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THE ROLE AND SIGNIFICANCE OF LIP-READING

Tamara Kovačević*, Ljubica Isaković

University of Belgrade, Faculty of Special Education and Rehabilitation, Belgrade, Serbia

Abstract

Lip-reading is a complex psychophysiological process, which involves the visual perception of oral movements, their kinaesthetic memorisation, and the psychological act of recognising (identifying) words for their better understanding. The need of each person to supplement and clarify the received message is emphasised by the careful observation of the face and lips, especially in unfavourable environmental conditions. The main aim of the study is to point to the role, importance, specific features, and the benefits and limitations of lip-reading through the review of available literature. The methods of analysis and evaluation were applied to the relevant available literature. Numerous pieces of data on the characteristics, factors and features which affect lip-reading were obtained. Lip-reading, i.e. the ability to understand speech on the basis of observing the movements of speech organs is a very specific skill. It is one of the components of speech development, and it represents a part of the communication speech chain which comprises the speaker and the one who reads speech. It has a manifold application in the transcription of speech in cases when sound is not available. What can have a negative impact on the perception of speech is the possibility of sound and lip movements not being synchronised. It is of particular significance for deaf persons and persons hard of hearing who rely on this process fully in their everyday communication, which makes it easier for them to receive information from their surroundings. It enables their better communication, education, independence and coping in their daily functioning.

Key words: lip-reading, speech-reading, communication, speech, the deaf and hard of hearing.

* Corresponding author: Tamara Kovačević, University of Belgrade, Faculty for Special Education and Rehabilitation, Visokog Stevana 2, 11158 Belgrade, Serbia
122tamara@gmail.com

УЛОГА И ЗНАЧАЈ ЧИТАЊА ГОВОРА СА УСАНА

Апстракт

Читање говора са усана је сложен психофизиолошки процес који укључује визуелну перцепцију оралних покрета, њихово кинестетичко запамћивање, али и психолошки акт рекогниције (препознавања) речи ради њиховог бољег схватања. Пажљивим посматрањем лица и усана, нарочито у неповољним срединским условима, наглашена је потреба сваке особе да допуни и разјасни примљену поруку. Основни циљ рада је да се прегледом доступне литературе укаже на улогу, значај, специфичности, бенефите и ограничења читања говора са усана. Примењене су методе анализе и евалуације релевантне доступне литературе. Добијени су бројни подаци о карактеристикама, факторима и чиниоцима који утичу на читање говора са усана. Читање са усана, односно способност разумевања говора на основу посматрања покрета говорних органа, јесте веома специфична вештина. Једна је од компоненти развоја говора и представља део говорног ланца комуникације који обухвата говорника и онога који чита говор. Оно има многоструку примену у транскрипцији говора у случајевима када звук није доступан. Оно што може негативно утицати на перцепцију говора јесте могућност да звук и покрети усана нису усклађени. Посебан значај има за глуве и наглуве особе које се у својој свакодневној комуникацији пуно ослањају на овај процес, који им олакшава пријем информација из окружења. Омогућава им бољу комуникацију, образовање, самосталност и сналажење у свакодневном функционисању.

Кључне речи: читање говора са усана и лица, комуникација, говор, глуви и наглуви.

INTRODUCTION

The problem of speech-reading by observing the lips and the face of the interlocutor is not new. Many theories of speech development indicate that, in the beginning, speech used to be mouth pantomime generated by speech organs following the movements of hands through their functional movements. The opinions of many authors to date show that the first symbols of oral and voice speech directed the listener to the interlocutor's face and mouth. Even nowadays, when speech has reached a high level of development, we endeavour to obtain more information on the subject of our conversation by looking at the interlocutor's face and mouth. We are often unaware of the role the visual part has in understanding speech. We learn this in some exceptional situations, in circumstances of loud noise, when speech is muffled, or when there is an obstacle between the interlocutors. In such situations we endeavour to follow the movements of speech organs alongside listening to speech, so as to receive more information and understand the message. Chung and Zisserman (2016) state that even if the auditory input is preserved and comprehensible, visual information helps in improving performance on the occasion of recognising speech. Lip-reading, i.e. the ability to understand speech using only visual information is a very attractive skill. It has clear

application in the transcription of speech when sound is not accessible, regardless of whether everyday communication or the exchange of information between politicians and famous persons is in question. It is complementary to the audio understanding of speech, but as it is asserted (McGurk & MacDonald, 1976), it may have a negative effect on the perception if the sound and lip movements are not coordinated. Speech reading from the interlocutor's mouth and face is one of the components of speech development. It is a part of the communication speech chain which includes the speaker and the one who reads the speech.

