old student. Essentially this chapter is related to the need of creating a special methodology for teaching languages to this group of students. In ASD there are imminent communication problems, which usually limit the student's potential for language acquisition. Nevertheless, as is shown in the case study described in the chapter, there are special methods and strategies that may make it possible for the students to learn the basis of English as a foreign language. The chapter addresses the range of teacher's skills necessary to consider and engage with the student's needs.

Chapter 9 was prepared by Anna Podlewska and describes the results of a large scale investigation of the importance of mastering different language skills by deaf and hard of hearing students. The results show a great motivation of the DHH students to learn all language skills. The author concludes that this motivation creates a good starting point for learning a foreign language and to achieve not only reading and writing competency, but also highly intelligible speech in the target language.

Chapter 10 explores the possibility of teaching tonal languages, such as Chinese, to the deaf and hard of hearing students. It was written by Monika Malec, a researcher and a teacher of both English and Chinese. She has been working for some years with this group of students. Her practical understanding of acquisition processes, teaching methods and use of tonal languages by hearing impaired learners is enriched by a review on the literature of this topic. The last part of the chapter involves the author's observations and reflections based on experimental Chinese classes given to a prelingually deaf Polish student.

Chapter 11 shows an example of good practice. It was prepared by Barbara Henzel, an English teacher working with university students, including hearing impaired ones. The author presents a case study of one of her students, showing her path to developing language skills both in Polish and in English. A set of practical tips based on the authors experience may be valuable by other teachers working with this group of students.

The book is the latest one in the series *Not the voice, but the words...* produced at the Chair of Special Pedagogy of the John Paul II Catholic University of Lublin. As usual, the whole team was involved in its production and the work was directed by Professor Kazmiera Krakowiak. As the editor of the book I would like

to express my sincere thanks to the team and to all the authors who prepared the chapters. I am sure the book will be read and reflected on and this is going to be your greatest prize. I owe a great deal of gratitude to the reviewers of this volume – dr hab. Jolanta Baran and dr hab. Dorota Podgórska-Jachnik - your experience and kindness helped immensely to the final draft of this book.

PART ONE

DEVELOPING NATIONAL LANGUAGE COMPETENCE IN STUDENTS WITH HEARING AND SPEECH DISORDERS

Dorota KORNAS-BIELA

CHAPTER ONE

PRE- AND PERINATAL AUDITORY EXPERIENCES AND THEIR IMPORTANCE IN THE DEVELOPMENT OF THE CHILD

ABSTRACT

For thousands of years, mothers felt that the unborn child hears, in response to sounds from the environment, by changing their physical activity. Studies in recent decades have shown conclusively that in human beings, the hearing is a very active and well-developed sense from the beginning of the second half of the period of prenatal development. This article reviews the literature on the methodological aspects of research on prenatal hearing ability and applied research techniques, the phenomenon of audibility and hearing in utero, the discrimination of sounds, speech, singing and music perception, the cooperation between the senses, prenatal acoustic learning (e.g. classical and instrumental conditioning, habituation), the importance of prenatal experiences for the whole life, the ability to test the proper functioning of the sense of hearing before birth life and the usability of prenatal hearing test. Information about prenatal auditory stimulation has been supplemented by a recommendation to follow the principles of sound safety, because of the risk of hearing loss before birth.

Key words: *sense of hearing, audibility, auditory, sounds, senses, prenatal perception, prenatal learning, speech development, music preferences, prenatal development, fetus, newborn.*

INTRODUCTION

The interest in the impact of prenatal experiences regarding the sense of hearing on the postnatal life may be traced back to ancient times. Already then, Confu-

cius (500 BC) expressed the belief that what happens before birth may determine one's further life. Women in ancient China closely followed certain rules concerning prenatal care of the child, including those related to their well-being and stimulating the child, also with music. Pregnant women appreciated the importance of rocking the child to the rhythm of dancing and tunes sung by themselves. In his *De Generatione Animalium*, Aristotle (300 BC) wrote that already before birth the child receives the first sensory impressions. In the Bible, there is also a clearly expressed belief in auditory perception by the child before birth, expressed by the words of Elizabeth, who addresses Mary confessing that "as soon as the sound of your greeting reached my ears, the baby in my womb leaped for joy" (Luke 1, 44, New International Version). The Infant heard the voice from the environment of his mother and reacted with joy to its positive emotional message. Similarly, the Indian surgeon Susruta (400 AD) claimed that the child is seeking stimuli already at the end of the first trimester and his/her mind is operating from the fifth month of the prenatal development. Also in the Japanese tradition, mothers were trying to create the best conditions for the development of their child in the womb through the practice of Tai-kyo (teaching-womb), which entailed initiating contact with the child by rhythmic tapping on the abdomen at regular intervals, listening to music and visualizing the person of the child. It was believed that such type of stimulation has long-term consequences for its development (eg. <http://www.babyplus.com/TheScience.php>. Access: 04.11. 2012).

Hundreds of years later, John Locke argued that based on sensory stimuli the fetus is capable of creating certain "simple ideas" that are subject to the process of thinking (1690). Wilhelm Preyer believed that the brain functions start before birth (1895). According to Śniadecki, the baby has "origins" of mental powers, and "it has motion, feeling, uses the senses and receives external sensations" (1804, 1997). The belief in the sensual capabilities of the child before birth and specific knowledge about human prenatal development was gradually becoming more and more established.

The multiplicity of research on the sense of hearing conducted in the 20th century and the popularization of the results led to a relatively widespread belief that this sense is active before birth. For example, French and Canadian studies revealed that pregnant mothers claim that in about the 25th week of gestation, all the senses are already working, and half of the mothers were of the opinion that their child was experiencing emotions. The common perception of mothers is that the child is sensitive to music and playing an instrument or listening to music is positive for his or her development. This view has been made increasingly common and established in the social awareness thanks to the advertisements of special audio collections, e.g. CDs especially prepared for pregnant parents, with recordings of music, songs, lullabies and various sounds, such as the mother's

heartbeat or nature, as well as devices for listening, including special “walkmans for the fetus” (Kisilevsky et al. 2004).

The same belief concerns the neonatal period and infancy, and its significance is visible in various initiatives, such as the one by the governor of Georgia in the United States, who at the state budget meeting (13.01.1998) proposed to spend \$105,000 on audio CDs with classical music to be given to each of the 100,000 newborns per year leaving the hospital in this state. Accompanied by the sounds of the Beethoven’s *Ode to Joy*, he argued that there is no doubt that listening to music at a very early stage of development has a positive effect on the spatial-temporal reasoning, which underlies achievements in mathematics, technology, engineering, and even a game of chess. Listening to soft classical music supports the development of trillions of neural connections created then in the brain (Sack 1998a). The controversy was, however, whose music would have the best soothing and stimulating effect for the development of young children, which composers and what kind of music should be included: Mozart and Tchaikovsky, or rather Brahms, Rossini and Saint-Saëns (Sack 1998b). In the most common worldwide conviction it is the music of Mozart that has the best impact on the development of intelligence (see the debate on the issue called “the Mozart effect” – Don Campbell 1997, 2000; Gorman 1999; McKelvie, Low 2002). However, it should also be mentioned that in the opinion of many people most of the evidence on pre-birth experiences affecting later childhood or adulthood is anecdotal, unscientific, and based on subjective interpretation.

Our knowledge about prenatal auditory capabilities has been expanding more and more, not only in terms of the growing number of methodologically correct studies, but also in terms of the popularity of the issue in the public opinion. An increasing amount of information on this topic is possible to be found not only in textbooks (Kornas-Biela 2004, 2011) and professional studies in the field of developmental psychology (Kornas-Biela 1992, 1994; Maurer, Maurer 1994; Vaughan 1997; Holinger 2006), but also in popular Internet sources and in guides of various types.

METHODOLOGICAL ASPECTS OF TESTING THE SENSE OF HEARING BEFORE BIRTH

The history of empirical research on the sense of hearing before birth dates back to the 1920s. It is then that the prenatal child’s motor reactions to the sound were first tested. Most often it was the sound of a car horn, a loud bell, an alarm clock or other device situated close to or directly touching the mother’s abdomen. One of the first studies involved recording the baby’s movements after a series of

sounds made by the car horn. It turned out that after a series of the same sound the child accustomed to the stimulus and the motor reaction disappeared (Peiper 1925). Thanks to the behavioral manifestations of the child's auditory activity perceived by the mother in the second half of pregnancy (movements, strong kicking in response to the sound), hearing has become the first and the most experimentally studied sense of the child before birth. The first studies of the auditory capabilities were also carried out through observing the behavior of premature newborns to investigate the child's ability to receive and respond to stimuli from the sense of hearing in a way that had not been possible to study otherwise due to difference of the intrauterine environment that may have not allowed to disclose these capabilities. At present, auditory competences discovered in preterm infants are still treated as an indicator of the auditory skills of the child before birth.

Since the first studies on this matter, the techniques of testing prenatal hearing have changed significantly. The development of more accurate methods of studying the child's response to sound stimuli of different types, such as 3D and 4D ultrasonography (USG in real time), cardiotocography (CTG), electroencephalography (EEG), and magnetoencephalography (MEG) allowed a more precise investigation of this sense before birth. Many of the auditory functions of the prenatal child are also measured using such methods as classical conditioning, habituation and exposure learning.

Also animal studies are very helpful in understanding the functioning of sense of hearing in humans before birth. From studies carried out using a hydrophone transmitting sounds, implanted inside the amniotic sac of an animal, it is known that the sound environment changes with the progress of the pregnancy, especially during childbirth there is a change in the frequency of the waves that are conducted without distortion (Vince et al. 1985). Through reasoning by analogy, the animal model provides interesting information on the auditory perception, remembering auditory sensations and their importance in the process of adaptation after birth in humans. Primarily ethical, but also technical limitations do not allow for the research of many phenomena in the prenatal child, hence, studies on animals such as rats, chimpanzees, and sheep provide valuable information (Kornas-Biela 1994).

AUDIBILITY AND HEARING IN THE INTRAUTERINE ENVIRONMENT

The intrauterine environment is relatively loud – approximately 60-70 dB. It is reached by the sounds from inside the mother's body (movements of the diaphragm, gurgling of the stomach and intestines, heart rate, noise of the circulation

in the blood vessels, bone and joint movements, treading), her voice, as well as other sounds of the environment. The mother's voice is an important part of the intrauterine environment (Querleu et al., 1988).

The sense of hearing is one of the senses that is growing very fast. The structure of the sense of hearing develops during the first 20 weeks after conception. The most important of its parts is the cochlea in the inner ear and the auditory cortex in the temporal lobe. The first structural elements of the sense of hearing are bubbles that appear in the 4th week. The 3rd week of fetal life brings the development of the auditory vesicles. The inner ear is formed by 5th week. In the 7th week the earlobe takes the shape after the child's parents (Kornas-Biela 1991). The differentiation of cells in the cochlea (stereocilia) begins between 10th and 12th week of gestation. The eardrum develops from the ectoderm and the ossicles from the mesoderm. This development continues until the 8th month of intrauterine life. The cochlea, the hearing organ of the inner ear, finishes its morphogenesis by the 10th week, and in the 5th month of gestation it reaches its final size (7mm) (Relier 1994, p. 103; Kornas-Biela 2011, p. 155). Early studies by Einsenberg (1965, 1969) suggest that the sense of hearing develops between the 16th and 20th week of gestation. The author also mentions that about 20 weeks of gestation, the child's sense of hearing is developed as an adult one (see: Manturzevska, Kamińska 1990; Kornas-Biela 1991).

Audibility in the amniotic sac depends on many factors (e.g. thickness of the abdominal fat in the mother) and on the characteristics of the stimulus itself, moreover, its perception also depends on the child's age (Hepper, Shahidullah 1994, Lecanuet et al. 2000). Already in a study published in 1981, Querleu, Renard and Crépin proved that the child is able to hear not only stimuli coming from the internal environment of the mother, but also external sounds above or below the base volume – and responds to this stimulation by movements and changes in the heart rhythm. However, a response to a sound stimulus occurs only when the baby is not in distress.

Shahidullah and Hepper's study (1994) demonstrated the gradual development of the ability to hear. From approximately the 20th week of gestation the child begins to detect very strong vibrations and sounds, and reacts by restlessness, rapid eye movement, awakening from sleep, and accelerated heart rate (Joseph 2000). The child initially perceives the sounds in a non-acoustic way and gradually acquires the ability to differentiate the volume, pitch, duration, rhythm, and accent of the sounds. The child first hears the vibration, then strong individual sounds, very loud music, then weaker sound sequences such as human speech, music, singing. At 24 weeks about 50% of children respond to the strong sound by a delayed reaction of fright. Low sounds rather inhib-

it motor activity of the child, while high-pitch ones increase and accelerate it (Kornas-Biela 2011).

The development of the neural part of the sense of hearing, however, takes place later, and in about 25th week of gestation the auditory system is already operating. Neuronal connections to the auditory cortex are functionally efficient about 28-30 weeks after conception, but take several months to reach maturity. The most critical period for the formation of neural connections between the organ of hearing and the auditory cortex is in the period from 25 weeks of gestation to 5-6 months after birth (Graven, Browne 2008; Kral, Pallas 2011). For the capability of tones to develop, stimulation is necessary: access to stimuli, their differentiation and grasping the significance of the sounds.

Moreover, reactions to sound frequencies higher or lower than the frequencies audible by the human ear have been registered in the prenatal life, which indicates a reception of a different nature than auditory. Certain researchers point out that the sound in the aquatic environment is transmitted through the skull bone rather than through the outer and inner ear (Gerhardt, Abrams 1996). Yet, the question whether a child with a conductive hearing loss is prenatally less “impaired” (less impaired bone conduction) than a child with a sensorineural hearing loss still remains unanswered.

The prenatal child begins to respond to sounds between the 22th and the 24th week (Hepper, Shahidullah 1994). A better perception of stimuli of lower frequency (<500 Hz) has been observed (Gerhardt, Abrams 1996, 2000). As the child develops, also the ability to identify sounds of lower volume (decibels) is gradually increasing (Kisilevsky et al. 2004). In addition, at first the child only responds to sounds at low frequencies (250-500Hz, as opposed to the adult: 20-20000Hz), but then the ability to receive a wider range of frequencies gradually increases. Because the child more quickly and clearly hears sounds at lower frequencies (they are better conducted), it perceives music of the bass, cello, bassoon, or flute better than e.g. the violin.

Later, the child acquires the ability of hearing the mother’s voice and voices from the environment (Lecanuet, et al. 1993). The sounds come through the mother’s body, thus, they are suppressed, but low frequency tones are weakened to a lesser extent (the basic frequency of the human voice is 125-250 Hz – Hepper 2005). Querleu et al. (1988) and Benzaquen et al. (1990) observed that the voice of the child’s mother is received at about 10dB higher than a female or male voice with the same pitch as the voice of the mother. The same phenomenon of better audibility (higher volume) of the mother’s voice rather than other voices from the environment was also noted by other researchers (e.g. Richards et al., 1992).

DIFFERENTIATION OF SOUNDS

Prenatal auditory competences have been well described, not only for animals, but also for humans, but the animal model is still often in many studies. Before birth the child acquires a relatively high capacity to discriminate sounds (Chelli, Chanoufi 2008).

Studies on the preference of newborns to hear certain sounds rather than other ones demonstrate that in the period before birth already occurred such processes as receiving sounds, discriminating among them, and remembering differences in the rhythm (the child clearly prefers calm sounds with a steady rhythm, similar to the heart beat of an adult in the state of rest), and distinguishing voices that he or she is regularly exposed to (e.g. mother's voice – DeCasper, Fifer 1980; DeCasper, Spence 1986; Spence, DeCasper 1987), as well as the language (Moon, Cooper, Fifer 1993), parts of speech or music and songs. The prenatal experiences of receiving various sound structures are stored and are the basis of acoustic preferences after birth (Fifer, Moon 1989).

Shahidullah and Hepper (1994) investigated the behavioral manifestations of the child's physical reaction to pure tones with a frequency of 100Hz, 250Hz, 500Hz, 1,000Hz, and 30,000Hz, by children aged 19-35 weeks of gestation. The sounds were emitted from a speaker mounted on the mother's abdomen. The children's reactions were recorded using ultrasound technology. It turned out that the first reaction was movement to the sound of 500Hz at 19 weeks. Then developed the ability to register sounds of lower frequencies, 100Hz and 250 Hz. Altogether, 96% of children at the gestational age of 27 weeks were able to respond to the sounds of 250 and 500Hz, but not to higher tones (1,000Hz and 3,000Hz). The children developed the ability to hear these tones (as tested by the motor reaction) only about the 33rd-35th week of gestation. If in the period preceding birth (116 children, aged 36-39 weeks of gestation) the children listened to pure tones (e.g. of the piano, D4: 292-1,800Hz and C5: 518-300Hz), their heart rate dropped every time when the sound was different than the previous sound (Lecaunet et al. 2000).

The prenatal child not only has the capacity to receive sounds of different frequencies, but also acquires the ability to distinguish them (Lecaunet et al. 1987; Shahidullah, Hepper 1994). The child picks up vowels from the flow of the speech, as they have a lower frequency than consonants, and distinguishes them (Gerhardt, Abrams 2000).

Research conducted within the paradigm of habituation on children aged between 27 and 35 weeks of gestation indicated that all children are able to distinguish pure tones of 250Hz and 500Hz, and syllables such as 'baba' – 'bibi' and

‘babi’ – ‘biba’ (110 dB) at 35 weeks of gestation, while at the age of 27 weeks this capacity is not yet well developed. As observed in studies by a team of researchers from France and the USA (Lecanuet et al. 2000), the child is not only able to distinguish phonemes ([a] and [i]; 80-110dB) and syllables (‘ba-ba’ and ‘bi-bi’; 110dB), but also the male voice (80-100Hz) from the female voice (165-200Hz), although the loudness, speech duration, type of words and their prosodic features were the same. Interestingly, the study showed that the heart rate slowed down a few seconds after the sound and it returned to normal a new sound appeared or there was a change in the sequence. Already before birth occurs the ability – later possible to be confirmed in newborns – to differentiate between acoustic stimuli, and to perceive changes in their presentation, based on a short audio sample. In other words, before birth of the child attains the ability to perceive changes in the organization of the sound stimulus (Lecanuet et al. 2000).

The prenatal child’s skills to differentiate sounds of different frequencies are possible to be observed by magnetoencephalography. An analysis of the potentials evoked in response to the changing frequencies of tones in a series of repeated sounds indicated the child’s ability to discriminate them at the brain level as early as 28 weeks of gestation. With the next week the latency response time was decreasing (Draganova et al. 2007).

THE SPEECH AND MUSIC

Many studies have shown that the prenatal child is able to grasp sufficiently accurate necessary information from the sounds heard so that it is able to perceive auditory-specific patterns of hearing, as in the case of human speech. The ability to tell the difference between the sounds at different pitch is an important factor in the development of speech perception (Lecanuet et al. 2000). The ability to receive and distinguish sounds of different frequencies, including the different sounds of speech is essential to the assessment of the child’s hearing and speech development, its perception and active speaking. The prenatal child perceives particular prosodic and phonetic qualities of speech especially if it is at the volume above 60dB (eg. Smith et al. 1990).

Various studies on the development of auditory abilities documented that the prenatal child hears the speech of the mother (the best), notices the typical characteristics of her speech, thereby learning the mother tongue, which then provides the basis for learning the language after birth. The mother’s speech attracts the most of the newborn’s attention and arouses his/her emotions (Cooper, Aslin, 1989). In a study on 14 healthy preterm infants aged 31-34 weeks, who were

monitored 4 times a day for 3 days during the first week after birth, it turned out that the mother's voice played from a recording caused a decrease in their physical activity, an increase in alertness, stable heartbeat, a livelier facial expression and gaze, no symptoms such as trembling or loss of body color (Bozzette 2008).

Hepper, Scot and Shahidullah (1993) followed the neonates' behavior in response to the mother's voice and the voice of persons unknown to the child. They noted a difference in the babies' movements in response to both these voices. It turned out that the change in the child's movement is more pronounced in reaction to the mother's voice. Moreover, a more vivid and positive reaction occurs when the mother uses the so-called 'motherese' than when the child hears her voice characteristic for adult speech.

The mother's language spoken to the newborn was called infant-directed speech – IDS, child-directed speech – CDS, caretaker speech, maternal language, popularly also called motherese, parentese, baby talk, mommy talk or daddy talk (e.g. Papousek, Papousek 1984; Eliot 2003, pp. 337-338). Infants react more positively to motherese than to ordinary adult speech. This language has been well explored as a stimulator of speech acquisition by the child after birth, but the prenatal experiences are the important initial base for this process.

A special type of sound is music. The prenatal child gradually becomes sensitive to music (Kornas-Biela 1993; Relier 1994, chapter 6). The ability to receive low frequency sounds to grow faster and they are better conducted. James, Spencer and Stepsis (2002) reported a group of children who listened to music, compared with the control group. The "music fetuses" displayed a higher mean fetal heart rate, higher fetal heart rate variation, and a higher count of changes in the body position over time, compared to the control group. Similarly, in another study conducted at 33 weeks of gestation, a higher heart rate was observed in the children while listening to music (Kisilevsky et al. 2004). The child is more sensitive to the rhythm of music rather than to the pitch (Gerhardt, Abrams 2000). There has been a preference for children to listen to quiet music, with a steady rhythm and tempo similar to the heart rate of an adult at rest. That is also why the low-pitch musical instruments mentioned above (such as the bassoon, flute and cello) are recommended to mothers for listening during pregnancy.

However, it is also important do not overdo in attributing prenatal stimulation an excessively important role, because early exposure to music from the prenatal period is only one of many factors affecting whether the child would be e.g. musically gifted in the future. In addition to prenatal exposure to music, such factors are also important as: interest in music, time that the child spends on contact with music, a positive image of oneself as musically talented, motivation and hard work (Kaminska 2002, p. 39). These basic factors determine whether music is becomes a field of one's interest and activity.

PRENATAL ACOUSTIC LEARNING AND THE IMPACT OF PRENATAL EXPERIENCES
ON THE WHOLE LIFE

Sounds provide experiences for prenatal child. As Abrams and Gerhardt (2000) stated “The acoustic environment of the fetus is composed of continuous cardiovascular, respiratory and intestinal sounds that are punctuated by isolated, shorter bursts during maternal body movements and vocalizations”, and of course by sounds external to the mother’s environment. Additionally, vibrations on the external surface of the maternal abdomen are also able to induce sounds inside the uterus.

Over the next weeks in the third trimester of prenatal life child is observed to be capable of improvement in terms of auditory habituation – adaptation to the sound that occurs constantly, for a long time or is frequently repeated (Hepper 1992). A study on the prenatal children’s skills to recognize a musical stimulus played on TV has shown that at about 30 weeks of gestation the prenatal child is able to recognize the given sound stimulus as familiar and livens up (Hepper 1991). Other researchers have confirmed that this period is appropriate for developing the ability to recognize well-known sounds, and even suggest that this capacity may possibly be acquired earlier (e.g. Springen 2010).

A special type of sounds that accompany the child throughout its whole life before birth is the mother’s heartbeat and the sounds of the work of her internal organs. They are a constant feature of the intrauterine environment and alongside with the mother’s speech they are subject to habituation and remembering. Imprinting concerning the maternal heart rate causes that the baby held by the mother at the breast has a sense of continuity of experience, feels safe, calms, relaxes. Premature babies who can hear this rhythm (even from a recording) cry less, have less difficulty with breathing, eating and sleeping, and less frequently fall ill (Sadowski 2001, p. 468). Mother of all cultures intuitively fulfill the need of the newborn in this respect by carrying or holding the baby with the head on the left side of her body, and by breastfeeding. A similar calming effect on children (and adults) has the rhythmic ticking of the clock, the sound of the metronome or a fan, the sea waves, the church bells, the wheels of the train, as well as listening to the rhythm of a person breathing.

The prenatal child remembers sounds that are often present in the environment. As development increases its ability to habituation, that is, the frequency of a lack of reaction (such as cessation of body movements, increased heart rate) after a series of vibroacoustic stimuli, which reflects increasing maturity of the neurophysiological processes that allowing an identification of the given sound as familiar. Therefore, the prenatal child stops responding to even strong but repeat-

ed sounds in the surrounding environment, and does not react to them as a stressor either before or after birth. Newborns of mothers who have lived near an airport since before the 5th month of pregnancy rarely cry or awaken at a passing aircraft, while half of the infants whose mothers moved into the vicinity of an airport just before birth wake up and experience anxiety. Most newborns regularly exposed before birth to loud disturbing (alarming) sound, did not respond to it with fear, while infants who had not been accustomed to such sounds in the womb clearly expressed their astonishment and fright (Damstra-Wijmenga 1991).

The child registers the mother's voice in the memory. The preference to hear the voice of the mother rather than the voice of another woman is visible in the newborn immediately after birth and is independent from the length of time that passed after birth (research until 2 years of age) or the feeding method (DeCasper, Fifer 1980; DeCasper, Spence 1986; Fifer, Moon 1989; Hepper Scott, Shahdullah 1993). In a study conducted on a group of 28 newborns on the second day after birth, it turned out that over half paid particular attention to their mother's voice, while not reacting to the voice of another woman (Damstra-Wijmenga 1991).

The above was confirmed by experiments, for example, neonates very quickly learned such way of sucking that enabled them to listen to the voice of their mother or sucked in such a way as to listen to the story "familiar" to them from before birth, rather than one with a different rhythm and quite new to them. Newborns prefer to listen to the female voice rather than the male one, and generally to the human voice rather than to any other sound or silence.

The auditory memory of the mother's voice results in faster learning the mother tongue. It also manifests itself in the fact that in a bilingual environment the child learns faster the language that the mother spoke during pregnancy. Also, bilingualism in babies starts in the womb. A recent study by Canadian and French researchers shows that babies of mothers have different language preferences than babies born to monolingual mothers. [<http://blog.babyplus.com/prenatal-brain-development-linked-specialized-sound/02.12.2012>].

Prenatal listening exercises allow the infant to respond to human speech and to adapt their movements to the rhythm of the speech it hears in the environment (the child "dances" with its body to the rhythm of the adult's speech), while adults spontaneously meet the preferences of the newborn and use higher pitch and affectionately-sounding clusters (the motherese/baby talk mentioned above, Eliot 2003, p. 337-338). Children pick up and remember the prosodic features of the language their mother spoke during pregnancy and not only learn that language faster, but also learn to distinguish the emotional components of speech (which correspond to the physiological messages that reach the child) and after birth are able to distinguish the emotional speech patterns of their mothers (Mastropieri, Turkewitz 1999). The mother's voice, as a sound breaking the silence is the

'primary object' for the child, the precursor of the internalized object, which the mother becomes for the baby after birth.

Even premature infants, when exposed to recordings of their mothers' voice (speaking, reading fairy tales, singing), the heartbeat or sound of calm music, played from small speakers placed in incubators – overcome difficulties of the preterm period more successfully (they cry less, have less difficulty in breathing, are less often sick, suck and sleep better, gain weight faster). Obviously, technical devices imitating the intrauterine environment are not able to substitute the child's direct contact with the mother. It is also unclear whether artificial, prolonged and frequent repetition of stimuli from the period of life that has passed does not disturb the child's openness to new stimuli and contacts (e.g. if it does not constrain the child or arouse the desire to escape to the previous prenatal state).

The prenatal child remembers fragments of songs the mother sang (Relier 1994; Trehub, Trainor 1998) and fragments of music regularly heard in the womb (Gerhardt, Abrams 2000; James, Spencer, Stepsis 2002; Hopkins et al. 2005). Music played to prenatal children for several hours, at intervals, for three days before birth through headphones attached to the mother's abdomen caused a change in the rhythm of the children's heartbeat and behavior and was remembered. In the period of 3-5 days after birth the same music induced a change in the behavior and a longer time of alertness in children who had the opportunity to listen to it before birth (10), compared to children whose headphones emitted no sound (10) (James, Spencer, Stepsis 2002).

Many researchers emphasise that pre- and perinatal exposure of the child to the sounds of music has long-term positive effects on its development (Hurwitz et al. 1975; Douglas, Willatts 1994; Costa-Goimi 1997; Rauscher et al. 1997; Rauscher, Robinson Jens 1998). The child remembers fragments of music the mother often listened to during pregnancy (e.g. the jingle or clip from a show – Hepper 1988, 1991), and her singing (e.g. Relier 1994, chapter 6). In experimental studies it was found that children of mothers in their 37 week of pregnancy reacted, by slowing down their body movements, to the opening tune of a soap opera watched regularly by the mother ("Neighbours"). The same children, as 2- to 4-day old newborns recognized the tune, stopped moving or crying, and their heart rate slowed down. However, if after birth they had no contact with the tune for three weeks, the memory weakened and the ability to recognize it as familiar disappeared (Hepper 1988). Emitting such familiar sounds after birth has a calming effect and supports the development of the child.

A study carried out in Thailand (Department of Obstetrics and Gynecology, Hua Chiew Hospital in Bangkok) aimed to assess the capacity of the prenatal child's memory and learning in various senses. 120 pregnant mothers were trained to enrich their auditory environment by using the heartbeat sound, music, rhyth-

mic patting and rocking. Their study suggests that “giving a baby an enriched auditory environment before birth really can make a difference in the prenatal brain development”. The experiment also resulted in a better relation between the mother and the child after participating in the prenatal activities, which may be an effective way to support the bonding between the mother and the child and promote the infant’s emotional and intellectual development [<http://blog.babyplus.com/prenatal-brain-development-linked-specialized-sound/04.12.2012>].

THE SENSE OF HEARING AND ITS INTER-SENSORY RELATIONS

Pre- and postnatal sensory experiences shape the functional architecture of the brain (Pallas 2005). The sense of hearing is not the only acting sense, on the contrary – during the prenatal stage of life all the senses are active: from the end of the third month of the other senses reach their functional efficiency, e.g. at the turn of the 3-4th month the baby perceives the basic tastes and the smell of the amniotic fluid, in the period of the 7th and 15th week the whole body gradually becomes sensitive to touch and pain sensations (Kornas-Biela 2011). The fact that all the senses work long before raises a question on the cooperation of the sensory modalities (Busnel, Granier-Deferre, Lecanuet 1992) and the possible dominance of one sense, as it occurs in infancy (Bremner, Lewkowicz, Spence 2012). The cooperation among the senses remains a phenomenon that we do not know much about, as studies have mainly focused on the understanding of each sense separately. However, the prenatal neural structures may possibly play a mediating role in collecting impressions, e.g. at the absence of a developed receptor, the stimulus may be received by sensory modalities that are developmentally more advanced or by a non-specialized neural system (Hepper 1992, pp.133-134). Studies on newborns and infants suggest that there is an interaction among the senses, hence, an assumption may be made that it also occurs to a certain extent before birth. It is possible that in the near future the cooperation among the senses will become an interesting field of investigation.

PRENATAL HEARING TEST

Many authors point to the usefulness of the auditory evoked response (AER) test for predicting neurological disorders in newborns, delays in the neuro-motor development (e.g. hydrocephalus), and for the diagnosis of hearing loss before

birth. However, with the current state of technology, the still too many false negative results do not allow a solid base for reliable diagnoses. Nevertheless, the AER test is particularly useful in the diagnosis of severe brain damage and brain death (Lowery et al. 2009). On the other hand, the AER tests may in the near future be a very precise diagnostic tool to examine the functioning of the brain and may be used to predict the child's cognitive abilities (Sheridan et al. 2010).

Testing the child's auditory reaction before birth indicated its predicative value. Namely, when the child's spontaneous motor reaction was observed, alongside with a reaction induced by an acoustic stimulus (on a group of 260 children from high-risk pregnancies and 233 children from low-risk pregnancies) it was found that children of mothers with high-risk pregnancies were characterized by atypical forms of a response to the sound stimuli. These results suggest the need for further research on the relationship between the operation of the child's sense of hearing before birth and language skills after birth (Kisilevsky, Hains 2005).

At present, there is rich literature on the usefulness of the sound test (fetal acoustic stimulation) and the child's response. The type of movements and changes in the heart rate are used to assess the possible perinatal risk. This test is non-invasive, safe and is a fast screening method for evaluating the child's well-being, which allows to identify children at the risk of developmental disorders or problems in the progress of labor (e.g. Tannirandorn, Wacharaprechanont, Phaosavasdi 1993).

Prenatal auditory abilities are of clinical relevance. The child's ability to notice the differences between sounds of different frequencies belongs to the important conditions for the proper development of the cognitive functions, and problems in this matter are clinical manifestations of disorders of hearing after 28 weeks of gestation. Therefore, the magnetoencephalograph test – that diagnoses the evoked potentials in response to the changing frequencies of sounds, in a series of repeated sounds (and thus, tests the child's ability to distinguish them) – is an important method in the prenatal diagnostics of neurological disorders or hearing (Draganova et al. 2007).

CONCLUSION

Studies on the prenatal sensory abilities provide knowledge about the potential of the child that is born. However, the acoustic stimuli that are belong to the normal prenatal experience are different from those that the child perceives in the physical and personal environment after birth. Nevertheless, all the senses are functionally active before birth and the sensory impressions are gradually integrated into simple perceptual schemas.

We also have to remember that due to the high prenatal sensitivity to sounds, one should follow the principles of sound safety. The prenatal child's sensitivity to low frequency sounds indicates the need to protect it from loud low-pitch sounds, as they may cause damage to the sense of hearing (Hepper Shahidullah 1994). Loud and continuous (prolonged, uninterrupted) sound and impulses emitted by devices or electronic instruments with low frequencies may damage the cells in the cochlea and lead to hearing loss (Gerhardt, Abrams 2000). The more frequent the child's exposure to loud sounds, the greater the risk of hearing loss (Relier 1994, p. 106; Eliot 2003, pp. 326-327). Thus, properly designed prospective randomized control studies on different sounds should involve long-term follow-up observations of subjects and controls to examine the duration of such effects and their potential harm (James, Spencer, Stepsis 2002, p. 348).

REFERENCES

- Abrams R.M., Gerhardt K.J. (2000). The acoustic environment and physiological responses of the fetus. *Journal of Perinatology*, 20 (8 Pt2), 31-36.
- Benzaquen S., Gagnon R., Hunse C., Foreman J. (1990). The intrauterine sound environment of the human fetus during labor. *American Journal of Obstetrics and Gynecology*, 163, 484-490.
- Bozzette, M. (2008). Healthy Preterm Infant Responses to Taped Maternal Voice. *The Journal of Perinatal and Neonatal Nursing*, 22 (4), 307-316.
- Bremner, A. J., Lewkowicz, D. J., Spence, C. (2012) (Eds.). *Multisensory Development*. Oxford: Oxford University Press.
- Busnel M.C., Granier-Deferre C., Lecanuet J.P. (1992). Fetal audition. *Developmental Psychobiology*, 662, 11-134.
- Campbell D.G. (1997). *The Mozart Effect for Children: Awakening Your Child's Mind, Health, and Creativity with Music*. New York: Avon Books, Inc.
- Chelli D., Chanoufi B. (2008). Fetal audition. Myth or reality. *Journal de Gynécologie, Obstétrique et Biologie de la Reproduction*, 37 (6), 554-558.
- Cooper, R., Aslin, R.N. (1989). The Language Environment of the Young Infant: Implications for Early Perceptual Development. Special Issue: Infant Perceptual Development. *Canadian Journal of Psychology* 2, 247-265.
- Costa-Goimi E. (1997). The McGill Piano Project: Effects of Piano Instruction on Children's Cognitive Abilities. *Paper presented at the Proceedings of the Third Triennial ESCOM Conference*, Uppsala, Sweden.
- Damstra-Wijmenga S.M.I. (1988). Fetal soap addiction. *Lancet*, 23, 223.
- Damstra-Wijmenga S.M.I. (1991). The memory of the new-born baby. *Midwives Chronicle*, 104 (1238), 66-69.

- DeCasper A. J., Fifer W. P. (1980). Of human bonding: Newborns prefer their mother's voice. *Science*, 208, 1174-1176.
- DeCasper A. J., Spence M. J. (1986). Prenatal maternal speech influences newborn's perception of speech sounds. *Infant Behavior and Development*, 9, 133-150.
- DeCasper A.J, Fifer W.P. (1980). Of human bondage: Newborns prefer their mothers' voices. *Science*, 208, 1174-1176.
- Douglas S., Willatts P. (1994). The relationship between musical ability and literacy skills. *Journal of Research in Reading*, 17, 99-107.
- Draganova R., Eswaran H., Murphy P., Lowery C., Preissl H. (2007). Serial magnetoencephalographic study of fetal and newborn auditory discriminative evoked responses. *Early Human Development*, 83 (3), 199-207.
- Eliot L. (2003). *Co tam się dzieje? Jak rozwija się mózg i umysł w pierwszych pięciu latach życia*. Poznań: Media Rodzina.
- Fifer T.M., Moon C. (1989). Psychobiology of newborn auditory preferences. *Seminars in Perinatology*, 13, 430-433.
- Gerhardt K.J., Abrams R.M. (1996). Fetal hearing: characterization of the stimulus and response. *Seminars in Perinatology*, 20 (1), 11-20.
- Gerhardt K.J., Abrams R.M. (2000). Fetal exposures to sound and vibroacoustic stimulation. *Journal of Perinatology*, 20 (8 Pt 2), 21-30.
- Gorman, A. (1999). The "Mozart Effect": Hard Science or hype. <http://l3d.cs.colorado.edu/~agorman/pdf/mozart-effect-survey.pdf> (Dostęp: 05.11.2012).
- Graven S.N., Browne J.V (2008). Auditory development in the fetus and infant. *Newborn and Infant Nursing Reviews*, 8 (4), 187-193.
- Hepper P.G. (1988). Foetal 'soap' addiction. *Lancet*, 1, 1347-1348.
- Hepper P.G. (1991). An examination of fetal learning before and after birth. *Irish Journal of Psychology*, 12, 95-107.
- Hepper P.G. (1996). Fetal memory: Does it exist? What does it do? *Acta Paediatrica, Suppl.* 416, 16-20.
- Hepper P.G. (2005). Unraveling our beginnings: On the embryonic science of fetal psychology. *The Psychologist*, 18 (8), 474-477.
- Hepper P.G., Scott D., Shahidullah S. (1993). Newborn and fetal response to maternal voice. Special Issue: Prenatal and perinatal behavior. *Journal of Reproductive and Infant Psychology*, 11, 147-153.
- Hepper P.G., Shahidullah B.S. (1994). Development of fetal hearing. *Archives of Disease in Childhood*, 71, 81-87.
- Holinger P.C. (with: K. Doner) (2006). *Co mówią dzieci, zanim nauczą się mówić. Dziewięć sygnałów używanych przez dzieci do wyrażania uczuć*. Poznań: Media Rodzina.
- Hurwitz I., Wolff P. H., Bortnick B. D., Kokas K. (1975). Non-musical effects of the Kodaly music curriculum in primary grade children. *Journal of Learning Disabilities*, 8, 45-52.
- James D.K., Spencer C.J., Stepsis B.W. (2002). Fetal learning: a prospective randomized controlled study. *Ultrasound in Obstetrics and Gynecology*, 20 (5), 431-438.

- Joseph R. (2000). Fetal brain behavior and cognitive development. *Developmental Review*, 20, 81-98.
- Kamińska B. (2002), *Słuchowe zdolności muzyczne – ewolucja poglądów w psychologii muzyki*. In M. Grajter (Ed.), *Narząd słuchu, jego funkcjonowanie i możliwości percepcji elementów muzycznych*. Łódź: Akademia Muzyczna.
- Kisilevsky B.S, Hains S.M. (2005). Comparison of fetal behavior in low- and high-risk pregnancies. *Fetal and Pediatric Pathology*, 24 (1), 1-20.
- Kisilevsky S., Hains S.M., Jacquet A.Y., Granier-Deferre C., Lecanuet J.P. (2004). Maturation of fetal responses to music. *Developmental Science*, 7(5), 550-559.
- Kornas-Biela D. (1991). Rozwój dziecka nie narodzonego. In M. Kallas (Ed.), *W obronie poczętego* (pp. 16-44). Pelplin: Wydawnictwo Diecezjalne.
- Kornas-Biela D. (1992). Dźwiękowa stymulacja prenatalna i jej konsekwencje dla rozwoju dziecka. *Annales Academiae Medicae Bydgostiensis*, (Supl.: V Sympozjum Sekcji Psychosomatycznej Polskiego Towarzystwa Ginekologicznego, *Psychosomatyczne uwarunkowania porodu*, Żnin, 5-6.06.1992, 5, 129-133.
- Kornas-Biela D. (1994). Kształtowanie się zdolności słuchowych w prenatalnym okresie rozwoju dziecka. In: *Opuscula Logopaedica in honorem Leonis Kaczmarek* (pp. 143-158), Lublin, UMCS.
- Kornas-Biela D. (2004). *Wokół początku życia ludzkiego*. Warszawa: IW PAX.
- Kornas-Biela D. (2011). Okres prenatalny. In J. Trempała (ed.), *Psychologia rozwoju człowieka. Podręcznik akademicki* (pp.147-171). Warszawa, Wydawnictwo Naukowe PWN.
- Kral, A., Pallas S.L. (2011). Development of the auditory forebrain. In J.A. Winer, C.E. Schreiner (eds.) *The Auditory Cortex*. New York: Springer.
- Lecanuet J.P., Granier-Deferre C., Jacquet A.Y., DeCasper A.J. (2000). Fetal discrimination of low-pitched musical notes. *Developmental Psychobiology*, 36 (1), 29-39.
- Locke J. (1690). *Essay Concerning Human Understanding*.
- Lowery C.L., Govindan R.B., Preissl H., Murphy P., Eswaran H. (2009). Fetal neurological assessment using noninvasive magnetoencephalography. *Clinical Perinatology*, 36, 701-709.
- Manturzevska M., Kamińska B. (1990). Rozwój muzyczny człowieka. In M. Manturzevska, H. Kotarska (Ed.), *Wybrane zagadnienia z psychologii muzyki*. Warszawa: Wyd. WSiP.
- Mastropieri D., Turkewitz G. (1999). Prenatal experience and neonatal responsiveness to vocal expressions of emotion. *Developmental Psychobiology*, 35 (3), 204-214.
- Maurer D., Maurer Ch. (1994). *Świat noworodka*. Warszawa: PWN.
- McKelvie P., Low J. (2002). Listening to Mozart does not improve children's spatial ability: Final curtains for the Mozart effect. *British Journal of Developmental Psychology*, 20, 241-258.
- Moon C., Cooper R. P., Fifer W. P. (1993). Two-day-olds prefer their native language. *Infant Behavior and Development*, 16, 495-500.