SPEECH READING FROM THE MOUTH AND THE FACE OF THE INTERLOCUTOR

Speech reading from the mouth and the face of the interlocutor includes the speaker (expedient) and the one who reads speech (percipient). The knowledge of the language of the expedient should at least partially match the knowledge of the language of the percipient, so that the information can be understood. If the expedient's and percipient's pools of knowledge do not correlate, the information cannot be understood. That requires the listener getting accustomed to the speaker. Their attention focuses on what makes the common core in speech, which enables their communication. The primary modality of the perception of voice speech in standard listening circumstances is the auditory modality. However, in situations where the auditory perception of speech is made difficult or disabled, such as where difficulties in the perception of acoustic stimuli are greater, the visual modality assumes greater significance. For the perception of voice speech which takes place through the visual modality, i.e. for the visual perception of voice speech, we most frequently use the expression of lip-reading. In the English-speaking countries, the term *lip-reading*, or *speech-reading* is used.

The ability to identify what is being said only through visual information – lip-reading (Chung, Senior, Vinyals & Zisserman, 2017), is an impressive and challenging skill. Ambiguity already arises at the level of words (for sounds which look the same on the lips, e.g. /p/ and /b/). However, such ambiguities may be overcome, to a certain extent, through the use of the context of the adjacent words in the sentence, or through the linguistic context.

Lip-reading represents a complex psychophysiological process, of which the three elements are important: the visual perception of oral movements, the kinaesthetic memorisation of speech and the psychological act of recognising (identifying) words for their better understanding. The visual speech signal carries sufficient information for linguistic discrimination, even among very similar languages. The mechanisms lying at the core of these abilities are based on segmental, suprasegmental and

lexical processes, or on their combinations. The movements of speech organs may be useful for information on the acoustic features of sounds, while head movements bear information on the fundamental frequency, as well as information on suprasegmental features of speech (Soto-Faraco et al., 2007). From the developmental perspective, sensitivity for multisensory coherence is crucial for the development of adequate perceptive, cognitive and social functioning. Multisensory coherence of audio-visual speech is determined by the overlapping of auditory and visual information flows which come from the face and the vocal tract of the speaker (Soto-Faraco, Calabresi, Navarra, Werker & Lewkowicz, 2012). Shang, Zhang, Xu and Peng (2018) point to the fact that lip-reading is not easy to imitate, and they point to an important characteristic of lip-reading, which is the fact that the information relayed by a face and auditory information may be collected simultaneously. The individuality of lip-reading may be used as the basis for the identification of the speaker. In comparison to previous research, where the number of words was strictly limited, the research conducted on the possibility of recognising phrases and sentences, with or without auditory information, used an unlimited number of words. The possibilities of machine translated speech were in question, considering the development of new technologies. The 'Look, listen, attend and spell' network model, which successfully transcribes oral speech into text, was presented. The data set developed in this study was based on thousands of hours of BBC television shows, in which persons who were speaking were recorded together with the subtitles of what was being said. The authors emphasise that different discriminative signs which would be useful for deaf persons and persons hard of hearing learning lip-reading could be observed through such research.

FACTORS WHICH AFFECT THE SUCCESSFULNESS OF LIP-READING

The condition of a person's hearing, and their knowledge of the vocabulary, sound, grammar and every day and idiomatic expressions of a spoken language, i.e. the comprehension of the language affect the lip-reading ability. The understanding of a language is of the utmost significance for a good lip-reader, because lip-reading in itself includes the ability to use context (Campbell & Mohammed, 2010; Oliveira, Soares & Chiari, 2014). The ability to use the context, or the rules of a language, may be crucial for fitting into the conversation being made. Goebel (2013) notes that context is used more through the visual than through the auditory channel. Deaf persons and persons hard of hearing are specifically directed to lip-reading. It is essential for them in the process of communicating with the hearing environment. It is underlined that they should use their remaining hearing abilities to fill in the context, or they