- Pallas S.L. (2005). Pre- and *postnatal* sensory experience shapes functional architecture in the brain. In B. Hopkins, S.P. Johnson (eds.), Prenatal development of postnatal functions. *Advances in Infancy Research*, 14: 1-30.
- Peiper A. (1925). *Sinnesempfindungen des Kindes vor seiner Geburt*. Monatsschrift für Kinderheilkunde, 29, 236-241.
- Preyer W. (1895). *Rozwój umysłowy dziecka od pierwszego dnia życia*. Tłum. Maksymilian Flaum, Warszawa.
- Querleu D., Renard X., Crépin G., (1981). Auditory perception and fetal reaction to react to sound stimulation (French). *Journal de Gynecologie, Obstetrique et Biologie de la Reproduction*, 10 (4), 307-314.
- Querleu D., Renard X., Versyp T., Paris-Delrue L., Vervoort P. (1988). Fetal hearing. *European Journal of Obstetrics, Gynecology, and Reproduction Biology*, 29, 191-212.
- Rauscher F. H., Robins, K. D., Jens J.J. (1998). Improved maze learning through early music exposure in rats. Neurological research. *Neurological Research*, 20 (5), 427-432.
- Rauscher F. H., Shaw G. L., Levine L. J., Wright E. L., Dennis W. R., Newcomb R. L. (1997). Music training causes long-term enhancement of pre-school children's spatial-temporal reasoning. *Neurological Research*, 19 (1), 1-8.
- Relier J.P. (1994). *Pokochać je nim się narodzi. O więzi matka - dziecko przed urodzeniem* Warszawa: Ancher.
- Richards D. S., Frentzen K. J., Gerhardt K. J., Abrams R. M., McCann M. E. (1992). Sound levels in the human uterus. *American Journal of Obstetrics and Gynecology*, 166, 186-190.
- Sack K. (1998a). Georgia's Governor Seeks Musical Start for Babies. *The New York Times*, 15.01.1998: A 12.
- Sack K. (1998b). Lullabies by Brahms and Others. *The New York Times, Week in Review*, 18.01.1998.
- Shahidullah B.S., Hepper P.G. (1994). Frequency discrimination by the fetus. *Early Human Development*, 36 (1), 13-26.
- Sheridan C.J, Matuz T., Draganova R., Eswaran H., Preissl H. (2010). Fetal Magnetoencephalography - Achievements and Challenges in the Study of Prenatal and Early Postnatal Brain Responses, A Review. *Infant and Child development*, 19 (1), 80-93.
- Smith C., Satt B., Phelan J.P., Paul R. H. (1990). Intrauterine sound levels: Intrapartum assessment with an intrauterine microphone. *American Journal of Perinatology*, 7, 312-315.
- Śniadecki J. (1804). *Jędrzeia Śniadeckiego, medycyny doktora, Teorya jestestw organicznych*. Warszawa: Drukarnia No 646 przy Nowolipiu.
- Śniadecki J. (1997). *O fizycznym wychowaniu dzieci. Ze wstępem Macieja Demela*. Gdańsk: Wydawnictwo Uczelniane AWF w Gdańsku.
- Spence M. J., DeCasper, A. J. (1987). Prenatal experience with low frequency maternal voice sounds influences neonatal perception of maternal voice samples. *Infant Behavior and Development*, 10, 133-142.

- Springen K. (2010). Fetal recall? Memory in utero. *Scientific American*, 14.01.2010.
- Tannirandorn Y., Wacharaprechanont T., Phaosavasdi S. (1993). Fetal acoustic stimulation for rapid intrapartum assessment of fetal well-being. *Journal of the Medical Association of Thailand*, 76 (11), 606-612.
- Trehub S. E., Trainor L. J. (1998). Singing to infants: Lullabies and playsongs. *Advances in Infancy Research*, 12, 43-77.
- Vaughan Ch. (1997). *Jak zaczyna się życie czyli 9 miesięcy w łonie matki*. Warszawa: Bis.
- Vince M. A., Billing A. E., Baldwin B. A., Toner J. N., Weller C. (1985): *Maternal vocalisations and other sounds in the fetal lambs sound environment*. *Early Human Development*, 11 (2), 179-190.

CHAPTER TWO

HYPOACUSIA AS ONE OF THE REASONS FOR CLEFT-TYPE ALALIA

ABSTRACT

The author presents her understanding on the disorders of speech in children with cleft palates. She mentions several harmful factors that are causes for these speech disorders. In her analysis she focuses on the role of the hearing sense in the creation of these above mentioned disorders in the case of children with cleft palates. The author carries out some precise revision of the goals of the speech therapy and formulates many indications and tips concerning the therapy in the case of the child with cleft lip and cleft palate.

Keywords: *speech in children with cleft palate, cleft alalia, cleft dyslalia*

1. CLEFT LIP AND CLEFT PALATE AS A DEVELOPMENTAL DISORDER

1.1. THE CORE OF THE CLEFT LIP AND CLEFT PALATE

The cleft lip, cleft palate, and alveoloschisis are inborn disorders and the most frequent anomalies of the central part of the face. When discussing the etiology of cleft-like deficit, what is often indicated is both the genetic and environmental factors appearing in various configurations. The patho mechanism of the origin of this deficit is strictly connected with the period of time when the central part of the facial skeleton is shaped, i.e. the first trimester of the pregnancy. The cleft deficit can arise between the fourth and the twelfth weeks of the embryonic life. These deficits may have an isolated form or appear in other sets of disorders. So far about

400 sets of disorders have been identified. In all of them the cleft feature is one of the symptoms. The cleft lip and cleft palate are the disorders in the anatomical continuity of the tissues in the places where the disorders of embryogenesis have occurred. They manifest themselves to different degrees and with variable intensity within the lip, the alveolar process and the palate.

The distorted area may be a small fissure within the lip or it may also embrace a few elements – the lip and the alveolar process or the lip, the alveolar process, the soft and hard palate or, in some cases, the soft and hard palate or the soft palate. The cleft may be unilateral, bilateral, ultimate and partial. It may be of sub-mucous character, which is quite often the reason why the therapist does not recognize the disorder at the time of birth. Hence the diagnosis takes place later in the child's life. The frequency of occurrence of the cleft disorder in Poland is similar to incidence rates both in other European countries and in the world. The incidence rate is roughly 1 to 2 children per 1000 alive-born infants.

Let us notice that the space in which the face distortion and the deformation of lower jaw occur is also where the respiratory and alimentary system begins. This fact causes children with cleft palates to present various symptoms of the dysfunction of the respiratory and alimentary functions from the very moment of birth together with the disorders of the speech development. In the case of the cleft palate what is often observed is the disorder of the hearing sense in the context of the dysfunction of the auditory tubes (Eustachian tubes). In the early years of life the children are prone to the ear illnesses and the risk of hypoacusia.

1.2 MULTI SPECIALIST TREATMENT OF THE CHILDREN WITH CLEFT LIP AND CLEFT PALATE

People with cleft lips or cleft palates are treated in a multi disciplinary way from the very moment of their birth. This specialist treatment includes the surgical joining of the cleft elements. It is most important for the child's life, his physical appearance and speech. It is necessary to stress that the closing of the cleft fissure (one-stage closing – at the age of about 6-7 month of life or the two-stage closing – the lip from the age of 3 months old and the palate from the age of 9 months old or later, depending on the center of the treatment of the cleft disorder) is not sufficient, if we want these children to gain the proper speech, occlusion, appearance of the face and, indeed, the possibility of satisfactory participation in social life. Hence, while dealing with the child with some kind of cleft element, we need to ensure that the child has possible access to several specialists, e.g. speech therapists, surgeons, phoniatriests, laryngologists, audiologists, pediatricians, or, in time, psychologists.

The specialist treatment, the diagnosis, and the speech therapy should be undertaken from the moment of birth in the case of babies with cleft. These steps embrace different therapies, namely: the medical (together with orthodontic, laryngological, audiologic, phoniatic, surgical, pediatric) as well as speech therapy and psychological treatment. The diagnostic action, depending on the specialist who undertakes this task, has different aspects. In general it aims:

- to determine the kind of the cleft with the usage of the classification based on the anatomical criterion or the one connected with embryology,
- to determine the kind and the size of anatomical deformations within the face, the jaws, the nasal cavity, the nasopharynx,
- to describe the state of physiological hearing system,
- to establish the kind of the functional disorders, particularly ones connected with breathing, eating food, and drinking, the kind of the speech disorder which can have the form of cleft dyslalia or cleft alalia,
- to determine whether the cleft disorder is of isolated nature or whether other disorders coexist with the cleft , and
- to determine the range and possibilities of specialist treatment.

1.3. PROTOTYPICAL FEATURES IN THE CHILD WITH CLEFT

While discussing the characteristic features in a patient with the cleft dysfunction it is advisable to use the term 'prototype'. One determines the most typical, representative, and frequent features occurring in the case of those patients. Although the term is associated with cognitive linguistics, and is rooted in Rosch's theory (Rosch, 1978), it can be applied in this context due to its cognitive values. One finds the typical, representative, and the most frequent features that are determined on the basis of the recognition of the frequency criterion. Having accepted the approach, we may distinguish 3 prototypes, namely, the prototype of anatomical disorders, the prototype of biological disorders, the prototype of communication disorders (Pluta-Wojciechowska 2008, p. 21-44).

1.3.1. THE PROTOTYPE OF ANATOMICAL DISORDERS.

Any malformations within the structures with cleft are visible after the birth, although the possibility of recognizing them exists even when the child is not born. This latter possibility gives a new perspective in the area of helping the parents of this child. On the other hand, it does not relate to all the cases of cleft: notable in this regard is the sub mucous cleft, the diagnosis of this disorder occurs not earlier than a few years after birth, for example, at the moment of the occurrence of characteristic and typical anomalies of the features of the

produced sounds, that is, in the form of the disorders of the resonance, such as, open nasality.

When we discuss the anatomical disorders, we should take into consideration the prenatal period of time after the birth, but also the period after the basic operation/s as well as during the following years of the child's life. The picture of the structural disturbances in these following years will vary, due to the time and the means of surgical and orthodontic treatment as well as with the compensational changes in the organism, the disorders developing under the influence of iatrogenic factors, as well as the functional factors, such as, breathing and eating. It is worth emphasizing that different factors (e.g. inherited features) work together and cause the situation in which the effects of the multi-specialist treatment and speech therapy on cleft children may look different in spite of the occurrence of the same type of cleft.

The type of the anatomical disorders is related to the place where the continuity of the structures has been broken. The smallest differences are observed in the case of the lip cleft where the disorder is due to the break of the orbicular muscle of upper lip. In the case of the upper lip cleft, alveoloschisis and cleft palate, the scope of the disorders is much wider as a result of the break in the continuity of the upper lip (unilaterally or bilaterally) and the continuity of the soft and hard palate.

The cleft disorder may be connected not only with the soft/hard and soft palate, but it may also be of a sub mucous character, which we were discussing above. While evaluating and discussing the kind of the anatomical disorders, what should be taken into account is the following set of the features: inappropriate vascularization of the cleft tissues, tongue pressure, improper muscle balance, the lack of the proper pressure, unequal and improper work of the cleft muscles and their influence on osseous tissue, dislocation of tissues, tissue hypoplasia and secondary atrophy resulting from the insufficient function or inactivity.

1.3.2. THE PROTOTYPE OF BIOLOGICAL DYSFUNCTIONS

The most difficult types of the cleft (e.g. the ultimate bilateral lip and palate cleft, the unilateral cleft lip and cleft palate) are connected with the large connection of the mouth and nasal cavity. Such circumstances create quite different conditions for the action of breathing, eating food, drinking, hearing, and speaking. They also influence the quality of the infant's life and are connected with breathing (the nasal function is excluded which causes the situation where the cold, humid, polluted air gets directly into the lungs), eating, drinking (e.g. difficulties with sucking milk as a result of the disability connected with separating

the nasal cavity from the mouth cavity and problems with creating the proper pressure in the latter, and with activating the upper lip during eating directly from the spoon).

In children with cleft palates there is a risk of hearing disorders as the result of the dysfunction of Eustachian tube at the background of functional and structural changes. Together with other factors, they may contribute to an intensification of the speech disorders. However surgical, orthodontic and laryngological treatment as well as the speech therapy help in the feeding actions, drinking and breathing actions and influences not only the quality of the infant's life but also its speech development.

The description of the biological functions should focus on the time after the birth and the time following the basic operations connected with the closure of the cleft gap (also the time after the corrective and additional operations), because together with the multi-specialist treatment and other factors, the way of breathing and eating changes.

1.3.3. THE PROTOTYPE OF COMMUNICATION DISORDERS

While dealing with speech disorders in people with cleft, the researchers often touch upon the issue of the disorders of segmental substance. This indicates, depending on the accepted perspective (the phoniatic one or the one connected with speech therapy), disorders of the phoneme realization, including nasality or nasal-ity and articulation disorders. If we accept the fact that in verbal communication, nonlinguistic elements also occur, (e.g. those connected with appearance), then, while analyzing the effects of the cleft disorder we should take into consideration the appearance of the face of the child with cleft, where we can find more and less serious deformations.

Due to the significant role of the face area in human communication, the visible malformations in the face which result from the cleft disorder (post-operational scars on the upper lip and sub-nasal area, wide wings of the nose, the shortened nasal column, underdevelopment of the middle area of the bony face) may have some influence on its course. What is stressed in the research carried out by the psychologists and sociologists, who deal with the various aspects of the effects of the cleft, is the risk of activating the stigmatization process. This may have some harmful influence on the child's emotional and social development. These disorders are connected with the appearance of the face and communication difficulties (the child's speech may be misunderstood by other people). What is relevant here is that they may affect, in varying degrees, communication when language is used. The child may avoid contacts, feel inhibited whilst speaking, isolate himself/herself from other speakers, or avoid situations

in which he or she has to speak a lot or speak in public. Moreover, recent research in the area of the speech in the child with cleft lip and cleft palate (the children at the age 3 months - 4 years old) showed that in some patients there may be delayed speech development, disturbances in the rhythm of development, as well as in its intensity (apart from those disorders connected with the sound production) (Pluta-Wojciechowska, 2011).

2. THE DEVELOPMENT OF THE PHONETIC ABILITY AT THE BACKGROUND AND IN CONNECTION WITH OTHER SPHERES OF DEVELOPMENT

2.1. THE INTERCONNECTIONS OF THE DEVELOPMENTAL PATHS OF THE VARIOUS SUBSYSTEMS OF LANGUAGE.

The development of the phonetic-phonological system is a necessary condition for the development of other levels of language –the morphological, lexical, and syntactic ones. The reason for this is that phones are the basic elements of the bigger structures built in the verbal utterances. Without these important elements, that is, phones (identified with phoneme realization), it is not possible to build the constructions, such as morphemes, lexis, phrases and sentences.

While speaking about the development of speech in children with cleft, in whom particularly the phonetic path is damaged, it is useful to start from the indication of the wide context that is strictly connected with it. It is worth remembering that the development of all the levels of language does not run in complete isolation. The evidence for this may be read in the articles by M. Zarębina and P. Łobacz. The former author writes that “Simultaneously the acquisition of the phonological system conditions the development of the remaining partial systems, e.g. the word-formation system, syntactic system, which do not have to be acquired to the full at the same time [...], not mentioning the lexical-semantic one, which is developed and enriched during the whole life” (Zarębina 1994, p. 7).

On the other hand, P. Łobacz presents the other side of the interconnections in the development of different levels of language in the following way: “[...] the acquisition of vocabulary by the child conditions his or her further development of phonetic-phonological sphere. [...] the more words the child has in the active repertoire, the faster one can cope with the difficulties in articulation of the single phones, in spite of the fact that his utterances are more strongly individualized in the area of particular phone realization than at the later age” (Łobacz 2005, p. 241).

What is indispensable in human communication is competence and skills. As the sound side of language constitutes the language communication and speech acquisition, it is relevant to point to the relations between competence and skills. These relations are noted by S. Grabias. The author describes the conditions determining the effective communication by means of language and, at the same time, he formulates the fundamental one concerning the mutual conditioning of the two phenomena that determine the essence of the successful communication, namely:

“[...] a human being, in order to participate the language communication without any obstacles, has to have at his or her disposal some kind of competence and some kind of skill. It should be stressed that the competence and skills are the two sides of the same phenomenon. They condition each other and the competence, which refers to the knowledge, cannot appear in the human mind without the given skills. Some skills, on the other hand, at least those ones that have the form of the realization skills, do not reveal themselves without the competence acquired at the earlier time. (...) The skills that determine the process of competence acquisition and the means of its utilization reveal themselves as the biological processes and as the activities of the mind. The former (the biological skills) have the form of the perceptual and realizational processes, and the latter (the mental communication activities) are realization-like processes” (Grabias, 1997, p. 30-31).

While dealing with the speech development together with the phonetic ability, it is relevant to emphasize that during ontogenesis the child simultaneously learns the form and the meaning of the word. However, the child also activates many of psycho-motor functions earlier including the biological ones. They gradually allow the young person to approach the moment of learning the extraordinary relation between sequences of sounds and meaning. Hence, in what follows, I will discuss the connections between the phonetic development and other functions, together with the biological ones. Here, we must stress that these ones are particularly “damaged” in the case of children with cleft.

2.2. “FROM A SCREAM TO A WORD CARRYING THE MEANING”

The child is prepared for the meeting of the phone and the phoneme from the moment of birth or even earlier, that is, during pregnancy. At this stage, the organic and neuro physiological basis of speech in both the perceptual and realization-like aspect is built. After the birth the development of structures and functions initiated in the prenatal period is continued. The birth itself should be treated as some kind of change of the conditions of life and development. The major factor that clearly appears in the post prenatal period is the presence of other human beings, although even in the prenatal period the child has an opportunity to listen to the mother’s voice, feel her heart beating, etc. In this way, the path of the

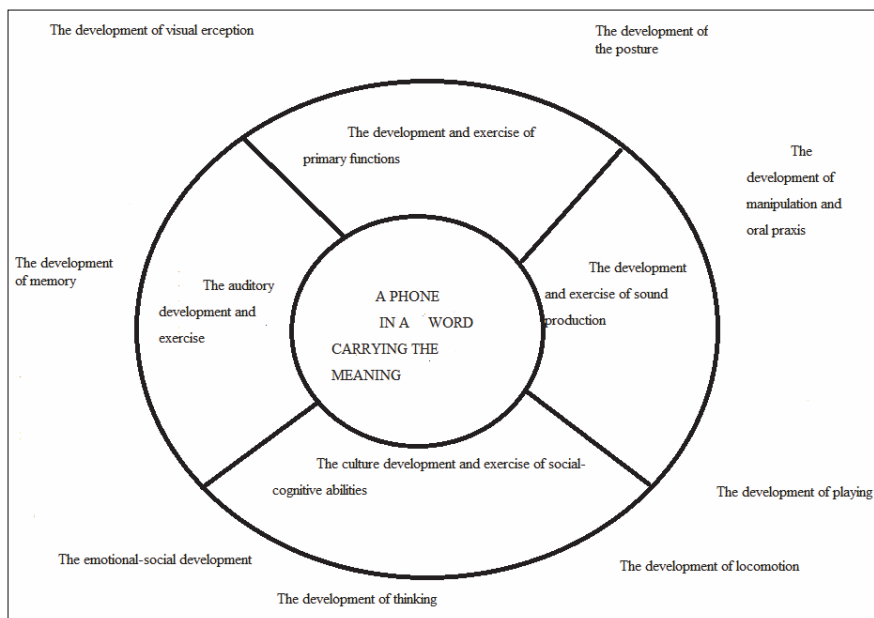
biological development and the one conditioned by culture meet and interweave and both become the basis of the speech development process.

From the prenatal period to the stage of a phone in a pronounced word carrying meaning, the child goes through interconnected experiences, exercises or even work-outs (Pluta-Wojciechowska 2011, p. 121-127). The results of this amazing progression are uttered word/s. The interconnected experiences are as follows:

- **the development and exercise of the primary functions**, that is, breathing, eating and drinking (shaped on the basis of the primary motor system), and also the development of other related nonverbal activities of the mouth-facial complex, e.g. mime, self check-up, auto experimenting and orofacial games, sensing the experience coming from the mouth cavity, which, together with the nervous system, constitute, the motor basis of the speech
- in the prenatal period
- in the post prenatal period,
- **the auditory development and exercise** which constitute the basis of formation of the phone patterns – phonemes; the process of hearing is initiated in the prenatal period,
- **the development of sound production (the phone production) which uses, to different degrees, the vocal-articulatory path** (according to the normative development): it embraces the various sound activities from a scream to a phone in a word through different sound forms produced by means of various parts of the vocal-articulatory path. It has to do with the biological traits. The sound activity may take several forms, namely:
 - signaling various needs of the child (scream, cry),
 - producing the sounds of vowel and consonant profile (the ones resembling vowels and consonants),
 - producing vowels and consonants mainly in syllables,
 - producing phones in words,
- **culture development and exercises**, and the social-cognitive abilities: mutual attention, mutual involvement, understanding the intention, that enables learning through imitation – which is the necessary condition of speech acquisition, together with uttering the first word (Tomasello, 2002).

The following scheme (1) shows the most important developmental paths on the way “from a scream to a phone in a meaningful word”. It is presented in a symbolic and simplified way. In the centre of the scheme we see a phone in an uttered word. Different developmental paths are located around this phone and these paths, are “built “ in the whole process of the child’s development, that is, in the development of the body, manipulation, communication, etc.

Scheme 1. The paths of individual and culture development on the way from “a scream to a phone in a word”.



The author's materials (Pluta-Wojciechowska 2011, p.127)

Due to the main problem presented in this elaboration, the demonstrated analysis sheds some light on the selected developmental paths in the way that matches the accepted perspective. This way of presenting the problem, which distinguishes four main paths (not the only ones) from the prenatal period to the phone in a word, aims to show that during ontogenesis of speech the paths of individual development and the paths of the cultural development interweave. In the case of each child they create a different configuration, but, at the same time, this configuration may be found in the genetic and culturally programmed normative developmental model.

The phonetic development does not occur in complete isolation. This has been shown in the following way: around the central element are placed the remaining spheres of development, such as the body development, development of locomotion, emotional-social development, the development of memory, the development of the visual perception, the development of the ability to play, and the development of manipulation. The capability of using the phone and the phoneme does not come from nowhere, but it is a result of the interrelated experiences connected with numerous spheres of development. Particularly in the children with cleft, the path of development connected with the primary functions as well as the

one connected with the development of the auditory perception and production of speech sounds are damaged. This damage is clear due to the essence of the disorder.

3. THE COMPLICATIONS OF THE ONTOGENESIS OF SPEECH IN CHILDREN WITH CLEFT

3.1. THE SYNTHETIC PERSPECTIVE

Traditionally, the speech in the case of children with any disorder within the bony face is described in terms of the disorders of phoneme realization. It may seem, on the one hand, to be obvious in the context of those anatomical disorders, but, on the other hand, it may be perceived as a way of narrowing the problems that begin from the moment of his or her birth. Here we mean the child with malformation within the lip, alveolar process and palate. The research that has been carried out in order to test the early development of speech in children aged from 3 months to 3 years old, makes us consider the situation of some children in whom there are disorders related to the rate and rhythm of development, as well as the changes due to the quality and quantity of speech production. The character of the disorders of the early ontogenesis makes us call them cleft alalia. One is connected with different biological and psychological factors resulting from the abovementioned disorder (Pluta-Wojciechowska 2011, p. 231-240, p. 325-339).

Ontogenesis of speech is strictly connected with the feedback activity of biological, psychological and social factors. The amazing interplay of these factors is the mystery of speech development. If these are right, the speech also develops in the correct way, and any symptoms connected with oral behavior patterns agree with the normative model. However, in the case of any changes within these factors it may happen that a child faces numerous disorders. In the field of speech pathology, it is understood that the foundations of speech development include the perceptual processes, the realisational ones and the activities of the brain. These functioning together with culture learning, lead the child to the ability of using a language.

The morphology of the cleft disorder indicates that structural deficits have an influence particularly on the primary activities that are seen by the author as the biological activities appearing earlier than speech. They are more important for the child as they determine the quality of life and health. They are the various nonverbal activities taking place in orofacial space (the labial-facial complex). While listing these activities what appears to be in the foreground is breathing, eating and drinking. On the other hand, the orofacial space is the space where other activities occur, such

as facial expression, primary motor functions, oral reactions, auto stimulation, auto testing of the oral cavity, orofacial games, the functions of reflex nature and parafunctions activated in the course of some children's development, which are based upon sucking the thumb, biting nails, etc. While discussing the meaning of these activities for the development of speech, it should be stated that they take part in the creation of the biochemical basis of the articulated speech. It is emphasized that we should pay attention to the activities connected with breathing, eating and drinking.

If we take into consideration the fact that the disorder of the bony face includes the places where inhaling and exhaling air, as well as eating and drinking take place, it appears to be clear that children with this disorder have many difficulties connected not only with the right breathing and eating but also with articulating sounds from the moment of birth.

However, what is more, the cleft palate also changes the conditions of hearing development as a result of the dysfunction of the Eustachian tubes, which are associated with the function of the palate. Additionally, young children with cleft palate encounter other problems connected with the development of the hearing sense, which is connected with the middle ear effusion and inflammation, the hypertrophy of tonsils and other disorders. Hence, the speech disorders occurring in children with cleft palate may be connected with a different etiology.

3.2. THE CHANGED MODEL OF ONTOGENESIS IN CHILDREN WITH CLEFT

The harmful factors that may cause the speech disorders and interact with one another as well as accumulate, contribute to the fact that the group of children with cleft is not homogenous. On the other hand, we may find some common features in contrast to the children without clefts:

- the occurrence of the disorder within the facial skeleton, which changes the kind of the experiences connected with the primary activities and the hearing ability,
- the higher risk connected with illnesses of the ears and partial hypoacusia,
- the parents' reaction to the child who was born with the disorder,
- the necessity of carrying out the surgical operation and the risk of occurrence of emotional disorders connected with the defect,
- the necessity of adjusting to the new anatomical-functional conditions
- the risk of delay in the speech development as a result of emotional and social factors connected with the operation, and the necessity of carrying out the early stimulation of the orofacial space which is not accepted by many children,
- the risk of emotional problems arising as a result of the appearance of one's face and unintelligibility of speech,

- the risk of over-correction by adults and the risk of early improper therapy of speech, the risk of the earlier shaping of metalinguistic competence.

3.3. HYPOACUSIA IN CHILDREN WITH CLEFT

1. The meaning of the hearing loss in the creation of speech disorders is discussed in different ways. M. Hortis-Dzierzbicka and A. Komorowska describe the issue in the following way: "in the cases of cleft palate when patients were not operated, the frequency of occurrence of severe reappearance of the middle ear inflammation and effusion is much higher and it additionally affects the speech development causing several disorders in it. The middle ear inflammation is one of the more frequent illnesses in otolaryngology. One occurs not only in children with cleft. Children with cleft palate, however, more often face the danger of hearing disorder. Relevant literature highlights the importance of the early closure of the palate for the proper development of the hearing sense.

2. According to B. J. McWilliams, H. L. Morris, and R. L. Shelton, the research data determining the relation between the early illness of the ears and the later disorders of the speech development are insufficiently proved in methodological terms. The authors discuss the numerous examples of the research that reveal that the given problem is more complex. The reason is because different factors, apart from the hearing loss, can influence the speech development in children with cleft palate. Secondly, the results of ear inflammation may have varying forms in different children. We may also hypothesize that the relevant variables are the time when the illness appears, its length, as well as the frequency of the episodes of ear inflammation, the degree of the hearing loss and – what is particularly important - the quality of the social environment, the means of stimulation of the speech development, etc. If we support the thesis concerning the feedback activity of the factors during the speech development, we may state that these factors together with the ear inflammation may, in different ways, modify the speech development. In some children they may cause delays in speech development and in other children there may be no such deficits.

As the analysis of the model of the development of children with clefts shows, there are more harmful factors influencing the speech development in the case of the abovementioned group than in the group of children without such disorders. They may be connected with the partial hearing loss in different ways. Thus, we may confirm the thesis; that children with cleft are in the risk group where there is a danger of the influence of the illness of ears on the speech development. F. D. Horowitz comments on this issue and states, at the same time, that an infant with a recurring ear inflammation and progressive hearing loss gains inadequate hear-

ing experience. The effects of this situation for the speech development depend upon the time of the occurrence of the ear illness and the parents' reaction time.

Valuable data concerning the meaning of the ear inflammation in the context of speech development may be gathered during medical tests of the speech development in children without clefts, but who, at the same time, have such illnesses. Nevertheless, it is problematic as there is a basic difficulty in isolating all the factors affecting the speech development. B. J. McWilliams, H. L. Morris, R. L. Shelton, while discussing the problem, indicate that otitis media secretoria plays some subtle role in the speech development of the children with clefts. What can be done with certainty is monitoring the condition of the hearing system and speech development in children with clefts from their birth and undertaking the early therapy.

It appears that the ear infection as such does not have to be the only reason of the occurrence of the speech disorders. What is relevant are its results in the context of development of the hearing system and its links with other harmful factors which the child with cleft must face in the course of development and which, as a whole, relate to the disorder. These problems connected with the illness of ears and the risk of the occurrence of hypoacusis forces us to apply careful monitoring of the hearing system in the children with the presently discussed defect of the bony face and other pathogenic factors, that may appear in this group in various arrangements and groups. Children with cleft palate are in the high risk group. This risk group is associated with the illnesses of ears and hearing loss that is frequently transitory, although some research indicates the possibility of occurrence of the receptive type of hypoacusia.

3.4. THE RESULTS OF THE RESEARCH ON THE EARLY SPEECH DEVELOPMENT IN CHILDREN WITH CLEFT

Research carried out among the children at the age of 3 months – 3 years old showed that 73,21 % of children have different features of the ontogenesis of speech and they are not in agreement with the normative model. They do not only embrace differences in the created sounds of speech, but they also include the rate and rhythm disorders in development. At the same time, the research distinguishes children in various stages of speech development, as follows:

- the children whose speech development runs in accordance with normative rate and rhythm development and who utter correct sounds after the operation,
- the children whose speech development agrees with the normative rate and rhythm of development; however, there are changes in the produced sounds (*the child speaks a lot, speaks "in his own way", distorts phones*); these are simple speech disorders;

- the children whose speech development includes the disorders of the rate, rhythm and intensity of the development together with cases of non normative phones (e.g. *the child speaks a little and deforms the sounds or speaks a little and suddenly starts speaking much more but also deforms sounds*); these are complex speech disorders.

Therefore, in the case of one child the disorders may be connected with the occurrence of distortions of phones and in another child apart from these distortions there may also occur changes in the rate, rhythm of development and quality. Another perspective of the analysis makes us distinguish simple and complex speech disorders, which in this case, correspond with the terms ‘cleft dyslalia’ and ‘cleft alalia’. In this article I follow H. Mierzejewska and D. Emiluta-Rozy, and say that dyslalia is a disorder in the sounds of speech that may have different reasons (Mierzejewska, Emiluta-Rozya, 1997, p. 37-48). Speech disorders in the first years of child’s life can be described in the following categories:

- **cleft-type dyslalia** (*the simple disorder of speech development*) – the quality disorders of the produced phones (non normative phones appear) in the context of the proper rate and rhythm of development, as well as, in the context of the lack of quantity factors connected with the number of the phones:
non normative phones + a high number of frequent productions (for example, syllables in cooing, the first words) + the proper rate and the rhythm of speech development,
- **cleft alalia** (*complex disorders of speech development*) – quality disorders of produced phones (non normative phones appear), and the small amount of produced units and/or rare appearance of ones (e.g. the small number of words and/or their rare occurrence) and/or the disorders of the rate and/or rhythm of the development; hence the production of phones runs together with the use of non normative phones in the contexts of various configuration of the following features:
 - delays in the speech development of non normative phones + delayed occurrence of e.g. the first word,
 - changes in the rhythm of speech development: non normative phones and the suddenly slower rate after the early proper rate of the development or the sudden acceleration in the development after the earlier slowness,
 - quality changes: non normative phones, but a small number of the units produced (syllables, words) and/or their rare occurrence.

When trying to get an insight into these disorders, what should be listed are the factors connected with the changed model of development in the case of children with the disorder of their face skeleton as well as their groupings, as given above. Here hypoacusia plays an important role.

In the following research we should profile the groups of children with various biological features, together with hypoacusia, with different psychological traits and ones coming from different families. It would enable us to determine the special influence of particular factors on speech development. These, however, are not easy tasks. Separate tests should be carried out among those children whose speech develops properly after the surgical operation. We could then see the other side of the phenomenon – the quality of the factors, which contribute to the proper ontogenesis of speech.

1.4. THE PREVENTIVE MEASURES IN THE CASE OF THE SPEECH AND HEARING DISORDERS IN CHILDREN WITH CLEFT

2.4.1. THE REVISION OF THE AIMS OF SPEECH THERAPY

The research which has been carried out in the area of the early speech development in children with cleft leads us to revise the aims of the speech therapy, that is applied in the case of these children, as well as indicate the necessity of introducing some improvement not only in the phoneme realization but also in other levels of language functions. The newly born children, infants and older children with cleft lip and cleft palate, due their changed ontogenesis resulting from the cleft disorder (including, in many cases, the occurrence of hypoacusia) should be treated as patients from the risk groups, which are connected with different speech disorders. They may be connected not only with the production of non normative phones, but also with the rate, rhythm and intensity of the changes. In this case, it is necessary to have constant monitoring not only of the state of the chewing tools, auditory system and nasal-pharyngeal cavity throughout the following years of the child's life (which is practiced), but also monitoring the development of speech in children with cleft.

1. The procedure of helping the child with cleft should not start too late. It should not be postponed until the moment of surgical operation. The stimulating, supportive and correctional action should be undertaken much earlier. Stimulation assists the development. Its main aim is to promote some phenomena and processes. The act of supporting the development means, on the other hand, undertaking such activities that intensify and support the naturally appearing phenomena that are beneficial from the point of view of the speech development. The latter makes it easier to maintain the advantageous processes. However, both types of action interweave. The essence of the correctional activities is weakening the force of some problems occurring in various areas of the child's functions.

2. Speech therapy in the case of the child with cleft should not be perceived as a series of exercises of articulation. It is necessary to understand all the connections between the development of the articulation skill and other spheres of language use, which was discussed at the beginning of this article. If we take into account the meaning of language in communication, learning about the world and social life, it is relevant to stress that the most important and ultimate goal of speech therapy in the case of the child with cleft should be, depending on the diagnosed disorders, as follows: equipping him or her with the skills of efficient use of a language in its all dimensions, and not only teaching the child the appropriate pronunciation, treating nasality, even if these are important elements of the speech therapy.
3. The disorders in phoneme realization are a very important feature among patients in this group, but during the speech therapy other levels of language should also be taken into account. During the therapy of disorders connected with articulation, what should we focus on is the process of reconstruction of the biological foundations and the exercises of the hearing perception. The early therapeutic intervention should be adjusted to the diagnosed features which are connected not only with the disorders in articulation, but which can also be connected with non normative speech rhythm and rate of speech development.
4. From the point of view of different specialists who treat the child with cleft and cooperate in one team, it should be emphasized that the assessment of speech development is relevant in the context of the evaluation of the surgical operation that has been carried out. When there is little activity in cooing or there are no words produced by the child, it is not possible to assess the effects of the surgical operation or to predict the further treatment or speech therapy. Additionally, it should be emphasized that the situation where the speech development is delayed or even not present may turn out to be a symptom of other disorders. It means it is necessary to differentiate between cleft alalia and other types of speech development.
5. The research findings indicate the following: in the speech therapy in the case of children with cleft. we should take into account not only the improvement of the phonetic path, but also the development of other linguistic abilities, such as lexical ones, categorization, understanding and creating metaphors, meronymy, presenting different perspectives by means of language, as well as training the narrative speech and equipping the child with some kinds of scripts of verbal patterns of behavior connected with different social contexts, for example, the telephone conversation.

Due to the weaker verbal expression demonstrated in the research carried out among older children, the significant element of the speech therapy is the element of encouraging and provoking children to express their own opinions and to utter sentences. Here, what may be helpful are drama activities, theatrical forms of expression, showing children the important features of different types of speeches, for instance, telling a story, a description, a telephone conversation or a talk in the shop, etc.

While designing the therapy sessions, we ought to connect the process of improvement of phoneme realization with the development of different linguistic and communication skills in an appropriate way. In the case of children what will be useful is joining the speech therapy with psychological action whose aim will be strengthening the positive sides of the child, building its positive self-esteem, developing social skills and creating the natural support groups. An inherent element of this should be the subjective treatment of the child and his/her parents as well as helping the parents in finding their own way of life with the child with cleft, as they will be the most important support group for the young patient.

4.2. THE CONSTRUCTION OF THE FOREGROUND OF SPEECH ACQUISITION (TOGETHER WITH THE ACQUISITION OF ARTICULATION)

It is necessary to create the basis, preparation, and foundations for the natural and structured way of learning phones during speech therapy. It consists in elimination of undesirable features or in weakening their strength as well as stimulating and supporting the positive features in the area of activities connected with the mouth-facial complex, hearing exercises, exercise of speech organs and culture learning. The set of all such types of treatment may be called *construction of the foreground of articulation* (Pluta-Wojciechowska 2011, p. 387-388).

The usage of the word *constructing* is the intentional procedure which aims at showing that we mean the multi-threaded and multi-dimensional preparation connected not only with the simple sum of elements but also having a systematic and interconnected character. It happens because the relations between the activities, which are the objects of the intervention, and the development of the articulation skill, are complex. The construction of the foreground for the natural phone therapy led by the speech therapist is based on the knowledge of the rules of the development of activities connected with the mouth-facial organs, of the hearing perception and of the phonetic skill and also of the methods of culture learning as well as the abilities to apply the speech therapy methods to improve these activities. However, the means to accomplish these tasks connected with the creation of the basis of speech development depend on the age of the child and his/her individual conditions. Among the most important tasks connected with the

construction of the foreground of articulation, we may list the following ones (on the basis of Pluta-Wojciechowska 2011, p. 406-408; Pluta-Wojciechowska):

- supervising the proper psychomotor development,
- supervising the proper development of orofacial space (including different activities connected with this area, particularly the primary ones),
- developing the “phonetic realization skills”
- stimulating the development of the hearing perception,
- supervising the proper development of sound production from the moment of birth,
- exercising cultural methods of speech learning (particularly that of imitating).

Within each of the distinguished areas, we may find different tasks, different ways of working and we may profile different techniques. Due to the complexity of the path of the phonetic development that results from the disorders in the primary activities and hypocouasia, the following tasks should be taken into consideration:

IN RELATION TO THE GENERAL PSYCHOMOTOR DEVELOPMENT

- monitoring the psychomotor development,

IN RELATION TO THE OROFACIAL AREA

- monitoring the development of dentition,
- training the child in the hygiene of the mouth in accordance with the child’s developmental abilities,
- checking the state of the frenulum of the tongue at the birth; in the case of its shortening, recommending its cutting, if there are no medical contraindications,
- improvement of the cleft elements after the surgical operation by means of the exercises of the lip and palate as well as by massage,

IN RELATION TO BREATHING

- taking care of the patency of nasal-pharyngeal cavity from the moment of birth,
- systematic clearing of the nose in the case of nasal catarrh,
- teaching the child to clear the nose on his/her own,
- after each infection of the upper airways, checking if the child returns to the correct physiological way of breathing, and, if not, carrying out the proper treatment, for example, the proper positioning of the child’s head in the optimal position while he or she is sleeping, the control of the closing of the mandible (lower jaw) during the day, massage of the orofacial area,
- placing the child to sleep in the right position and appropriate holding of the child during carrying,

IN RELATION TO NUTRITION

- to monitor the development of the activities connected with nutrition and introducing the regulations that make it easier for the child with cleft to eat and drink safely,
- in the case of the appearance of difficulties when passing from one stage to the following one (stages connected with eating) – early professional speech therapy, without expectation of spontaneous improvement,
- to aim at stopping sucking by the child at the age of about 12 months which is connected with other ways of eating,
- when teething starts, introducing the proper food to bite, to bite and chew,
- accepting the rule that each new skill connected with eating and drinking must be learnt by the child and not being discouraged by some unsuccessful cases, such as spilling something, making oneself dirty,
- accepting the fact that self-reliant eating and drinking activity is strongly related to the child's general psychomotor development as well as that in order to learn these activities, the child must pass through the stages of clumsiness,
- limiting the use of a dummy to a reasonable extent, or, if one is necessary, it should be not used after the sixth month of the child's life,
- if the child stops sucking the dummy, we should ensure that he/she does not suck the finger instead; sucking the finger is worse than sucking the dummy.

DEVELOPING „THE PHONETIC REALIZATION SKILLS”

- early exercises within the area of the lip and tongue that activate the important organs that serve to eat, drink and articulate, particularly those which promote the vertical position of the wide tongue in the mouth cavity and the bilabial closing,
- promoting the prototypical arrangements, positions and movements of the speech organs that are important from the point of view of articulation,
- developing different “phonetic realization skills” connected with the respiratory-phonation-articulatory structures.

STIMULATION OF THE DEVELOPMENT OF HEARING PERCEPTION

- exposing and differentiating:
- different features of verbal and nonverbal sounds,
- prosodic features,
- the volume, pitch and length of sounds,
- different features of verbal sounds,
- the clear and rather slow articulation of phones with a light mouth opening, particularly during cooing, producing the first words, which makes it possible for the child to observe the arrangement of the speech organs.

- exposing not only the auditory features of articulation, but also the visual and sensual ones,
- joining exercises of speech organs (together with massage) with the exposition of speech sounds during our time spent with the child,

SUPERVISING THE PROPER PRODUCTION OF SOUNDS FROM THE MOMENT OF BIRTH

- depending upon the direction and intensity of speech development:
- promoting and maintaining the phones produced by the child by using the lips and the tongue,
- stimulating cooing by reflecting and strengthening the sounds produced with the help of the lips and the tongue and the mild removal of undesirable sounds, for example, those realizations outside the mouth cavity,
- “leading” the phones in cooing, which means the mechanical changes in the arrangement of the speech organs, (for example, supporting the bilabial occlusion) in the case of the sounds which are not in accordance with the normative speech development,
- stimulating the general expression during cooing and creating the first words when the child produces only few words,

IN REFERENCE TO CULTURE METHODS OF SPEECH ACQUISITION

- intensification of cultural methods of speech and language acquisition (Tomasello 2002).

However, bearing in mind the risk connected with the occurrence of cleft alalia as a result of the activity of different harmful factors connected with the disorder of cleft type, for example, the disorder of the primary activities, hypoacusia, emotional damage, etc., we should start to *construct the foreground of speech acquisition* from the moment of the child's birth. This notion is much wider than the notion of *the construction of the foreground of acquisition of articulation*. It embraces all the mentioned areas of the child's development on the way from the scream to the phone in the word carrying the meaning.

CONCLUSION

While profiling the hearing disorders in the case of children with cleft, it is possible to formulate a few general conclusions which may be applied while planning treatment sessions designed for these patients, as well as during speech therapy. They are as follows:

- the development of speech and hearing system as well as other areas of the development of the children with a disorder of the facial bones should be monitored from the birth,
- the speech therapy should be undertaken earlier when disorders of the sense of hearing. Speech development should be diagnosed; the therapy is connected not only with realization processes but also with the perceptual ones,
- what should be taken into account in the speech therapy are exercises of the hearing system. These exercises make it possible for the children, in spite of their partial hearing loss, to most effectively use speech in the course of speech acquisition.
- Children with cleft should start, from the moment of birth, activities to stimulate and support speech
- the cooperation of the speech therapist is necessary with the laryngologist, audiologist and phoniatrist, as well as with orthodontist and surgeon,
- it is necessary to undertake tests among children in different groups distinguished on the basis of various biological, psychological and social features conditioning the speech development,
- it is relevant to monitor those children with cleft whose speech development is correct; it will allow determination of the positive factors that are important in the proper ontogenesis.

REFERENCES

- Peiper A. (1925). *Sinnesempfindungen des Kindes vor seiner Geburt*. Monatsschrift für Kinderheilkunde, 29, 236-241.
- Gałkowski T., Grossman J. (1987). *Determinanty rehabilitacji zaburzeń mowy*. AWF. Warszawa.
- Grabias S. (1997). Mowa i jej zaburzenia. *Audiofonologia* T. X, 3-20.
- Horowitz F. D. (1980). Effects of otitis media on cognitive development. *Ann Otol Rhinol Laryngol*, 89, Suppl, 272-278.
- Hortis-Dzierzbicka M., Komorowska A. (1996). *Wpływ warunków anatomicznych na rehabilitację mowy u dzieci z wadą rozszczepową twarzy*. In: *II Konferencja Robocza – rehabilitacja mowy. Rozszczep wargi i podniebienia*. Z. Dudkiewicz (ed.). Instytut Matki i Dziecka. Klinika Chirurgii Dzieci i Młodzieży. Warszawa, 19-23.
- Hortis-Dzierzbicka M. (2004). *Nasofiberoskopia w ocenie zastosowania płata gardłowego w niewydolności podniebieno-gardłowej u pacjentów z rozszczepem podniebienia*. Wydawnictwo Medyczne Borgis. Warszawa.
- Kowalski M. (1971). Zaburzenia czynnościowe w rozszczepie podniebienia. *Czasopismo Stomatologiczne* nr 24, 541-546.

- Kubik P., Pisulska-Otremba A., Namysłowski G., Rachwał K., Fajt E. (1995). Stan słuchu i cefalometryczna analiza kształtu części nosowej gardła u dzieci z wrodzonym rozszczepem podniebienia pierwotnego i/lub wtórnego. *Czasopismo Stomatologiczne* T. XLVIII, nr 4, 264-270.
- Łobacz P. (2005). *Przewidywany rozwój mowy dziecka*. In: *Podstawy neurologopedii*. Tadeusz Gałkowski, Elżbieta Szelaąg, Grażyna Jastrzębowska (ed.). Wydawnictwo Uniwersytetu Opolskiego. Opole, 231-268.
- McWilliams B.J., Morris H. L., Shelton R.L. (1990). *Cleft Palate Speech*. B.C. DECKER. Philadelphia.
- Mierzejewska H., Emiluta-Rozya D. (1997). Projekt zestawienia form zaburzeń mowy. *Audiofonologia* T. 10, 37-48.
- Mitrinowicz-Modrzejewska A. (1957). Badania narządu słuchowego w rozszczepach podniebienia. *Czasop. Stomat.* 11, 661-670.
- Mitrinowicz-Modrzejewska A., Pawłowski Z., Tłuchowski W. (1965). Wady rozwojowe podniebienia jako zaburzenia wieloukładowe. *Rozprawy Wydziału Nauk Medycznych PAN*. R. X. T. 1, s. 33-123.
- Pluta-Wojciechowska D. (2008). *Zaburzenia mowy u dzieci z rozszczepem podniebienia. Badania-Teoria-Praktyka*. 2nd edition revised. Wydawnictwo Ergo-Sum. Bytom.
- Pluta-Wojciechowska D. (2011). *Mowa dzieci z rozszczepem wargi i podniebienia*. Wydawnictwo Naukowe UP. Kraków.
- Pluta-Wojciechowska D. (in print). *Zaburzenia ustnej fazy połykania i oddychania w dyslalii obwodowej, funkcjonalnej*.
- Rosch E. (1978), *Principles of categorization*. W: *Cognition and categorization*. Eleanor Rosch, Barbara Lloyd (ed.). New Jersey, 27-48.
- Smith T.L., DiRuggiero D.C., Jones K.R. (1994). Recovery of Eustachian tube function and hearing outcome in patients with cleft palate. *Otolaryngol Head Neck Surg.* vol. 111, 432-429.
- Sobieszkańska-Radoszewska Ł. (1990). Ocena laryngologiczna i audiologiczna dzieci operowanych jednoetapowo z powodu jednostronnego całkowitego rozszczepu podniebienia pierwotnego i wtórnego. *Problemy Chirurgii Dziecięcej*, nr 16, 57-58.
- Tomasello M. (2002). *Kulturowe źródła ludzkiego poznawania*. PIW. Warszawa.
- Zarębina M. (1994). *Język polski w rozwoju jednostki*. Wydawnictwo GLOTTISPOL. Gdańsk.

Ewa MUZYKA-FURTAK

CHAPTER THREE
HEARING IMPAIRMENTS AND THE PROBLEM OF
“MINIMAL SPEECH DISORDERS”.
SELECTED ISSUES

ABSTRACT

The present article is concerned with problems with diagnosing minor speech disorders in children with impaired hearing. These types of disorders have been named “minimal” with reference to the term “minimal hearing loss”. They occur in the speech of children with slight hearing deficits but also in the speech of children with major hearing impairments, who, despite limitations in perception, have achieved a high level of language and communication competence. These children go to regular public schools, many of them wearing cochlear implants. The occurrence of even the slightest language difficulties is conducive to the rise of educational problems, which is why their diagnosis and quick correction are extremely important to the hard-of-hearing student at regular schools. From the therapist’s point of view, in the case of a child with a hearing defect, “minimal” speech disorders should also include language deficits that are very often disregarded in logopedic diagnosis and escape the teachers’ attention at school, thereby being left without conscious and guided correction. The article will present a survey of such disorders with a brief description.

Keywords: *cochlear implant, hearing impairment, inclusive education, surdologopedic diagnosis*

1. WHAT ARE “MINIMAL” SPEECH DISORDERS?

If there are minimal hearing impairments that result in various language and communication difficulties, a question arises whether one can speak of “minimal” speech disorders in certain cases of hearing impairments.

A hearing loss can be called “minimal” on account of its insignificant degree. It ranges from 16 to 25 dB and results in problems with understanding utterances at a further distance, especially under conditions of noise (After Kurkowski 2000: 110). The distinction of a group of minimal impairments as a separate one is necessary because there is a relationship between the degree of hearing defect and the knowledge of the language system. It is thus assumed that slight problems with communicating may require some degree of speech-therapy support to some extent.

The necessity of creating a more detailed scale than the generally used classification of speech impairments by BIAP (International Bureau for Audiophonology) has also been pointed out by other scholars. K. Krakowiak (2006) suggests shifting the limit of the mild deficit in hearing sensitivity from 20 dB to 10 dB, by redefining its range from 10 to 30 dB. These limits would also cover the above-mentioned impairments that are called minimal. With regard to the “ability to hear speech sounds”, she also suggests that a separate group, those functionally hearing, be distinguished from persons with hearing impairments. The functionally hearing subjects comprise persons with “a negligible lowering of the hearing ability” and with “a mild lowering of the hearing ability”. This group can also include children with more severe hearing impairments who have attained a high level of hearing skills and an accompanying high level of language skills. Speech disorders or even speech defects need not necessarily occur in the speech development of functionally hearing children. An observable effect of speech defects can exclusively be some communication problems, e.g. under conditions not favorable for listening. Children in this group learn to speak spontaneously. It may happen, however, that they will have problems with noticing certain features of speech sounds, which sometimes results in speech defects.

The problem of the occurrence of “minimal” speech disorders therefore affects children with milder hearing impairments that produce fewer problems with learning Polish but it also affects those children with more severe hearing deficits, who have nevertheless achieved a high level of the development of language and communication skills, which enables them to function in a satisfying way in the environment of the hearing people.

The term “minimal speech disorders” is somewhat perverse because it makes one seek problems where it would be justified to speak about success exclusively. This is often the somewhat “perverse” situation of the children with cochlear implants who live in the environment of hearing people and attend regular schools. In principle, if, despite a hearing defect, they are able to meet the curricular requirements of mass education, then their achievements can be considered exclusively in terms of success. Is this really so, however? The parents of implanted children emphasize the need to expend a great amount of work, which is entailed in the

choice of a regular school for the child with a hearing deficit. A condition for the success of the child with a cochlear implant in the world of hearing people is thus a greater effort put into school education than in the case of his hearing peers. This is largely due to the existence of certain language and communication difficulties that the implanted child must successfully overcome. The nature of these difficulties changes with the child's development and depends on a series of variables that mold the process of this development. It appears problematic and complicated, however, to identify and describe language difficulties of impaired-hearing children (i.e. to make a surdologopedic diagnosis) when these difficulties are few. In superficial assessments made by logopedists, guidance counselors and teachers at school, such children are recognized as knowing and speaking Polish very well. From the standpoint of logopedic practice, I propose that "minimal" speech disorders in hearing-impaired children should also include language and communication difficulties ignored by specialists, disregarded in diagnoses, and thereby neglected in therapy programs.

The use of the term "minimal speech disorders" is therefore deliberate and due to the common practice in the diagnostic process (in surdologopedic diagnosis and in diagnosis made systematically by teachers at school) to neglect to assess some aspects of the linguistic functioning of children with hearing deficits.

2. "MINIMAL" SPEECH DISORDERS AND SURDOLOGOPEDIC DIAGNOSIS

The preliminary thesis for the present discussion assumes that among speech disorders in hard-of-hearing children there are some disorders more frequently disregarded in surdologopedic diagnosis than others. They remain unnoticeable to therapists, teachers and parents. A schematic approach in assessing language and communication skills in hearing-impaired children causes the diagnosis of their language skills to focus on speech defects, lexical deficits, and difficulties in forming utterances, which results in problems with constructing longer forms of utterance. If serious language problems in those areas are not observable and yet the child has problems with learning at school, it is concluded that the cause of their occurrence is not the limitations of hearing perception. Consequently, this begins the process of seeking the child's educational problems in him/her, i.e. in different spheres of his/her functioning, e.g. in his intellectual or emotional spheres, etc. "The child does not know many words", "makes mistakes in the use of words", "uses wrong inflectional endings", "can't make sentences", "can't write school compositions" are only some examples of stereotyped assessments. The diagnosis based on them refers to generalizations without introducing addi-

tional, detailed explanations and classifications within the deficits observed. Very often this approach disregards:

- the assessment of the semantic level of language that is crucial to the development of vocabulary and
- the level of acquisition of word-formation rules that determine the expansion of the lexicon and
- the assessment of many communication skills extremely important in the process of communicating.

A schematic approach to diagnosis may be the result of the superficial knowledge of specialists who have a narrow understanding of the problems of hard-of-hearing children with Polish as problems with the utilization of some elements of the language (i.e. sounds, words, letters,) and with the use of rules of combining them (or the rules of grammar). The semantic level, which determines the essence of a language sign, is thereby ignored to some extent, grammatical rules are confined to selected precepts pertaining to the use of inflectional endings, and the communication skill is treated as a systemic skill.¹

The main objective of the present study is to draw attention to those often imperceptible, subtle, superficially treated or even ignored language difficulties of impaired-hearing students who attend regular schools.

3. POLISH LANGUAGE AND PROBLEMS WITH ITS ACQUISITION

Polish causes many and complex problems to hard-of-hearing persons. This is largely determined by the language's characteristics. Polish is an inflectional language. This means that the basic way to the formation of grammatical forms are inflectional endings that accumulate a number of syntactic and semantic functions. (*Encyklopedia językoznawstwa ogólnego* 1999: 274). It is therefore an inflectional ending that determines the function of a word in a sentence. Moreover, Polish is characterized by an abundance of word-formation processes. The knowledge of them is an absolute condition for expanding one's lexicon because the majority of words in Polish are divisible units in morphological terms. All this makes learning Polish difficult, which is also confirmed by foreigners learning this language. However, the essence of problems associated with the acquisition of Polish by children with hearing deficits is its semantic level. The assigning of appropriate semantic elements to words is the condition for learning the many meanings of lexical units, including their metaphorical senses. This process is highly influenced by the level of grammar acquisition because there are close correlations between lexical and grammatical development.² Syntactic information

influences the process of learning new words (“syntactic bootstrapping”), because it helps the child to recognize some of their semantic elements (Bloom 2007). This is not unilateral conditioning, however, because on the one hand, grammatical knowledge facilitates the development of the lexicon while, on the other hand, lexical development molds the process of grammatical rule acquisition (Dionne et al. 2003).

A hearing-impaired child is in a far more difficult situation than a foreigner learning Polish. For the child, Polish is his first language, which means that he has to acquire it without reference to any other language and has to do this by overcoming his own limitations of perception. Nevertheless, hearing-impaired children are able to learn Polish at a very high level: slightly hard-of-hearing children are not exclusive members of this group. Owing to audiological and speech-therapy intervention, many children who were born with more serious hearing impairments know Polish very well and function like hearing children. Many of them wear cochlear implants. Despite quick and proper help, however, they may also have problems with Polish. With respect to language skills acquired by hearing-impaired children, including the implanted ones, there is an immense individual diversity, which is particularly noticeable with the level of lexicon acquisition and this is confirmed by studies conducted not only in the field of Polish language (Kunisue et al. 2007). Attempts to find “minimal” speech disorders in students attending regular schools, who know Polish very well, and have been diagnosed with hearing impairments do not always have to be successful. Some of them, with a favorable configuration of many variables influencing speech development, will no longer need a speech therapist’s help at the stage of elementary school while others, on the contrary, will be under the constant care of speech therapists, and their school problems may make it necessary to change school and attend an integrated one.

4. SEMANTIC-LEXICAL DIFFICULTIES

Lexical difficulties in cases of speech impairments consist in difficulties with building the lexicon, remembering and producing word forms, difficulties with assigning the proper content and scope of meaning to them, and with assigning many meanings to one word form, including metaphorical meanings. It is important to distinguish distortions of word structure from lexical-semantic disorders because it produces a different model of logopedic management, i.e. a different range of corrective exercises since the mechanism of how they occur is different. This is not obvious to every therapist and teacher. The consequence is the iden-

tification of all irregularities concerning words as lexical problems in the broad sense, which is a far-fetched generalization.

The difference between the phenomena in question may be illustrated by a specific example taken from the utterances of a pupil with a cochlear implant, attending a regular primary school. The use of the phrase *zupa wyschnie* [the soup will dry] in the sense *zupa wystygnie* [the soup will cool off] may be regarded in a superficial analysis as a lexical error consisting in the use of a wrong word. However, this error requires elucidation. After more detailed analysis, it can be deduced that there was a transfer of meanings through the resemblance of names. The process of association of sonically similar words that results in the change of the meaning of one of them without distorting its formal form is usually called paronymy (Grabias 1982). In the foregoing example the mutual identification of the two semantically different words was facilitated by their semantic similarity, because *wyschnie* [will dry] means “to become dry” as well as “when spoken of a liquid: disappear as a result of evaporation or being soaked up”, whereas *wystygnąć* [cool off] means “to lose heat” or metaphorically “to lose intensity when spoken about emotions or experiences” (www.sjp.pwn.pl). There is certainly some similarity of meanings between the two words and it is this similarity that places that type of error in the group of semantic disorders. If an error of the type *zupa zastygnie* [the soup will congeal] appeared in this place it would be a word-formation error, it would pertain to grammar, or more precisely, to the knowledge of grammatical morphemes: prefixal formatives. If, in turn, an error of the type *zupa wystynie* [instead of *wystygnie*] appeared, it would be an error pertaining to the form of the word: a distortion of the word’s structure arising as a result of consonantal group simplification (Kania 2001). In the first case it is necessary to administer exercises aimed at establishing the meaning of words (lexical-semantic exercises), in the second – word-formation exercises, in the third – auditory and articulatory ones.

Paronymy is a frequent phenomenon in the speech of impaired-hearing children, consequently it characterizes their lexical difficulties to some extent (Muzyka-Furtak 2013b). The words that are often identified with one another, even by children with hearing defects who know Polish very well, have a formal-semantic similarity in common (e.g. *ryba* – *rybak* [fish – fisherman], as in the example *zdrowy jak rybak* [literally ‘healthy like a fisherman’] instead of (healthy) *jak ryba* [like a fish = ‘as right as rain’], or exclusively formal (sound) resemblance, e.g. *strój* – *nastrój* [attire, costume – mood] (in the context: *Gdzie jest mój nastrój na wuef* [where’s my gym mood?] instead of *strój na wuef* [gym costume])). This phenomenon also occurs during the development of speech in hearing children. They give meanings different from conventional ones to the words that they do not know. In this manner they try to include them in their still limited lexicon in

the way that is available to them. The mechanism responsible for the occurrence of paronyms thus consists of the child's attempts to establish room for new words in his own lexical system (Grabias 1982).

Words that the hard-of-hearing students attending regular schools may confuse do not have to resemble one another in any way. A repeated phenomenon is equivalent identification of lexical units that are related exclusively in semantic terms. What happens then is the transfer of names as a result of similar or adjacent meanings.³ Association of a word with other referents serves to complement the nominative features of language (Buttler 1978: 87). The greater the lexical deficits, the more intense the process becomes. Consequently, it appears with greater intensity at the initial stages of the lexicon development and in children with greater degrees of hearing deficits (Muzyka-Furtak 2013a). In hearing-impaired students attending regular schools, shifts of meaning may be a marginal phenomenon, which, however requires investigation. They sometimes ‘confuse’ names within one semantic field, e.g. the use of the word *kogut* [rooster] to name a turkey (*indyk*), the name *bażant* [pheasant] to refer to a peacock (*paw*), or they call a swan (*labędź*) a duck (*kaczka*) or a goose (*gęś*). Other examples of this phenomenon occurring in other semantic fields are: e.g. the use of the word *kapustka* [cabbage] or *salatka* [salad] to refer to cauliflower *kalafior*, or the interchangeable use of names *szklanka* [glass] – *kubek* [mug] – *filiżanka* [cup].

Children with impaired hearing, including those attending regular schools, may understand a particular word, know its meaning and repeatedly use it, and yet they may have problems with its actualization in a concrete context, which results in a reference to another word with a similar meaning as a replacement. Consequently, instead of words required by the context, other words with similar meanings appear, which may sometimes produce comprehensible expressions but with a metaphorical shade of meaning e.g. *grzmi – krzyczy* [thunder – shout] (in the context: *bo krzyczy burza* [because the storm is shouting]), *szary (pochmurny) – smutny* [grey (cloudy) – sad] (in the context: *bo chmura była smutna* [because the cloud was sad]).

The problem with remembering a particular word also affects users of cochlear implants and hearing aids. For that reason, the two groups often use lexical units with a broad semantic scope so that they could apply them to as large a number of phenomena as they can. In practice this accounts for the appearance of semantic errors of the type: *strażak leje wodę* [a fireman pours water] instead of *strażak gasi pożar* [a fireman puts out a fire], or *pani myje ubranie* [a woman is washing clothes instead of *pierze ubranie* [laundrying clothes].

The broadening (generalization) of meanings consists in that one of the semantic features that make up the meaning of a word and limit the range of its real use is obliterated, thereby automatically increasing the number of objects that can

be potentially used as referents of this name (Buttler 1978: 79). The broadening of the semantic scope of words means referring a name to a greater number of phenomena than the language norm includes. In the speech of hearing-impaired children it is an attempt to overcome the quantitative restrictions of the lexicon, which in practice entails the “overuse” of selected words and generalization of their meanings in such a way that they could apply to a greater number of referents e.g. *Lubię mięsko i jeszcze takie inne mięsko i sałatkę i jeszcze taką inną sałatkę.* [I like meat and also some other meat and salad and also some other salad].

In the speech of implanted regular-school students there are both distortions of word structures and uses of words in the wrong meaning, often resulting from the identification of units with similar sounds and/or similar meanings (including morphological formations, which are always related to the base word by a relationship of formal-semantic similarity). If these types of difficulties are isolated ones, i.e. they pertain to single words whose form and meaning have not been firmly established (as for example newly learned words, foreign ones, abstract names, scientific terms, or sporadically used units) they may be difficult to observe and will be thereby ignored. Noting these phenomena in the speech of a child with a hearing deficit, and also identifying the mechanisms responsible for the occurrence of these phenomena are prerequisites for a properly conducted therapy.

5. WORD-FORMATION – PROBLEMS WITH RULES OF WORD-MAKING

Derivative words are an integral and significant part of the Polish lexicon. There is therefore a close correlation between the knowledge of word-formation rules and the degree of language competence. In surdologopedics, like in glotto-didactics (language education), word formation tends to be omitted, however, and it is certainly underestimated. In practice, therefore we should always remember that “the teaching of the ability to interpret morphological formations and the ability to then actively use the knowledge of rules of forming derivatives are the most important manifestations of the shaping of language competence at the lexical level” (Pastuchowa 2007: 23). The need for an other-than-traditional approach to the problem of word-formation in the methodology of teaching Polish as a foreign language is discussed increasingly often (Pastuchowa 2010). Surdologopedics should also reflect this need.

Language contains many words that are not present in dictionaries although they appear in literary texts and in the press, they are used in daily communication, in the speech of young people, on the internet, etc. Understanding them correctly, i.e. in accordance with the sender’s intention, is possible only after one

is understands the mechanism of word-formation (Pastuchowa 2010). Whether a hearing-impaired child understands neologisms, or whether, when encountering a new word with a complex morphological structure, he/she can guess its meaning on the basis of the word form, is very important for the process of understanding other people's utterances. The development of an awareness of word formation allows one to train these types of abilities. By getting to know word-formation mechanisms, we provide an opportunity “to develop a creative approach to language already at the early stage of teaching it” (Pastuchowa 2007: 27). This is important not only from the receiver's perspective but also from the perspective of the sender of language messages.

Word-formation in Polish is irregular. It uses a huge amount of word-making devices. Consequently, the acquisition of word-formation rules cannot be easy. Impaired-hearing children have serious problems with learning the rules of word making (Muzyka-Furtak 2010). Even hard-of-hearing students at regular schools who know Polish very well sometimes have problems with understanding and properly using some types of morphological formations. Some of the most difficult are probably transposition constructions. They are acquired by hearing children as the last ones during the process of speech development (Haman 2000). Transpositions comprise names of activities (e.g. *mówienie* [speaking], *picie* [drinking], *wypłata* [paying out]) and names of abstract characteristics (e.g. *szarość* [greyness], *głupota* [stupidity], *lenistwo* [idleness]). A derivational morpheme in transpositions performs a grammatical function. The addition of it does not change the meaning of the derived word in relation to the base word but it changes its function in a sentence (Grzegorzczkowska 1982), as for example in the utterance: *Słyszę, że ptaki śpiewają* [I can hear (that) birds (are) singing] – *Słyszę śpiew ptaków* [I can hear the singing of birds]. The absence of parallelism between formal and semantic changes caused by the fact that adding a derivational morpheme does not produce changes in the meaning of a word accounts for the later appearance of transposition in the speech of hearing children (Haman 2000). For that reason, transposition-type transformations may seem functionally unjustified to hearing-impaired children. Consequently, hard-of-hearing children often attribute identical meaning and the same function in the sentence to words like: *mówić* [speak] – *mówienie* [speaking], *smutny* [sad] – *smutek* [sadness]. The change of parts of speech resulting from transpositions (adjective > noun, e.g. healthy (*zdrowy*) – health (*zdrowie*), verb > noun e.g. *leżeć* [lie (as in bed)]– *leżenie* [lying (as in bed)]) is incomprehensible to many hearing-impaired children, hence few such constructions appear in their utterances. Attempts to use them produce syntactic errors because hard-of-hearing children find it easier to form a sentence with a verb form (e.g. *pić* [drink], *chodzić* [walk]) than with a noun form (*picie* [drinking], *chodzenie* [walking]), e.g. *Chcę pić* [I want to drink= I am thirsty]

– *Chcę coś do picia* [I want something to drink, literally for drinking], and easier to make a sentence with an adjectival form (*szary* [grey], *smutny* [sad]) than with a nominal one (*szarość* [greyness], *smutek* [sadness]), e.g. *Jestem smutny* [I am sad] – *Odczuwam smutek* [I feel sadness]. Making a sentence with transposition constructions causes problems even to those hard-of-hearing children whose language skills have been rated very high, e.g. *Zdrowie nie psuje dobre* [Good health does not worsen]; *On jest lenistwo* [he is idleness]; *To głupi* [this is stupid] (meaning stupidity); *I nagle się skończył do oglądania* [and suddenly it ended for watching] (meaning *skończyło się oglądanie* [watching is over, *skończył się czas oglądania* – the time of watching is over), or even *On ma dobre zdrowie jak ryba* [he has good health like a fish].

A separate problem is the question of establishing the meanings of word-formation constructions. Some formations are semantically regular. Their meanings can be guessed from their structure, e.g. *piesek* is *mały pies* [a small dog], *biegacz* [runner] is *ten, kto biega* [someone who runs]. A great number of word-formation constructions are semantically irregular. The sum total of their components does not make up their meaning, which even contains a semantic surplus, e.g. *pisarz* [writer] is someone who writes (literary pieces) [*ten, kto pisze (utwory literackie)*], *wędkarz* [angler] is *ten, kto (łowi ryby) wędką* [someone who fishes=catches fish with a fishing rod]’ (Cf. Grzegorzczkova, Puzynina 1984). Children have to learn the meanings of such constructions, and also other morphologically unanalyzable words. Hearing-impaired children sometimes enrich the semantic content of a word with additional elements, which is conducive to semantic errors e.g. *cukiernik* [confectioner] is interpreted as *ktoś, kto zajmuje się wyrobem ciast z cukru* [someone who makes cakes from sugar] but also as someone who sells sugar [*ktoś, kto sprzedaje cukier*], and *sluchacz* [listener] is someone who is listening (to the radio, lecture, or a speech) *ktoś, kto słucha (radia, wykładu, przemowy)*”, but also obeys (=literally: listens to) mom [*slucha mamy*]’ (Muzyka-Furtak 2013c). These types of semantic errors in the speech of hearing-impaired children (who are regular-school students) are certainly fewer but even a slight percentage of them disturbs the understanding of texts and contributes to wrong use of words by placing them in inappropriate contexts.

6. METAPHORS IN THE SPEECH OF THE HEARING-IMPAIRED CHILD

A metaphor “consists in that a set of words gains a different meaning from that which would follow from the meanings of individual words, it is a new semantic combination which cannot be reproduced by means of other words” (Sierotwiński

1986: 141). From the cognitive standpoint, metaphors are a basic cognitive mechanism that serves to conceptually interpret and name the unknown elements of the surrounding reality by reference to familiar experiences (Grzegorzczkowska 2001). A special kind of metaphor is the so-called colloquial metaphor, termed a linguistic one, e.g. *bieg wydarzeń* [course of events], *rachunek sumienia* [examination of conscience], or *gorący spór* [heated argument]. They are "frequently reproduced set of word combinations established in the language custom; their meanings have been acquired to the extent that they are automatically understood without the necessity of justifications and references to the non-metaphorical meanings of the words that make them up" (*Słownik terminów literackich* 1988: 274).

Language cannot function without metaphors - they are an indispensable element. The frequent use of metaphors, even by uneducated and not well-read people, shows that metaphorical utterances are a natural and widely available means of communication. For the metaphor is "one of the basic, universal communication mechanisms" but despite its common occurrence in different languages, types of utterance and various style varieties "it violates the rules of code use to some extent" and "and activates sense-making processes different from those accompanying the ordinary use of language signs in their literal meaning" (Dobrzyńska 1994: 11). The understanding of metaphors and their appropriate use is an extremely complicated process. A condition for the acquisition of these abilities is obviously the knowledge of language. This condition is fulfilled in the case of children with slight hearing deficits and implanted children, who all attend regular schools. "For the change of sense in a metaphor to occur the receiver must demonstrate his good knowledge of the code meaning, otherwise, he will not be able to reconstruct the new - metaphorical - sense" (Dobrzyńska 1994: 62). However, the discovery of any problems with the acquisition of word meanings in the speech of the child with a hearing deficit, even a slight one, will at the same time disturb the process of understanding metaphorical expressions, including those used every day.

Examples of "minimal" errors in understanding colloquial metaphors by impaired-hearing regular-school students confirm the existence of the problem in question. On the one hand, they sometimes literally interpret colloquial metaphors (which means that the child does not reach the metaphorical sphere of language), on the other hand, they may also interpret them inappropriately, in an individualized way but in metaphorical terms (which means that the child understands the essence of a metaphor but because of insufficient experience he does not know its conventional meaning) e.g. *ciemny człowiek* [literally: a dark man = ignorant person, ignoramus] as understood by hard-of-hearing children is not "a benighted, uneducated man" (www.sjp.pwn.pl), but *to samo, co człowiek spod ciemnej gwiazdy, czyli nieuczciwy drań, łotr* [a shady character, or a dishonest rogue] or

literally *ma czarną kurtkę, spodnie, buty, wszystkie ciemne ubrania* [he has a dark jacket, dark trousers, shoes, all his clothes are dark]. This example shows that in order to understand a metaphor correctly it is not enough to simply know the language, it is also necessary to know the context of its use and have a certain cultural competence. “A metaphorical utterance should be interpreted a part of a specific communication situation, within a certain cultural community” (Dobrzyńska 1994: 27).

For the abovementioned reasons it is also extremely important to be able to understand and use collocations, which are “the first school of metaphorical thinking, of the art of allusion and, generally, the art of using language indirectly”, the knowledge of them being conducive to adopting “a creative attitude towards language” (Lewicki, Pajdzińska 2001: 328). Collocations are established sets of words in the language, whose meaning does not follow from the sum total of the meanings of their constituents; consequently, they have to be remembered in their entirety. They enrich the lexicon (they make it possible to express something more than just single words), they also enhance the synonym capacity of the language (diversity on account of style, emotions, and evaluations). Metaphors complement many gaps in the semantic space of the language, and, together with single words, they make up the set of nominative units in language (Lewicki, Pajdzińska 2001).

As has been said above, impaired-hearing children, even those knowing Polish very well, may have problems with understanding metaphorical meanings of words. With regard to collocations, a frequent phenomenon is that they are understood in a concrete way e.g. *mieć długi język* [literally: to have a long tongue = be unable to keep a secret] does not mean to them “inability to keep a secret” but the fact that *trzeba go zmierzyć linijką, ile ma centymetrów długości* [it has to be measured with a ruler how many centimeters long it is], while *strach ma wielkie oczy* [literally: fear has large eyes = fear makes us overestimate danger] is not associated with “exaggeration of danger” but with the fact that “it is necessary to draw large eyes on a scarecrow.” Children generally remember the meanings of collocations they have learned, but they often understand others in the wrong way. Metaphorical expressions used in daily communication may, due to a failure to understand them, even arouse children’s disapproval, e.g. the statement that *coś siedzi we mnie* [literally: something is sitting in me = something is in me, is haunting me] is associated with a content entirely unimaginable to a child, thus producing mixed feelings.

The problem of understanding colloquial metaphors and collocations by hearing-impaired children is a significant one: it requires investigation and consideration in logopedic diagnosis, particularly when we are dealing with a child whose language skills are rated very high. The observable deficiencies

in this area of competence will be an obstacle in understanding utterances of other people and in understanding literary and functional texts that one has read. They will also reduce the child's capacity for linguistic expression. Consequently, they are responsible for the occurrence of communication problems. If a child does not fully understand utterances of other people, he begins to be discouraged from the process of communicating, which may lead to limiting his contacts with other people, which in turn has a negative effect on his cognitive development.

7. DIFFICULTIES IN COMMUNICATION – UNDERSTANDING OF TEXTS

Processes of understanding are the first to appear in speech development and precede processes of language expression (Berko Gleason, Ratner 2005). Problems with understanding texts are a significant obstacle in getting an education by children with hearing deficits. In the course of school education these problems make it difficult to acquire the knowledge of school subjects, but first of all they limit reading in hearing-impaired children, thereby markedly slowing down the process of linguistic development at all its levels: lexical, semantic, and grammatical. A vicious circle arises: "I don't understand texts, which is why I don't read, but also I don't read because I don't understand the text being read." Reading influences cognitive and intellectual development. The ability to read with comprehension is a significant tool for expanding the knowledge of the world but also one for developing human intelligence (Kliś 2004).

At present, reading and writing are treated as a complex psycholinguistic activity made up of language skills (at the phonological, morphological, syntactic, and semantic levels) and cognitive skills (mainly in visual and auditory perception, memory processes, and in mental operations at the level of conceptual thinking), and as a form of linguistic communication (Krasowicz-Kupis 1999, 2011). The process of understanding is a complex activity. Decoding of language signs and recognition of their meanings is only one of its stages. Reading consists of decoding a text and interpreting its content (Krasowicz-Kupis 2011). According to R. Dottrens, to be able to read is not just to translate the graphic signs of a manuscript or printed text into spoken language or inner language; this is not reading, this is deciphering a code. To be able to read is essentially to understand a thing read, to be able to assess its value and rightness, to ponder over it, judge, and take a stand on it (Cf. Dottrens 1970: 44).

For hearing-impaired children, reading is an excellent way of complementing the limitations of linguistic experiences resulting from perception deficits. The

role of reading in the speech development of a hearing-impaired child is particularly important.

As shown by studies conducted among hearing primary-school or even junior high-school students, many of them do not understand the texts that they read. These conclusions also apply to adults (Kliś 2004). If it is a social phenomenon, this aspect of development of communicative skills in children with hearing defects needs even more a special focus. Parents of children with hearing deficits - students at regular schools - report difficulties in understanding texts by their children. The use of language-teaching methods in surdologopedics might prove very helpful in this respect. Checking of the level of understanding various texts, from simple instructions to stories, from functional to literary texts, has to be an element of diagnosis even of those hearing-impaired children who know Polish best. If there is a hearing deficit, limitations cannot be allowed in the area of reading, which is such a significant way of overcoming language difficulties, even if such limitations are generally observed among hearing children.

CONCLUSION

Many of the language difficulties experienced by hearing-impaired children described here may gradually and spontaneously disappear under the influence of learning at school. It is important, however, that this should happen as soon as possible. Each abnormality observed slows down the child's cognitive and language development, including the acquisition of new subject contents with different ranges of themes. This contributes to poorer understanding of texts read, to erroneous interpretations of the intentions of other persons, and to limiting the capacity for language expression.

In view of this state of affairs it is possible to adopt a wait-and-see attitude stemming from the choice of the following point of view: the difficulties observed are going to recede by themselves, under the influence of the gradual broadening of auditory and linguistic experiences (learning at school, participation in various communication acts, and reading). It is also possible to adopt an active attitude resulting from the recognition that the effects of impaired hearing manifesting themselves in the form of any abnormalities, for instance in the form of "minimal" speech disorders, should be corrected as soon as possible, based on the principle of continuous stimulation, thereby preventing the cases of possible developmental retardation – linguistic and cognitive.

REFERENCES

- Berko Gleason J., Ratner N.B. (2005). *Przyswajanie języka*, In: J. Berko Gleason, N.B. Ratner (ed.), *Psycholingwistyka*, [translated from *Psycholinguistics*] Gdańsk: GWP, 375–438.
- Bloom P. (2007). *Kontrowersje wokół przyswajania języka: uczenie się wyrazów i części mowy*, translated by M. Haman from [*Controversies in language acquisition: Word learning and the part of speech*]. In: B. Bokus, G.W. Shugar (eds.), *Psychologia języka dziecka*, Gdańsk: GWP, 175–210.
- Buttler D. (1978). *Rozwój semantyczny wyrazów polskich*. Warszawa: Wyd. UW.
- Dionne G., Dale P. S., Boivin M., & Plomin, R. (2003). Genetic evidence for bidirectional effects of early lexical and grammatical development, *Child Development* 74, 394–412.
- Dobrzyńska T. (1994). *Mówiąc przenośnie...studia o metaforze*. Warszawa: IBL PAN.
- Dottrens R. (1970). *Wychowanie i kształcenie*, translated by E. Chłapowska from [*Éduquer et instruire*], Warszawa: PZWS.
- Encyklopedia językoznawstwa ogólnego* (1999)., K. Polański (ed.), 2nd Ed., Wrocław.
- Grabias S. (1982). Paronimia jako proces leksykalny, *Socjolingwistyka* 4, 75–88.
- Grabias S. (2007). *Język, poznanie, interakcja*. In: T. Woźniak, A. Domagała (eds.), *Język. Interakcja. Zaburzenia mowy. Metodologia badań*, t. 2. Lublin: Wyd. UMCS, 355–377.
- Grzegorzczkowska R. (1982). *Zarys słowotwórstwa polskiego. Słowotwórstwo opisowe*. Warszawa: PWN.
- Grzegorzczkowska R. (2001). *Wstęp do semantyki językoznawczej*. Warszawa: PWN.
- Grzegorzczkowska R., Puzynina J. (1984). *Problemy ogólne słowotwórstwa*. In: R. Grzegorzczkowska, R. Laskowski, H. Wróbel (eds.) *Gramatyka współczesnego języka polskiego. Morfologia*. Warszawa: PWN 307–331.
- Guirard P. (1976). *Semantyka*, translated by S. Cichowicz from [*La Sémantique*]. Warszawa: WP.
- Haman E. (2000). Semantic vs. formal determinants of derivational morphology development: The case of derived nouns in Polish, *Polish Psychological Bulletin*, 31 (2), 123–136.
- Jones Moyle M., Ellis Weismer S., Evans J. L, Lindstrom M. J. (2007). Longitudinal Relationships Between Lexical and Grammatical Development in Typical and Late-Talking Children, *Journal of Speech, Language, and Hearing Research* vol. 50, 508–528.
- Kania J.T. (2001). *Podstawy językoznawczej klasyfikacji zaburzeń mowy*. In: J.T. Kania, *Szkice logopedyczne*, Lublin: PTL 11–30.
- Kliś M. (2004). Proces rozumienia tekstu w badaniach psychologicznych. *Konspekt 18*, (www.konspekt.up.krakow.pl)

- Krakowiak K. (2006). Pedagogiczna typologia uszkodzeń słuchu. In: K. Krakowiak, A. Dziurda-Multan (eds.), *Przekraczanie barier w wychowaniu osób z uszkodzeniami słuchu*, Lublin: Wyd. KUL, 255–288.
- Krasowicz-Kupis G. (1999). *Rozwój metajęzykowy a osiągnięcia w czytaniu u dzieci 6–9-letnich*, Lublin: Wyd. UMCS.
- Krasowicz-Kupis G. (2011). Poznawcze i społeczne uwarunkowania osiągnięć w czytaniu sześciolatków, *Studia Pedagogiczne. Problemy społeczne, edukacyjne i artystyczne* 20, 159–172.
- Kunisue K., Fukushima K., Kawasaki A. et al. (2007). Comprehension of abstract words among hearing impaired children. *International Journal of Pediatric Otorhinolaryngology* 71, 1671–1679.
- Kurkowski Z.M. (2000). Audiogenne uwarunkowania zaburzeń mowy, *Logopedia*, vol.28, 105–113.
- Lewicki A.M., Pajdzińska A. (2001). *Frazeologia*. In: Jerzy Bartmiński (ed.), *Współczesny język polski*, Lublin: Wyd. UMCS, 315–333.
- Muzyka-Furtak E. (2010), *Konstrukcje słowotwórcze w świadomości językowej dzieci niesłyszących*, Lublin, Wyd. UMCS.
- Muzyka-Furtak E. (2013a). Zaburzenia mowy dzieci niesłyszących – propozycja typologii. In: S. Grabias, Z.M. Kurkowski (eds.), *Logopedia. Teoria zaburzeń mowy*, Lublin: Wyd. UMCS, 287–313.
- Muzyka-Furtak E. (2013c), *Przyswajanie słów i ich znaczeń przez dzieci niesłyszące i słyszące – analiza porównawcza* (in print).
- Muzyka-Furtak E. (2013b). *Paronimia w języku dzieci niesłyszących* (in print).
- Pastuchowa M., 2007. O słowotwórstwie z perspektywy leksykalnej, In: A. Achtelek, J. Tambor (eds.), *Sztuka czy rzemiosło? Nauczyć Polski i polskiego*, Katowice: Wyd. Gnome, 21–27.
- Pastuchowa M. (2010). *Rola nauczania słowotwórstwa w kształtowaniu kompetencji językowej cudzoziemców*. In: *Sztuka i rzemiosło. Nauczyć Polski i polskiego. Tom 2*, (eds.) A. Achtelek, M. Kita, J. Tambor. Katowice: Wyd. Gnome, 9–15.
- Słownik terminów literackich* (1988). J. Sławiński (ed.), Wrocław: ZNiO.
- Sierotwiński S. (1986). *Słownik terminów literackich*, Wrocław: ZNiO.
- www.sjp.pwn.pl

ENDNOTES:

¹ The systemic language skill is the ability to make grammatically correct sentences. The communication (interactive) skill consists of : the ability to realize a social language role (social skill), the ability to produce utterances appropriate for an interactive situation (situational skill) and the ability to realize intentions (pragmatic skill). The command of all types of skills determines the efficient course of the process of communication (Grabias 2007).