can rely on their visual perception in lip-reading so as to understand what is being said. The context for the improvement of speech recognition (Spehar, Goebel & Tye-Murray, 2015) exists in a lot of forms, including the current context, context based on a sentence, and situational context. Considering the fact that there are limitations in understanding context, the successfulness of lip-reading is related to a high level of working memory capacity and the skill of verbal reasoning. Bradarić-Jončić (1998) points out that the input of speech-language information in reading is partial, and that they may be compensated for only by using information from the higher cognitive levels (using the knowledge of the language being spoken and the knowledge of the world). The processing of speech-language information received visually sets considerable requirements for short-term memory. Speech-language information should be retained in short-term memory until the data is analysed, compared and synchronised sensorily with the information stored in long-term memory, and until it is connected with the incoming information to make sense. Thus, the capacity of short-term memory is significantly related to the successfulness of reading. Ortiz (2008) emphasises that the understanding of speech by lip-reading depends on the capacity of deductive reasoning. The capacity of deductive reasoning enables the understanding of speech by mentally filling in what the ear cannot hear or the eye cannot perceive. What we can conclude from this is that the skill of phonological processing and the short-term memory capacity affect the lip-reading ability. Auer (2010) examined the effect of perceptive similarity using words which were presented auditorily and visually. The accuracy of the identification decreased when the number of perceptively similar words increased. Isolated spoken words which are perceptively similar to other words in the mental lexicon are usually more difficult to recognise than words which are perceptively unique. The efficiency and the accuracy of recognition are also affected by the number and the nature of the words which are alike (Luce & Pisoni, 1998). They further point out that the main problem in the auditory identification of words is linked to the relations between sound patterns of words in the memory (the mental lexicon) and the effects those relations have on the identification of words. The successfulness of lip-reading with deaf persons and persons hard of hearing is affected to a large extent by the level of familiarity with the terms in spoken and sign language, as well as by the readability of the sounds of our language. Properly learnt and stable terms are read well, even when the visibility of the sounds they are composed of is lower.

Campbell and Mohammed (2010) point out that speech-readers keep their gaze on the eye area of the speaker's face. They move their gaze to the mouth area so as to understand a specific piece of information, which may be foreseen from the previous interpretation. Understanding most information when lip-reading includes peripheral vision. Lip-

reading is more effective when the whole face is seen, although lip-reading from the profile of a face is possible. That is a mental act based on the joint functioning of perceptive and cognitive processes.

A good lip-reader has to be motivated and self-confident, and they must have a positive attitude and relation to lip-reading. Showing interest in effective lip-reading and good knowledge of the language, and the context (the situation) which is the subject of speech are key factors for successful lip-reading. Moreover, this skill may be improved by training, i.e. by exercise. What makes a good lip-reader is the quantity of training (the greatest improvement is achieved after one to three years of training), understanding of the language (knowledge of vocabulary, grammar and everyday expressions), the duration of hearing impairment, if there is one (persons who have lost hearing at a later stage are better lip-readers), the degree of hearing impairment (better remnants of hearing help in lip-reading), as well as other factors, such as emotional factors (motivation, self-confidence) and the person's visual abilities (visual discrimination and visual memory).

The restrictions of lip-reading, that is the situation which may potentially cause problems in reading, are obvious. The very speaker, i.e. the one who speaks is an important link in lip-reading. If the speaker has limited movements of the articulator (lips and jaw), quick speech, slow speech, unclear facial expressions, or specific head and body movements, lip-reading will be more difficult. Alongside this, environmental factors (inadequate distance, poor light, noise) contribute to poor concentration and reduced attention, while we can say that the very speech and its nature have a significant effect on lip-reading. The greater the number of poorly visible or invisible sounds in a language, as it the case when words look the same or similar on the lips –homophenes (such as, for example, some of the first words children learn - *ma-ma, pa-pa, ba-ba*[1]), the more difficult the task of lip-reading. Good lip-readers overcome these problems in various ways. They use the context of speech to a great extent, they rely on good visual and auditory attention, and they also use methods which facilitate communication. These methods are particularly applied by deaf persons and persons hard of hearing. One of them involves Cued Speech, through which we can lip-read every sound with eight configurations and four positions of one hand.