² Cf. a survey of investigations presented by M. Jones Moyle, S. Ellis Weismer, J. L. Evans, M. J. Lindstrom (2007).

³ Cf. Ullman's classification pertaining to semantic changes (after: Guirard 1976: 49–55).

Anita LORENC¹

CHAPTER FOUR

DYNAMIC VISUALIZATIONS IN STUDIES ON CONTEMPORARY POLISH PRONUNCIATION²

ABSTRACT

The paper opens with a brief survey of selected traditional and contemporary methods applied in research on articulation. More room is devoted to EMA (Electromagnetic Articulography) systems used to determine the position of sensors in an alternating electromagnetic field. The paper then presents the methodology of research applied in the present project now underway, whose prime goal is to develop the first objectivized, quantitative and qualitative description of contemporary Polish pronunciation. Owing to the equipment used in the investigations – electromagnetic articulography, a circular microphone array and high-speed video, it is possible to obtain dynamic visualizations of Polish pronunciation.

Keywords: *articulography, microphone array, high-speed video, contemporary Polish pronunciation*

INTRODUCTION

The beginnings and at the same time, the intensive heyday of research into articulatory phonetics in Poland dates back to the interwar decades (1918-1939): in 1925 the cross-sections of Polish sounds by M. Abiński were published. These were the graphic forms of the author's ideas of his own articulation (cf. *Schematy*

¹ Previously: Trochymiuk

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artykulacyjne głosek polskich [Articulatory diagrams of Polish sounds] 1988). Invaluable studies in phonetics (including palatography) by T. Benni also appeared at that time (cf. Benni 1931). The results of these past studies (cross-sections of Polish sounds and palatograms) are still used in the teaching process on foreign-language, speech-therapy and pedagogy study programs.

The next period of intensive studies on articulation in Polish were in the 1950s, 1960s and 1970s. At that time cross-sections of Polish sounds (still cited in literature all over the world) were drawn up based on the X-ray method developed by H. Koneczna and M. Zawadowski (1951), and many publications by B. Wierzchowska appeared that discussed various problems in articulatory phonetics (cf. Wierzchowska 1965, 1967, 1980). Since the late 1970s, with the last studies by Bożena Wierzchowska, research on articulation has been carried out less and less often in Poland: it appears to be on the wane. During that period many traditional (often subjective) methods and techniques of speech investigation and visualization were replaced by objective and exact ways of assessment developed in instrumental phonetics. Contemporary phonetic studies thus make it possible to verify, update and organize the current knowledge on pronunciation, with the instruments used in the process aiming largely to show the articulation of speech sounds in their dynamism and variability.

For example, as regards the measurements of the movements and positions of articulators, palatography (cf. Benni 1931) has been replaced by electropalatography (EPG). In the latter technique the contact of the tongue with the palate is recorded dynamically using an artificial palate with sensors (currently, none of the centers in Poland has such a device). Traditional labiograms (cf. Dłuska 1950, Wierzchowska 1967) are gradually being replaced by video recordings that make it possible to capture the dynamics of the operation of the articulatory organs such as the lips, mandible or tongue (in cases of interdental and dental articulations) and to freely stop, repeat and slow down the pace of selected articulation stages (this method is described in greater detail further down in this study). X-ray methods (cf. Koneczna, Zawadowski 1951) have been replaced by MRI (magnetic resonance imaging) or ultrasonography (in Poland these methods are widely used in medicine for the examination of practically the whole body, but they have not yet been used in phonetics), while instead of cinerentgenography (cf. Wierzchowska 1980) there are dynamic visualizations that use the electromagnetic field in studying the positioning of articulators (EMA systems).

1. INVESTIGATIONS OF ARTICULATION USING EMA SYSTEMS

Until the 1970s the methods of describing articulation, all over the world, did not permit the objective quantification of the phenomena described. A breakthrough was the construction of a device that used the system of X-ray microbe-

am. The device not only permitted objectivization but also made considerable progress in investigations of articulation. It also contributed to the development of experimental studies combining phonology and phonetics, and, in particular, it laid the foundations for articulatory phonology (Browman and Goldstein 1989, 1992). Because of the high cost of such devices and because they were not available on the market, systems were created (by analogy to the X-ray microbeam device) based on determining the positioning of sensors in the electromagnetic field (EMA). They gained great recognition among researchers all over the world and found a wide range of applications. A comparison between articulographic data obtained from the EMA articulograph and the X-ray microbeam device showed no statistically significant differences (Byrd et al. 1999). This comparison verifies the high accuracy of EMA systems. Furthermore, the articulograph can be regarded as a device with even greater capabilities because it records not only the movement of sensors positioned at one level in the longitudinal section but also those located in any position and, additionally, each measurement provides data on the inclination angles of sensors at two levels. In comparison with other methods of articulation investigation (e.g. using magnetic resonance, ultrasonography transducer, or X-ray microbeam) the EMA analysis has many advantages such as: high sampling frequency, the possibility of 3-dimensional measurement, or even 5-dimensional if the angles of sensor positioning are taken into account), health safety, high quality of acquired data, and even unlimited mobility of the speaker's head.

Electromagnetic articulography is used to describe the movements and positions of the speech organs by leading phonetic research centers all over the world (USA, Canada, Australia, Japan, Russia, China, Germany, Holland), for instance in Massachusetts Institute of Technology (MIT), Haskins Laboratories, Queen Margaret University College (Edinburgh), Zentrum für Allgemeine Sprachwissenschaft (Berlin), University of California Phonetics Lab, Speech Dynamics Lab at Beckman Institute, Max Planck Institutes, and many others.

Articulatory characteristics of pronunciation of many languages have been described using articulographic analysis, e.g.

- English in all its varieties (Wrench 1999; Wrench and Scobbie 2003; Kühnert and Hoole 2004; Mullooly 2004; Richmond 2007; Carignan et al. 2011; and many others),
- German (Mooshammer et al. 2003; Hoole and Mooshammer 2002; Kühnert and Hoole 2004; Pompino-Marschall et al., 1996; Pompino-Marschall et al. 1998; Mooshammer et al. 2001; Fuchs et al. 2001; Bauer et al. 2010; Harrington et al. 2011),
- Chinese and its dialects (Hu, Fang 2003; Hoole and Hu 2004; Feng 2007),
- French (Badin et al. 2008; Kühnert et al. 2006),
- Dutch (Schiller et al. 1997; Warner et al. 2001),

- Korean (Kochetov et al. 2007; Kochetov and Pouplier 2008),
- Hungarian (Geng and Mooshammer 2004; Benus and Gafos 2007),
- Russian (Kochetov et al. 2007),
- Hindi (Shosted 2011),
- Arabic (Roon et al., 2007).

The foregoing studies present only a fragment of articulo-graphic investigations conducted in phonetic centers. They focus on the dynamic characteristics of the speech organs, their coordination and positions in particular stages of the analyzed pronunciations. Some of the global research problems concern relations between the acoustic signal and the position assumed by articulators. Others focus on the use of the acquired data in speech synthesis or in phonological theory.

The state of research on the articulo-graphy of Polish is decidedly not too impressive. Pioneering articulo-graphy studies of Polish were carried out in the Berlin Zentrum für Allgemeine Sprachwissenschaft and focused on a small section of Polish phonetics, i.e. on the articulation of post lexically palatalized labial consonants [pʲ] and [bʲ] (Pompino-Marschall and Żygis 2003, Rochoń and Pompino-Marschall 1999). Since 2009 articulo-graphic studies of Polish have been conducted using the AG500 equipment at the UMCS Department of Speech Pathology and Applied Linguistics. Under a separate research project, detailed testing of two speakers – with normative and defective pronunciation (Trochym-iuk and Święciński 2009, Lorenc and Święciński 2014) was conducted to create 2-dimensional animations of Polish pronunciation (Lorenc [forthcoming]), which can be accessed through the internet portal (www.fonem.eu). Comparative tests describing the articulation basis in the Poles while they speak Polish and English were also carried out (Święciński 2013).

DESCRIPTION OF THE RESEARCH PROJECT

The present project seeks to conduct advanced, objective and multimodal research on contemporary Polish pronunciation: these requirements are now imposed on articulatory phonetics. The final effect of the proposed experiment will be to acquire knowledge and data on the specificity of contemporary Polish pronunciation, to prepare a detailed description of the dynamic characteristics of the movement of the speech organs, their coordination and position at particular stages of the studied pronunciations, and the graphical presentation of the analyzed material in the form of articulatory cross-sections of sounds. This objective can be achieved by creating a modern articulation laboratory using advanced audio, video and articulo-graphic techniques, which will function owing to the skills of the research team established for the purpose.

1. SPEAKERS

The experiment involved 20 adult speakers of Polish (10 women and 10 men), who, in the opinion of a team of experts (phoneticians and speech therapists), use the precise style of the standard variety of contemporary Polish. The participants were qualified for the study on the basis of specially developed criteria related to linguistic (phonetic, orthophonic, sociolinguistic) and biological (anatomic, functional and perceptual) factors [for more, see Lorenc 2013]. In this way, anatomical defects within the articulatory apparatus (e.g. bite malocclusions, dental abnormalities, malformations of the lips, tongue, palate, etc.), disorders of motor control and oral parafunctional habits (such as swallowing or chewing) as well as abnormalities related to physical and phonematic hearing were excluded.

2. RECORDINGS

The recordings used a specially developed word list consisting of 328 items. It was constructed on the basis of formal (the basic/entry form of a word, manner of presentation) and phonological (complete inventory of phonemes, the length of the word and its phonetic structure) criteria. The participant's task was to memorize the word presented on the screen placed at eye level and then to say it aloud in the most natural way at a prearranged light signal (i.e. after the screen turned green). In some cases the pronunciation of the memorized word was preceded by the execution of a simple mathematical operation (subtraction) presented on the screen, whose result had to be said aloud, and only after the screen turned green, was the memorized word to be pronounced. The use of distractors and delayed response were intended to prevent spelling pronunciation.

3. RESEARCH TOOLS

ELECTROMAGNETIC ARTICULOGRAPHY

Electromagnetic articulography is a comparatively new technique developed by the German company Carstens Medizinelektronik GmbH in Bovenden. The method allows for the study of articulator movements based on a low-strength alternating electromagnetic field that detects the positions of sensors placed at the speech organs under observation.

Over the years, four generations of devices (articulographs) for the study of pronunciation with this method have appeared. The first two generations (AG100, AG200) were uncomfortable for the subject, because a Plexiglass helmet was placed on his/her head, consisting of heavy transmitting coils and some part of

wires. It was only in the AG500 model (third-generation, the model used by the author in her studies) that a cube, onto which all components were fixed, replaced the helmet. This improved the comfort of the subjects and also provided wider research opportunities. In the latest-generation device (AG501) the manufacturer was able to entirely eliminate the elements that limit the space around the participant. The ergonomics and style of the device were also enhanced, and the technology was slightly improved.

The AG500 electromagnetic articulograph is a device, which, owing to the technology utilized, allows recording, storage, presentation and assessment of articulator movements (tongue, lips, mandible, and soft palate) in 3-dimensional space in real time – while speaking. The general principle of operation of the device consists in inducing alternating current in a sensor, which is a tiny coil, through the magnetic field of varying frequencies, produced by six transmitting coils. This process makes it possible to calculate sensor coordinates in 3-dimensional space (i.e. to determine the XYZ coordinates) in real time as well as two angular units (phi, theta). Owing to the computer software attached with the device, the collected data are easy to manage, browse and edit.

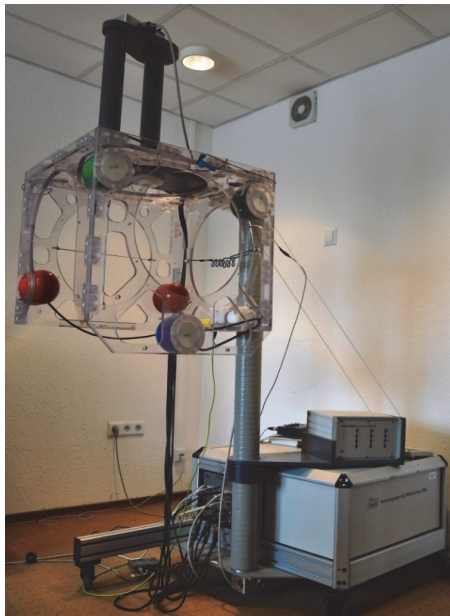


Fig. 1. The AG500 electromagnetic articulograph. Source: own work

The most important parts of the articulograph:

1. The DHG Platform

It is the foundation and base for all articulograph components.

2. The EMA cube
This is attached to the DHG Platform. The height at which it is situated and its inclination angle are adjustable. It consists of transparent plastic panels surrounding the measurement field, in which the subject's head has to be placed. Six transmitting coils are attached to the cube: they emit the alternating electromagnetic field in specified directions.
3. The "Lida "Computer.
In the DHG Platform. It controls the work of the transmitter/receiver and temporarily stores the data collected during tests.
4. The controlling server.
A PC computer operated under the supervision of a specially modified Linux system. It is a platform for the software controlling the process of recording, processing and storing the data collected during tests.
5. The DTC6 transmitter
It controls the transmitting coils.
6. The PSR12 receiver.
It collects the signals of induced voltages produced in a sensor. It can receive and process such signals from 12 sensors at the same time.
7. Sybox.
This device synchronizes the process of collecting data from the sensors and the microphone.
8. The Calibrator
Used to calibrate sensors. It consists of a turntable permanently attached to the EMA cube and a detachable disk, in which there are three magazines (with four sensors each).
9. HQ220-L165-S Sensors (cf. Fig. 2)
Each consists of a plug, a thin wire and a receiving coil that is attached to the subject's articulation organs by means of special tissue adhesive.
10. A sound card, audio mixer, and the microphone.
They are used to record and save the sound track during testing.



Fig. 2. A HQ220-L165-S sensor. Source: own work

The AG500 articulograph allows for a maximum of twelve sensors during tests. Three of them function as references for the others and serve to subsequently normalize the data linked with the correction of head movements. They are placed on the left and right mastoid processes and on the nasal bridge respectively. One sensor attached to a wooden tongue depressor was used to record the speaker's individual anatomical conditions by making the contours of the upper incisors, gums and the palate during oral and nasal respiration, or location of the temporomandibular joints. Having such data allows, inter alia, for creating the virtual shape of the vault of the mouth, in reference to which individual articulations are analyzed. (cf. Fig. 3).

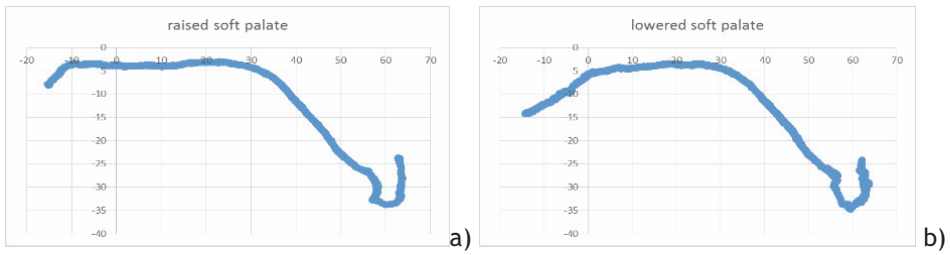


Fig. 3. The contour of upper incisors, gums, and palate during oral respiration (the raised soft palate) b) during nasal respiration (the lowered soft palate). Source: own work

All the remaining sensors were dedicated to controlling the mobile speech organs. Five of them were positioned on the tongue, four in the central line (the tip, front, center, back) and one on the frontal lateral edge of the tongue (cf. Fig. 4).

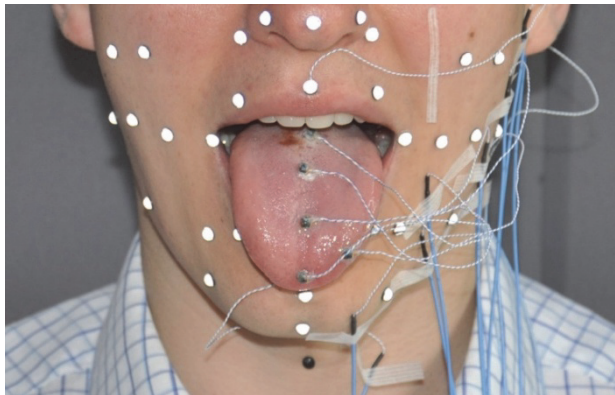


Fig. 4. Positioning of sensors on the tongue of one of the speakers. Source: own work

Two sensors recorded the work of the upper and lower lip: they were placed in the central part, just above the red of the lips. One sensor glued inside the mouth on the border between the lower incisors and gums was used to control the work of the mandible.

THE MULTICHANNEL MICROPHONE ARRAY

For the purpose of multichannel audio data acquisition, a 16-channel microphone array recorder and a circular microphone array were designed and constructed (Fig.5).

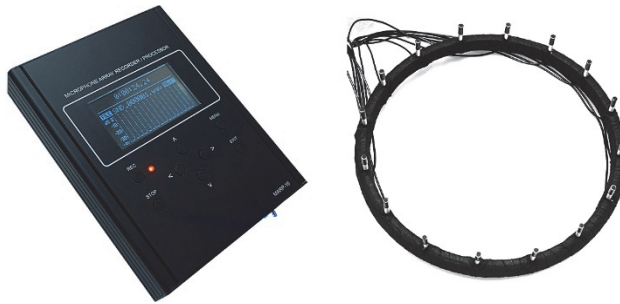


Fig. 5. The 16-channel array recorder and circular microphone array constructed for investigations

Source: own work

Unlike similar products on the market, this device is characterized by uncompromising design and construction. The input circuits were made using low-noise, broadband microphone amplifiers and high-speed successive approximation register (SAR) analog-to-digital converters that are dedicated to the measuring equipment. The superiority of the SAR technique over the commonly used sigma-delta technique is presented in the literature (Król 2008). The acquisition and pre-processing of the recorded audio data was performed by a 32-bit floating point digital signal processor (DSP) with the Cortex M4F core. The audio data acquired are stored on an SDHC memory card in the form of 16-channel WAV files. The device is controlled from the main computer equipped with an opto-isolated interface to minimize interference. The circular microphone array was constructed based on Panasonic WM-61 electret condenser capsules having a linear frequency response.

Microphone arrays enable beam forming in order to achieve the desirable directional characteristics. The phenomenon of interference is used to change the directionality of microphone and loudspeaker arrays. Because of the properties of the

wave, microphone arrays can be analyzed in the so-called near field and far field. In the near field a wave propagates spherically while in the far field it has a characteristic of a plane wave. The analysis in the present study concerned the near field.

The simplest algorithm enabling control of the beam is Delay-Sum Beam forming. Its operation comes down to an introduction of appropriate delays in particular channels before they are added up. The purpose is to compensate for the time shift in microphone array recorded signals coming from a given distance and direction.

The use of beam forming enables rendering of the three-dimensional acoustic field distribution, which, when applied onto the image of the high-speed camera, visualizes the active sources of sound pressure (cf. Fig. 6).

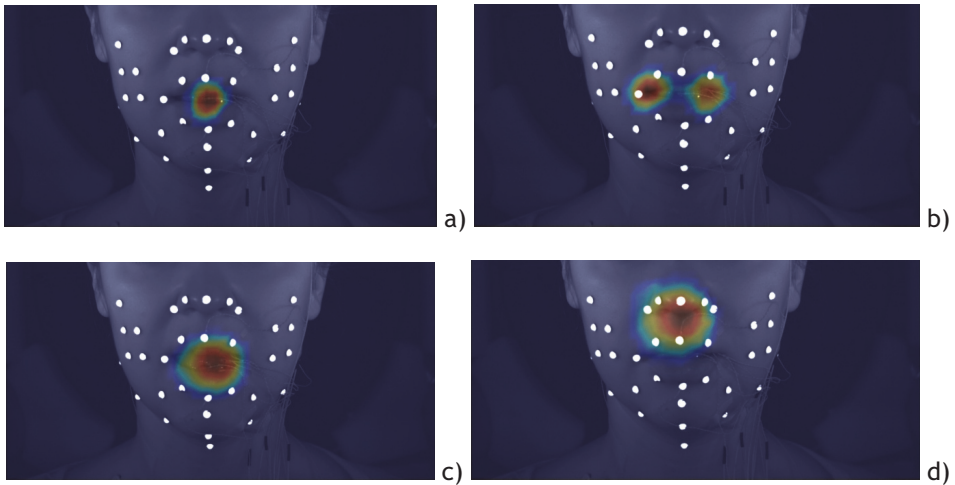


Fig. 6. Acoustic field distribution in the word *tlen* [oxygen] a) consonant [t], b) consonant [l], c) vowel [ɛ], d) consonant [n]. Source: Król, Lorenc [forthcoming].

In addition, it is possible to generate vertical and horizontal sections of the acoustic field distribution as a function of time (Fig. 7) that facilitate spatial analysis of the distribution of the acoustic field for individual sounds in a spoken word. The vertical section enables investigation of the presence and level of speech nasality (visible in Fig. 7 as the energy distribution at positive values starting at 300ms). In a similar manner, central and lateral airstreams may be analysed in the horizontal section (visible in Fig. 7 in the 40-150ms segment corresponding to the [l] sound as two simultaneous non-central energy streams).

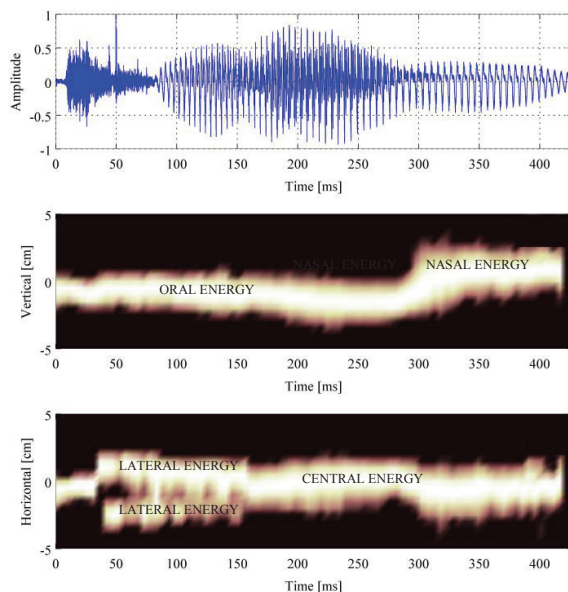


Fig. 7. Oscillogram correlated with the spatial distribution of acoustic energy [cm] in time [ms] in vertical and horizontal sections in the word ‘tlen’ (Polish word for oxygen). Source: Król, Lorenc [forthcoming]

HIGH-SPEED VIDEO CAMERAS

Concurrent with recording, the positions of speech organs with the articulograph and with recording sound by means of the audio recorder, images were recorded using three high-speed CCTV video cameras, model: Point Grey Gazelle GZL-CL-22C5M-C (cf. Fig. 8).



Fig. 8. High speed video cameras used in testing. Source: own work

One camera recorded the frontal face image while the other two recorded the side profiles (left and right). Forty white markers were placed in selected points on the faces of the tested speakers (cf. Fig. 9a).

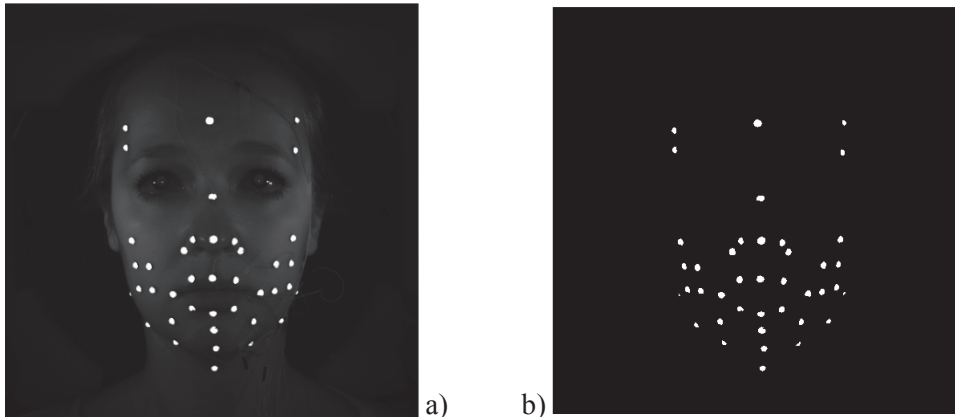


Fig. 9. Views: a) positioning of markers on the speaker's face, b) markers after binarization. Source: own work

Six of them, positioned on the forehead, temples, and the nasal bridge, had a reference function: they were the reference point for calculating the position of the other markers on the face during speaking. Owing to that, the error caused by the subject's head movements was reduced. The remaining markers were positioned on the mandible (7), the chin (3), on the jugular bone within a group of muscles (10), the lips (8), the nose and in the nasal area (5), and on the larynx (1). The image from each camera was recorded as a video sequence on a PC computer, which made it possible to archive the data and subsequently analyze it.

For a video sequence recorded by each camera, it will be necessary to calculate the positions of the markers in each discrete time moment determined by the sampling frequency of the articulograph (200Hz). Consequently, it will be necessary to isolate each point (marker) out of a single image frame so that its spatial coordinates x , y , z could be calculated in the next steps. Each camera records only a 2D image. The camera image recording the front of the face makes it possible to determine the x and y marker coordinates. The last coordinate will be calculated on the basis of the side cameras. The calculation of marker positions in each frame of the image requires the use of an image processing operation. If there are interferences on the image after it has been recorded, it will be necessary to filter it. This operation will be followed by binarization which will make it possible to highlight white points and place them against a black background. The next operation will be to segment the image and index it. This will make it possible to high-

light single points out of the background (cf. Fig. 10b). Calculation of the center of gravity of each point will allow for the calculation of their coordinates in the Cartesian system. All the foregoing operations will be carried out in the MATLAB program using Image Processing and Computer Vision tools.

CONCLUSION

Due to technological progress, research tools used in the phonetic analysis of languages are becoming, without doubt, even more advanced. They present a far more objective and detailed picture of articulation than that obtained through the instruments used several decades ago. The project underway is an answer to the obvious need to create a new description of the articulation of sounds in Polish. Its goal is to acquire knowledge and data on the specificity of contemporary Polish pronunciation, develop a detailed description of the dynamic characteristics of the movement of the speech organs, their coordination and positioning in particular stages of the studied pronunciations, and the graphic form of the analyzed material.

REFERENCES

- Badin P., Elisei F. Bailly G. & Tarabalka Y. (2008). An Audiovisual Talking Head for Augmented Speech Generation: Models and Animations Based on a Real Speaker's Articulatory Data. *Proceedings of 5th International Conference AMDO*, 132-143.
- Bauer D., Kannampuzha J., Hoole, P. & Kröger B.J. (2010). Gesture duration and articulator velocity in plosive-vowel-transitions. In: A. Esposito, N. Campbell, N. Vogel, A. Hussain & A. Nijholt A. (eds.), *Development of Multimodal Interfaces: Active Listening and Synchrony*, LNCS 5967 (pp. 346-353). Berlin: Springer.
- Benni T. (1931). *Palatogramy polskie*. Kraków: Wydawnictwo Towarzystwa Miłośników Języka Polskiego.
- Benus S., Gafos A. (2007). Articulatory characteristics of Hungarian 'transparent' vowels. *Journal of Phonetics* 35, 271-300.
- Browman C., Goldstein L. (1989). Articulatory gestures as phonological units. *Phonology* 6, 201-251.
- Browman C., Goldstein L. (1992). Articulatory Phonology: an overview. *Phonetica* 49, 155-180.

- Dłuska M. (1950). *Fonetyka polska. Artykulacja głosek polskich*. Kraków: Wydawnictwo Studium Słowiańskiego.
- Byrd D., C. P. Browman L. Goldstein & D. Honorof (1999). Magnetometer and X-ray microbeam comparison. In J. J. Ohala, Y. Hasegawa, M. Ohala, D. Granville, & A. C. Bailey, (Eds.). *Proceedings of the 14th International Congress of Phonetic Sciences*, (pp.627-630). New York: American Institute of Physics.
- Carignan C., Shosted R., Shih, C. & Rong. P. (2011). Compensatory articulation in american English nasalized vowels. *Journal of Phonetics*, 39, 668-682.
- Feng L. (2007). The Articulatory and Acoustic Study of Fricative Vowels in Suzhou Chinese. *Proceedings of the 16th International Congress of Phonetics Science (ICPhS)*, Saarbrücken, Germany, 573-576.
- Fuchs S., Perrier, P. & Mooshammer, C. (2001). The role of the palate in tongue kinematics: an experimental assessment in VC sequences from EPG and EMMA data. *Proceedings of Eurospeech in Aalborg*, 1487-1480.
- Geng C. & Mooshammer, C. (2004). The Hungarian palatal stop: phonological considerations and phonetic data. *ZASPIL* 37, 221-243.
- Harrington J., Hoole P., Kleber F. & Reubold U. (2011). The physiological, acoustic, and perceptual basis of high back vowel fronting: Evidence from German tense and lax vowels. *Journal of Phonetics* 39, 121–131.
- Hoole P., & Mooshammer C. (2002). Articulatory analysis of the German vowel system. In P. Auer, P. Gilles, & H. Spiekermann (Eds.), *Silbenschnitt und Tonakzente* (pp. 129–152). Tübingen: Niemeyer.
- Hoole P. & Hu Fang. (2004). Tone-Vowel Interaction in Standard Chinese. *Proceedings of International Symposium on Tonal Aspects of Languages: Emphasis on Tone Languages*. Beijing, 89-92.
- Hu Fang. (2003). An acoustic and articulatory analysis of vowels in Ningbo Chinese. *Proceedings of the 15th International Congress of Phonetic Sciences*. Barcelona, 3017-3020.
- Kochetov A. and Pouplier, M. (2008). Phonetic variability and grammatical knowledge: An articulatory study of Korean place assimilation. *Phonology* 25(3), 1-33.
- Kochetov A., Pouplier M. & Son M. (2007). Cross-language differences in overlap and assimilation patterns in Korean and Russian. *Proceedings of the 16th International Congress of Phonetics Science (ICPhS)*, Saarbrücken, Germany, 1361-1364.
- Król D. (2008). On superiority of Successive Approximation Register over Sigma Delta AD converter in standard audio measurements using Maximum Length Sequences. *International Conference on Signals and Electronic Systems, ICSES'08*, Kraków, Poland, 14-17 September.
- Król D. & Lorenc A. (forthcoming) *Rozkład pola akustycznego w badaniach wymowy polskiej*. Prace Filologiczne.
- Koneczna H., Zawadowski W. (1951). *Przekroje rentgenograficzne głosek polskich*. Warszawa: PWN.

- Kühnert B. & Hoole P. (2004). Speaker-specific kinematic properties of alveolar reductions in English and German. *Clinical Linguistics & Phonetics*, vol. 18, No. 6–8, 559–575.
- Kühnert B.; Hoole P. & Mooshammer C. (2006). Gestural overlap and C-center in selected French consonant clusters. *Proceedings of the 7th International Seminar on Speech Production*, Ubatuba, Brazil, 13-15 December, 327-334.
- Lorenc A. (2013). Diagnozowanie normy wymawianiowej. *Logopedia* 42, 63-87 (Diagnosis of the pronunciation norm (http://www.logopedia.umcs.lublin.pl/images/1-278_Logop_42_ANG_ok.pdf).
- Lorenc A. (forthcoming). *Polish pronunciation animations developed on the basis of electromagnetic articulography*. Festschrift Adama Łobacz.
- Lorenc A., Święciński R. (2014). Application of phonetics in speech therapy: a case of abnormally convex tongue setting in Polish. In J. Szpyra-Kozłowska, E. Guz, P. Steinbrich, R. Święciński (Eds.) *Recent Developments in Applied Phonetics* (pp. 287-324). Lublin: Wydawnictwo KUL.
- Mullooly R. (2004). *An electromagnetic articulograph study of alternating [ɹ] and the effects of stress on rhotic consonants*. Unpublished PhD thesis, Queen Margaret University College, Edinburgh.
- Mooshammer C., Perrier P., Fuchs S., Geng C. & Payan P. (2001). The control of token-to-token variability: an experimental and modeling study. *Actes de la 4th International Speech Motor Conference*, Nijmegen, 78-81.
- Mooshammer C., Geumann A., Hoole P., Alfonso P., Lieshout P. & van, Fuchs, S. (2003). Coordination of lingual and mandibular gestures for different manners of articulation. *Proceedings of the 15th International Congress of the Phonetic Sciences*, Geneva, vol.1, 81-84.
- Pompino-Marschall B. & M. Żygis (2003). Surface Palatalization of Polish Bilabial Stops: Articulation and Acoustics. *Proceedings of the 15th International Congress of Phonetic Sciences*, Barcelona 3-9 August, 1751-1754.
- Pompino-Marschall B., Janker P. M. & Ch. Mooshammer (1996). Kinematic and dynamic analysis of syllable articulation. A pilot study on German syllables with tense and lax vowels. *ZAS Papers in Linguistics (ZASPIL)* 7, 163-192.
- Pompino-Marschall B., Janker P., Mooshammer C. & Kröger B. (1998). Kinematic and dynamic analysis of German syllables with tense and lax vowels. In: B.J. Kröger et al. (Eds.) *Festschrift Georg Heike, Forum Phonetikum* 66, 161-182.
- Richmond K. (2007). Trajectory mixture density networks with multiple mixtures for acoustic-articulatory inversion. In: M. Chetouani, A. Hussain, B. Gas, M. Milgram, & J.L. Zarader, (Eds.), *Advances in Nonlinear Speech Processing, International Conference on Non-Linear Speech Processing, NOLISP 2007*, volume 4885 of Lecture Notes in Computer Science, (pp. 263-272). Berlin, Heidelberg: Springer Verlag.
- Rochoń M. & Pompino-Marschall B. (1999). The articulation of secondarily palatalized coronals in Polish. *Proceedings of XIVth International Congress of Phonetic Sciences*, San Francisco, 1897-1900.

- Roon K., Gafos A., Hoole P. & Zeroual C. (2007). Influence of Articulator and Manner on Stiffness. *Proceedings of the 16th International Congress of Phonetic Sciences*, Saarbruecken, Germany, 409-412.
- Schiller N. O., Meyer A. S., & Levelt W. J. M. (1997). The Syllabic Structure of Spoken Words: Evidence from the Syllabification of Intervocalic Consonants. *Language and Speech*, 40, 103-140.
- Shosted R.K. (2011). An Ema-Aerodynamic Approach to the Velic Opening Hypothesis: Evidence from Hindi Vowel Pairs. *ICPhS XVII*, Hong Kong 17-21 August, 68-71.
- Schematy artykulacyjne głosek polskich (1988). Vol. 2. Lublin: Uniwersytet Marii Curie-Skłodowskiej, Zakład Logopedii, Polskie Towarzystwo Logopedyczne.
- Święciński R. (2013). An EMA study of articulatory settings in Polish speakers of English. In: E. Waniek-Klimczak & L.R. Shockey [Eds.] *Teaching and Researching English Accents in Native and Non-native Speakers* (pp. 73-82). Heidelberg: Springer Publications.
- Trochymiuk A. & Święciński R. (2009). Artykulograficzne badanie wymowy grzbietowej. Studium przypadku. *Logopedia* 38, 173-201.
- Warner N.L., Jongman A., Cutler A. & Mück, D. (2001). The phonological status of schwa insertion in Dutch: An EMA study. *Proceedings of the 4th International Speech Motor Conference*, Nijmegen, 86-89.
- Wierzchowska B. (1965). *Wymowa polska*. Warszawa: Państwowe Zakłady Wydawnictw Szkolnych.
- Wierzchowska B. (1967). *Opis fonetyczny języka polskiego*. Warszawa: PWN.
- Wierzchowska B. (1980). *Fonetyka i fonologia języka polskiego*. Wrocław: Zakład Narodowy im. Ossolińskich Wydawnictwo PAN.
- Wrench A. A. (1999). An investigation of sagittal velar movement and its correlation with lip, tongue and jaw movement. In: J. J. Ohala, Y. Hasegawa, M. Ohala, D. Granville, & A. C. Bailey (Eds.) *Proceedings of the 14th International Congress of Phonetic Sciences*, (pp. 2259–2262). San Francisco.
- Wrench A.A. & Scobbie J.M. (2003). Categorising vocalisation of English /l/ using EPG, EMA and Ultrasound. In: S. Palethorpe and M. Tabain (eds.) *Proceedings of the 6th International Seminar on Speech Production*, (pp. 314-319). Sydney.

Aleksandra BOROWICZ

CHAPTER FIVE

PSYCHOSOCIAL SITUATION OF FAMILIES RAISING CHILDREN WITH HEARING LOSS

ABSTRACT

The article discusses the challenges faced by parents raising children with hearing impairments. The problem of the selection of communication methods is also mentioned, as well as the issues related to the social and mental health of family members. The author describes the specificity of parental stress and its impact on the functioning of the parents and their responsibilities related to bringing up children. Discussed are the coping styles used by parents under stress, as well as changes in the family system caused by the birth of a child with a disability. A discussion on the needs of creation and implementation of broad-based programs of social support sums up the article.

Keywords: *hearing-impaired children, parental stress, styles and strategies for coping with stress, support areas, the level and profile of stress*

INTRODUCTION

For almost all parents, childcare is an experience full of joy and pride, but also involves the stress and difficulties. Parental stress is experienced by all parents, but specifically in the case of a child with a disability. It can be described as an undesirable, psychological reaction to a difficult situation. This particular type of stress occurs when the demands on parenting and raising a child exceeds the parental resources for coping with them. Every parent is trying to deal with the situation as best he/she can, but everyone must work out their own way to deal with difficult emo-

tions. Undoubtedly, the personality type of the parent has great importance and determines whether he/she will be able to seek and reach the social support networks. Although parental stress is a common occurrence, the experience of intensive, frequent or chronic stress may reduce the mental health of parents and their ability to raise a child. Undoubtedly, it may also have an impact on parent-child relationships and have a negative impact on child development. All of this makes the issues of stress and support the key problems that are worth looking at, and aiding.

THE SITUATION OF FAMILIES RAISING CHILDREN WITH HEARING IMPAIRMENTS

The problem of the child's hearing impairment affects not only himself, but also his entire family. It is connected with some changes in the life and habits of the family. First of all it is necessary to find a suitable way to communicate, so that it is possible to satisfy the needs of the child's general development. When making a decision on the selection of the language the choice concerns equally parents and their child. Their participation in the acts of communication is still equally important. Regardless of what type of communication they choose its full acceptance is extremely important. Furthermore, the uniformity in its application is needed, so that all members of that family, "speak the same language." This approach makes the child live with a sense of harmony and security. This in turn contributes to its proper integral development. This thesis is confirmed by O. Sacks. He states: "if the communication is disturbed, it negatively affects the intellectual development, social life, and the development of the language and emotional attitudes" (Sacks 1990, 94).

There are a number of studies in the literature on the situation of mothers of children with hearing impairments. As described by Krakowiak (1993), many mothers, busy and lacking in assistance, may be unable to bear this task. For this reason, they feel guilty and live in deep anxiety about the fate of their children. Awareness of helplessness and guilt makes children suffer not only because of hearing impairment, but also because of the fear caused by feeling that they are the reason for the suffering of their mothers. It is obvious that every child, especially the disabled, needs a most happy and loving mother, to equip them with faith in people and himself, and in hope and awareness of the value of life.

Marcinkowska (2009, 13) gives general guidance regarding the rehabilitation of hearing impaired children and states that it is necessary to create the right attitude of the family environment towards therapy and rehabilitation, and to motivate the child to cooperate.

Similarly, it is important that the level of requirements is adapted to the age and abilities of the child, and that the material used for the exercise is also used

in everyday life. Therefore, it is important to support parents in the implementation of these tasks, so that their cooperation with specialists to improve the functioning of the child is as fruitful as possible.

It is also worth remembering that having a child with a disability disturbs the family system and – even if temporarily – causes a disturbance in factors associated with its operation, such as subjectivity, emotional ties, plasticity, stability, adequate perception of reality and bi-directional communication. According to Stelter (2013), it is important for the family, that after the phase of shock and despair, there is a change in the direction of development that applies to every person in the family, and to the whole family as mentioned previously.

**Table 1. The child's disability and changes in the family system
(Stelter 2013 Liberska, Matuszewska 2011, 2012, Marat 2014, 447-448)**

Dysfunctional change	Pro-development change
Subjectivity	
Family members are trying to keep the status quo, do not want to accept the changes in the system and are not able to examine the concept of themselves.	Parents accept the situation, find the meaning of life, redefine themselves in the world and have a new perspective on the future for themselves and their family.
Emotional Ties	
The family is in a phase of shock and emotional crisis. Emotions are dominated by fear, suffering, guilt, and an aversion to the child and partner. Dominates recriminations about the child's disability.	Family adapts to the situation constructively. Internal relationships are a source of joy and satisfaction. The chances of the individual development of all family members grow.
Plasticity	
Lack of acceptance causes a reduction or loss of the ability to perform the tasks of the family system. Focus on the old, inefficient working methods and life.	Establishment of the new system of norms and values. Appreciation of intangible assets. Adaptation of the family to the new situation.
Stability	
With the advent of a child with a disability comes destabilization of family life, especially in the emotional, social and economic. The imbalance causes a loss of a sense of security.	Under the influence of a redefinition of the situation comes the development of a new and better balance, adapted to the current conditions. The family and its members regain a sense of control over their own lives and sense of security.
Adequate perception	
Family members may have impaired perception of the relationship. It also changes the contacts with the environment. Can lead to rupture intra-family relationships, both inside and outside.	Manifestation of the right perception of family life in understanding of the three types of relationships: family - the outside world, individual - the outside world, individual - the family.

Bidirectional communication	
Child's disability may affect the child's communication capabilities. These difficulties lead to the impoverishment of the relationships in the system and reduce the family relationship with the outside world. Other negative consequences of lack or hindered communication are emotional disorders in individual family members.	Alternative forms of communication help to build emotional ties between the child and family members. Their application facilitates the adaptation of the family to the child's disability and optimizes conditions for the development of the child and all members within the family.

Parental Stress has a negative impact on the stability of the family and delays its pro-development changes. This is an extremely complex issue and is increasingly discussed and analyzed by many Western scholars.

The influence on parental adaptation to the new role as a parent of a disabled child is related to early diagnosis of disabilities of the child. Pisula writes (2007, 18) that it is associated with the experience of their lower anxiety, the creation of a more realistic picture of the child, and a greater sense of control over events. In Poland, the situation of early diagnosis was improved by introducing the Newborn Hearing Screening Programme in 2002.

STRESS AND COPING WITH IT BY PARENTS OF CHILDREN WITH HEARING LOSS

Worldwide research on the situation of parents of children with disabilities has been done for forty years. Most authors working on this subject use the general definition of stress, in which the accent is on the causes, symptoms and consequences of stress. The most often mentioned variables in the basic definitions are the size, intensity, length and unpredictable stressors (Pisula, 1998, 48).

In a situation of parents of children with disabilities, there is a vicious circle. Increased level of anxiety leads to increased sensitivity to stress, and on the other hand, living in conditions of constant stress associated with the upbringing of a child raises the level of anxiety, as a personality trait (Pisula 1993, 70). Therefore, it is impossible to study the factors involved in stress in isolation, without an integral look.

The causes of stress, also known as stressors, are characterized by Heszen (2014, 160) into different levels. Most often they are divided into three levels according to the level of severity. The weakest stressors are those related to everyday life, medium-level stressors are associated with life events and the strongest ones are linked to traumatic or extreme events. The duration in time is the factor by which stressful situations differ. Some stressors accompany people throughout their lives, others are finite in time, and others are repeated. Reaction to stressors

manifests in predictable ways. The most often chosen strategy for coping with stress is avoidance, whereas in situations where people have the ability to control events – the strategy is confrontation. These are strategies that protect people from experiencing unpleasant emotions. On the basis of this knowledge, the adaptability of human behavior under stress can be concluded.

Ways of coping by Lazarus (1980). It consists of four strategies or steps:

1. The search for information. It consists in improving the well being by seeking information about the stressful situation in which a person is. These are the preliminary steps before continuing activities aimed at reducing anxiety and other negative emotional reactions.
2. Direct action. Mentioned here are the steps that lead to controlling the stressful situation and are associated, for instance, with the expression of emotions, or the preventive actions aimed at preventing a given stressful event.
3. Refraining from action. Contrary to appearances, it is not about a passive approach to the stressful situation. This often includes a significant active effort to refrain from acting.
4. Intrapsychic methods. These methods include, for example, defense mechanisms (denial, projection, avoiding threats), but also cognitive activity, not disruptive to the picture of reality and designed to increase the sense of control. These are usual activities, aimed to regulate the emotion and create a distance to the problem.

In the case of parents of children with hearing impairments ways to cope with stress usually begin with the first strategy, that is, from the search for information. This is a very important step, in which the parents are trying to get as much information as possible regarding the hearing loss, its characteristics, the consequences associated with it, the limitations and possibilities of hearing impaired children. It is also an important orientation in the possibilities of supporting the development of the child, the search for professionals and rehabilitation centers where such help can be found. All these activities are designed to reduce tension, fear and other difficult emotions. This step provides the basis for further constructive steps towards improving psychological well-being of their parents.

All these strategies have a dual function of problem solving and regulation of emotions. They can also be focused on their own “I” or on the environment and relate to the past, present (damage - loss) and future (threat or challenge). This way, scientists following Lazarus and Folkman distinguish two basic forms of coping with stress - problem-focused and emotional. Problem-focused coping is the situation causing distress and preventing the achievement of an important goal.

In contrast, emotional coping involves orientation on the individual's emotions. Each of the two categories includes various specific forms of effort undertaken to cope with stress (Klonowicz, Cieslak 2004, 281).

In addition to the above, there are many other strategies in the literature to cope with stressful situations, eg. confrontation, distancing, seeking social support, self-control, planned problem solving, assuming our responsibility, positive reevaluation, wishful thinking, escape / avoidance, blaming oneself(cf. Lazarus, Folkman 1984).

There are also individual forms of coping with stress, which are associated with the ability to use one's own coping mechanism, gained over a lifetime experiences related to specific stressful situations. By developing their own individual forms of coping with stress, people usually decide to use one or two strategies. One is focused on the problem and allows the risk assessment. According C.S. Carver (Carver et al. For the Bishop, 2000, the problem-oriented behavior may be directed to:

- getting rid of the stressor or minimizing its operation;
- Finding ways to cope with stressors (eg. Brainstorming);
- omission of other tasks in order to focus on the stressor;
- a lack of any action, waiting for more favorable conditions;
- Searching for social support in order to obtain real help or obtain information.

The second strategy concerns the activities of coping with stress, which are aimed at regulating emotions. They focus on improving the well being and mood, freeing of negative emotions, fear, sadness, anger caused by the situation. This activity also includes those forms that clinical psychologists identify as defense mechanisms, some of which are used unconsciously, and others are the result of a conscious choice. Mechanisms can be ordered starting from adaptive to pathological, while it is impossible to determine the sharp boundary between them. Studies by Lazarus and Folkman confirmed the thesis stating that the problem-oriented action and emotions do not have to be mutually exclusive, and in many cases people use both (Łosiak 2008, 86-87). "As it has been proven many times, people characterized by emotional coping style experience more psychopathological symptoms compared with those applying problematic strategies" (1997 Zwoliński for Steuden, Chamulak 2005, 83).

Table 2. The styles of coping of parents having children with hearing impairments (own study).

Style focused on the task	Style focused on emotions	Style focused on avoiding
Parents make every effort to raise the level of functioning of the child. They are looking for ways and means to support auditory-language development of the child. Focus for the tasks assigned by specialists in rehabilitation of the child. Cooperate with medical centers, therapeutic and educational. They are fully involved in the organization of the rehabilitation process of the child. This style is often preceded by emotional struggles with acceptance of the child and its difficulties.	Parents, especially in the initial period are overwhelmed by their emotions. It happens that emotions dominate over any action. They feel miserable and depressed. They are overwhelmed by anxiety about how to cope with the child's disability. They often feel guilty about the situation or focus on the search for the guilty. Experiencing mourning over the loss of a child "from their dreams". They have difficulty in accepting the facts and adapting to the demands of parenting that is difficult and demanding. Capping their emotions blocks the possibility of constructive action.	This style is based on a natural defense mechanism consisting avoidance, withdrawal, escape from the problem. May take the form of denial of the situation. These parents do not acknowledge that their child has a hearing loss. Deny this information, try not to think about it. Become a stepping stone for example. Socialize, but they are not finding support, and try „to stifle” the problem. In this style fathers may seek refuge in work and other alternative forms of activity. This style is usually displaced by another, because sooner or later it collides with the painful reality.

Coping styles with stress by the parents of children with disabilities were investigated by Sekułowicz (1995). Using the WCQ questionnaire (Ways of Coping Questionnaire, by Lazarus and Folkman), she revealed that the most frequently chosen and used style of coping was to focus on the task, consisting mainly on safeguarding the most important needs of the child. In addition, mothers more often than fathers showed faith in the success of rehabilitation.

According to Kobosko (2013), higher severity of depression in mothers of young deaf and hard of hearing children can be seen in comparison with the fathers and mothers of children with typical development of hearing. According to the author of that study, the severity of symptoms of depression among mothers of children with hearing loss is highest in the first, second and seventh years of the diagnosis of hearing loss. Significantly the highest of all of these periods is in the second year after this diagnosis. The author concludes that some of the mothers are confronted with the experience of depression when they confront the reality of social and educational requirements. It also turns out that the fathers of children with hearing loss in the study did not differ in terms of depressive symptoms due to the time of diagnosis of hearing loss in a child. A variable that turned out to important in the study Kobosko (2013, 136-137), was the age of diagnosis of deafness in the child. The older the child at the time of diagnosis is, the greater

the observed severity of depressive symptoms in fathers. It was also stressed that the strongest confrontation with the emotions associated with a diagnosis occurs when parents come into contact with the requirements related to child development for instance educational, linguistic and social (usually at 7 years of age). The conclusion is that "in the offer of Centers of the rehabilitation and education of deaf and hard of hearing, their parents need constant availability to various forms of psychological intervention and psychotherapy, even in marriage, because their mental functioning as parents (depression) remain in a strong relationship with marital satisfaction" (ibid, 140).

CHARACTERISTICS OF THE STRESS OF PARENTS OF CHILDREN WITH HEARING LOSS

The selection of parents included in the study was purposeful and different criteria were applied. The selection encompassed 85 parents bringing up children with hearing impairment, varying in terms of different features. The average age of the parents was over 36 years ($SD = 5.05$) and ranged from 27 to 52 years. The age of the child has been recognized as an important variable. Families selected for the survey had children aged from birth to 12 years. Such a restriction was imposed in the preliminary assumptions of the Parenting Stress Index. The surveys of Gray (2002) showed that parents surveyed twice, in a second study carried out 10 years after the first survey, felt significantly less intensity and load of stress. It can therefore be concluded that many parents adapt to situational requirements and are able to find effective ways of coping with stress. Additional criteria in the selection of the research group were the degree and the moment of the loss of hearing by the child (moderate, significant and profound damage), the stage the sense of hearing was damaged (before using speech, and in the early stage of using speech), the structure of the family (a family with two parents and single parents with a child). The respondents were mainly hearing parents due to the premise that having a child with hearing impairment is a significant stressor for them. The choice of the research sample should allow for a faithful description of the phenomenon, which is the problem of parental stress experienced by parents of children with hearing disabilities. This group meets the requirements for quantitative research on the Parental Stress Scale. (PSI)

For the purpose of analysis, the results obtained by the parents in the PSI scale for the entire study group were averaged. The average of the results obtained by the parents in the Area of the Child is 114 points ($SD = 26.43$), which corresponds to the 80th percentile. The Parent Scale average score of 131 points ($SD = 24.37$), which reaches 68th percentile. All results in all subscales are above

the 50 percentile, and the Total Stress index for the entire study group reaches above 75 percentile (245 points), which clearly indicates that parents are stressed to a significant degree. This confirms the validity of the research undertaken into these problems. High scores, located above the 85 percentile, were obtained by the parents of children with hearing impairments in three subscales: DE – Level of being demanding, AC – Acceptability and AT - Attachment. The explanation for the high results in these subscales is – among other things- because raising a child with a disability hearing is demanding, especially when it comes to communication skills. Hearing-impaired children often have problems with social independence and require from parents and caregivers their full commitment and support. The wide variation in the level of the results obtained in the individual subscales shows more or less the impact of specific problems on the total score. The presented graph shows only the mean for the group, and indeed, in the studied population there were actually individuals having results of very high or very low. In order to show the diversity of the results achieved, the table includes the minimum and maximum results and standard deviations.

Table 3. The mean results obtained by the parents in the PSI Scale (N = 85)

Parental Stress Index	Minimum	Maximum	Average	Standard Deviation
Distractibility/Hyperactivity	13	40	26,45	5,28
Adaptability	11	49	28,02	6,97
Reinforces Parent	6	22	10,84	3,62
Demandingness	9	42	22,52	7,11
Mood	5	24	10,96	3,96
Acceptability	7	31	15,64	4,99
Child domain	54	194	114,42	26,43
Competence	14	43	29,74	6,82
Isolation	6	27	14,86	3,97
Attachment	7	26	16,71	3,08
Health	6	22	11,60	3,31
Role restrictions	10	31	18,86	4,45
Depression	9	37	22,53	5,60
Spouse	0	33	16,94	5,90
Parent domain	72	208	131,24	24,37
Total stress	133	387	245,66	45,88
Life stress	0	26	6,24	5,85
Defensive responses	16	64	37,73	8,76

Calculating the average for the entire study group may raise doubts as to whether it is meaningful. However, the author of the tool uses this kind of operation as a way to indicate a general trend.

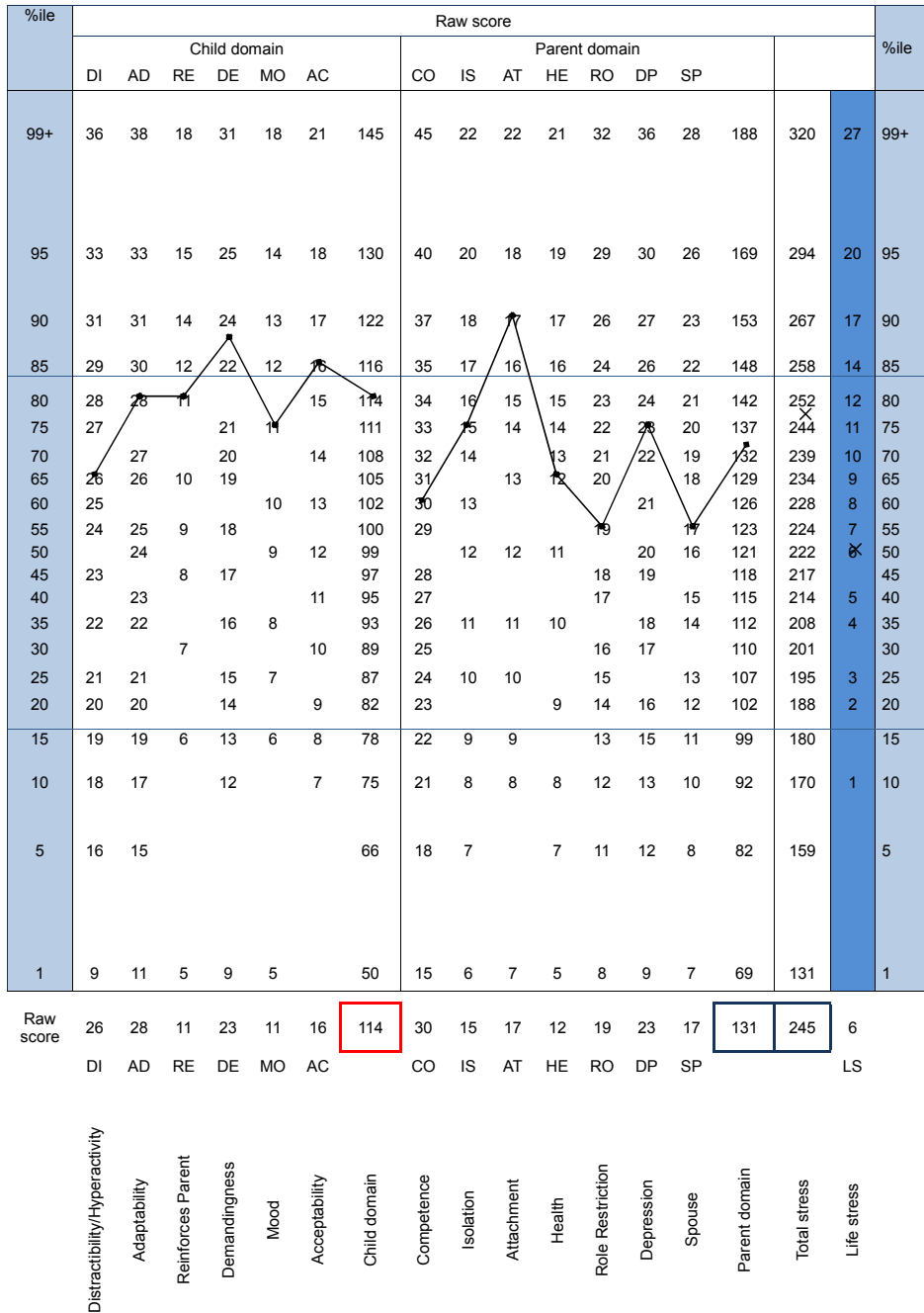


Figure 1. The average profile for the entire study group (N = 85).

We can conclude that the results in the Area of the Child in all subscales are higher than in the Area of the Parent. The lowest scores, meaning a low level of stress, are disclosed in subscales: RO - Restrictions of roles and SP - Spouse, which indicates the average level of support received. Controversy appears when comparing the high score in the subscale DE meaning the setting of high standards for child with low score on the subscale RO relating to the sense of restrictions associated with performing the role of a parent. High scores on the subscale RO occur when a parent sees the child as setting many demands (Bendell et al. 1986,, Hanson & Hanlin 1990 Humble & Perry 1988 for Abidin, 1995). Requests may have different source: crying, physical “clinging” to the parent, often asking for help, the high frequency of minor problems in behavior (Beebe, Carey & Pinto - Martin in 1993, Russ, 1988 by Abidin, 1995). Source of stress becomes larger when the parent is committed to being a model parent. Young parents often achieve high scores. Children who are very dependent on their parents (Cameron & Orr 1989, Goldberg, Morris, Simmons, Fowler & Levinson 1990, Gross, 1988, Zimmerman 1979 by Abidin 1995)) or which have not been successful in developing as individuals (the process is not completed) are often a source of high results in this area. The fear of separation from parents and lack of commitment in relationships with peers is often noted (Bendell, Stone & Field 1989 for Abidin, 1995).

Stress Scale life is considered optional, but may offer some background in the interpretation of the results for the individual parental stress.

Specialists working with hearing-disabled child’s parents should constantly keep in mind that when assessing the level of stress to assess the parents rather than suggest what they consider to be a strong burden. Detailed knowledge of the specific situation of the parents can help determine the situations that are so burdensome that they cannot face it themselves. Often it is necessary to help in accurate diagnosis and defining their own needs and feelings as parents. These tasks should be completed only by a teacher. This situation is a good test of the ability to cooperate with other professionals and share their experiences.

SUPPORT FOR PARENTS OF CHILDREN WITH HEARING IMPAIRMENTS

Parents play an important role in supporting their children’s overall development and learning. High levels of stress in parents can hinder the ability of parents to support their children and the implementation of educational activities. In addition, parents play an important role in the education of their children, and help in effectively dealing with negative feelings and difficult experiences. In the

case of parents experiencing stress, they are less efficient in teaching children coping strategies and in supporting their social and emotional development (Zaidman-Zait, 2014). “The family left alone with their problems, difficult and misunderstood by society, is unable to handle every situation and to cope with parenting tasks requiring special skills “(Krakowiak 2012, 164).

Comprehensive psycho-pedagogical support for parents is an extremely important and responsible task. Social support provides parents significant help in reducing the effects of parental stress. According to Odzimek, psychological practice shows that the type and manner of psychological support provided to parents of deaf children depends on the current stage of emotional experiences in the family, the age of the child and its needs. It also suggests psychological support to the family of a child with impaired hearing. Help should start when first concerns relating to the hearing performance of the child occur, and indeed from the very moment of the first diagnosis of audiological tests, to prepare parents to accept the difficult diagnosis. It is necessary to inform both parents about the child’s hearing loss and at the same time to take care of them. This has an impact on further cooperation of parents in process of rehabilitation. Information about the diagnosis should be given in the presence of a psychologist. (Odzimek 2006, 311).

According to Guni (2005, 118), the role of specialists is to support the family so that the parents develop a constructive attitude towards their child’s disability and rehabilitation, to prevent secondary disorders of development. The author presents indicators of behavior that should be developed shaping the constructive attitude of parents. These are:

- Acceptance of the child
- Interest in the essence of deafness and its consequences in the development of psycho-physical entity;
- Awareness of the responsibility lying on parents to carry out the basic functions of a parent;
- Motivation for comprehensive revalidation work and perseverance in its implementation;
- Conscious choice of methods of work under the guidance of experts.

Support for parents raising the children with disabilities can be realized through various forms. In Poland, the available forms are, amongst others: the institutional forms of assistance, the organization and parents’ educational activities and the impact of psychotherapy. The most important institutional forms bring help – primarily related to health and education - to disabled children. These are managed firstly by the Ministry of Health and are designed to diagnose disability as early as possible and to take appropriate treatment and rehabilitation activities. Health care facilities also perform preventive functions through genetic counseling, whose task is to determine the likelihood of a genetic disability in offspring. Health care

of children is mainly served by public and private health clinics. They deal with the early diagnosis of children with deviations in health status, their treatment, which is done by screening, health checks and development. Children at risk of disability are redirected to specialist clinics, that carry out a detailed diagnosis. Parents can receive there a first indication of how to deal with children and what exercises to lead them with(cf. Twardowski 1991, 546).

Analysis of the results obtained by Baran (2012) suggests that many mothers of children with hearing impairments admit that thanks to the support received from professionals in clinics, schools and at rehabilitation, they can better cope with their problems. Particularly important are proven contacts in clinics and educational institutions, whose employees are considered reliable. The mothers also stressed the paramount importance of support within the family. J. Baran Research shows that among mothers, there are also those who do not receive sufficient support in their environment to meet the needs of the child. They pointed out the important role of doctors and specialists in rehabilitation of hearing impaired children and medical clinics.

Support to the family that is raising a child with impaired hearing who is isolated from society should be considered an important and indispensable form of assistance. Usually, these children do not have the luck to meet people in their environment, who can treat them as a fully-fledged and valuable conversation partners. Support from the public for families of children with hearing impairments consists in understanding the problem and in being positive to differences in the method of communication (Krakowiak 2012, 163-165).

Psycho-pedagogical assistance program for parents of a child with a disability hearing should take into account the individual circumstances, needs and expectations of a specific family raising a deaf child. It should include a wide repertoire of aid activities directed to parents. A multidisciplinary team should implement this aid, and be able to work effectively, and competently to make decisions in individual cases. The foundation of all program activities must be an accurate understanding and diagnosis of the child's impaired hearing. At this stage, an especially recommended method is to begin with an open in-depth interview, that allows one to get closer to the reality in which a family lives.

An important task for professionals is to help parents believe that they can meet the many demands of special education and rehabilitation. Building self-confidence in competence and skills should be the starting point of a program to support parents. The better the parent feels, the greater the chance of effectively influencing the child and its development.

In the rehabilitation of a child with a hearing impairment, it is essential to establish a "partnership" between all those involved in supporting the development of the child and to make sure their work is effective. The first task is to choose

a channel of communication between all involved individuals and to ensure a consistent use of methods chosen by these people. The principles and framework of relations between parents and professionals should be clearly and logically set, so that they do not violate the natural functions of the family or shift the entire responsibility for the child and his upbringing away from the parents.

REFERENCES

- Abidin R.R. (1995). *Parenting Stress Index*. Third Edition. Professional Manual. Florida: Psychological Assessment Resources, Inc.
- Bishop G.D. (2000). *Psychologia zdrowia. Zintegrowany umysł i ciało*. Transl. A. Śliwa, L. Śliwa, Wrocław: Astrum.
- Gunia G. (2005). *Pomoc i poradnictwo rodzinie dziecka z wadą słuchu*. In: S. Milewicz (ed.) *Dziecko z trudnościami w rozwoju*. Kraków: Oficyna Wydawnicza „Impuls”.
- Heszen I. (2014). *Psychologia stresu. Korzystne i niekorzystne skutki stresu życiowego*. Warszawa: PWN.
- Klonowicz T., Cieślak R. (2004). *Neurotyczność i radzenie sobie ze stresem w sytuacji zagrożenia*. In: J. Strelau (ed.) *Osobowość a stres ekstremalny*. Gdańsk: GWP, 281-298.
- Kobosko J. (2013). Depresja matek i ojców a głuchota dziecka. Znaczenie satysfakcji małżeńskiej jako predyktora nasilenia doświadczanych przez rodziców objawów depresji. *Roczniki Pedagogiczne*. Vol. 5 (41), nr 3, 123-140.
- Krakowiak K. (2003). *Kim jest moje niesłyszące dziecko? Rozważania o ukrytych założeniach antropologicznych współczesnych koncepcji surdopedagogiki i audiologii*. Lublin: Wydawnictwo KUL.
- Krakowiak K. (2012). *Dar języka. Podręcznik metodyki wychowania językowego dzieci i młodzieży z uszkodzeniami narządu słuchu*. Lublin: Wydawnictwo KUL.
- Lazarus R.S., Folkman S. (1984). *Stress, appraisal and coping*. New York: Springer Publishing Co.
- Lazarus R.S. (1980). *The stress and coping paradigm*. In: L.A. Bond, J.C. Rosen (ed.) *Competence and coping during adulthood*. Hanover: University Press of New England, 28-74.
- Łosiak W. (2008). *Psychologia stresu*. Warszawa: Wydawnictwa Akademickie i Profesjonalne.
- Marat E. (2014). *Rodzina z dzieckiem niepełnosprawnym*. In: I. Janicka, H. Liberska (ed.) *Psychologia rodziny*. Warszawa: PWN, 437-458.
- Marcinkowska J. (2009). *Rodzice wobec głuchoty dziecka*. In: M. Kowalska (ed.) *Moje glucho dziecko. Kompendium wiedzy na temat rehabilitacji dziecka glucho*. Łódź: PZG, 8-17.

- Odzimek B. (2006). *Pomoc psychologiczna rodzinom dzieci z uszkodzeniami słuchu. Potrzeby a rzeczywistość*. In: K. Krakowiak, A. Dziurda-Multan (ed.) *Nie głos ale słowo... Przekraczanie barier w wychowaniu osób z uszkodzeniami słuchu*. Lublin: Wydawnictwo KUL, 303-314.
- Pisula E. (1993). *Poziom lęku u rodziców dzieci niepełnosprawnych – niektóre uwarunkowania sytuacyjne*. In: J. Stochmiałek (ed.) *Kierunki rozwoju współczesnej pedagogiki opiekuńczej i specjalnej*. Częstochowa: WSP, 66-71.
- Pisula E. (1998). *Psychologiczne problemy rodziców dzieci z zaburzeniami rozwoju*. Warszawa: Wydawnictwa UW.
- Pisula E. (2007). *Rodzice i rodzeństwo dzieci z zaburzeniami rozwoju*. Warszawa: Wydawnictwa UW.
- Sacks O. (1990). *Zobaczyć głos. Podróż do świata ciszy*. Poznań: Zysk i ska.
- Sekułowicz M. (1995). *Drogi radzenia sobie z sytuacjami trudnymi przez matki dzieci niepełnosprawnych*. In: J. Rola, E. Pisula (ed.) *Dziecko z upośledzeniem umysłowym w rodzinie. Materiały z konferencji naukowej*. Warszawa: WSPS.
- Stelter Ź. (2013). *Pełnienie ról rodzicielskich wobec dziecka niepełnosprawnego intelektualnie*. Warszawa: Difin.
- Studen S., Chamulak P. (2005). *Poziom koherencji a radzenie sobie ze stresem u osób chorych na astmę*. In: S. Studen, M. Ledwoch (ed.) *Wybrane zagadnienia z psychologii klinicznej i osobowości. Problemy człowieka chorego*. Lublin: Wydawnictwo TN KUL, 61-88.
- Twardowski A. (1991). *Pomoc rodzinom dzieci niepełnosprawnych*. In: I. Obuchowska (ed.) *Dziecko niepełnosprawne w rodzinie*. Warszawa: WSiP, 543-582.
- Zaidman-Zait A. (2014). *Parenting Stress among Parents of Deaf and Hard-of-Hearing Children*. In: <http://raisingandeducatingdeafchildren.org/parenting-stress-among-parents-of-deaf-and-hard-of-hearing-children>. Access: 11.2014

Renata KOŁODZIEJCZYK

CHAPTER SIX

ON THE NEED FOR POLISH LANGUAGE LESSONS FOR HEARING-IMPAIRED STUDENTS

ABSTRACT

Hearingimpaired students begin their studies with different levels of communication skills in the Polish language. As former students of various secondary schools, they know different means of interacting with the environment and speech is not always their preferred mode of communication. The decision to continue their education at university level obliges them to improve their speaking and writing skills in the native language. This is necessary for independent study, i.e. taking exams and writing theses. This paper will provide a description of the most common difficulties encountered by hearingimpaired students in constructing accurate texts in Polish. It will also describe the methods used in Polish language classroom that can help to overcome these difficulties and to improve the communication skills in Polish.

Keywords: *hearing-impaired, language competency, Polish*

INTRODUCTION

Hearingimpaired students begin their universitylevel education unsettled by many fears but also driven by the hope for development and for an independent life and a professional career. Their fears concern the requirements and the level of difficulty at the university but primarily their communication skills. The most common questions they pose are: Will I be able to communicate effectively with teachers and colleagues? Will I be able to understand the content of lectures and

courses? Will I be able to join discussions in classes? Will I understand the academic literature? Will I be able to write papers and other assignments? Will I work fast enough? Will teachers and colleagues accept me with all my difficulties and limitations? Will it be possible to receive any form of support and use adapted facilities?

These concerns are well grounded as every hearingimpaired person works on their communication skills already from a very young age intending to attain the linguistic proficiency equal to that of hearing people. However, the results of their work are often unsatisfactory and they fail to provide the hearingimpaired with the opportunity to start their own independent social and professional life. Prospective students represent very diverse levels of communication skills, both in speech and in writing. Some speak very accurately, have a rich vocabulary and employ complex syntactic structures. Their difficulties only surface in imperfect pronunciation, sporadic linguistic mistakes, mainly in style or idiomatic language, and most commonly in problems with participating in group discussions and with comprehension in challenging conditions such as dim lighting or noisy surroundings. Others are proficient in Polish Sign Language, which is common in students coming from households and schools that prefer this mode of communication. They are keen on using this way of communication at the university as well and seek the help of a sign language interpreter. They prefer not to use Polish, which is often rather poorly developed. Still others stem from a different, individualized communicative background. All these groups of students need help but each of them on a different level.

Students with hearing impairments are offered support in the form of equipment such as induction loop systems or FM systems and in the form of help from sign language interpreters, transliterators who use cued speech, transliterators who render texts simultaneously or personal assistants who help with note taking and inform the students of any changes and announcements. However, what they also require are dedicated language courses that would develop their linguistic and cognitive competence. Courses pertaining to this category are: individual courses in English that allow for the adaptation of techniques of foreign language teaching to the hearing and linguistic abilities of each student; individual consultation sessions in diverse academic subjects where explanations of problematic topics are offered to hearingimpaired students; proofreading sessions where students receive help in avoiding linguistic mistakes when preparing their papers and theses. One particularly important and necessary course is a Polish language course that promotes the students' comprehensive linguistic development in both speech and writing.

DECISIVE FACTORS IN LINGUISTIC DEVELOPMENT OF A HEARINGIMPAIRED PERSON

Contrary to the common belief, humans are able to develop their linguistic skills not only during childhood but also in adult life. Research has demonstrated that people with hearing impairment can acquire certain competences later in their life as compared to healthy children who attain them by the time they are fourteen (Kołodziejczyk 2013; Maciejewska 2012; Domagała-Zyśk 2013; Białas 2007). That is why the stage of higher degree studies can be a time of intense linguistic development if favourable conditions and opportunities are provided.

In healthy children, speaking skills are formed between the first and the seventh year of life. Researchers are unanimous in their belief that “during language acquisition children go through a variety of more or less specific stages. The age at which individual children reach a certain stage is very different but the relative order is constant. Stages are reached in the same order although in some children they happen one right after another and in others they are further apart” (Aitchison 1991). This principle is also observable in children with hearing loss. Linguists point to different ages when defining the end of intense linguistic development. Kaczmarek (1988), Smoczyński (1955), Zarębina (1965) and Rocławski (1986) see the seventh year of life as the final threshold in speech development. Aitchison (1976; as cited in: Porayski-Pomsta 1994, p. 53) notices that some features of mature language use can be observed in the tenth year of life. Kurcz (2000) and American scholars (Gleason, Ratner 2005) demonstrate that between the fourth and the ninth year of life children acquire full competence in their first language, which can be recognized through a rich vocabulary (see 2000), the employment of subtle phonetic rules, full syntax and comprehension of figurative language (Kurcz 2000, p. 73).

The abovementioned stages of linguistic development are observable in all children acquiring their first language regardless of the culture they originate from and even if a given culture uses sign language¹. The observations on language acquisition in children with hearing impairment allow the conclusion that the process of speech development is sequential, as manifested in its division into stages described in literature on the subject (Smoczyński 1955; Kaczmarek 1956, 1988; Jurkowski 1986; Kurcz 2000; Gleason, Ratner 2005). Although this division is characteristic of any human child, it may occur later in their life depending on various factors that determine their development. Sometimes the features of speech typical for a given stage persist for several years and the process is not completed even in adulthood.

Healthy children of six or seven years of age acquire the skill of using various syntactical structures. However, compared to adult speech, they use a limited number of constituents, have a low variety of linking words and phrases, use typical sentence structures repetitively, lack precision in conveying meaning, communicate with high level of generality, do not obey the restrictions of word order, use ellipsis abundantly, but at the same time also employ numerous redundant elements. These are only a few characteristics of syntax in children's texts. Nonetheless, they reveal the complexity of speech acquisition and, consequently, the need for practice.

Some syntactical skills are acquired later in childhood. Lexical ambiguity may prove to be a difficult concept but syntactical ambiguity is even more challenging. A crucial ability that is developed in the senior years of elementary school is paraphrasing as well as idiomatic and figurative language comprehension. Up to the seventh year of life children understand this type of language literally. The ability to interpret it correctly is developed when children reach school age.

Developmental psychology distinguishes three stages of linguistic and cognitive development: situational, concreteimaginary and abstract, which emphasizes the gradual acquisition of speech. Abstract language only appears in children when they are twelve years old. Speech development has a few critical periods, which is significant for teaching language to children with hearing loss. Speech cannot develop early in life, that is in infancy, and around the fourteenth or fifteenth year of life it is too late for first language acquisition (Hockett 1968; Aitchison 1986). Knowledge of the tendencies in development of healthy children allows parallels to be drawn between the stages of speech development in children with hearing impairment and those of healthy children. Such comparative analysis shows that hearingimpaired adults have the most difficulties with skills, which develop last in ordinary development.

As it was mentioned in the introduction to this paper, the level of language and communication skills in an adult hearingimpaired person depends on many different factors, but above all on the upbringing, education and therapy received. The most decisive factors that determine the character of speech disorders in a hearingimpaired child are:

1. The nature of organ damage and particularly its type, its degree and the time it occurred;
2. Effectiveness of therapy and/or implant treatment in the case of permanent hearing impairment;
3. Psychosocial life conditions of the hearingimpaired person and particularly the way and scope of communication used in the upbringing (the family where the child is brought up, the school where the child is educated);

4. Effectiveness of the methods of linguistic education and speech therapy (Krakowiak 2006, p. 9);
5. Personality traits of the person with hearing loss – including the intelligence level, ability to compensate, motivation and opportunity to integrate with the hearing, etc. (Szczepankowski 2009).

At the level of linguistic functioning, hearingimpaired students are affected by all the above-mentioned factors. However, I will consider more thoroughly those that depend directly on the influence of the educating parties and which may affect speech development in favourable or unfavourable ways.

The role of the family in speech development is crucial and inestimable. Whether the child was born into a hearing family or one where all the members have a hearing loss entails numerous consequences that determine their further growth. Being confronted with a hearing impairment diagnosis is a traumatic experience for hearing parents. Usually they are ready to do all it takes for their child to learn to speak and are frustrated with the limitations in communication – understanding their child’s intentions and needs, conveying knowledge about the world and communicating the rules they want to introduce in the upbringing. Meanwhile, deaf parents are usually familiar with the problem of hearing loss and the information on their child’s hearing impairment is not as traumatic but also they ascribe different levels of priority to speech training. Some of them prefer bilingual upbringing. Apart from using sign language to communicate with their child, they also try to speak to them, ensure that they have frequent contact with the hearing, for example with grandparents, with peers, in maternity school, and in systematic sessions with speech therapists. Children who are raised in such families have good chances for a dynamic development of speech and of their knowledge of the world. Knowledge acquired in early childhood through sign language ensures an unobstructed cognitive development and positively affects the acquisition of new skills in oral language. Other parents disapprove of auditory-language upbringing, for different reasons, but mostly because of their personal experience. They are not concerned with appropriate hearing implants or speech therapy. They communicate with their child solely using sign language and they prepare them to function in a “linguistic ghetto”.

The influence of the school is a continuation of family upbringing. Children with hearing impairment are educated in diverse institutions: mainstream schools, integration schools and special education institutions. The school environment where a hearingimpaired child is educated is incredibly important for their linguistic development. The language codes theory is very adequate for the description of this situation. In mainstream and integrating schools where children constantly interact with people who use accurate Polish and receive help from a supportive teacher, they get the opportunity to master the elaborate language code, acquire a rich vocabulary, and refined grammatical structures that prove helpful in literary

and academic text comprehension. However, it may occur that the child is not ready to cope with the requirements of mainstream and integrating schools and that the support offered there is insufficient, which would mean that even when remaining there, the child would not make progress.

The special school environment provides comfortable conditions for educating hearingimpaired children. Specialists, who are familiar with the difficulties that this group of students encounters, work with their pupils in teams of less than ten. This facilitates individualized teaching. Unfortunately, very often this environment constitutes a 'hermetic' linguistic circle of sign language users and users of the so-called deaf and mute language (*gluchoniemski*) that has a poor vocabulary and grammar and is highly contextual for the sake of efficient communication. As a result students who finish these schools, especially those who live in school dorms and rarely go home, master only a specific kind of restricted language and for them interacting with speakers at university level as well as independent reading of textbooks becomes a challenge.

The influence of the educating parties is tied directly to the choice of linguistic education method. In deaf families the dominant method is bilingual education, which is biased either towards sign language or towards speech. In hearing families at the initial stage, the tendency is to concentrate on supporting speech development that is carried out through auditoryverbal, oral and cued speech method. This influence is modified when children go to school. While mainstream or integrating schools reinforce and maintain the oral therapy, special institutions offer diverse methods of linguistic education but mostly use sign language or total communication. The factors described above result in a high diversity in linguistic skills among hearingimpaired students who undertake higher education even though their mental capabilities may be comparable.

DIFFICULTIES IN STUDYING AS PERCEIVED BY HEARINGIMPAIRED STUDENTS

Insufficient skills in using oral language are an obstacle in studying. In the following part of the chapter students remarks are presented and commented upon.

- *My main problems are: my Polish is poor and really I'm not even good at reading books because my vocabulary is not rich. And because I don't write well in Polish it is difficult for example to talk or write with the hearing, because the Polish language is enormous: grammar, sentence, etc. And when I talk to the deaf who use sign language it's easy, I don't think there's any grammar. If one knows Polish very well, they won't have any problems.*

(Deaf thirdyear student of Pedagogy)

Comment: In this statement, the student notices his own shortcomings in Polish. Because of these problems, he has difficulties with reading and writing without help from someone else. He is intimidated by the enormous amounts of grammar that he has to learn to ameliorate his linguistic skills but at the same time he envies those who know Polish well as they can study with ease and tranquillity.

- *My great problem are abstract notions and stylistic styles. I have trouble with the language and with grammar. And this is the biggest obstacle, especially in exams. Teachers sometimes ask complicated questions which I sometimes misunderstand.*

(Deaf secondyear student of Pedagogy)

Comment: The student recognizes a very strong link between her linguistic difficulties and problems in her studies. It is an obstacle in taking exams, both in written and oral form, understanding questions, etc.

- *I am not satisfied because I learn parrotfashion, by heart, with my notebook, but actually I really want to know about it (I mean the subject). The person who uses cued speech says only what appears in the lecture and doesn't explain properly. I would like to have someone who uses sign language and who could explain the concepts in sign language. This is very convenient for me.*

(Deaf thirdyear student of Pedagogy)

Comment: This answer reveals that the student is not satisfied as she often has to learn by heart, word for word, without really understanding the content. In consequence, she would rather use sign language, which would allow her to better understand the explanations.

- *Lectures that are not transcribed precisely are a worry to me. I mean that people who transcribe lectures from recordings often write what is important according to the teacher. I understand that for students this information is enough for the exam, but I need the so-called commentaries and examples. This helps me to understand the topic and I can profit more from that.*

(Deaf thirdyear student of Pedagogy)

Comment: This answer emphasises the very important fact that hearing-impaired people have great difficulty in understanding notes, ellipses, mental shortcuts. They need complete information, often with additional explanations, comments or examples.

- *The deaf are able to study but it's also true that it's very hard and you have to study a lot, not only for exams, but also new notions, which are ordinary, understandable for the hearing, but very difficult for us. You have to read a lot and understand and learn the lectures, you have to know lots of difficult words.*

(Deaf fifthyear student of Pedagogy)

Comment: In her answer, the student points to the great effort that hearing-impaired students have to make as compared to hearing students. What constitutes the difficulty is learning new vocabulary, scientific terminology and reading.

- *I have difficulty with learning to read and write very frequently, because I have problems with the Polish language and especially with grammar; a difficult concept of the Polish language, because I have my own, that is sign language. We, the deaf, don't use phrases as in writing and we don't use grammar and so Polish is for me like a foreign language. I know that the hearing have difficulties too, they make spelling mistakes, but I think this is less of a problem. When I have serious difficulties I might even stop my actions because I feel threatened. Such a situation diminishes my motivation for further work. I also have problems with readings because some books are very difficult and vocabulary is unknown to me. I sometimes had to use a Polish dictionary or PWN (Polish Scientific Publishers). Some subjects are incomprehensible and then I have to learn a lot until I understand, but not always do I understand.*

(Deaf thirdyear student of Pedagogy).

Comment: The student brings attention to how difficult Polish language learning is for the deaf who treat it as a foreign language. It often requires using dictionaries of Polish language and other publications. Although sign language is much easier, it is not an effective means of communication at the university. Interactions with academic teachers and other students can be facilitated by cued speed and writing. The obstacles in communication have a detrimental effect on their motivation to study continuously demanding work, which produces the threat of academic failure.

- *Almost each course requires to write a term paper, an essay, a review, etc. Such assignments are difficult for me because I have to gather materials, think my opinions through and I need to use rich vocabulary. I envy the hearing, who can write their papers beautifully and accurately as far as grammar and style is concerned. I cannot compare to them but I write each of my assignments alone, without anyone helping me. I don't even ask anyone to correct my ideas and phrases. I do it because I want to convince myself that I can write my works independently. I only consult my friend on the topic, if I understood it correctly, and the expected form of the assignment. Sometimes my work is not well fitted to the topic and then course teachers are unpleasant and tell me that I didn't try hard enough or that I wrote but silly things. It makes me sad. Exams and tests – thanks to them I can verify my knowledge and pass the semester. They aren't easy and not because I didn't study hard enough but mainly because the content is difficult to*

understand. There are lots of new notions or easy notions are replaced with more complicated ones so that the lecture uses a more academic language.

(Deaf thirdyear student of Pedagogy)

Comment: The linguistic form of this answer in itself is a proof of well-developed language skills for a person with hearing impairment. Unfortunately, it does not change the fact that she feels her knowledge and skills in Polish are insufficient. She complains about her slow pace of work and the frequent necessity to use dictionaries. Sometimes she misunderstands the instructions or the content of an exercise, which results in disagreements and unpleasant situations in class. However, the student also displays how determined she is in achieving linguistic proficiency, she is ambitious and ready to make effort in order to be successful and stimulate her own growth.