Many foreign authors assert that co-articulation (the effect of preceding and succeeding the words spoken) make successful lip-reading more difficult. Furthermore, the distinction of homophenes (words that sound different, but involve the identical movements of a speaker's lips) using only visual information is difficult (e.g. English homophenes *mark*,

[1] Serbian words meaning mother, goodbye and grandmother, respectively.

park and *bark* look the same on the lips and cannot be distinguished) (Goldschen, Garcia & Petajan, 1996). Apart from this limitation, lip-reading is a challenging problem at any rate, due to variations such as accents, the speed of speech, and slurred speech, as well as poor lighting, strong shadows, and motion (Saraswati, Winarsih, Anisa, Rokhman,& Supriyanto, 2019).

THE SPECIFIC FEATURES OF LIP-READING WITH DEAF PERSONS AND PERSONS HARD OF HEARING

Deaf persons and persons hard of hearing face limitations in communication, especially in language communication, which results in aggravated social adjustment. They primarily use sign language, but they also use lip-reading. Saraswati et al. (2019) underline that the environment, i.e. the population at large does not know sign language, and thus lip-reading arises as necessary for the communication between the deaf and persons with normal hearing. They point out that, in Indonesia, there are several educational centres for deaf persons where lip-reading is learnt and mastered. The application (UCD) involves using pictures, video recordings of lip-reading, and texts, as well as sign language, which altogether help in understanding the content. The results of the application assessment, following its use, imply benefits and the fact that they suit the goals and the user experience of persons with hearing impairment.

In order to clarify and understand the reading strategies better, a group of authors (Pinheiro, Rocha-Toffolo & Vilhena, 2020) tested two groups of deaf students. The first group comprised users of the Brazilian sign language, and the second one comprised users of the Brazilian sign language and spoken language (including lip-reading). The second group, which used alternative means of communication, showed better results in all psycholinguistic categories in lip-reading. The conclusion is that the reading process is improved by the use of the orthographic strategy. Such results imply that the improvement of language resources with the deaf is related to building a strong linguistic basis, which is enhanced by placing emphasis not only on learning speech but also on the process and mastering lip-reading. Other research has led to similar conclusions. Delayed and aggravated learning of a language, mastering lexical and syntactic systems (Chamberlain & Maiberri, 2008) and learning the morphology a language (Trussell & Easterbrooks, 2017) affect the process of learning reading, but this can be improved by learning speech, and insisting on lip-reading. Kovačević and Isaković (2019) point out that oral and vocal speech reading from the mouth and the face of the interlocutor is an ability to receive, process and confirm the visual images of words during speech behaviour or a speech act. A person who can hear perceives and controls speech by hearing. Deaf persons and persons hard of hearing are

compelled to use lip-reading. They carefully follow the movements of the lips of the person who is speaking. Thus, they create visual images of the movements of the speech organs which take part in the articulation.

Speech-reading from the mouth and the face of the interlocutor cannot be reduced only to the visual perception of the movements of speech organs, because it also includes other auditory possibilities and the mental processing of received data. The interlocutor's speech is perceived visually and speech organs are activated at the time, and new habits for speech are thus created. Non-verbal context, and the overall situation in which a person is found are important for understanding speech. Lip-reading is a complex activity, and it is the result of the harmonious connection of the operation of various cortical structures and links. It implies not only the connection of verbal symbols but also the understanding of thought and ideas.

Successful and good quality speech-reading from the mouth and the face of the interlocutor is possible if the following conditions are provided: correctly set lighting; the person who is speaking must have clear, distinct and correct pronunciation; speech must be distinct, clear, somewhat slower at the beginning, but without exaggeration, chanting and without clipping sentences; the length of the sentence should not exceed three to five words; the manner of pronunciation should be normal; the pace of speech should be natural; the position of the head should be normal; the attention of persons with hearing impairment should be focused on the one who is speaking from the very beginning; the family should be trained to assist in speech-reading; the beginning of training in speech-reading should match the communication which starts in the family in the earliest days (Isaković, Kovačević & Dimić, 2016).

Lip-reading is very difficult where unfamiliar content is concerned, when it is impossible to make a guess based on the context, and when several persons participate in the conversation. In order to make lip-reading easier for a deaf person, it is desirable to speak somewhat more slowly, making breaks after connected segments, and taking care not to stand against the light and not to be more than 1.5 metres away from the deaf person.