- *I can say that I've made some big progress since I started studying. I am a little better at writing but I'm not as good as the hearing. For example I had this answer that I'm writing now checked by my friend to correct grammar and logical relations. Sometimes I have great difficulty understanding some of the lectures. They are written in a very difficult language. But thanks to the help I receive from others I can learn some notions by heart, for example when the instruction is to enumerate. Sometimes it's so hard that I can't understand and I have to simply learn by heart. For sure I profit a lot from my studies because I can say that I know certain words or that I have better knowledge of the world.*

(Deaf thirdyear student of Pedagogy).

- *While studying in this university, my big accomplishment is the gradual overcoming of communication barriers and also a gradual development of my vocabulary and pedagogical knowledge. What is very useful is the help I receive from my friends. I have my various assignments and homework checked to make sure they are correct linguistically and also they tell me what is problematic in my papers. It's very profitable for me because my parents are deaf and they also have difficulties. Hearing parents can help more. Thanks to this help, I could manage to finish my studies.*

(Deaf secondyear student of Pedagogy)

Comment: In the two answers above, students underline the value and express gratitude for the support offered to them at the university in order to promote dynamic development. They emphasise the fact that for some students, help is hardly accessible if they come from deaf families and do not receive support there. They notice their own progress in social communication, linguistic and pedagogical knowledge. They consider this progress as their personal success.

- *I'm happy that I have more and more success and that there are people there to help me, explain, say what is meant. The teacher wrote a simple*

word (noted down a word from the lecture to understand more easily). She asked if I understood. If not, she noted down an example and told me to write another example. But I'm not able to study by myself, without help, because I don't understand. I note down new words so that the teacher explains it to me. Now I'm writing about my failure: I can't really write myself, for example an assignment, because I don't have a choice of words to use because my Polish is not rich.

(Deaf thirdyear student of Pedagogy)

Comment: The form of this answer is itself an account of the difficulty deaf students face when they try to construct a text that would have accurate vocabulary, grammar and style. The student expresses his joy and gratitude to a teacher who helped him develop his language skills. He feels that courses of this type are indispensable, as he doubts he would be able to study alone. Similarly as the previous answer, this one also underlines the value of additional examples as help in understanding phenomena and concepts.

- *Now I can say and thank Professor Krakowiak for organizing for us, the hearingimpaired, a campaign with help in studying, explanations, help and the necessity to inform of important announcements such as the dates of tests and exams, what we have to prepare, study or read. I even have my assignments checked by my friends to correct grammar and style. Because of my hearing I have problems with writing. They talk to me, or rather us, the deaf, a lot but these are chosen people who really want to help and also talk on various subjects.*

(Deaf secondyear student of Pedagogy)

Comment: In this answer the student also highlights the need for constant help in written assignments, i.e. appropriate rendering of ideas, and especially in grammatical and stylistic accuracy. It is worth mentioning that student peers frequently offer help and this support should be more organized and reliable. The student is grateful for this dependable coordination.

- **What are the most common linguistic difficulties among hearingimpaired students?**

Krakowiak (2012, p. 130) distinguishes the following symptoms of speech disorders in hearingimpaired people:

- Irregularities at the level of content, for example incomplete utterances, lack of structure, ambiguous and incomprehensible phrases;
- Irregularities at the level of linguistic structure, for example developmental, lexical and syntactic neologisms, developmental semantic neologisms, agrammatism, disgrammatism, linguistic interference;
- Irregularities at the phonetic level:

- Prosody disorders: aprosody (monotonous pronunciation, lack of intonation or stress), dysprosody, chanting (pronouncing syllables separately), syllabising (pronouncing individual letters separately along with epenthesis, i.e. superfluous vowels), lack of stress, faulty stress;
- Speech disorders: phone deformation, deformed co-articulation, substitution, elision (reduction, skipping phonemes), epethesis (adding phonemic elements), metathesis (wrong phone order);

Numerous linguistic research, both Polish and foreign, has confirmed the variety of linguistic disorders as listed above. It can be observed in oral and written discourse in hearingimpaired people, even though their skills are much better developed than, for example, those of hearingimpaired middle school students.

Research by Kołodziejczyk (2011, pp. 41 – 43) concerning grammatical skills analysis has demonstrated that students with hearing impairment are usually able to:

- independently construct dialogues and narrative texts,
- maintain the order of events in stories,
- construct coherent wellstructured texts,
- employ all types of sentences, which may be further elaborated to say that people with a more advanced competence use compound sentences quite often, a little less frequently developed simple sentences, complex sentences and compound-complex sentences; however, less competent people mostly use developed simple sentences,
- use rich, even sophisticated vocabulary although it is more common in people with the highest level of competence,
- apply a variety of inflection forms,
- attempt to adapt the inflected form of a word to the requirements of the chosen syntax,
- attempt to use Polish idiomatic expressions; however, abundant use of these forms is found only in people with the highest level of competence

The most common difficulties they encounter are the following:

- omission of important elements of the sentence,
- incorrect use of reflexive pronouns,
- omission or incorrect use of prepositions in prepositional phrases,
- omission or incorrect use of conjunctions in multiple sentences,
- trouble with choosing the correct form of the verb to express the intended meaning (choice of tense, mood and person),
- incorrect use of rare inflected forms or derived words which sometimes results in using non-existent forms,

- incorrect choice of words to express the intended meaning overuse of the nominative case for nouns and adjectives and of the infinitive for verbs,
- misunderstanding and incorrect use of phrasemes.

The understanding of the metaphorical meaning of some expressions by the hearingimpaired is a crucial process. It may be perceived as a test of cultural-linguistic competence. Research by Białas (2007) demonstrates that generally adults with hearing impairment have a low understanding of metaphorical expressions (the study group comprised ten people between twentythree and thirty years of age). “They do not understand expressions which have metaphorical meaning, which is confirmed by both linguistic test analysis and selfevaluation where they reveal that the interpretation of these expressions poses a great problem to them and that they do not use them in casual conversations. It is possible to hypothesize that the main reason for this difficulty in deciphering metaphorical meaning is the way hearingimpaired students communicate (*Signed Polish, System Językowo-Migowy*) and the therapy methods used in early childhood when children are purposefully prevented from using metaphors as supposedly it might hinder the process of learning new meaning and lead to creating ‘a false image of the world’” (Białas 2007, p. 315).

Not only Polish hearingimpaired students have trouble with mastering the grammatical aspect of language but it is generally acknowledged that Polish is particularly hard because of the numerous inflected forms, declination and conjugation that have to be learnt. Research conducted among hearingimpaired Americans (Quigley, Smith, Wilbur 1974, Wilbur, Goodhart, Montandon 1983; as cited in: Domagała-Zyśk 2013 p. 55) has revealed their difficulties with:

- Mastering the system of nouns, verbs and pronouns use,
- Choosing the correct verb form,
- Using infinitive complements, interrogative sentences, relative clauses, and compound sentences,
- Constructing phrases containing comparative adjectives, reflexive pronouns, modal verbs, quantifying expressions, pronouns and prepositional phrases.

Research by Paul (2001, as cited in: Domagała-Zyśk 2013, p. 55) has shown that “former secondary school students with hearing impairment constructed sentences structured similarly to those created by hearing children between eight and ten years of age. In their written answers they used fewer multiple sentences, the language was more stereotypical, contained more nouns, verbs and attributes but fewer adverbs, operators and conjunctions. Students in the study group made more mistakes as far as structural accuracy is concerned and their answers were less interesting and less coherent than those of the hearing.” Other research (Musselann and Szanto 1998, Antia, Reed and Kreimeyer 2005; as cited in: Do-

magala-Zyśk 2013 p. 56) confirmed that the findings of the Polish one were correct in stating that the hearingimpaired that receive their linguistic education in mainstream schools achieve average and above average results much more frequently. Relatively good results can be observed in the subscales that assess structure, punctuation and spelling, but what poses difficulties are syntax and lexical accuracy. Research (Channon and Sayers 2007; as cited in Dmagala-Zyśk 2013, p. 56) comparing the competence of hearingimpaired students from Gallaudet University with that of hearing students shows that “students with hearing impairment made more mistakes in function words than in content words use. As for function words, they overused them and as for content words, they overused them too and also omitted or replaced them incorrectly. They also had trouble with punctuation, avoiding full stops and commas. Their use of articles and specifiers was scarce. Definite articles were overused and indefinite article failed to be used in necessary places. Frequently there was a lack of pronoun use. All function words, pronouns, articles, conjunctions, modal verbs and operators were used correctly in around 50% of cases. The authors explain that function words are usually short, unstressed and ambiguous, which makes them more difficult to notice and recognize through hearing or lip reading. Because of these difficulties, not all secondary school students can achieve the level of language skills that would allow them to attend university.”

Polish hearingimpaired students, who learn English as a foreign language, claim that it is much easier than their native language. However, research by DomagałZyśk (2013, pp. 215 – 222) demonstrates that there is a strong relation between speaking and lip reading skills in native language and in foreign language. The higher the level of competence in the native language, the better the skills are in a foreign language, although it is always considerably poorer than in the native language. This is another argument for the possibility of continuous work on improving language and communication skills in the native language.

Along with grammatical mistakes the hearingimpaired also struggle with various speech disorders. Research by Trochymiuk (2008, pp. 16 – 23) demonstrates that despite the numerous factors that determine speech development, phonetic features of pronunciation in people with hearing impairment have a universal character across the world and regardless of the ethnic language:

- Pronunciation of high vowels is lowered and that of low vowels is heightened, while back vowels are fronted and front vowels are centralized,
- The hearingimpaired attempt to alter vowels by increased movements of the jaw rather than placement of the tongue adequate for the pronunciation of a given sound,
- Front vowels i, y, e are deformed more frequently than back and central vowels a, o, u,

- Sometimes vowels and diphthongs are omitted,
 - Oral vowels are strongly nasalized as an effect of insufficient control of the movements of the soft palate,
 - Problems with consonants pronunciation also occur: the highest accuracy (at the level of 60 – 85%) is achieved for consonants m, p, t, x, l, r, d, n, f, and the lowest accuracy (at the level of 0 – 25%) is for consonants dź, ź, dż, ć, dz, bi, wi, mi, cz, ź, gi, c, ś. There have been no cases of accurate pronunciation of ź and dź.
 - Irregularities of consonants pronunciation concern voicing and devoicing, changes in the manner of articulation, changes in place of articulation, replacing nasal consonants with oral plosives, omission of target consonants or of a segment of a consonant (e.g. friction or stop),
 - Phonemes, which can be controlled through hearing at least partially, are imitated on that basis, sometimes in a deformed manner, depending on the number of features available. If using hearing feedback while talking is not possible, people with hearing impairment use their pronunciation on the articulation (sensimotor) feedback because visual features of vowels are also important as hints,
 - In speech prosody a variety of irregularities can be observed concerning different features of speech signals: rise (intonation), intensity (loudness, stress), vowel length (tempo, rhythm) and quality of the voice. These disorders originate from difficulties in controlling speech signals through hearing and also, indirectly, from breathing, muscle tension and articulatory system disorders.
 - The intonation is generally raised as compared to the norm, fundamental frequency is higher, the scope of frequency changes is narrower, reception of speech melody is flat and monotonous (Sieńkowska, Gubrynowicz 2001, 2002; as cited in: Trochymiuk 2008).
 - The voice of people with profound hearing impairment is soundless, lacklustre, swaying and hard to keep at one level. It is strained, the sound attack is hard and the neck muscles are tense, time of voicing is considerably shorter, scope of voice is narrow and voice intensity is heightened.
 - Functioning of the articulatory system: the functioning of lips and tongue is sometimes limited, there are irregularities in soft palate movement which leads to nasalization and disorders of voice emission coordination and spastic voicing disorders (ManieckaAleksandrowicz, Szkiełkowska 1998; as cited in: Trochymiuk 2008).
- Krakowiak (2012, pp. 131 – 132) mentions four groups of speech disorders in people with hearing impairment. This division is made based on the causes:

- audiogenic (audiogenic dyslalia), e.g. insufficient amounts of models caused by difficulties in reception, self-control and concealing difficulties in articulation;
- graphogenic, caused by the influence of writing – “letter pronunciation” (voicing, epenthesis, excessive vocalisation) and the influence of finger spelling (deforming vowel length, stress, intonation, voicing, epenthesis)
- compensatory
- consequences of excessive strain on speech system muscles (hard sound attack, additional plosion and friction, superfluous pauses),
- consequences of excessive movement of the supraglottal cavity, especially the jaw and the tongue,
- stopping fricative phonemes (stabilising the place of articulation),
- apparent nasalization (excessive resonance of skull cavities and bones).
- Iatrogenic (deformations caused by therapists – hearing people who represent inaccurate pronunciation models while helping)
- Pathologically slow speech,
- Excessive plosion in articulating plosives,
- Interdental (even interlabial) articulation of dentals,
- Hypercorrection in pronouncing consonant clusters.

All of the abovementioned difficulties, which can be observed in hearing-impaired students’ speech, are a hindrance to everyday social interactions at university but also to unrestricted access to knowledge, participation in classes, taking exams and preparing papers, especially theses.

POSSIBLE METHODS OF WORKING WITH THE DEAF IN POLISH LANGUAGE COURSES

The above analyses of language skills suggest specific principles for an outline of a Polish language course that is relevant. What should be practiced are comprehension skills (literary and academic text comprehension, polylogue comprehension, i.e. group discussions), speaking (e.g. clarity of speech, accurate use of speech prosody, enriching vocabulary, improving grammatical accuracy in inflection, morphology, word formation and syntax, using different styles, using phrasemes (sayings, metaphors, idiomatic expressions)), and writing (e.g. writing summaries, taking notes, paraphrasing texts, writing essays and academic papers, including theses, creating footnotes and bibliography). Agnieszka Dłużniewska (2010, p. 39), who has been a speech therapist and a support teacher for the deaf and hard of hearing children and students for many years, emphasizes that “improving their competence in this domain should concern both oral and written discourse and take into consideration

the functions it might have in organizing the process of communication, including the ability to inform, evaluate (estimation and assessment), and argue, among others. The analysis and interpretation of any product of culture requires the student to possess knowledge on the phenomena of the surrounding reality and the skills that allow functioning in the world of values, to distinguish facts from fiction, and to analyse the content of the text. Thus, accurate analysis and interpretation of literary text requires using the language efficiently in relation to the cultural reality". The author proposes a very interesting comparison of linguistic difficulties encountered by the hearing impaired and the possible methods of teaching (A. Dłużniewska 2010, p 44):

Table 1. Linguistic difficulties of the hearing-impaired students

Difficulties caused by hearing impairment	Principles of work supporting the education process
Difficulties in learning new concepts, defining them and constructing systems of concepts	<ul style="list-style-type: none"> • When introducing new topics, write down any key concepts on the blackboard and use visual aids (boards, charts, illustrations, etc.) • Explain any unknown and abstract concepts, • Gradually increase the level of difficulty, • Help in analysing the content of the text – oriented text analysis (bring attention to causeeffect relation and spatialtemporal relations).
Difficulties in linguistic structuring of the text concerning expressing opinions, judgments, arguments, evaluation, etc.	<ul style="list-style-type: none"> • Help in interpreting content, • Help in formulating answers, preparing presentation outline in the form of questions.
Difficulties in constructing utterances (poor vocabulary, syntactical mistakes, stylistic mistakes)	<ul style="list-style-type: none"> • Ask supporting questions that facilitate constructing a coherent logical storyline, • Bring attention to three-part composition of written texts, • Introduce the practicing of linguistic competence through written assignments (accurate style, grammar and punctuation).
Difficulties in selecting information	<ol style="list-style-type: none"> 1. Help in selecting material – point to important information for comprehension and learning, 2. Prepare notes with the most important information.
Difficulties in permanent memorization of content	<ul style="list-style-type: none"> • Frequent repetitions and systematic revision of important content, refer to previously discussed content, • Verify smaller portions of material more often, • Repeat key information during recap at the end of the lesson.

Limited ability to concentrate on content conveyed through hearing	<ul style="list-style-type: none"> When presenting new material, use teaching aids that allow the content to be perceived through as many channels as possible (visual, auditory, kinaesthetic, kinetic).
Learning by heart without understanding	<ul style="list-style-type: none"> Help by asking leading questions.

Interesting suggestions for classes that develop the ability to understand metaphorical language can be found in works by Białaś (2007) and Maciejewska (2012). Białaś (2007, p. 245) mainly encourages the promotion of reading classes, as “working with text enriches the lexical resources, especially as far as cognitive, ethical and aesthetic values are concerned. Exercises on a literary text will stimulate the adequate use of the new categories of words, and will also broaden the scope of associations which relate linguistic expressions to the culturebound meaning”. Maciejewska (2012, p. 202), amongst other suggestions, proposes to use puzzles. “In order to understand a puzzle it is necessary to discover and understand the meaning of images and metaphors, as well as information inscribed into the context. It is also necessary to create hypotheses using the given data and verify it. Not only does one check his knowledge of the subject but also traces similarities and differences in associations, perception and language use. Solving puzzles is an exercise for the mind in defining concepts, by reflecting, inquiring, logical thinking: it is creative, curious, cautious and critical, revealing hidden meanings and expressing ideas through words. It engages imagination, memory, thought fluency and flexibility, and also linguistic actions, such as researching equivalents for sentences, expressions, synonyms and terms.” The linguistic training based upon puzzlesolving brings to the attention of the hearingimpaired student the fact that in any text every item, even the smallest one, has meaning and modifies the meaning of other elements. It is a very useful skill in the process of acquiring academic knowledge, which is characterized by the constant need to use similar thought processes and linguistic analyses.

It is worth mentioning that textbooks for teaching Polish as a foreign language are goldmines of interesting and very useful exercises that can be used in teaching older school and university students to practice vocabulary, grammar, style, and phrasemes. They help with listening and reading comprehension practice, speaking and writing. Importantly, the exercises are ordered based on the level of difficulty and are adapted to the interests of adult students. Listening comprehension can be practiced using filling the gaps or true/false exercises, choosing illustrations for texts and other exercises using illustrations or open questions, etc. Grammatical accuracy practice comprises morphological transformations (declination and conjugation of different parts of speech), word formation (derivation processes, creating lexical fields), syntax (constructing different sentence types, principles of syntactical associations, using prepositions and prepositional

phrases, conjunctions, etc.). Both student and teacher can find many examples of interesting exercises in reading comprehension, writing, speaking, constructing various texts: communication situations, i.e. dialogues, monologues in a given subject, descriptions, expressing one's own opinions on a given subject, summarizing texts and sharing one's impressions on what is problematic.

At universities, the organization of Polish language courses, which would take into account the findings described in this paper, would create an enormous opportunity for students with hearing impairment to develop and improve their language skills during this important and difficult stage of education. All the research mentioned above clearly shows that for hearingimpaired people it is necessary to create conditions of continuous education so that they are able to finally achieve the level of competence that will enable them to be independent, and professionally and socially active.

¹ In sign language acquisition children are said to manifest initial language skills even earlier due to the quicker development of motor skills as compared to speech.

REFERENCES

- Aitchison J. (1991). *Ssak, który mówi. Wstęp do psycholingwistyki*. Transl. M. Czarnecka. Warszawa: PWN.
- Białas M. (2007). *Głusi – język – metafora. Rozumienie metaforycznego znaczenia wyrażeń językowych przez uczniów niesłyszących*. Piotrków Trybunalski: Naukowe Wydawnictwo Piotrkowskie.
- Dłużniewska A. (2010). *Model pracy z uczniem niesłyszącym i słabosłyszącym* In: AUTOR *Podniesienie efektywności kształcenia uczniów ze specjalnymi potrzebami edukacyjnymi. Materiały szkoleniowe. Part II*. Warszawa: MEN.
- Domagała-Zyśk E. (2013). *Wielojęzyczni. Studenci niesłyszący i słabosłyszący w procesie uczenia się i nauczania języków obcych*. Lublin: Wydawnictwo KUL.
- Gleason, J. B., Ratner N. B. (2005). *Przyswajanie języka*. In: *Psycholingwistyka*. J. B. Gleason, N. B. Ratner (ed.). Gdańsk: Gdańskie Wydawnictwo Psychologiczne, 375-438.
- Jurkowski A. (1986). *Ontogeneza mowy i myślenia*. 2nd edition. Warszawa: WSiP.
- Maciejewska A. (2012). *Świat ukryty za słowami. Definiowanie wyrazów przez studentów z uszkodzonym słuchem*. In: K. Krakowiak, A. Dziurda-Multan (ed.) *Nie głos, ale słowo... Wychowanie dzieci z uszkodzeniami słuchu – nowe wyzwania dla rodziców i specjalistów*. Lublin: Wydawnictwo KUL, 199 – 218.
- Kaczmarek L. (1988). *Nasze dziecko uczy się mowy*. 5th edition. Lublin: Wyd. Lubelskie.

- Kołodziejczyk R. (2011). *Osoba z uszkodzeniem słuchu w komunikacji interpersonalnej*. In: K Krakowiak, R. Kołodziejczyk, A. Borowicz, E. Domagała-Zyśk *Student niesłyszący we wspólnocie akademickiej. Informator o warunkach edukacji wyższej osób z uszkodzeniami słuchu*. Lublin: Wydawnictwo KUL. 35-61.
- Krakowiak K. (2006). *Studia i szkice o wychowaniu dzieci z uszkodzeniami słuchu*. Lublin: Wydawnictwo KUL.
- Krakowiak K. (2012). *Dar języka. Podręcznik metodyki wychowania językowego dzieci i młodzieży z uszkodzeniami narządu słuchu*. Wydawnictwo KUL.
- Kurcz I. (2000). *Psychologia języka i komunikacji*. Warszawa: Scholar.
- Porayski-Pomsta J. (1994). *Umiejętności komunikacyjne dzieci w wieku przedszkolnym. Studium psycholingwistyczne*. Warszawa: Wydawnictwo UW.
- Rocławski B. (1986). *Poradnik fonetyczny dla nauczycieli*. Warszawa: WSiP.
- Smoczyński P. (1955). *Przyswajanie przez dziecko systemu językowego*. Łódź-Wrocław: Ossolineum.
- Szczepankowski B. (2009). *Wspomaganie rozwoju dziecka niesłyszącego. Audiofonologia pedagogiczna*. Warszawa: Wydawnictwo UKSW.
- Trochymiuk A. (2008). *Wymowa dzieci niesłyszących. Analiza audytywna i akustyczna*. Lublin: Wydawnictwo UMCS.
- Zarębina M. (1965). *Kształtowanie się systemu językowego dziecka*. Wrocław-Kraków: Zakład Narodowy im. Ossolińskich.

PART TWO

DEVELOPING FOREIGN LANGUAGE COMPETENCE IN HEARING AND SPEECH DISORDERS

Iva URDAREVIĆ

CHAPTER SEVEN

ENGLISH AS A FOREIGN LANGUAGE FOR DEAF AND HARD-OF-HEARING STUDENTS IN SERBIA

ABSTRACT

This paper describes the education system for deaf and hard-of-hearing students in Serbia with an emphasis on foreign language teaching. English as a foreign language was introduced to deaf and hard-of-hearing high school students in the school year 2002/2003. Elementary school students started learning English, from the first grade, in the school year 2012/2013. In 2014/2015 second foreign language was introduced to elementary school students, as from the fifth grade. This paper also presents some examples of good practice in teaching English as a foreign language to deaf and hard-of-hearing students. Students have been involved in international project work, within the framework of the Academy of Central European Schools. In partnership with special and mainstream schools from Romania and Bulgaria we realized two projects on media literacy and diversity. Students also participated in the Debating Europe Schools project, which is an online discussion platform designed to enable them to question European policymakers, learn more about the work of the European Union and discuss with their peers from abroad.

Key words: *EFL, deaf and hard-of-hearing students, project teaching*

INTRODUCTION

Serbia has a long tradition in educating deaf and hard-of-hearing children, but the system of schooling, ways and methods of teaching has changed in accordance

with the socio-economic and political situation in the country and with the current scientific trends.

First attempts to educate deaf and hard-of-hearing children in Serbia were made by individual doctors and teachers and were later extended to regular schools, private institutions for deaf and finally to state schools for deaf and hard-of-hearing children and youth. According to professor Jasmina Kovačević¹, first methods of educating deaf children were mime and gesticulation, written method, finger spelling, while an oral approach was used for working with hard-of-hearing children. An organised school system in Serbia was established after the Constitution in 1835 had been adopted. Serbia then got its first government that included a Ministry of Education. The first Law on Education was passed on September 23, 1844. It was valid for almost 40 years and it allowed psychically and physically disabled children to be exempt from obligatory schooling.

At the same time, Radivoje Popović, the first educated teacher for the deaf and the author of the first school books for deaf students in Serbia, tried to open a private school for the deaf in Belgrade, but his attempt failed. He subsequently opened the school for the deaf in Sremska Mitrovica in 1876, which was closed in 1888 due to a bad financial situation. Radivoje Popovic used mostly an oral approach in teaching deaf children. Veljko Ramadanović, also a teacher for the deaf, opened a school for deaf children in Požarevac, in 1896, but the school closed 2 years later. He temporarily stopped his pedagogical work with deaf children. However, he continued his work after the First World War and became one of the creators of the special education system in Serbia. The „King Dečanski“ society opened an institute for the education of deaf children on January 30, 1897. This included a school using the oral approach in educating deaf children. The school adopted the same model of organization as one functioning in Berlin. It consisted of eight grades, each with a duration of one year. In this period, mainly the social welfare system cared for deaf children, as the first state schools for deaf children were established after the First World War. Until the end of the Second World War there were only two state schools for deaf in Serbia (in Belgrade and Jagodina). In the period between 1918 and 1941 schools for the deaf were independent institutions. These were not included in the state school system as they officially belonged to the social welfare system, while they were supervised by the Ministry of Education.

After the Second World War more state special schools were opened and they became a part of the educational system. Education in special schools lasted for seven years and there were two additional years for vocational training (mostly in different trades). In 1958 elementary school was prolonged to eight years and a trade high school with a duration of four years was established. After 1974 special and mainstream schools followed the same reforms in education.

The Law on Education in 1970 was the first law that allowed deaf children to transfer from special to mainstream schools on every educational level and to continue their education up to the university level, under the condition that they were capable of following the mainstream school curricula.² The Law on the Basics of the Education System in 2009, and amendments to that law in 2011 and 2013³, have introduced the concept of inclusive education to Serbia. Education is available to all children, students and adults without any sort of discrimination and segregation. Deaf and hard-of-hearing children can today be educated in special schools, or in special classes within mainstream schools or in mainstream schools. All schools follow the mainstream curriculum, which can be individualised and tailored to the individual needs and psycho-social abilities of each child. In special schools for deaf and hard-of-hearing, an oral approach, sign language and dactilology are used in the education process. Sign language is recognised as the first language of deaf people, but the Law on Sign Language is still to be adopted.

1. "STEFAN DEČANSKI" SCHOOL FOR HEARING-IMPAIRED PUPILS

The "Stefan Dečanski"⁴ school for hearing-impaired pupils, in Belgrade (Serbia), has existed for over 115 years. Its origins can be traced back to the "King Dečanski" Institute for education of deaf children, established in the school year 1896/97. During its existence the school has operated under different names and in different places, but the main activity has always been education of children with different degrees of hearing loss.

The school provides preschool, primary and secondary education and training of deaf and hard-of-hearing children and youth. Throughout the history of this school a desire to monitor and actively participate in the current academic trends related to the habilitation and rehabilitation of all forms of hearing impairments was present. The school enrolls pupils from Belgrade and inner Serbia as there is a possibility of accommodation in a boarding-house.

School activities are performed by special education teachers and speech therapists, teachers of different educational backgrounds, psychologists and social workers. School also provides vocational rehabilitation and training in different work fields, such as: chemistry, non-metals and graphic design, mechanical engineering and metal processing, textile and leather industry, forestry and wood processing and personal services. This training lasts from 1 to 4 years, depending on each student's psychosocial abilities. Their students can engage in numerous extracurricular activities and can also learn foreign languages, religion, civic education and computer science.

The school is the first educational institution in Belgrade, to have devoted great attention to the problem of cochlear implantation and rehabilitation of

children with cochlear implants. In this framework the School cooperates with regular kindergartens, primary and secondary mainstream schools, because the ultimate goal of rehabilitation is the involvement of children in the regular or mainstream system whenever it is possible.

The “Stefan Dečanski” School for hearing impaired pupils, is also the Resource Center for providing support to other special and mainstream schools, that educate deaf and hard-of-hearing students in an inclusive environment. These students are provided additional support in the form of individual or group tuition and additional explanations of lexical and grammatical content, as well as assistance in preparation of the exam in English.

2. EFL FOR DEAF AND HARD-OF-HEARING STUDENTS IN SERBIA

Even when we recognise that teaching a foreign language is an important segment and a mandatory component of the curriculum, deaf and hard-of-hearing students do not always have the opportunity to attend and participate in foreign language classes. Until recently, deaf and hard-of-hearing students were considered incapable of learning a foreign language and, therefore, in many cases they were exempted from school attendance of foreign language classes, even in the mainstream education system. Since deaf and hard-of-hearing students often have difficulties with learning and speaking the language of the country they live in, it was thought that they could not learn a foreign language. It is now recognized that learning and knowing of a foreign language, on some level, can provide a new perspective for deaf and hard-of-hearing pupils, in terms of facilitating access to higher levels of education, better employment opportunities and career advancement, greater access to information on the Internet, travel and so on. Teaching a foreign language to deaf and hard-of-hearing pupils is a relatively new concept in modern education systems in the world. It is being developed in Serbia in the last decades of the twentieth and early twenty-first century, and is based on an educational policy of equal opportunities for all, representing the attitude that all students should be provided equal opportunities for education, as well as the same quality of education, without discrimination on any grounds.

Deaf and hard-of-hearing students, as foreign language learners, usually learn English language (in non-English-speaking countries), because educational systems recognized the importance of English for everyday life in the modern world. Deaf and hard-of-hearing students are often enrolled in regular schools, or they continue their education in mainstream colleges and universities, where one of the subjects taught is a foreign language. Special schools for deaf and hard-of-hearing students also introduced a foreign language in their curricula, as it is recognized that learning of another language can provide significant opportunities for

deaf and hard-of-hearing population. The “Stefan Dečanski” School for hearing impaired students in Belgrade, is the first school of this type in Serbia, that introduced English as a foreign language, as a school subject for deaf and hard-of-hearing students.

ELEMENTARY SCHOOL

In elementary school, as a pilot project and in agreement with the school management and parents, English language was offered as a facultative subject, for the younger age group of students (preschoolers and the first four grades of primary school) in a daily attendance unit, in the school years 2003/2004 and 2004/2005. The initiative was supported by parents. They supplied the teachers, textbooks, manuals and other materials from children, who had attended mainstream schools. As the students in the daily attendance unit were in different age groups and different grades, some students did not know the Latin alphabet, and preschoolers did not know how to write at all, the focus was not on writing in English. During English lessons we used predominantly the communicative approach, and the total physical response method, as it is believed that this method is suited for children of this age, and that it allows them to adopt new concepts and use them for communication purposes.

The Total Physical Response (Total Physical Response) method was created by psychologist Dr. James Asher. It is based on a physical response to verbal commands. This method is based upon the principles of natural adoption of the mother tongue and at the same time helps to develop motor and verbal abilities of students. We used pictures, songs, toys and games (such as “Simon says” and similar). This approach puts an emphasis on good non-verbal communication skills (facial expressions, imitation, gestures), and this segment is particularly apt for working with deaf and hard-of-hearing students.

In this method a child first learns to understand and execute basic commands (for example, “Come!”, “Stand up!” etc.), that allow the child to develop observation skills, the ability to understand and execute orders and tasks. In this way children learn, for example, the vocabulary for body parts by learning the popular song “If you are happy and you know it” (in Serbian language it is the song “When You’re Happy”).

The course was also well-received by the students, thus providing the impetus to roll out the course to all elementary school pupils. In line with the inclusive education policy in Serbia, English as a foreign language, was introduced as a compulsory (or mandatory) subject in primary schools for the deaf and hard-of-hearing

students in Serbia, in the school year 2012/2013, starting from the first grade. Deaf and hard-of-hearing elementary school students follow the mainstream curriculum for English language, that was published in the “Regulations on the curriculum for first and second grade of primary education” (“Official Gazette of RS - Educational Gazette” no. 10/2004, 20/2004, 1/2005, 3/2006, 15/2006, 2/2008, 2/2010, 7/2010, 3/2011, 7/2011 and its amendments in no. 1/2013, 4/2013, 14/2013). In the school year 2014/2015, legislative changes, inclusion and reforms of education that are currently in progress in Serbia have led to introducing a second foreign language to elementary school students in Serbia, starting from the fifth grade (in our school, Italian is offered as a second foreign language).[5](#)

1. HIGH SCHOOL

In Serbia, teaching EFL to deaf and hard-of-hearing students has been introduced at the high school level in the “Stefan Dečanski” School for hearing impaired pupils in Belgrade, in the school year 2002/2003, in the field of work of chemistry, non-metals and graphic design.

In the beginning, there were no formal curriculum guidelines for teaching EFL to deaf and hard-of-hearing students and the curriculum for mainstream schools was used as a basis for teaching. It should be emphasized here that the Serbian Law on Education allows the curricula to be adapted for students with special needs by changing up to 1/3 of its content. In high school English language classes were run according to the joint programs for educational profiles in duration of three or four years, which were published in the “Official Gazette of the Republic of Serbia - Educational Gazette”, No. 6/90 and 4/91, and then in accordance with the instructions, recommendations and contents of the program published in the “Official Gazette of the Republic of Serbia – Educational Gazette” No.21 / 2004. The number of classes per week is 2, which means there are 74 school classes in a year in the first three grades and 68 in the final, fourth grade of high school.

In the 2007/2008 school year, in line with the reform of the curriculum, English was introduced as a subject in the work field of personal services (education profile: male and female hairdresser), and in the school year 2009/2010 in the work fields of agriculture, food production and processing, when the school has opened a new educational profile and started training future bakers. The English language curriculum for deaf and hard-of-hearing students was announced in the “Regulations on amending and modifying the regulations on the curriculum of secondary education in the three-year and four-year duration for deaf and hard-of-hearing students”, which was published in the “Official Gazette of the Republic of Serbia – Educational Gazette”, no. 2/2009.[6](#)

From the academic year 2013/2014, students on the specialist one-year education in the field of work of personal services (female hairdresser, male hairdresser, manicure and pedicure), also began learning English language as one of the subjects.

After completing primary school for deaf and hard-of-hearing, some students continue their education in mainstream secondary schools, where English as a foreign language is a regular curricular subject. Because the teaching of a foreign language for deaf and hard-of-hearing students is still not fully regulated, students are either exempt from the foreign language teaching or an adjusted curriculum is used for English language for these students. An example of the foregoing is a student K.A7., who enrolled in the “High School of Design” in Belgrade, after completing elementary education in the “Stefan Dečanski” School for the hearing impaired pupils in Belgrade, in the academic year 2012/2013. In the following year, the high school together with parents, initially decided to allow this pupil to be exempted from the English language lessons. After K.A. expressed her desire to learn the English language, and in accordance with the recommendation of the Institute for the Improvement of Education, she was given the opportunity to learn English at the beginners level (or level A1 according to the Common European Framework for Foreign Languages), while other students in her class follow the regular curriculum for the first year of high school.

A number of deaf and hard-of-hearing students, after graduation from high schools for deaf and hard-of-hearing students, have enrolled into mainstream colleges and faculties. Since the 2006/2007 school year, 22 students from our school have successfully passed the examination in English language at higher education institutions (the largest number of students studied at various departments of “Belgrade Polytechnic”). These students were provided with adequate supplementary educational support programs in mastering the English language in the form of additional individual or group lessons and consultations.

As the teaching of a foreign language to deaf and hard-of-hearing students, is a new concept in our education system, no specific methodology exists. We assume that the spoken Serbian language is practically the first foreign language deaf and hard-of-hearing students learn (as sign language is a mother tongue for the majority of deaf students) and use the principles and methods of teaching Serbian language for deaf and hard-of-hearing students, combined with the principles and methods of teaching English as a foreign language. Soon after beginning to teach English to deaf and hard-of-hearing high school students, it became evident that even students in the same class are very often at different levels of acquiring foreign language skills. Most of deaf and hard-of-hearing students need a highly individualized approach during lessons that will provide progress and obtaining of optimal results in English language learning. In work-

ing with deaf students all methods of communication are used – oral, written, sign language, dactylogy etc.

Teaching methods and course contents are modified according to the individual needs and psycho-social abilities of each deaf and hard-of-hearing student. Students have the opportunity to work on the development of all four language skills (reading, writing, listening and speaking), but the emphasis is usually placed on reading and writing skills in English. The art of listening is practiced by using existing residual hearing, accompanied with the lip-reading and sign language, and speech is not required if the student does not want to speak in English (if, for instance the child is ashamed to speak in a foreign language because of poor articulation or possible mistakes). In teaching English as a foreign language to deaf and hard-of-hearing students, principles of individualization and differentiation are applied, and grammatical activities are simplified and reduced in accordance with their mental and physical abilities.

After revising the proposed course books for EFL, in use in Serbian schools, it becomes evident that most of the books are not appropriate for deaf and hard-of-hearing students. Mostly foreign authors have written course books for EFL. Although these books are well designed, they are completely in English, which presents a problem to deaf and hard-of-hearing students. There are not many books for teaching EFL to high school students at the beginner level by domestic authors and book publishers which is quite understandable because most of the Serbian students start learning English at some point in elementary school. We decided to use a course book and workbook designed for adult beginners and published by the Institute for Foreign Languages in Belgrade. Each unit consists of four lessons followed by an English-Serbian dictionary. At the end of the unit, main grammar points are explained in Serbian language. Instructions for exercises are written in Serbian and easier for deaf and hard-of-hearing students to understand. At the end of the book, an alphabetical, bilingual, English to Serbian dictionary is provided. Although planned for adult learners of EFL, on the beginner level, topics covered are interesting to deaf and hard-of-hearing teenagers as they cover basic communication needs, and with some minor adaptations and adjustments, the book provides a good basis for class work. The course book is accompanied by the corresponding workbook, which is commonly used for additional exercises and reinforcement, as well as for homework. The course book is based primarily on the structural – communicative approach to language teaching, but it also contains elements of other approaches, such as, for example, functional and lexical approach. Its goal is to familiarize students with the basic grammatical structures, language functions and vocabulary necessary to communicate in everyday situations, frequent phrases, and to provide awareness of appropriate responses in certain social situations and in appropriate register as well as to train the students

for oral and written communication suited to the beginners level of learning the English language.⁸

3. PROJECT TEACHING IN EFL

Until recently, in Serbian schools for deaf and hard-of-hearing students, English, as a foreign language, was introduced as a school subject, for the first time, at secondary school level. This implies that deaf and hard-of-hearing students have had their first contact with the concept of foreign language learning as teenagers. In order to further motivate the deaf and hard-of-hearing high school students to learn English, as well as provide them with an opportunity to use language learnt in classroom and to implement the knowledge of English in realistic, appropriate and meaningful communicative situations, students were engaged in the implementation and participation of various international projects.⁹

In the school year 2012/2013 the school became a member of an international school network, Academy of Central European Schools (ACES), which includes elementary and high schools from 15 European countries. Within the ACES framework we participated in two projects in cooperation with other special and mainstream schools from this part of Europe. Project participants were students from partner schools, aged between 12 and 17 years. Implementing ACES projects provided the deaf and hard-of-hearing students with an opportunity to participate in international project meetings and partners' visits, to communicate with their peers from abroad and to use English as the main mean of communication in international and inclusive settings.

The first project, "Media Voices For Special Teens"¹⁰, on the topic of media literacy, was implemented in cooperation with a special school from Romania. The aim of the project was to increase the visibility of students with disabilities in media and to raise the level of awareness and consciousness of general public about people with special needs. While working on the project, the students interacted with their peers from partner schools through the Internet (e-mail and social networks - mostly Facebook), with the support of teachers, they discussed and made decisions about future project activities. Mutual visits of the project partners were additional opportunities for establishing communication in English. As there were a lack of media reports about teenagers with special needs, we have created our own media tool, a trilingual project blog on the Internet, in English, Serbian and Romanian language, available online at www.aces128.blogspot.com, which was exceptionally well attended (there have been recently over 19 000 visits). High school students were actively involved in the development of the blog, the choice of materials and content creation, and two students have officially been "bloggers". Students also had the opportunity to prepare materials for

two international network meetings, while student representatives, who attended these meetings had a chance to communicate with their peers from mainstream and special schools in Europe, and to present our project activities and results, together with a student from Romania, in the English language. At the closing ACES Academy in Senec (Slovakia), in April 2013, the project was awarded for special achievements in the field of innovative learning. In Serbia, in June 2013, part of the activities of the project, implemented in our school, entered the “Base of Knowledge” in the Creative School contest (www.kreativnaskola.rs). On European level, the project was publicised in the manual “Media Literacy in Europe: 12 good practices that will inspire you.”. The manual was published in November 2013 by the Belgian Evens Foundation, in cooperation with the Institute for Media Research and Media Education from Germany (<http://issuu.com/joadriaens/docs/medialiteracymagazine>).

The second project, “Different But The Same” had diversity as the main topic, and it was run in partnership with two mainstream schools from Bulgaria and Romania, in the 2013/2014 school year. During the project implementation we created our project page on Facebook, (www.facebook.com/differentsame), which recorded our project activities, as well as shared interesting information on Deaf culture. During project partner visits, we organized various workshops and a “small school of sign language”, where our students taught their peers from local and foreign partner schools the basics of communication with deaf people. We recorded ten video lessons of sign language course, and we published them on our project page. Fifteen current and former students were the page administrators. They published and edited the contents of the page (for example page statuses, photos and video albums of the project and other relevant activities, and other content relevant to the deaf and hard-of-hearing people, such as songs of various artists translated into sign language, announcements of different cultural events etc.) Project partner visits presented a further opportunity to use English in order to establish and maintain communication. As the students become friends with their peers from Romania and Bulgaria, the communication between them has continued, even after the project completed, through social networks. During the project implementation, deaf and hard-of-hearing were trained to use various computer and internet programs to facilitate the communication and to translate content from Serbian to English language (like, for example “DI Dictionary” and “Google translator”), but also the basics about internet safety. During the visit of the delegation from our school to the partner school in Bulgaria, a group of high school students made a presentation on Belgrade in Microsoft Office Power Point, in Serbian and English, and two students represented our city at the meeting in Plovdiv. Students who participated in two international network meetings had the opportunity to speak English,

acquired in the school settings, and to communicate with their peers from other European countries. This ACES project cycle, also included another special school for deaf and hard-of-hearing students, from Bucharest (Romania). At the initiative of the project coordinators from the two schools for students with hearing impairments, in order to facilitate communication of deaf and hard-of-hearing students with their hearing peers, at the final network meeting, an interpreter for sign language was present. It is interesting that the student representative from our school decided to speak in English, together with students from the mainstream schools from Romania and Bulgaria, at the project presentation at the ACES Academy 2014 in Senec (Slovakia), refusing to use the services of sign language interpreter, although she suffers from severe hearing loss (more than 90 percent hearing loss). (<https://www.facebook.com/video.php?v=459173470880385&set=vb.396215777176155&type=3&theater>).

Deaf and hard-of-hearing high school students also participated in “Debating Europe Schools” project, part of Debating Europe. This is an online discussion platform supported by the European Parliament that has encouraged a series of online debates on a number of topics with citizens, and asked high-profile politicians and experts to contribute. The initiative is intended to provide students with an opportunity to ask questions about European politicians, learn how to formulate “difficult” questions and interpret the answers, discuss with students from other countries in Europe and learn more about the work of the European Union. The students asked five questions related to the position of deaf people in the EU, education of the deaf in Europe, sign language in legislative and practical use, opportunities for employment and getting adequate health care. We recorded our questions in the form of short videos, and made them available to deaf and hard-of-hearing population to participate in the debates, as we have also provided subtitles in English and translation to sign language. Members of the European parliament and human right activists answered our questions. The dialogue was published on the Debating Europe Schools web page as two posts:

What can be done to improve employment opportunities for people with disabilities? (<http://www.debatingeurope.eu/2014/06/26/what-can-be-done-to-improve-employment-opportunities-for-people-with-disabilities/>)

- and How can the EU better guarantee the rights of people with disabilities? (<http://www.debatingeurope.eu/2014/06/26/how-can-the-eu-better-guarantee-the-rights-of-people-with-disabilities/#.VEk7LiKUC-M>).

The project presentation was sent to the Creative School contest and has been included in the “Base of Knowledge” (www.kreativnaskola.rs). We have been invited to participate in another ‘Debating Europe Schools’ debate, on the topic of coding and computer sciences, and we are currently preparing our questions and videos on this topic.

During the Belgrade International Book Fair, a group of deaf and hard-of-hearing elementary and high school students participated in an English language learning workshop, titled “Touch the Sky”. This was organised in cooperation with the British Council and EUNIC Serbia (European Union National Institutes for Culture), together with students from two mainstream schools from Belgrade.

Deaf and hard-of-hearing students were highly motivated to participate in project work. Project-based learning has increased the opportunity for them to interact with their ‘normal’ peers and raised their self-confidence and self-esteem. While working on a project topic, they have also improved their English language skills in an interesting, meaningful and fun way, and made many new friendships with their peers from partner schools, so we can recommend project-based learning as an added tool for teaching EFL to deaf and hard-of-hearing students.

REFERENCES

- Defektološki leksikon* [Lexicon of Defectology] (1999). Zavod za udžbenike i nastavna sredstva, Belgrade, 440.
- Kovačević J. (2003). *Didaktički sistemi u školovanju gluvih* [Didactic systems in deaf education]. Belgrade: Društvo defektologa Srbije.
- Kovačević J. (2011). *Step by step – engleski jezik, početni 1, priručnik za profesore* [“Step by step“ – English language, beginners 1, teachers’ book]. Belgrade: Institut za strane jezike.
- Službeni glasnik RS – Prosvetni glasnik* [Official Gazette of the Republic of Serbia – Educational Gazette]
- Urdarević I. (2014). Engleski kao strani jezik za gluve i nagluve učenike [English as a foreign language for deaf and hard-of-hearing pupils], *Beogradska defektološka škola*, vol. 20 (2), no. 59, 269 – 293.
- Urdarević I., Dimić N. (in print). *Nastava engleskog kao stranog jezika za gluve i nagluve učenike u nekim evropskim zemljama i u Srbiji* [Teaching English as a foreign language to deaf and hard-of-hearing students in some European countries and in Serbia].
- Urdarević I., Petrović L., Matović S., (2014). *Projektna nastava: aces projekat Medijski glasovi za tinejdžere sa posebnim potrebama*, [Project teaching: aces project Media voices for special teens], *Zbornik rezimea, Dani defektologa Srbije, Zlatibor*, 15-18, 35
- Urdarević I. (2013). *Media Voices 4 Special Teens*. In: *Media Literacy in Europe: 12 Good Practices That Will Inspire You*, Belgium: Evens Foundation, 46-49.
<http://issuu.com/joadriaens/docs/medialiteracymagazine>, accessed 2. 11.2014
<http://www.decanski.znanje.info/>, accessed 2. 11.2014
<http://aces128.blogspot.com/p/skola-za-ostecene-sluhom-nagluvestefan.html>, accessed 2. 11. 2014

Ewa DOMAGAŁA-ZYŚK

CHAPTER EIGHT

TEACHING ENGLISH AS A FOREIGN LANGUAGE TO A STUDENT WITH HEARING LOSS COMBINED WITH SLIGHT AUTISTIC DISORDERS

ABSTRACT

The population of people with hearing loss is a very diverse one due to differences in biological factors such as the level and type of hearing impairment and also social and educational factors, among them the family environment, type and intensity of rehabilitation undertaken and school experiences. The functioning of a hearing impaired student at language classes depends not only on the above factors, but also on teaching strategies and the student's learning strategies. The process of learning and teaching a foreign language usually can be very effective, particularly when effective methodological strategies are used. Significant difficulties arise, however, in such situations, when hearing impairment is accompanied by other serious cognitive and language difficulties, eg. autistic disorders. They make it difficult to communicate with the student, limit the repertoire of forms and techniques of teaching, often de-motivate the student to learn a new language. In cases like these, teachers raise doubts about the legitimacy of such kind of didactic work.

The aim of this presentation is to discuss the methods and forms of work with a deaf student with an autistic disorder used during the 54-hour individual foreign language course. This is a case study drawn from the author's teaching practice. The case study took a form of participatory research/action research. The conclusions of these analyses can confirm the fact that even when working with a student with such serious difficulties, it was possible for the student to acquire the basics of speaking a foreign language. The classes have to be highly individualized. The outcome may be the acquisition of a specific vocabulary and a strengthening of the intellectual and social potential of the student.

Keywords: hearing loss, deaf, autism, teaching a foreign language

INTRODUCTION

Deaf and hard-of-hearing students experience serious difficulties in communication in social and educational contexts. First, their parents (of whom more than 95% are hearing) have to take decisions as to the best rehabilitation method and try to make language skills accessible for their child. Usually proper technological devices such as hearing aids and cochlear implants support this process. Sometimes a sign language is the choice of language. This means that parents have to learn this new language and get accustomed to using it as a main means of family communication. Later the accessibility of this language has to be guaranteed at schools and other institutions. Services of professional educators, technological devices such as hearing loops or FM systems and supportive social atmosphere should all support the learning process. Quite often stereotypes and misunderstandings about hearing disability have to be discussed and fought.

The process of communication development is even more difficult if we take into consideration teaching a foreign language to the deaf and hard-of-hearing students. Even if they master reading, writing and – quite often – speaking in a foreign language – it is a really difficult task for them to acquire yet another language – with all its cultural, social and individual variables. Learning a new language means not only knowing one more name for a given activity or thing – but understanding the way of thinking and perceiving the world that is characteristic for people of another nationality and way of life.

Supporting a deaf and hard-of-hearing student in acquiring language skills is difficult if there are some additional disabilities, and might be especially difficult in work with a person with hearing loss combined with autistic disorders. Lack of communication skills is one of the three most characteristic features of autism.

The aim of this paper is to present possibilities and challenges of teaching English as a foreign language to a profoundly prelingually deaf student with an autistic disorder. Although this task might seem unworkable it is not like that. The paper is based on author's experience gained through a 54-hour English as a foreign language course for such a student. Teaching strategies and techniques used during this process might be useful for other teachers working with students with similar characteristics.

1. LANGUAGE AND COMMUNICATION SKILLS IN AUTISTIC STUDENTS

There are several dozen types of autism spectrum disorder (ASD) so it is not possible to enumerate or characterize all forms of communication challenges met by this group of students. ASD is recognized as a set of developmental disabilities that result in severe social, communication and behavioral problems. The cause of

these challenges is mainly biological: information is processed differently by the brains of ASD persons.

Autism seriously affects the person's communication skills- only about a quarter of persons with ASD have language skills in the normal range (Kjelgaard, Tager-Flusberg 2001). Its symptoms differ as to their level and severity, but generally autistic persons have problems in interacting with others and communicating successfully. Although some patients can have a rich vocabulary and are able to talk about particular subjects in a great detail, the majority of them do not speak at all, some use only a narrow repertoire of words and expression, others use only gestures, sign language or other means of alternative visual communication. Persons with ASD experience deficits in spontaneous language, difficulty in conversational skills, delayed grammar usage, echolalia and difficulty in the social use of communication skills (Ganz, Flores 2009). Autistic persons usually have problems with non-verbal communication: eye contact, hand gestures, facial expressions, body language and nuances of voice tone. Their language is repetitive and rigid, and usually concentrated on some narrow interests or abilities.

One of the main aims of autistic persons' therapy is to develop their language and communication skills. The type of intervention depends on age and scope of interests, but the patients generally respond highly positively to well structured and specialized programs. Basic communication trainings often emphasize the functional role of language, which means to learn how to hold a conversation and to take turns in asking and answering the questions.

One effective therapeutic approach to persons with ASD is, among others, the Direct Instruction method (DI). It is characterized by several features (Ganz, Flores 2009): 1. Tasks are broken into components and taught individually; 2. Teachers' responses include a set of procedures, like the provision of instruction and immediate corrective feedback; 3. Students are engaged mainly in repeated practice and 4. Learning environment and teacher behavior set the stage for a student's effective learning. The Direct Instruction method is reported as the one that helps the ASD children to master reading as decoding, reading as full comprehension (Flores, Ganz 2007) and developing higher language skills. Thanks to it, ASD persons get a greater access to a learning environment (Ganz, Flores 2009).

Another efficient teaching strategy is the Instructive Feedback (IF). In this method extra information is presented to a student during teaching trials for other target skills (Kurt 2009). This strategy postulates 1:1 teaching instruction for autistic students as only then is a teacher able to monitor the autistic student work progress and intervene when necessary with a small cue or suggestion. Research shows that this way of teaching, with the use of regular instructive feedback may bring really promising effects for some ASD students, but was not effectively used by every AD students in the study.

One more commonly used method is the Discrete Trial Teaching (DTT). In this method skills to be taught are separated into simple steps and each step is taught by means of repetitive trials. The study session consists of five steps: 1. Stimulus; 2. Prompt; 3. Response; 4. Consequence; 5. Inter-trial interval. The teacher is firstly presenting a new stimulus to the student and encouraging the student to take part in the teaching process by different prompts. These prompts are consequently fading, providing a space for the student to do the task. After each success the student feels gratified and is praised. Research show that the DTT method is highly effective and can serve as a teaching method of many language and communicative skills for ASD students. Additionally, it is possible to use the DTT method not only with verbal instruction but also in programs using augmentative and alternative communication, also with the use of sign language (Webber, Scheurerrmann 2008).

2. LANGUAGE AND COMMUNICATION SKILLS AND CHALLENGES OF DEAF STUDENTS

Hearing impairment is almost inevitably connected with language and communication challenges – as it was stated by R.O. Cornett: *Not speech, but language – this is a main problem of the hearing impaired persons*. Although today the time of diagnosis is really early and a child is usually equipped with technological devices such as hearing aids or cochlear implants and supported by early intervention programs, language development of a hearing impaired child is quite often delayed. It takes a huge effort from the family members and the teachers to support the deaf or hard-of-hearing person to learn new vocabulary and grammar rules that enable this person to build correct and understandable sentences and longer texts.

Only 5% of deaf persons are born to deaf parents. Sign language is the natural and first way of communication for these families. It greatly helps to establish emotional and social bonds between the family members and social environment. Education, however, requires a good command of a national language and sign language users require a strong support to learn their national language and use it efficiently in education.

Despite these difficulties, deaf and hard-of-hearing students can become experts both in using their national language and foreign languages (Domagała-Zyśk 201a, 2010b, 2011a, 2011b, 2012 a, 2012b, 2013a, 2013b, Domagała, Rosowicz 2013). More and more of them graduate from high schools and start their careers independently. On the other hand, there is still a large group of deaf and hard-of-hearing persons excluded from good quality education and job opportunities.

3. TEACHING A FOREIGN LANGUAGE TO A DEAF STUDENT WITH AUTISTIC DISORDERS – A CASE STUDY

Foreign languages are taught to deaf and hard-of-hearing students at each level of education, in primary low secondary and secondary schools. It usually enables a student to pass the Matura exam and encourage the smartest of them to apply to the university. However, there is a considerably large group of D/HH persons who experience severe learning difficulties, usually connected with hearing loss AND some other disabilities. They usually have their education organized in special schools and after finishing it seek for a job in supported work environments.

In this paper, teaching strategies and the participant's response to them will be analyzed for one such student, 18-year old Adam, who experiences prelingual severe hearing loss and autistic spectrum disorders (ASD).

The preparation for teaching a student with hearing loss and autistic disorders should firstly include all training of methods of communication that the student is used to. The most popular ones include sign language and writing. Some of these students are able to communicate by speech. Interviews with parents or carers might help to learn more about it. Before starting my work, I learnt that Adam communicates with his parents in different ways: he lip reads their speech, which is usually supported by sign language and other family gestures. Adam does not use speech. He knows some sign language that he uses in communication with family members and other people at work.

Adam is regarded by his parents as an independent man – he commutes to school and workshops by himself, is able to manage different job tasks, participates in housework and other duties, such as using the ATM, doing simple shopping or paying the bills at the bank. Adam likes sport – he goes regularly to the gym and swims. I also got to know that he likes writing – at home he tries to copy some words or sentences in Polish almost every day. He is encouraged to do by his parents and thanks to that, he revises his skills in using his native language.

Adam, as a typical autistic person, was very nervous during our first meeting, as this situation was new for him. He had to meet with a new person in a new place (a language school). He came with his mother, motivated to learn English, but was – I suppose – afraid that this might be too difficult for him. We greeted each other with “good afternoon” in sign language and shook our hands. During the first half of the class, Adam looked through the window several times and probably wanted to go out. However, he tried to participate in the class and continued doing his tasks. I tried to lead the class very slowly, checking his rhythm and pace of work. To communicate, I used some sign language and some simple writing. I patiently waited for him to finish the tasks and commented every single one with a smiled emoticon – a sign of success.

Our meetings were scheduled once a week and lasted 90 minutes each. After 45 minutes there was a break. During the next classes, Adam was more relaxed: he was entering the classroom courageously and he was usually very focused on the class tasks and interested in new exercises. Since the very first class I established a clear class structure: after the initial greetings, there were several tasks which had a common topic – some of them were pen-and-paper (first half of the class) and some of them were to be done online (they were scheduled for the second half of the class). In the last ten minutes of the class, we played dominoes in English – and this was a sign for saying goodbye. This routine helped Adam to feel secure and to control the time of the class.

The teaching program consisted of three stages: 1. Arousing interest in learning languages; 2. Using words; 3. Using simple expressions and sentences.

3.1. STAGE ONE: AROUSING INTEREST IN LEARNING LANGUAGES.

Students with autistic disorders do not manifest a need for extensive communication with other people. If they have some language problems connected with hearing loss, communication possibilities may be very limited. Adam communicated regularly with a narrow mixture of Polish and PJM signs. He did not have any possibility to meet foreigners. The key question for me was how to make him interested in learning English? The level of his cognitive and language skills was quite low, but at the same time he was an adult man, working in a small factory. It was not an easy task to set the aim of this class. After some consideration, I decided to profit from Adam's hobby - sports and his interest in good cuisine.

Task 1. Sportsmen from different countries

Aim:

- to arouse interest in learning English
- to learn names of countries in English

I prepared a PP presentation of well-known sportsmen. At each slide there was a picture and a name of a sportsman (Robert Lewandowski, David Beckham, Leo Messi, Michael Schumacher), a flag symbolizing his country and a greeting *Good morning* in his language. This presentation was accompanied by a simple explanation in sign language: *They are from different countries. They do not know Polish and Polish Sign Language. They speak different languages.* In the second stage of the task next to each greeting there appeared a greeting in English. The teacher explains: *They use different languages but all of them know English.* As a natural conclusion there appeared a statement: *People use different languages, but in order to communicate they use English. It is good to know English, as it is possible to communicate with people from different countries.* Afterwards there was a series of several exercises aiming at identifying the flags of the countries (the student knew

them as he likes watching different sports events on TV) and their names. The tasks were both traditional (based on visuals on paper) and technological. On different internet sites there are interesting exercises addressing this issue. As homework the student was supposed to match the flags and names of several countries. Astonishingly, he did not only do the required 20 – but wrote down 5 pages of the names of the countries, nationalities connected with them and their flags.

Task 2. Greetings in English, Polish and PJM

Aim:

- to learn greetings in English
- to use appropriate greetings depending on the time of night and day

The next exercise aimed at learning the greetings. Firstly the teacher showed a student greetings in Polish written on pieces of card (*dzień dobry* – good morning, *dobry wieczór* – good evening, *dobranoc* – good night, *cześć* – hello, *do widzenia* – goodbye, *jak się masz* – how are you, *mam sie dobrze* – I'm OK). The teacher asked the student to show these greetings in PJM – in this exercise a student was an expert and the teacher learnt and revised her skills. The situation allowed the student to feel like an expert. This was considered as a very important motivational factor. After matching the greetings with their signs, the teacher provided an English equivalent for each sign. As the expressions in Polish and in English were written down both as a list (Polish and English expression next to each other) and on two collections of separate pieces of paper each it was possible to repeat this exercise several times: 1. The teacher shows an English greeting and the student provided an equivalent in English; 2. The teacher shows a greeting in sign language and the student provides an English expression. 3. The pieces of paper lie face down on the table and the student tries to find the same expressions (Polish one and English one); 4. The student shows an English expression and the teacher shows a Polish one, but sometimes makes mistakes and then the student has to spot the mistake and correct it; 5. The teacher shows an expression in sign language and the student shows a form in English.

As a summary one more idea was included: figures of sportsmen were printed with bubbles overhead. They “spoke” different greetings. Next to them the teacher wrote down the student’s name and the bubble. In each bubble the student was supposed to answer the sportsmen greetings.

It is worthwhile to notice that the limited language presented and acquired during this class was successfully used in real-life communication. Three languages were used in the conversations. The aim of these classes was successfully met: the student started to be motivated to learn English, perceiving it as a means of communication with people whom he regarded significant. The student recognized several flags of the countries and was able to copy a name next to each flag. He got to know several greetings and was able to use them in communication.

3.2. STAGE TWO: USING WORDS

Several of the following classes were devoted to learning, revising and extending Adam's English vocabulary. We started from learning words. This way of communication was natural for Adam. Neither in Polish nor in sign language was he able to communicate with sentences. When asked he usually answered with a word or simple statements like "Yes" and "No". Words used at this stage were chosen according to the student's individual preferences and were mainly those that were known by Adam in Polish or in PJM. They were close to Adam's everyday experience. However, Adam rarely used in his native language some of the words that I planned to use. Hence the English class served actually as a language therapy class (cf. Domagała-Zyśk 2006) as the students had the chance to revise, fix, understand better and widen the full meaning of some of the words.

Below the structure for presenting a new class of vocabulary will be shown.

Task 3. Vocabulary: Food & Drink.

Aim:

- to acquire, fix and revise new food and drink vocabulary in English

At the beginning, it is usually worth to start from everyday experience, so the lesson can begin with eating or drinking a small snack or drink with an English name written on it. I used a small cartoon of apple juice that had an English name on it. That was a good starting point to ask in sign language: *What is it inside?*, point to the English name and comment: *It is not in Polish, it is in English. Let's learn some English names of food and drink.*

After this short warm-up the first exercise was to see a PP presentation consisting of several slides with pictures of fruit and a name of each fruit. Some names are known even to small children as they see or hear them in films, while doing shopping etc, so it is usually possible to use 12-20 pictures for this presentation. Pictures have to be realistic, show one fruit (to avoid misunderstanding singular and plural forms). At this level of communication articles do not have to be used. It is necessary to check if the student knows a Polish name for each of these items so it is advisable to prepare a vocabulary Polish-English list of all names. While watching the slides the teacher and the student might comment on them with a simple expression, eg. orange – *I like it. And you?* If some fruit is not known by the student, it is possible to show some more simple information about it, e.g. avocado – *Not sweet. From Mexico. You can buy it in a shop. I do not like it.* The presentation can be watched once or twice – depending on the student's preferences.

After seeing the presentation the student is advised to prepare a vocabulary sheet. The worksheet given to the student has Polish names of the items written down, with plenty of space around. The student's task is to glue a picture of the

fruit and – using the presentation – write or copy its name. Such vocabulary sheets can be kept in one file and used as a reference list for different tasks. They form an open collection and the student can add new cards if only he feels like it.

Having this reference list, it is possible to do a series of exercises concerning these new vocabulary items:

- *Matching* – a worksheet consists of some pictures of the fruit on the left (the pictures can be schematic this time so as to help in the classification of some items into a class) and the names of the fruit on the right. The student's task is to match names and pictures. One more option is to match Polish names and English names of the fruits.
- *Missing letters* – this worksheet contains pictures of fruits on the left and names of them on the right, written with large fonts. In the names some letter are missing. The student's task is to complete the names – with or without using the reference list.
- *Circling* – this worksheet contains 4 pictures of the fruit. Around each picture there are 4-6 names but only one of them is correct and describes the picture. The student's task is to circle the name of the fruit on the picture.
- *Memory* – if we cut a set of the fruit pictures and a set of their names, it is easy to organize a memory game. The number of items depends on the student's potential. To make this task more interesting and diverse, it is possible to find memory games online and use them. Online games should not replace the traditional cardboard games – they improve visual and kinesthetic coordination and engage the student's mind in a very effective way. Using memory games, we can also introduce and practice plural forms – on some of the pictures the student can see one fruit and a singular name, on others – some fruits and a plural name.
- *Fruit juice* – student is given a picture of some juice cartoons. His task is to decide which fruit can be used to produce a juice. If possible, a picture of a fruit is glued to the cartoon and the name is written down e.g. orange juice, plum juice.

Task 4. Rare and interesting sports

Aim:

- to learn new sports vocabulary

As I knew from my short interview with Adam, he was keen both on watching and doing sports. We started this task by watching short films (accessible from YouTube) that presented fragments of different sports plays and activities. After watching each fragment, I presented Adam a photo of it and a name in English – thus our reference list was created. It consisted of some well-known items, but also some new ones, like rugby, squash, cricket or grass hockey. Next we played *matching*, *missing letters*, *circling* and *memory* exercises. It was a very interesting

lesson for Adam as the different gadgets used for the sports and the intensive and emotional ways of playing these games amazed him.

The methodology described above can be used effectively with different sets of vocabulary items, thus widening the vocabulary and thanks to that – the communication skills of our students.

3.3. STAGE THREE: USING SIMPLE EXPRESSIONS AND SENTENCES

Taking into consideration the language and communication disorders connected with autism, it is not always possible to teach an autistic person communication more advanced than word communication. However, if the person communicates in her/his native language with the use of longer expressions and sentences, it might also be possible to use these strategies in a foreign language.

Task 5. Do you like avocado?

Aim:

- to acquire, fix and revise simple conversational expressions in English

The first stage of this task includes a presentation of the expressions *I like* and *I don't like*. If we know that the student is not using pronoun "I" and is naming himself/herself by a first name, the expressions *likes* and *doesn't like* should be introduced and used with the student's first name, e.g. *Adam doesn't like....* The meaning of this expression can be explained verbally, with the use of sign language (sign for *like* and *not like*) or emoticons – smiling or unhappy faces. The next stage is to provide visuals (pictures or photos of food and drink labeled in English) and to assist the student in deciding about his/her attitude towards it, which can be expressed with a sign or emoticon. Later, next to each picture, the student should be encouraged to write a sentence: *I like avocado/Adam likes avocado* After that we ask the student: *Do you like?* And motivate him to answer. The next stage involves a dialogue between a students and a teacher. \

Such exercises are very *user-friendly* – they consist of simple language activities, but at the same time give an opportunity to create short dialogues and exchange thoughts and share personal experiences. They can be repeated with other vocabulary groups, like animals, sports, weather or free time activity.

Task 6. Adam can.../Adam's Mum can't

Aim:

- to understand and use modal verb can in positive and negative sentences
- to revise and use names of selected activities

Another useful and easy to understand expression is the modal can/can't, especially when used in a personalized way. First the meaning of it was explained, both in sign combined with mimics and writing. Next labeled pictures of some activities were presented. Adam's task was to divide them into two columns, named

as: *Adam can* and *Adam can't*. Each activity that was placed in the column "can" was appreciated and applauded. Then the chart was given different names: Eva (the teacher) can/can't, Tomek (Adam's brother) can /can't or Mum can /can't. As the exercises were personalized, Adam was very happy to share the information about him and his family with me and he was interested in my skills. Students usually like knowing some facts about their teacher, so I suppose it was interesting for Adam to know that I can't play football or swim well and to feel appreciated as he was able to do these activities perfectly. At the second stage of the task, Adam was instructed to read the questions and give a correct answer. After introducing some new verbs and a reference list of them, the questions were formulated so as to describe the activities, but also to provoke a smile, e.g. *Can Adam cook? Can Eva fly? Can Adam's Mum run one kilometer?* Answering the questions (using full names, not pronouns), Adam did not even try to hide his smile. At the end Adam was also able to copy the expression describing his skills.

CONCLUSION

The aim of the chapter was to present the educational opportunities, strategies and methods that have been used during a 54-hour *English as a foreign language course* for the deaf and hard-of-hearing participant with slight autistic disorder. The chapter presents both the student's challenges and the teacher's strategies. The material can be used as a reference on the possibility of teaching a foreign language and communicating in it, despite the low level of social and educational skills showed by autistic persons with accompanying disorders.

REFERENCES

- Domagała-Zyśk E. (2011a). Organizacja lektoratu języka obcego dla niesłyszących i słabo słyszących studentów uczelni wyższych <http://www.abcd.edu.pl>
- Domagała-Zyśk E. (red.), (2013b). *English as a foreign language for the deaf and hard-of-hearing persons in Europe*. Lublin: Wydawnictwo KUL. ss. 220.
- Domagała-Zyśk E. (2001a). *O uczeniu języka angielskiego uczniów z uszkodzeniem słuchu*. *Języki Obce w Szkole*, 7, 106-110.
- Domagała-Zyśk E. (2006). *Edukacyjne i terapeutyczne wartości lektoratu języka angielskiego dla studentów niesłyszących*. W: K. Krakowiak, A. Dziurda-Multan (red.) *Przekraczanie barier w wychowaniu osób z uszkodzeniami słuchu*. Lublin: Wydawnictwo KUL, s. 423 - 432.

- Domagała-Zyśk E. (2010a). *Procesy pamięciowe u osób z uszkodzeniami słuchu a nauczanie ich języka obcego*. W: M. Wójcik (red.) (2010). *Edukacja i rehabilitacji osób z wadą słuchu – wyzwania współczesności*. Toruń: Wydawnictwo Edukacyjne „AKAPIT”, s. 119-130.
- Domagała-Zyśk E. (2010b). *Uwarunkowania rozumienia tekstu w języku obcym przez osoby z uszkodzeniami słuchu*. W: Z. Palak, A. Bujnowska, A. Pawlak (red.) *Aktualne problemy edukacji i rehabilitacji osób niepełnosprawnych w biegu życia*. Lublin: Wydawnictwo UMCS, s. 163-173.
- Domagała-Zyśk E. (2011a). *Lektorat języka angielskiego dla niesłyszących i słabosłyszących studentów uczelni wyższych*. W: K. Krakowiak, R. Kołodziejczyk, A. Borowicz, E. Domagała-Zyśk (red.) (2011). *Student niesłyszący we wspólnocie akademickiej. Informator o warunkach edukacji wyższej osób z uszkodzeniami słuchu*. Lublin: Wydawnictwo KUL, 105-122.
- Domagała-Zyśk E. (2011b). *Style uczenie preferowane przez niesłyszących uczestników lektoratu języka obcego*. W: M. Białas (red.) *Specjalne potrzeby niepełnosprawnych*. Kraków: Arson, s. 243-260.
- Domagała-Zyśk E. (2012a). *Strategie nauczania języka angielskiego jako obcego uczniów z uszkodzeniami słuchu w szkołach podstawowych, gimnazjach i szkołach ponadgimnazjalnych*. *Człowiek-Niepełnosprawność-Społeczeństwo*, 3 (17), 67-86.
- Domagała-Zyśk E. (2012b). *Poziom motywacji niesłyszących studentów w zakresie uczenia się języków obcych*. W: Kutek-Składek *Student z niepełnosprawnością w środowisku akademickim*. Wydawnictwo Sw. Stanisława BM, s.173-200.
- Domagała-Zyśk E. (2012c). *Strategie nauczania języka angielskiego jako obcego uczniów z uszkodzeniami słuchu w szkołach podstawowych, gimnazjach i szkołach ponadgimnazjalnych*. *Człowiek-Niepełnosprawność-Społeczeństwo*, 3 (17), 67-86.
- Domagała-Zyśk E. (2013a). *Wielojęzyczni. Studenci niesłyszący i słabosłyszący w procesie uczenia się nauczania języków obcych*. Lublin: Wydawnictwo KUL, ss.420.
- Domagała-Zyśk E., Podlewska A. (2012). *Umiejętności polskich studentów z uszkodzeniami słuchu w zakresie posługiwania się mówioną formą języka angielskiego*. W: Kutek-Składek *Student z niepełnosprawnością w środowisku akademickim*. Wydawnictwo Sw. Stanisława BM, s. 134-157.
- Domagała-Zyśk E., Rosowicz. M. (2013). *Udział w kulturze studentów niesłyszących i słabosłyszących- rzeczywistość i obszary wsparcia*. W: B. Sidor-Piekarska (red.) *Kompetentne wspieranie osób z niepełnosprawnością* Lublin: Wydawnictwo KUL, 171- 187.
- Ganz J.H., Flores M.M. (2009). The effectiveness of direct instruction for teaching language to children with autism spectrum disorders: identifying materials. *Journal of Autism Developmental Disorders*, 39, 75-83.
- Kjelgaard M. M., & Tager-Flusberg H. (2001). An investigation of language impairment in autism: Implications for genetic subgroups. *Language and Cognitive Processes*, 16, 287–308. doi: 10.1080/01690960042000058.

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- Kurt O. (2009). A comparison of discrete trial teaching with and without gestures/signs in teaching receptive language skills to children with autism. *Educational Sciences: Theory & Practice* 11,3 1436-1444.
- Świącicka J. (2010). *Uczeń z zespołem Aspergera. Praktyczne wskazówki dla nauczyciela*. Kraków: Impuls.
- Webber J., & Scheuermann B. (2008). *Educating students with autism: A Quick start manual*. Austin, Texas: Pro-ed.

Anna PODLEWSKA

CHAPTER NINE

DEAF AND HARD OF HEARING STUDENTS' PERSPECTIVES ON FOREIGN LANGUAGE PROFICIENCY

ABSTRACT

The paper presents the results of a large scale investigation into the importance attached to mastering the four language elements (pronunciation, spelling, vocabulary, and grammar) as well as the four language skills (extensive and intensive listening and reading, speaking, and writing) by deaf and hard of hearing foreign language learners from different countries. The research presented in the following pages is based on the premise that deaf and hard of hearing foreign language learners who managed to develop near-normal speech skills in their national language both receptively and expressively want to and, if properly guided, are capable of achieving highly intelligible speech in the target language.

Keywords: *English as a Foreign Language, deaf, hard of hearing, language elements, language skills*

INTRODUCTION

Until fairly recently, it was believed that due to communication difficulties they had typically faced when trying to acquire their national language(s), students with hearing impairments should be exempted from foreign language classes. However, in recent years, as a result of the Individuals with Disabilities Education Act (IDEA) of 2004, No Child Left Behind (NCLB) – the most recent iteration of the Elementary and Secondary Education Act of 1965,

Disability Discrimination Act (DDA) and Special Educational Needs in Europe. The Teaching and Learning of Languages: Insights and Innovations issued by the European Commission in 2005, the need for creating equal educational opportunities in the field of modern foreign languages teaching has been recognized. The promotion of language learning and linguistic diversity among people of all ages, including those with special needs, has been one of the main objectives of the Lifelong Learning Programme (LLP) and its four sub-programmes: Comenius for schools, Erasmus for higher education, Leonardo da Vinci for vocational education and training and Grundtvig for adult education. This change in educational systems is due, at least to a certain degree, to advances in technology, interpersonal communication as well as media quantity and quality which increase information sharing among professionals from diverse academic and cultural backgrounds. It also reflects the international nature of research efforts related to deafness as well as the increasing involvement and leadership of persons with hearing loss in the setting of research agendas for pedagogical conduct³. The study presented in the following pages was carried out in the context of this recent paradigm shift in deaf and hard of hearing education.

1. THE IMPORTANCE ATTACHED TO MASTERING LANGUAGE ELEMENTS AND SKILLS
BY DEAF AND HARD OF HEARING FOREIGN LANGUAGE LEARNERS FROM DIFFERENT
COUNTRIES

1.1. METHOD

An 8-item L2 learner self-report was designed to measure the importance attached to different aspects of foreign language proficiency by students with hearing loss. The scale is a unidimensional measure and it uses a 7-point response format where 1=not at all important and 7=very important. It was translated into English, French, and Spanish. Several Czech Sign Language (ČZJ), British Sign Language (BSL), and Polish Sign Language (PJM) users asked for translation into these sign languages. Translation into French Sign Language (LSF) was prepared with the use of a three-stage back translation method (Crowe 2002). Translators were not blind to the study objective. In the first stage, a prelingually deaf professional LSF instructor translated the scale items from written French into LSF onto a digital video recorder. In the

³ Educational and political activity of organizations such as International Federation of Hard of Hearing Young People (IFHOHYP), International Federation of Hard of Hearing People (IFHOH), and European Federation of Hard of Hearing People (EFHOH) reflects the increasingly important role of deaf and hard of hearing individuals in the study of their own population.

second stage, a certified interpreter, unfamiliar with the questionnaire, translated the recorded version back into written French. In the third stage, two different individuals, one hearing bilingual and one deaf bilingual, compared the original and back translated version for conceptual equivalence. Suggested modifications to the signed version were made to maintain the validity of the original written scale. Controversial items were discussed between the evaluators. Finally, when the conceptual equivalence of test items was reached, the translation was recorded again.

1.2. PROCEDURES

The written and recorded versions of the questionnaire were distributed among and shown to various groups of deaf and hard of hearing individuals at different times over a two-year period. Irrespective of whether they were completing written or signed version of the questionnaire, participants were allowed approximately 10 seconds to indicate their response on the form provided. Following the test, respondents completed a general demographic questionnaire and answered questions related to the clarity of the eight items. The entire process of test administration took approximately 10 to 15 minutes. All of the respondents participated in the study on a voluntary basis.

1.3. PARTICIPANTS

Two hundred deaf and hard of hearing individuals completed written and ČZJ, BSL, PJM, and LSF versions of a specially designed questionnaire. Because the study was specifically geared toward those who communicated in spoken language, respondents whose data were missing or who reported that they did not use speech in communication were excluded from the study. One hundred and twenty-three participants reported communicating orally or orally in addition to sign language, and this sample was used for all further analyses. Overall, this sample included a wide range of ages, nationalities, and hearing losses. The respondents were divided into the following three chronological age groups based on their age at the time of testing: 18-25 years, 26-30 years, and 31-40 years. The percentage of individuals in each age group are shown in Figure 1.

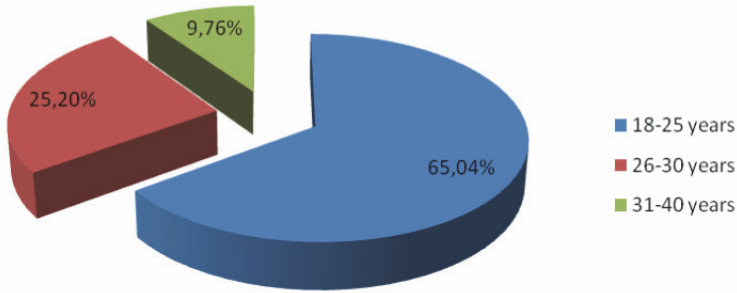


Figure 1. Percentage of participants in each of the three age groups.

The nationality composition of the same was 70 Polish, 14 Czech, 10 Swiss, 10 American, 7 British, 4 Italian, 3 French, 2 Spanish, 2 Turkish, and 1 Danish and it is represented diagrammatically in Figure 2.

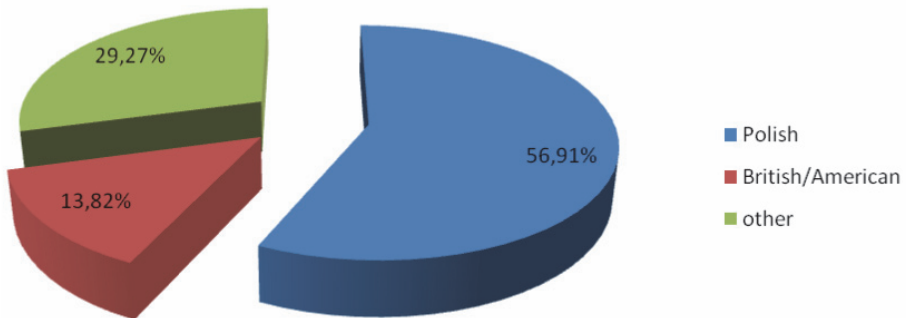


Figure 2. Nationality composition of the subjects.

The participants were described by one of four hearing loss categories based on International Bureau for Audiophonology (BIAP) classification (cf. Figure 3).

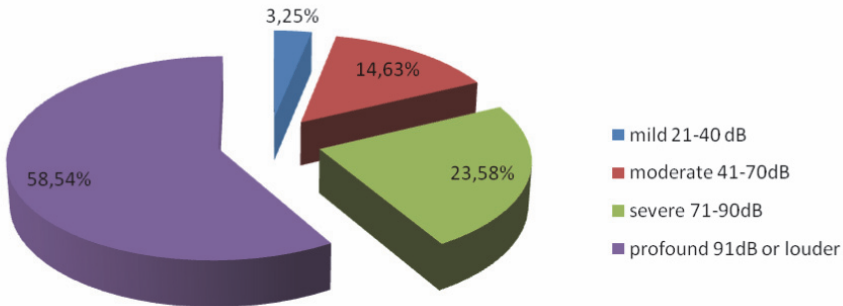


Figure 3. Percentage of participants in each hearing loss category.

Of the participants in the study, 26 (21,14%) were proficient users of Cued Speech or one of its adaptations to languages other than English which gives the following percentage distribution:

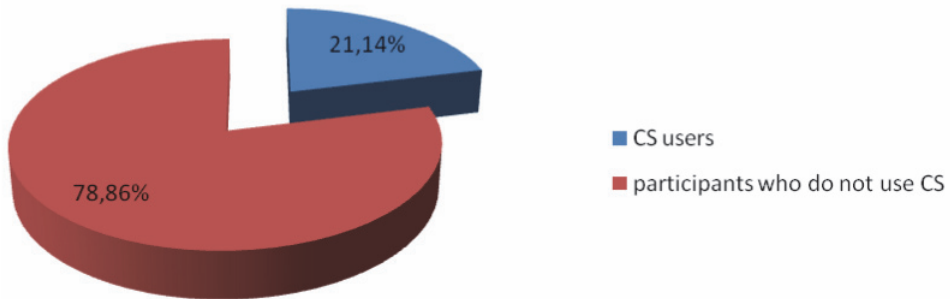


Figure 4. Percentage of participants who are and are not proficient Cued Speech users.

This sample is unique in that the respondents are all undergraduate or post-graduate students.

1.4. RESULTS

Before undergoing statistical analysis, the ratings of the judges were compressed according to the following pattern: 1,2 – not important; 3,4,5 – important; 6,7 – very important. A factorial analysis of variance (ANOVA) was conducted to compare assessment scores of the questionnaire for each of the eight items as dependent variables with three independent variables: age, degree of hearing loss, and the use of Cued Speech with respondents' national languages in rehabilitation. The totals for all calculations (the factorial ANOVA and post hoc Kruskal-Wallis, Mann-Whitney U, and Friedman tests) were gathered in Table 1 and represented diagrammatically in Figure 5. The effect of age on the importance attached to learning pronunciation, spelling, and speaking was significant ($p=0,034$; $p=0,017$; $p=0,029$ respectively). The most significant effect was that of Cued Speech proficiency in the national language on the importance attached to foreign language pronunciation ($p=0,003$). Another significant interaction ($p=0,050$) was that between the degree of hearing loss and the importance attached to extensive and intensive listening.

Table 1. The importance attached to learning various language elements and skills by the hearing impaired foreign language learners.

Tested parametres	Importance			ANOVA Friedman Test:	p
	M	N	SD		
Pronunciation	2,61	123	0,57		
Spelling	2,26	123	0,62		
Vocabulary	2,65	123	0,49		
Grammar	2,30	123	0,54	Ch ² =144,729	p<0,0001
Listening	2,23	123	0,64		
Reading	2,70	123	0,58		
Speaking	2,78	123	0,63		
Writing	2,52	123	0,54		

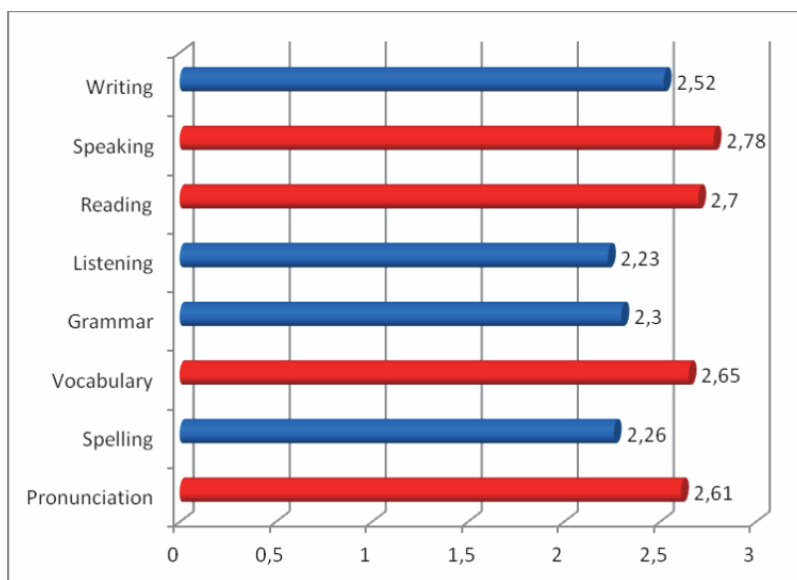


Figure 5. The importance attached to learning various language elements and skills by the hearing impaired foreign language learners.