The development of the lip-reading ability in deaf children and children hard of hearing should be initiated as early as possible, at preschool age. Educational content for deaf children and children hard of hearing envisions teaching them to follow the speech of the persons surrounding them so as to be able to participate in everyday communicational situations. Exercises at preschool age should be performed through play by learning certain words, sounds and sentences. In doing so, care should be taken of the order and way of learning. Reading vocals should be exercised first, followed by reading visible and then less visible consonants. Reading isolated sounds should be avoided unless they represent

a separate word or a sentence. A child should be trained to read the whole word and sentence, and to understand short commands which are required in everyday life and to give answers to posed questions. At the end of the preschool period, prior to starting school, it is necessary for a child to be able to lip-read all the words which are more frequent in everyday life, particularly short commands. Every kind of learning, including speech-reading from the mouth and the face of the interlocutor, is performed through play at preschool age. In teaching lip-reading, it is necessary that equal attention be paid to all parts of speech. They are introduced in the order in which they are learnt during regular speech and language development. It is certainly essential that each child should be afforded an individual approach, and that the capabilities and abilities of each individual are monitored. Based on that information, an adjustment of the treatment of each individual child can be made. The starting point are always objects, occurrences and events that are the closest to a child, and to which a child attaches positive emotions. The contents are subsequently, and in accordance with age, extended to objects from farther surroundings, as well as to abstract terms which always pose a greater problem for deaf children. They are harder to learn through senses and obviousness, and for that they demand greater attention (Kovačević & Isaković, 2019). The successfulness of lip-reading at preschool age is greatly influenced by the visibility (readability) of the sounds of our language, but it is also affected by the level of familiarity with the terms in spoken and sign language to a great extent. Adequately adopted and stable terms are read well even when the visibility of the sounds they are composed of is lower. The low visibility of fricatives (s-z, š-ž, h), affricates (c, ć-đ, č-dž), as well as velar sounds (k and g) in words makes the identification of terms on the lips more difficult. Adequately created words, as well as those which are frequently used and which children have had experience with do not present a problem in lip-reading despite lower visibility. Early knowledge of sign language significantly facilitates learning terms and lip-reading. Many children who responded to a pronounced term with the corresponding sign showed a higher level of understanding of what was being said than those children who did not use signs (gestures). The readability (recognition) of terms for which there is only one sign, or gesture, was also observed to be better (it is observed in the area of familiarity with the first adjectives and verbs) than of those where one sign (gesture) denotes several similar terms. In lip-reading sentences, the children perceived the length of sentences and recognised individual terms, while they gave suitable answers from the context of the pictures (Kovačević & Isaković, 2020).

Isaković, Kovačević and Dimić (2016) observed the level of successfulness of lip-reading words and sentences with deaf children and children hard of hearing of preschool age. The obtained results indicate

that the best lip-read terms are those which relate to the family. This was actually expected because the first words in the vocabulary of all children were examined, and daily contact with them facilitates identification. In lip-reading sentences, the children perceived the length of sentences and identified individual terms, while the majority of terms was recognised from the context of what was said.

The group of researchers in this study examined whether lip-reading could be improved at ages 7 through 14 and whether hearing loss affects the development of the ability to lip-read, as well as how individual differences in lip-reading are related to other abilities. The research was done on a sample of 40 children with normal hearing and 24 deaf children. Four elements, as well as measurements of perceptive, cognitive and linguistic abilities were used. For both groups, the lip-reading ability is improved with age on all four measuring instruments. Deaf children achieved better results than children with normal hearing. Age, auditory status and visual-spatial working memory were significant factors in lip-reading. Moreover, the obtained results indicate that the lip-reading ability of children is not fixed, but that it improves between the ages of 7 and 14 (Tye-Murray, 2014). Experience in lip-reading has an effect on the lip-reading ability. The finding that the deaf are better lip-readers than persons with normal hearing implies that experience has an important role in the development of this ability. The lip-reading ability of students who are deaf and hard of hearing is not fixed, but it improves with the age. The students in upper grades lip-read with more success than the students in lower grades.

Speech-reading is a skill which deaf children require so as to have access to the languages used for communication within a social community. The instrument *Test of Child Speechreading* (ToCS) is specially designed for use with deaf children and children who can hear. It is computer-based, and it measures child speech-reading on three psycholinguistic levels: (a) words; (b) sentences; and (c) short stories. The aim of the research was to standardise the Test and to examine the effect of the condition of a child's hearing, age and linguistic complexity on the speech-reading ability. The research comprised 86 children with severe and profound pre-lingual hearing impairment, and 91 children with normal hearing ages 5 through 14. The obtained results indicate that the speech-reading skill improves with age with both groups of children. The speech-reading ability is not affected by the condition of a child's hearing (Kyle, Campbell, Mohammed, Coleman & MacSweeney, 2013).

In a case study, Andersson and Lidestam (2005) tested the hypothesis according to which the superior lip-reading skill depends on higher cognitive functions, such as verbal working memory capacity. Experienced lip-readers achieved brilliant results on all tests, even though they had not shown superior working memory and higher ability of verbal

reasoning. They were skilled in phonological processing, recognising words and phonemes, and solving semantic and phonological verbal fluency tests. The extremely high level of lip-reading was based on a highly efficient perception process (lower levels), in combination with efficient central executive functions (higher levels) due to early hearing loss. Dell'Aringa, Adachi and Dell'Aringa (2007) show that deaf persons and persons hard of hearing use lip-reading to a great extent. They examined the advantages of lip-reading with adult persons wearing hearing aids. The research was conducted on a sample of 30 examinees. All of them had a moderate bilateral sensorineural hearing impairment. The examinees achieved the best results (93.5% of correct answers) in situations when they read speech with the use of a hearing aid. The authors conclude that lip-reading is an important communicative strategy of deaf persons and persons hard of hearing, together with a suitable hearing aid.

An important characteristic of speech-reading is also its use during the use of sign language as the first and natural language of deaf persons. Regardless of whether sign language is used by a deaf person or a person who can hear, the process is always accompanied by the movements of lips, i.e. speech. Speech is always present in the use of sign language, and thus speech-reading is used as well (Isaković & Kovačević, 2015). Deaf persons consider speech-reading from the mouth and the face of the interlocutor, and oral communication to be useful skills, but sign language, as their first language, is an irreplaceable form of communication. It is a standard to strive towards, particularly in education, as understanding is much better and more successful when sign language is used. It is always accompanied by speech, because lip-reading facilitates the comprehension of a multitude of synonymous signs, and prevents misunderstandings to a great extent. What characterises the Serbian sign language is the existence of a large number of synonymous signs, which makes the comprehension of a message harder and dependent on the context of the very conversation. Its shortcomings are overcome by being complemented with the use of facial expression, speech and dactylology.

The use of speech accelerates lip-reading, and the understanding of what is being said and demonstrated.

APPROACHES TO LEARNING LIPREADING

Wickware (2014) asserts that there are four main approaches to learning the lip-reading skill: analytic, synthetic, pragmatic and holistic. The analytic approach is considered the traditional teaching method in learning the lip-reading skill. A characteristic of this approach is the fast practice of syllables with the aim of building smaller verbal units (a syllable or a viseme) into words, and then into sentences. The analytic approach focuses on the details of sounds, i.e. on learning how to identify

what they look like on the lips, and on practising their recognition in isolation and in individual words (the Mueller-Walle, Bruhn and Jena methods). The core of this theory holds that the interlocutor, who is deprived of some of the acoustic information, should interpret as much information as possible from the visible movements. The fundamental hypothesis is that speech perception is basically a process in which the first task is to analyse an incoming visual signal in its basic components, prior to assembling those components into words and sentences (bottom-up processing). However, this approach is used exclusively as support in communication, because the time required for the visual identification and interpretation of the recognisable speech movements, their arrangement into words, and their organisation into sentences is exceeded by the speed of the interlocutor's speech. This may be a frustrating experience for deaf persons and persons hard of hearing.

The synthetic approach may be characterised as an approach wherein the perception centres on unity, rather than on smaller parts (top-down processing). The methods related to this approach are the Nitchie and Kinzie methods. Common exercises for these methods include the practice of speech-reading sentences in a familiar context. The aim of the synthetic approach is to have the one who reads speech use the context and known information. The limitations of the synthetic approach involve the situations in which the interlocutor is unable to determine the context of the message or its meaning (Sweetow & Sabes, 2006).

The pragmatic approach focuses primarily on creating the ideal surroundings and context for deaf persons and persons hard of hearing in a dialogue, where communicative strategies have been established so as to ensure the maximisation of understanding the interlocutors with the remnants of hearing. The aim of this approach is to have an individual concentrate on the interaction, rather than on the reception of specific signs or sounds, on seeking the modification of the speaker's message and the context in which the dialogue takes place, and on developing specific strategies for special situations, which are found to be potentially the most difficult for communication. The limitation of this approach lies in the fact that no efforts are made to have the bimodal approach (two sensory inputs, including auditory and visual signs) incorporated in overcoming the difficulties in conversation. Another serious limitation is that there is currently no science-based evidence which would corroborate the efficiency and the effectiveness of this approach (Wickware, 2014).