1.5. DISCUSSION

The study demonstrated that mastery of the speaking skill (M 2,78) and pronunciation (M 2,61) of the target language are high priorities for the subjects. Indeed, speaking received the highest rating overall whereas pronunciation took fourth place, and these results held across groups with widely different first language backgrounds. Similar findings are reported for hearing cohorts (cf. Nunan

1988, Willing 1988). The fact that hearing impaired foreign language learners express concern for mastering the art of speaking and developing intelligible and acceptable pronunciation may stem from their desire to function independently in today's multinational and multicultural society. The impact of global trade and enormous developments that have taken place in information and communication technology have confirmed the position of English as the dominant world language (see Kachru 2004, Hagen 1998a, Reeves 1996). The fact that English has come to be increasingly accepted as an international lingua franca has served to encourage the view that being able to speak the language opens new possibilities from better educational (e.g., active participation in exchange visits, seminars, and conferences) and job opportunities (e.g., participation in Work and Travel programs) to maintaining social contacts across national boundaries.

Even though in terms of the proportion of young adults able to speak modern languages other than English, Great Britain is outperformed by almost every other country in Europe (European Commission, 1991), the possible use of a foreign language in its spoken form in a work context might still be the underlying purpose of its learning for those of the hearing and hearing impaired who decide to get to an advanced level. Various studies have produced a wealth of evidence, which support the need for better foreign language expertise in a range of working environments in the UK – the country which has the lowest number of companies in Europe with executives able to negotiate in a foreign language (Hagen 1998b). Since the fastest-growing language community in the USA has been Hispanic, the vocational argument might also motivate respondents of American origin who have decided to learn Spanish.

The finding that those of the respondents who are proficient Cued Speech users attach more importance to pronunciation learning (M 2,96) compared to those who have had no exposure to this mode of communication (M 2,52) may be connected to the fact that the system, when consistently used, provides somewhat better speech skills for CS hearing impaired than for their non-CS hearing impaired peers (cf. Ryalls, Auger, & Hage 1994). That is to say, those who have better speech skills in their national language due to Cued Speech exposure tend to be more eager to work on mastering the sound system of a foreign language.

High ratings given to spelling by the respondents in the oldest age group (31-40 years) are probably connected with the heavy reading/writing bias of foreign language teaching in Europe in the 1980s and 1990s when bad spelling was perceived as a lack of education or care. Another possible explanation for this finding may be that, as opposed to younger participants, respondents who were over 30 years of age at the time of testing had not been exposed since early childhood to emails and SMS text messages which allow for inexact spellings.

Since the majority of foreign language learners with severe-to-profound hearing losses cannot auditorily access audio material accompanying the course book, they are exempted from taking tests in listening comprehension. Teachers working with these students often decide to skip focus on listening sections of the course they are teaching or to instruct learners to read tapescripts of the recordings instead. This may explain higher ratings of extensive and intensive listening skills in the process of foreign language learning among respondents with mild-to-moderate hearing losses. Even though these students must expend extra energy understanding what is being said, they can often benefit from tackling listening tasks and learn to discriminate auditorily to the best of their ability especially if their teachers help them exploit lip shapes and mouth movements.

2. IMPLICATIONS FOR LANGUAGE TEACHING TO THE DEAF AND HARD OF HEARING

The teaching of pronunciation has been a neglected aspect of English instruction in many classrooms (cf. Gilbert 2008, Harmer 2007, Nunan 1991). The fact that both experienced and novice teachers make little attempt to teach pronunciation in any overt way and only deal with it reactively in response to errors which students make in the classroom may be due to a lack of time, a lack of practical classroom skills, a lack of access to good ideas for classroom activities, and the conviction that most students manage to acquire intelligible pronunciation without focused practice. When these same teachers do find the time to address pronunciation, the instruction often amounts to prolonged exercises in mimicry which leads to discouraging results. In addition, the influence of the first language seems to affect the learning of pronunciation in ways that are not so true of studying morphology and syntax. Developing native-like mastery of the sound system of a foreign language requires much earlier exposure than basic word order. There are also a number of attitudinal factors that affect the learning of pronunciation, one example being the extent to which the learner wants (or does not want to) identify with the target culture.

Teachers of university students with hearing loss typically have to face all of these as well as additional challenges such as speech production problems (misarticulating sounds, omitting sounds, mispronouncing words, etc.) and bad effects of past learning experiences. Many deaf and hard of hearing students may have experienced failure or criticism at primary, lower secondary, and/or secondary school which makes them feel anxious and under-confident about foreign language learning in general and pronunciation learning in particular. Yet, in spite of the numerous difficulties, these same students, when properly encouraged, guided, and confronted

with better educational opportunities that being able to communicate in a foreign language provides, quickly become determined to achieve the goal of developing all language skills, including speaking, and perfecting all language elements, including pronunciation. Improved comprehension and intelligibility enable deaf and hard of hearing members of the academic community to actively participate in research and knowledge exchange during international seminars, workshops, conferences, and congresses. Since, to many of them, mastering the art of speaking is one of the most important aspects of learning a foreign language, it is essential to integrate tasks for stimulating oral interaction and pronunciation practice in communicative language work. Efforts to teach pronunciation to the deaf and hard of hearing should be directed at the development of intelligibility and communicative effectiveness, rather than at the development of native-like perfection.

The problem for teachers with a range of hearing impaired L1 speakers in their class is how to deal with this heterogeneity. In other words, what is difficult for a speaker with one type of hearing impairment will not necessarily be difficult for a speaker with a different type of hearing loss. For example, some students may confuse high-frequency, low-intensity sounds such as /s/ as in 'sin', /ʃ/ as in 'shin', and /θ/ as in 'thin'. Others do not have problems with detecting and distinguishing between /s/, /ʃ/, and /θ/ but struggle with low-frequency consonants such as /m/. In both cases the teacher's tasks include:

- making sure that they are not competing for the students' attention with background noise,
- cooperating with the audiologist in monitoring listening devices in an accurate manner by either increasing the high-frequency responses of the hearing aid(s) or cochlear implant(s) or by boosting the low frequency response to facilitate the perception of the nasal resonance of the /m/ sound,
- providing any phonetic descriptions and directions they typically use to remediate pronunciation errors of hearing students,
- using alternative approaches for representing the phonological system of the target language (e.g. Cued Speech, see-the-sound/visual phonics).

It is of vital importance for the teachers of the deaf and hard of hearing to have a thorough understanding of the nature of the problems they are trying to remediate.

REFERENCES

- Crowe T. V. (2002). Translation of the Rosenberg Self-Esteem Scale: A principal components analysis. *Social Work Research*, 26 (1), pp. 57-63.

- European Commission (1991). *Young Europeans in 1990*. Brussels: European Commission.
- Gilbert J. B. (2008). *Teaching Pronunciation Using the Prosody Pyramid*. Cambridge: Cambridge University Press.
- Hagen S. (1998a). Exporting today: Policy implications. *The Linguist*, 37 (3), pp. 66-70.
- Hagen S. (1998b). What does global trade mean for UK languages? In: A. Moys (Ed.), *Where Are We Going with Languages?* London: Nuffield Foundation, pp. 14-23.
- Harmer J. (2007). *The Practice of English Language Teaching* (4th ed.). Harlow, UK: Pearson Education.
- Kachru B. (2004). *Asian Englishes: Beyond the Canon*. Hong Kong: Hong Kong University Press.
- Nunan D. (1988). *The Learner-centered Curriculum*. Cambridge: Cambridge University Press.
- Reeves J. (1996). Does Britain need linguistics? In E. Hawkins (Ed.), *30 Years of Language Teaching*, London: CILT.
- Ryalls J., Auger D., & Hage C. (1994). An acoustic study of the speech skills of profoundly hearing impaired children who use Cued Speech. *Cued Speech Journal*, 5, pp.8-18.
- Willing K. (1988). *Learning Strategies in Adult Migrant Education*. Adelaide: NCRC.

Monika MALEC

CHAPTER TEN

TONAL LANGUAGES IN THE CONTEXT OF HEARING IMPAIRMENTS

ABSTRACT

English language, by many considered as a 'lingua franca', has its crucial impact on countries all over the world and became a factor conditioning professional careers of many people as well as their functioning in contemporary global society. To a certain degree, this led to the development of foreign language teaching methods designed specifically for the deaf and hard-of-hearing people. Nowadays, due to the growing strength of China and its economy, Chinese, one of the tonal languages, is perceived as the next predominant language of the future society. This in turn enhanced research into teaching methodology in the context of hearing impairments, language acquisition, and perception of tonal languages, in which word meaning is determined by lexical tones.

At this point theoretical discussions should support practical understanding of acquisition, teaching methods and use of tonal languages by hearing impaired learners. The purpose of this paper is to present the results of theoretical studies and a brief overview of the literature and trends in the field of second language learning and hearing impairment. I decided to focus mainly on findings of neuroscience research groups concerning communication disorders affecting speakers of tone languages, second language acquisition of tonal languages, Hanban International Standards for Chinese Language Teachers, and Shanghai Professional Training on Chinese Language Teaching that I participated in, as this contains commonly accepted hypothesis of the issue. However, more practical research is still needed.

Keywords: *deaf, hard-of-hearing, tonal languages, teaching methodology*

INTRODUCTION

The idea of surdoglottodidactics does not have a long-term tradition, but it has already achieved a great success in the field of teaching foreign languages to students with hearing loss (Domagała-Zysk 2013a, 2013b). It opens new horizons; it helps to learn about new cultures and to develop linguistically. As students want to learn different foreign languages, teachers try to find new teaching methods that would support their language acquisition. Even though, English leads the way among foreign languages being taught to deaf and hard-of-hearing students in Poland, there still exists a growing need to find methods suitable also for other languages, even Chinese.

As the idea of teaching Chinese is not very common, it enhanced research to get a deeper insight into the nature of the Chinese language and the problems students with hearing loss may encounter. For this reason, the following paper aims at investigating Chinese language features in the context of hearing impairments to prepare some basis for future lesson planning that would meet the requirements of deaf and hard-of-hearing students.

1. GENERAL CHARACTERISTICS OF CHINESE AS A TONAL LANGUAGE

Chinese is a language that differs almost entirely from the languages spoken in Europe. Apart from different writing system, which is based on characters (*hanzi*), it belongs to the group of tone languages. This means that contrastively to intonation languages (such as English or French) which use pitch to display emotions or attitudes of a person, Chinese use pitch or range of pitches of a vowel sound to differentiate the meaning of the word where it appears. The number of tones differs also among tonal languages, even between Chinese dialects. There are varieties of Chinese language which, for instance, have four tones (such as Mandarin), seven (Taiwanese), six or even nine (Cantonese). In Mandarin Chinese, which achieved the status of official language of China and is one of the main dialects taught as a foreign language, the fundamental frequency (F0) counter of vowel sound has four variations (tones): flat, rising, falling-rising and falling (Morton, 2008, p. 66). To facilitate teaching Chinese there is a special system called ‘Pinyin’, which transcribes Mandarin pronunciation of characters into the alphabet. The following table presents pinyin transcription of one syllable word *ma* and shows how different tones change its meaning.

Table 1. Tones, their marks, descriptions and meanings

STONE	MARK	DESCRIPTION AND MEANING
1 st (flat)	mā	‘mum’-high and level
2 nd (rising)	má	‘hemp’-starts medium in tone, then rises to the top
3 rd (falling – rising)	mǎ	‘horse’- starts low, dips to the bottom, then rises toward the top
4 th (falling)	mà	‘scold’-starts at the top, then falls sharp and strong to the bottom
neutral	ma	An interrogative particle

As the table indicates, the right choice of the tone is very important to understand the meaning of words in Chinese. Without the ability to distinguish tones, it would be difficult to understand sentences such as this one:

Mā ma qí mǎ mǎ màn mā mà mǎ.

The translation is, *A mother who is riding on a horse thinks that it is slow so she scolds it.* For this reason, it is important to distinguish proper tone: Mispronounced tones may cause misunderstandings, thus, it is necessary to learn how to pronounce them properly and understand them while learning Chinese.

2. DIFFICULTIES DEAF STUDENTS MAY ENCOUNTER WHILE LEARNING TONAL LANGUAGE

Deafness is a kind of obstacle which requires a great effort from the student when he or she wants to learn other foreign languages, but it has been proven that it is possible, to become multilingual (Domagała Zysk, 2013). However, there is no ‘one-size-fits-all approach’ that would meet the needs of all students with hearing loss (Marschark, 2012, p.137). There are hundreds of challenges and problems to overcome. Everything depends on the degree of hearing loss, whether they have implants or not, when they lost their hearing, whether and when they acquired speech etc.

In this way, the idea of teaching Chinese, which is a tonal language, rises a great deal of questions and doubts among foreign language teachers and linguists. They are mostly concerns about whether the students are able to learn to speak Chinese in a way, which is understandable for other communication receivers, whether it is possible to teach students with hearing loss a tonal language as a foreign language, and finally why we should even attempt to do so.

The answers to the above questions are not easy, since there are not many experienced teachers who have tried to teach deaf students to speak in Chinese (or other tonal languages) as a foreign language, but one might be sure that it is always worth it to make an attempt to do so. Especially since, surprisingly, there are many deaf students, who after having a successful experience with other foreign languages, such as English, are more likely to try to master another, more exotic language like Chinese. Young deaf community is usually eager to go abroad, make foreign friends, and learn about different cultures. Therefore, such attitude supports teaching them other languages and at the same time broaden their horizons and helps them to develop.

In this way, there is a great factor supporting and motivating the idea of teaching Chinese to deaf students. To keep this kind of reinforcement a teacher should remember that the best way to strengthen the motivation is the feeling of educational success (in other words, visible results). For this reason, to achieve it a teacher should search carefully for all the possible troubles connected with learning a particular language and try to prepare comprehensive curriculum for the students.

One of biggest difficulties when mastering Chinese is, of course, the sound perception. Even among students without hearing loss there are cases of tone-deaf learners who find it very difficult to master Chinese because they do not notice the differences among tones. Therefore, teaching tones to deaf and hard of hearing seems to be impossible, especially since they cannot register tones with the help of the devices they are using. On the other hand, there are many deaf Chinese people who use this language. Thanks to the constant and great development of technology, the digital hearing aids and cochlear implantations give deaf people better access to sounds and allows for a faster acquisition of the language. According to some research, it turns out that with a proper implantation and using the cochlear implant for a long time Chinese children are able to distinguish and produce tones almost like a hearing person. The accuracy of its production, however, differs. They found out, for example that Mandarin tone 2 (the rising tone) was the least accurate, while the tone 1 (the flat tone) was the most accurate (Han, 2007).

On the other hand, learning tonal languages differs between native and non-native tonal language speakers (also in the case of hearing students), which in the context of hearing impaired learners poses additional problems. For this reason, apart from several factors which influence strongly the possibilities of learning foreign languages by deaf students (such as age, the severity of hearing loss, hearing aids, etc.), in the case of studying tonal languages there are other additional difficulties. According to Bei Yang, Mandarin tones lie in the nature of the language and on the distance between L1 and L2. Another problem is the fact that tones have different variations depending on the context or isolation (Yang,

2010 p.30). Moreover, it is important to remember that the tones are acquired as *the system of contrasts not [of] individual items* (Yang, 2010 p.32). To sum up, even though there has been a vast number of research on tonal language acquisition, as well as in its perception and production, it is still a vague and controversial subject, even in context of hearing students.

Nevertheless, such studies on tonal languages, which consider the speech processing strategies, show how important it may be to one day study these kind of languages and in discovering future possibilities for improving the quality of speech perception for deaf students. Experiments with teaching Chinese as a foreign language, which seems to be an extreme challenge, might also bring a new light on second language acquisition and in new teaching ideas.

3. HOW TO TEACH A TONAL LANGUAGE TO THE DEAF AND HARD-OF-HEARING ?

As it has been mentioned that the level of progress in speaking Chinese is related mainly to the degree of hearing loss. Nevertheless, deaf students who can already speak, thanks to numerous speech therapies, have a greater knowledge of how to articulate sounds clearly and accurately, and how to function their speech organs. Thus, it may in a way, influence the process of learning. A teacher can try to explain to them how to move their speech organs and adjust them with practice, but also spot the most problematic areas and find the best way to make them understand how to read and produce a particular item.

Introducing the phonetic rules concerning ‘pinyin’ might also be very helpful in this case (the diagrams of the teeth/tongue positions for specific sound may come in handy). To understand the tone production it is usually good to start learning not from a single lexical item, but rather from whole (but simple) sentences, listening to them and repeating them many times with the students. That is why, developing critical listening skills is crucial.

On the other hand, ‘over-pronunciation’ of tones may also help a lot in the process, and make the tone production more visible and understandable. What is more, the teacher should make an effort to organize a favorable environment for his or her students, remembering about the proper light and clear pronunciation, and allow learners to observe carefully the movement of his or her lips.

Bearing in mind the fact that students with hearing loss are mainly visual learners it would be helpful to try to show them the tones. There exists a method invented by Harold Goodman, the author of audio courses for learning Mandarin Chinese, which is based on a color-coded approach. Apart from using colors depending on a particular tone, he accompanies speech production with special gestures, which display the usage of each tone. This in turn benefits the understanding and memorizing of particular words. Such approach, which utilizes the other sens-

es, apart from hearing, seems to be very advisable when helping our deaf students with their process of language acquisition. Moreover, it develops different types of intelligences, which additionally improves learning.

Even though teaching tonal languages at the beginning are based on constant repetition of tones, the classes should be conducted in an interesting way, containing various exercises in order to keep students' attention as well as motivate them, instead of turning them into another speech therapy session. Chinese is already difficult to master and it can be very easy to discourage our learners from studying it.

Moreover, the Chinese language and culture are interesting that lessons should not be based only on speech production but also on the other elements such as the art of calligraphy, which helps to develop the manual skills and attention. In addition, the written Chinese turns out to be more useful while communicating with people from different parts of China, who are often not able to understand even their own compatriots' from other provinces.

4. SAMPLE LESSON

Before starting the proper Chinese course, the author of the following article decided to conduct some sample classes to see how the methods described above work in the classroom environment and what kind of problems to expect from the part of a learner. The student who agreed to participate in the experiment was a twenty two year old girl with cochlear implant. In order to concentrate mainly on the tones production and perception teaching the characters was excluded from the lesson content. The learner has already studied English as a foreign language so it was easy to explain her how she should read the 'pinyin' transcription. The sample lessons consisted of the part explaining why tones are important and how to pronounce them. After such introduction the teacher read the new vocabulary and ask the learner to repeat it paying particular attention to tones. That was the way to check student's tone perception. Next, the student was given the set of new words with indicated tones and asked to read it at loud on her own.

Exercises which aimed at examining tones production and perception showed that the most problematic was the rising tone, while the production of falling-rising tone was the most accurate one. The explanations of particular tones pronunciation were supported by teacher with additional gestures depicting a given tone, but also with using different colours, and mimics. Nevertheless, the most successful method was describing the Chinese pronunciation on the basis of Polish articulation. For instance, presenting the rising tone as an over-pronounced way of asking questions in Polish or the falling tone as a short and retort answer. All those

methods applied together helped the student to get the overall idea of using tones in Chinese and constitute the basis for the future classes.

CONCLUSION

The achievements made in the field of surdoglottodidactics have proven that even if deafness causes a serious obstacle, it is still possible to teach deaf students to speak foreign languages. Moreover, the improvement in cochlear implantation, hearing aids and the appropriate early intervention of specialists gives hope for children to acquire oral language skills similar to their hearing peers. That is why, apart from the many obstacles mentioned in the following article there is still a chance to teach deaf and hard-of hearing students Chinese by researching for appropriate compensatory strategies, which may reinforce the tonal language acquisition, help them, and at the same time, break other barriers.

Therefore, the further studies and research are required. I hope that this article will inspire Chinese teachers to consider working with deaf and hard-of-hearing learners and develop new teaching methods.

REFERENCES

- Domagała-Zyśk E. (2013a). *Wielojęzyczni. Studenci niesłyszący i słabosłyszący w procesie uczenia się i nauczania języków obcych*, Lublin: KUL 2013.
- Domagała- Zyśk E. (ed.), (2013b). *English as a foreign language for the deaf and hard of hearing persons in Europe*. Lublin: Wydawnictwo KUL.
- Chrabąszcz A. (2014). *Acoustic Cues to Perception of Word Stress by English, Mandarin, and Russian Speakers* [in:] *Journal of Speech, Language, and Hearing Research*, August No. 57, pp. 1468–1479.
- Goodman H.(2006). *Michel Thomas Method: Mandarin Chinese Vocabulary Course* Audio CD– Audiobook, CD, 2006.
- Han D., Zhou N., Li Y. (2007). *Tone production of Mandarin Chinese speaking children with cochlear implants* Int J Pediatr Otorhinolaryngol. 2007 June; 71(6): 875–880. Published online 2007 March 21. doi:10.1016/j.ijporl.2007.02.008
- Malins J.G., Joannis M.F. (2012). Setting the tone: An ERP investigation of the influences of phonological similarity on spoken word recognition in Mandarin Chinese. In: *Neuropsychologia*, nr 50, pp 2032 – 2043.
- Marschark M., Knoors H. (2012). Educating Deaf Children: Language, Cognition, and Learning. In: *Deafness & education international*, Vol. 14 No. 3, 136–160.

- Morton K. D. (2008). Mandarin Chinese tone identification in cochlear implants: Predictions from acoustic models. In: *Hearing research* No. 244, pp. 66 – 76.
- Pagliaro C., Kritzer K. (2010). Learning to Learn: *An Analysis of Early Learning Behaviours Demonstrated by Young Deaf/Hard-of-Hearing Children with High/Low Mathematics Ability* [in:] *Deafness & education international*, Vol. 12 No. 2, pp 54–76.
- Wong L.N., Vandali A. (2008). New cochlear implant coding strategy for tonal language speakers. In: *International Journal of Audiology* No. 47, pp 337-347.
- Yang B.(2010). *A model of Mandarin tone categories-a study of perception and production*. University of Iowa.

CHAPTER ELEVEN

PRACTICAL ADVICE FOR FOREIGN LANGUAGE TEACHERS TEACHING STUDENTS WITH HEARING IMPAIRMENTS

I have been an English teacher for 24 years. However, my experience in teaching deaf students is actually 28 years, since the day when I first received instructions from a speech therapist, who told me how to start teaching speech to my daughter Danuta, immediately after her diagnosis of a severe degree of hearing loss. To familiarise the subject to teachers who have never taught persons with hearing impairments, I would like to describe the way my daughter was acquiring speech and how tedious a process it was.

My daughter was in a hospital from the 4th to 10th months of her life. The antibiotic she was given -Gentamicin- had damaged her auditory nerve. It was a blessing in disguise that she encountered Emilia Ślęczkowska-Faryna, an excellent Cracow speech therapist, who specialised in working with very young children with a severe hearing disorder. She did not find it impossible to teach speech to a child who even with hearing aids is not able to hear speech at all.

Following the guidelines given to me by the speech therapist I started the daily work of teaching speech to my daughter. Teaching speech was a laborious process bringing, however, much satisfaction. Each new vowel or consonant, and every moment she acquired a whole word gave us great joy. I must admit that the whole family took part in teaching, especially my mother, who willingly assisted in this. The method offered by the speech therapist was based mainly on the simultaneous implementation of a sound associated with a particular object and its written equivalent. For instance, the vowel 'u' was supposed to be associated by my daughter with a plane. Each time while the plane was flying above us I was pointing to the sky saying 'u' and my daughter was imitating me. This was followed by relevant body movements (which means spreading arms imitating the wings of a plane). As a basis to our everyday exercises we used a large notebook, containing drawings and corresponding sounds, and words. I always got my daughter involved in adding new entries to this notebook and later also to diaries (e.g. written when on holiday).

In this way, my daughter had already started learning to read at the age of 18 months. At the age of three she was able to read simple sentences, like for example, 'Dana ma lale' (trl. *Dana has a doll.*). She also started to write by herself. Even then she had well developed manual dexterity skills. She loved drawing. Soon she became able to draw more 'mature' drawings. While learning speech and reading (reading with understanding of course) my daughter also mastered the ability to lip-read. The hearing loss of my daughter is not only very severe (more than 80 decibels) but also specific. She does not hear sounds of high frequency, which unfortunately does not allow for hearing speech, even despite that Danuta is equipped with very good 'Behind The Ear' hearing aids. This is because most of the consonants are produced with high sound frequencies.

Deafness of people who have lost their hearing because of taking an antibiotic is similar, in this respect, to the deafness caused by a loud noise. The inner part of ear contains cochlea inside which can be found the Organ of Corti provided with hair cells. Such cells interact with neurons that change the hair stimulation into nerve impulses. In a healthy ear, the impulses are passed to the brain via auditory nerve. The important fact is that *the sounds of high sound frequency have an impact on hair cells situated closer to the basis of cochlea, while the sounds of lower frequency stimulate the hair cells located at the top of cochlea.* This can be compared to a piano keyboard rolled up in a spiral. This is why the antibiotic or, more often, hazardous noise tend to destroy the hair cells detecting the highest sound frequencies. Thus, if such a destructive noise reaches the end of the cochlea, there is a chance to save the remnants of hearing. However, these remnants will detect only the sounds with low frequencies (Grupa Onet.plSA). The only consonant that my daughter, for sure, can hear with the help of hearing aids is 'r'. (of course I mean the Polish 'r' which is pronounced with a strong friction). Nevertheless, she is able to pronounce all sounds, which comprise Polish speech! This was possible, thanks to her practicing her speech intensively from the moment she was diagnosed with hearing loss. When Danuta reached school age, her speech tuition was taken over by another excellent speech therapist - Ms Leokadia Nowak. This specialist also paid particular attention to precise pronunciation. Tedious exercises evoked the two missing consonants: 'k' and 'r'. My daughter, with her help, managed to learn the material from the first grade (officially it was supposed to be individual teaching at the level of 'zero grade') and thanks to it, she could begin her education in the nearby district school the following year. Graduating from a mainstream primary school and then secondary school required a huge effort from both my daughter and the entire family. At the end of her 'educational journey', my daughter realised her greatest dream: she graduated from the Faculty of Painting at the Fine Arts Academy in Cracow.

It would not have been possible to fulfil this dream if she had not met all of those enlightened and benevolent teachers. In most cases, Danuta was the first deaf student they had met so far. Thus, they had had no preparation to work with a deaf person. Nevertheless, they eagerly followed our instructions and they knew that Danuta could make progress in learning only with our comprehensive help. Here I must emphasize the great contribution of the headmaster of Maria Dobrowolska Upper-secondary School No. 30, who without hesitation not only enrolled my daughter, but also nominated her for two scholarships (*Jolanta Kawaśniewska* and the *President's of Cracow* Scholarships). Enrolling my daughter started a new curriculum attitude of this school towards enrolling disabled students, which as a consequence made it become an integrated secondary school.

The story of my daughter that I have written here, shows how a completely deaf child, even one who cannot hear speech with the usage of hearing aids, is able to acquire speech. It is important, however, that it is impossible to do it in the same natural way, as it happens for hearing children. A deaf child needs to have support from family together with help from a speech therapist to practice speech systematically. At the same time, the mother tongue is defined as 'acquired in a natural way by a child, gradually through learning, without the conscious effort neither from itself nor the environment' (O. Perier 1992, s. 96). For this reason a child with a severe hearing loss will never be as fluent a user of its native language as a hearing child. Firstly, because of their hearing impairment deaf children acquire their first language as a foreign language -which means via tedious exercises. They are, however, in a worse situation than hearing learners of a foreign language, since they are not able to acquire it though aural stimuli. Secondly, their pronunciation will always be worse than the pronunciation of hearing people. Moreover, it will be lacking the proper intonation, which may cause interference in communication. Thirdly, they have a poorer lexicon in comparison to hearing people. This is often the cause of difficulties in understanding both written and spoken texts. In the fourth place, mastering Polish grammar by a deaf person is very difficult. Polish is an inflectional language. The necessity for changing forms of parts of speech and a huge number of grammar exceptions poses a great challenge for any foreigner who would like to learn our language. For this reason, it is not surprising, in my opinion, that deaf persons usually make many grammar mistakes in their native language, no matter how old they are. When talking to a person with hearing loss or while reading a text (e.g. on the Internet) I am able to assess, only by the number of grammatical errors, how severe the hearing impairment of this person is.

How difficult, therefore, it is for a deaf person to learn a foreign language! Let us imagine such an individual while learning in a group of hearing people during an English language course. Regardless of whether or not a teacher explains a new text vocabulary in Polish or English, a learner with a hearing loss may not un-

derstand what the teacher has said (either because he or she is not familiar with the words teacher used to explain the new vocabulary item or just because the teacher did not write the words on the blackboard and speaks too fast for a person with impaired hearing). As Maria Dakowska observes in her book, *Psycholinguistyczne podstawy dydaktyki języków obcych* (trl. *Psycholinguistic perspectives on foreign language didactics*) to talk about linguistic communication a sender and a recipient are required. In addition, there further conditions must be fulfilled: the sender and the receiver need to focus their attention on each other, creating, in such way, a common structure and opening a communication channel (...) To overcome coordination problems there must exist some ways or means such as clear pronunciation (M. Dakowska 2001, s. 59).

It also may happen that a teacher will not explain vocabulary at all. He or she may ask students to read a text and do the reading comprehension exercises, which usually are prepared by the authors of a course book as a multiple choice exercises. A deaf student will not even know, in such situation, why he or she made a wrong choice or even will not understand a whole text or the teacher's explanations (if these are given at all).

Dakowska in her book, further points out that 'in the process of reading, monitoring is mainly a process of decoding its meaning and interpretation (...) To use the monitor properly there a certain measure of certainty is required about the usage of language forms, as well as a conscious linguistic knowledge or even metalinguistic knowledge (...) For this reason, the strategies which relate to monitoring the reading process should not assume from the very beginning a student's high level of language consciousness, but rather depend on teacher's instructions during the process of reading. On the other hand, feedback can play an important role. Taking into consideration the interactive character of the reading process, the contemporary language teaching promotes an active attitude towards the processed discourse and the lexical material it contains. This is reflected in the exercises that are based on the strategy of solving problems. After such exercises, feedback, for example providing the correct meaning, is essential. Without feedback from the teacher, an exercise based on lexical guessing or learning words from the context would be a didactic misunderstanding. (M. Dakowska 2001, p. 119)

Dakowska writes, of course, about working with a text done by a hearing person. Thus, if feedback is so important for persons who have no hearing problems it seems to be even more essential for students with impaired hearing. Usually the pace of working with a group of hearing students is too fast for a deaf learner, because he or she needs more explanations and these explanations must be addressed to him or her directly. Such learners should, therefore, participate in classes of a small size and get a chance to receive the answers to all his or her

questions and doubts or -in an ideal situation -in a group of persons with hearing impairment.

I teach exactly such a group. The classes began with three students, one of them, however, subsequently resigned from the college and the group consists now of two hard of hearing students. Thus, such an environment is optimally convenient for learning a foreign language. The students are very assiduous. I help them with any explanation they need. One of them graduated from a school for the deaf and the other from a mainstream secondary school. At the beginning of the course I had to help that student, who had graduated from the school for deaf, to tackle the fear of speaking in English. While at school there were English lessons, she has never learnt to speak this language.

I have always been a supporter of a cognitive approach in teaching foreign languages. In the case of teaching the deaf, in my opinion, this is the only possible approach that may ensure the progress in learning. A deaf person has to learn with understanding, which as Waldemar Marton writes in his book *Dydaktyka języka obcego w szkole średniej. Podejście kognitywne* (trl. *Teaching a foreign language in a secondary school. Cognitive Approach*) 'entails (...) a necessity of conscious involvement or even utilization of a native language in the whole process (W. Marton 1978, s.25). Marton writes about hearing students. This is all the more significant when teaching students with hearing loss: the teacher has to base lessons on what they already know in their mother tongue. Besides, the teacher cannot expect that a student will learn a language in some different 'after-classes' way, for instance, whilst listening to the recordings from course books, hearing songs or watching films. Only hearing people or persons with a mild hearing loss, who thanks to the hearing aids are actually able to hear in a way very similar to hearing people, can learn in such a way.

Both my students have one hearing aid and one cochlear implant, so in a large degree they could use the hearing sense in their learning process. They do not hear, however, well enough to understand dialogues on TV or talk on the telephone. During classes they always sit in front of me so that they can hear me properly and, if necessary, to lip-read. Of course, if students and teacher know the sign language they can use it to support their communication while explaining the material. There are, however, more and more students with impaired hearing who do not know the sign language or know it in a limited degree. These are the graduates from the mainstream schools that have never had contacts with students from schools for the deaf and, for this reason they had never chance to learn the sign language.

As I have already mentioned, my daughter is a graduate from the mainstream school, so I had never learnt the sign language as we communicate with the spoken language supported by lip-reading. One of my students also does not know the

sign language. Therefore, in such a situation the manner of a teacher's articulation is very important. To prove how significant is the proper and correct pronunciation, I would like to mention a situation which happened many years ago. I was asked to urgently come to the speech therapy clinics in Cracow as it was hosting a delegation from Gallaudet University in Washington, DC and the translator had fainted. I was told not to speak directly to the dean of the University, since he is able to read only from the lips of his assistant, and he failed to understand what the previous translator was saying. According to the guidelines I had been given, I was to translate during the meeting. This meant that at the same moment somebody was speaking to the dean, I was speaking in English to the assistant, who was repeating to the dean what I had said (he had lost his hearing after acquiring a language). During the break I forgot about the ban of talking directly to the dean and we started a conversation. Suddenly, I realised that everyone was looking at us with astonishment. Well, a miracle happened! The dean suddenly began to understand somebody else apart from his assistant! After a while, when the translator felt better, the situation was clear. When she started to speak English, everything was clear (at least for me)- the dean could not understand anything because she was speaking English with Polish articulation! In that way, the dean couldn't understand a single word only by looking at lips.

I do not mention the story to show how good my pronunciation is, but to make people realize that when communicating with deaf or hard of hearing people, clear articulation is extremely important. This is because while we are speaking, such a person can only understand us from our lip movements. To understand how difficult the art of lip-reading is, one can assess by covering their ears with the hands and trying to understand what somebody else is saying to us just from the lip movements.

At this point, I would like to draw a particular attention to the elementary principles of communication with persons who have problems with hearing and what is essential in the classroom. We should always remember about the right light. The teacher, when speaking should always face the students and his or her face must be well-lit. He or she cannot stand turned away from the source of light. For this reason, we should not walk through the classroom and especially not stand behind the students' backs. As I have already mentioned, it is important to try to speak clearly and not too fast. The larger the group of students with severe hearing loss, the slower the teacher should speak. It is important to constantly make sure whether our students have understood our explanations and if necessary write down what we are saying.

From my experience I could notice that there are people who are not able to pronounce words in a way possible for people with severe hearing loss to comprehend. During her education, my daughter has met only a few people able to speak

to her in an understandable way. Fortunately, there were also many people who understood immediately how it works.

People with disabilities have a right to be accepted to the universities on special conditions. The way of examination should be appropriately adapted to the type of disability. When my daughter was applying for the first cycle of studies at the Fine Arts Academy in Cracow, Professor Stanisław Rodziński, who was the rector at that time, agreed to my participation in the exam, in case I would have to support my daughter with translation. It turned out to be necessary. Even though the committee could understand what she was saying, my daughter had troubles with understanding the committee (the bushy moustaches of some professors interfered the lip-reading). I also participated in my daughter's final BA and MA exams.

Many sources state that the disabled student should be treated in the same way as students without disabilities. Of course the disabled student should have the same rights as other students, as well as the same responsibilities, for example receiving credits or taking exams. But this does not mean they should be treated in exactly the same way. For example, you cannot expect a blind student to read normally printed books or the deaf to take listening tests.

This thesis may seem trivial to the reader. Unfortunately, the ignorance of educational policy makers may sometimes be shocking. Recently, I read on the website associated with the Polish Association of the Deaf that since the introduction of the new matura exam in secondary schools, the percentage of deaf students passing it has declined sharply.

As Opara-Zawistowska observes, "Our high school graduates have the biggest problem with the understanding of the text (...) In my opinion, the examination committee does not include enough people who are au-fait with problems of the deaf" (B. Romanek 2008). On the other hand, the president of the Polish Association of the Deaf, Kajetan Maciejko-Roczán, said that 'deaf young people complain about the introduction of a law this year, that states that they have to take a foreign language test on their Matura exam in the form not used so far, which is listening' (M. Gajda 2010). The President tried to influence changes to this law but unfortunately failed to do so far. The Central Examination Commission rejected the protest, because they believe that the extension of the time of listening test of about 15 minutes is just enough for hearing-impaired student have a level playing field. There was also a well-known case when the department of education adapted a test to the needs of a deaf student by sending the same test printed with a larger font! These are examples, which prove that there are few people who know what kind of problems students with hearing impairment encounter.

For this reason there arises the question, how to treat a deaf student in a way that considers his or her disability. When it comes to the foreign language classes

apart from preferably placing him or her in a group that is created specifically for students who have hearing problems, he or she should be treated with an individual approach by a teacher. Then another question also arises: whether such a student should face the same requirements as his hearing peers, especially while taking exams. Such students will find it most difficult to pass the standardized test. If the teacher prepares an exam for a given group, he or she can adjust it to the abilities of a given group. I believe, in that way, that deaf and hard of hearing students should not be examined in a standardized way.

At present, according to the trends in foreign languages teaching, the most important thing is communication. The student who graduates from school passing the Matura examination is treated so liberally that he or she can make a huge amount of errors (either grammatical, or lexical and spelling) and this works well, because it is usually sufficient to get 30% of the points and pass the exam.

I believe that if we are going to be so tolerant of non-disabled people, it gives us even more reasons to forgive the mistakes of students with disabilities. Usually these mistakes are not misspellings, because deaf people are visual learners, but mostly grammatical and lexical mistakes. Since people with severely impaired hearing commit many errors in their native language, the progress that they make in learning a foreign language despite the errors committed, should be appreciated.

The most severe problem may be in understanding the text. In my opinion, the hearing-impaired students should have the right to receive exam texts that are clear, logical, and have no traps. Ideally, such text should contain mostly vocabulary frequently used, and should not contain too many words not known to students. Guessing the meaning of words from the context poses an enormous difficulty for deaf people. We should not give our students impossible tasks to do.

In conclusion, I would like to draw an attention to the fact that there is no one type of deafness. I met repeatedly with situations in which a hearing person showed a complete ignorance on the subject. For this reason, they were not able to communicate with people who have impaired hearing, or on the basis of one experience from their life draw completely wrong conclusions about other people affected by this type of disability. People with hearing impairment can be divided primarily according to the degree of hearing loss expressed in decibels. Amongst the deaf with profound hearing loss (who can hear sounds of 60 to 90 decibels) can be distinguished those whom hearing aids do not help to hear speech (it may be affected by receiving higher frequencies sounds) and those who are able to use it to receive speech, even though it might be not perfect. On the other hand, people with less severe degree of hearing impairment are hard of hearing persons.

Among them there are those who hear the speech quite well with a hearing aid, but they are not able to hear the voice from devices such as radio, television, recorders and telephone. These might be people with hearing loss between 60 and 40 decibels (so-called moderate loss). The best situation is, of course, the one of a person using the hearing aid to be able to receive sound from all those devices on a greater or lesser extent and can hear speech very well. This is the mild hearing loss (between 40 and 20 decibels). Since the invention of modern hearing aids many people with mild hearing loss were given a chance to hear in a very similar way that hearing people do. Such persons should not be treated as deaf. I am sorry to admit that there are situations in which such persons portray themselves as deaf. If on the basis of meeting them one may draw a conclusion that every deaf person can hear this well and is good at using the language. One then expects the same skills from deaf people with severe hearing loss. With early fitting hearing aids to hard of hearing children, they acquire a language through listening (however it is still imperfect). It can be therefore assumed that they acquire Polish language in a way very similar to the native language acquisition that in the case of a hearing infant proceeds in a natural way.

Children whom the hearing aid does not help and who do not have a family support in practising intensively speech, either do not master speech, or speak in a way that is almost completely incomprehensible for listeners. Of course they can make use of a sign language. However, the percentage of hearing people able to use it is small, so by all means it seems to be advisable to make every endeavour to teach a deaf child to speak. The worst situation is when children lose their hearing during their prelingual period. Children or adults who have lost their hearing after the period of language development are in a much better position even if they still require help in maintaining the ability to speak.

I hope that my observations will be helpful for teachers in understanding the problems faced by students with impaired hearing.

REFERENCES

- Dakowska M. (2001). *Psycholingwistyczne podstawy dydaktyki języków obcych*. Warszawa: Państwowe Wydawnictwo Naukowe.
- Kurcz I. (2000). *Psychologia języka i komunikacji*. Warszawa: Scholar.
- Marton W. (1978). *Dydaktyka języka obcego w szkole średniej. Podejście kognitywne*. Warszawa: PWN.
- Perier O. (1992). *Dziecko z uszkodzonym narządem słuchu*. Warszawa: WSiP.

Skehan P. (2008). *A Cognitive Approach to Language Learning*. Oxford: Oxford University Press.

Surowaniec J. (1993). *Podręczny Słownik logopedyczny*. Kraków: Wydawnictwo Naukowe WSP.

Trawiński M. (2005). *An Outline of Second Language Acquisition Theories*. Kraków: Wydawnictwo Naukowe Akademii Pedagogicznej

Internet sources :

<http://www.niepelnosprawni.pl/ledge/x/69995>, access: 12.11.2014.

<http://www.nieslyszacy.pl/info,1542.html>, access: 12.11.2014.