The holistic approach is incorporated from the aspect of the analytic, synthetic and pragmatic approach. The main goals of the holistic approach include the evaluation and use of overall communicative abilities, psychosocial aspects of deafness, the education of parents, brothers and sisters, and the use of hearing aids, with emphasis on the improvement of conversation and interactive skills. This approach utilises the positive as-

pects of the analytic, synthetic and pragmatic approaches, and provides a programme which is adjusted to an individual, or to the needs of a group. However, a shortcoming of this approach is the lack of science-based evidence (D. Dimić & N. D. Dimić, 2003).

The group of authors applies two methods in teaching lip-reading. The sounds of each word are learnt separately (the analytic method), through the use of visual and auditory signs for each of the words to be lip-read in each sentence (the synthetic method). The sounds are learnt separately, and then lip-reading homophonic words is learnt. Homophonic words may be distinguished through visual signs. Therefore, sounds are taught in the form of words, and those who lip-read are taught how the words are produced on the lips, jaw and mouth (Ugwuanyi & Adaka, 2012).

CONCLUSION

Lip-reading is a significant skill, which is learnt and mastered. It can be acquired by anybody, by persons who can hear, and, in particular, by deaf people and people hard of hearing.

For persons who can hear, it represents an important skill, applicable in various spheres of life. Looking at the interlocutor's face and mouth, a man strives to obtain more information on the subject of the conversation. The role of the visual part in understanding speech often fails to be acknowledged. It is only in exceptional situations, which result from muffled voice or speech, or an obstacle between the interlocutors, that endeavours are made to follow the movements of speech organs alongside the speech which is being listened to so that more information is received, and the transmitted message is more easily understood. This indicates that lip-reading is a complex psychophysiological process characterised by three important elements. They comprise the visual perception of oral movements, their kinaesthetic memorisation, and the cognitive process of recognition, that is, the identification of words for their better understanding, comprehension and memorisation.

For deaf persons and persons hard of hearing, lip-reading is a path to the world that can hear and that surrounds them. It provides them with opportunities for better communication, education, independence, and coping in their everyday functioning. There are factors which facilitate the process of mastering lip-reading, but there are also those which make that process more difficult. Certain factors which slow down and aggravate lip-reading may be influenced, and may be eliminated. The use of sign language, alongside lip-reading, is the best way towards the development of functional language, the enrichment of vocabulary, and the achievement of full independence of deaf persons and persons hard of hearing.

REFERENCES

Andersson, U., & Lidestam, B. (2005). Bottom–Up Driven Speechreading in a Speechreading Expert: The Case of AA (JK023). *Ear and Hearing*, *26*(2), 214–224. doi.org/10.1097/00003446-200504000-00008

Bradarić-Jončić, S. (1998). Neka obilježja čitača i govornika o kojima ovisi uspješnost vizualne percepcije govora u gluhih osoba [Some Lip-reader's and Talker's Characteristics Influencing Lip-reading Achievement]. *Hrvatska revija za rehabilitacijska istraživanja*, *34*(1), 1-12.

Campbell, R., & Mohammed, T. E. (2010). Speechreading for information gathering: A survey of scientific sources. *Deafness Cognition And Language Research Centre (DCAL).* Division of Psychology and Language Sciences, University College London. doi: 10.1044/1092-4388(2012/12-0039

Chamberlain, C., & Mayberry, R. (2008). American Sign Language syntactic and narrative comprehension in skilled and less skilled readers: Bilingual and bimodal evidence for the linguistic basis of reading. *Applied Psycholinguistics*, *29(*3), 367-388. doi.org/10.1017/S014271640808017X

Chung, J. S., & Zisserman, A. (2016). Lip reading in the Wild. In *Asian conference on computer vision* (pp. 87-103). Springer, Cham. doi: 10.1109/CVPR.2017.367.

Chung, J.S, Senior, A., Vinyals, O., & Zisserman, A. (2017). Lip reading sentences in the Wild. In *Proceedings of the IEEE conference on computer vision and pattern recognition* (pp. 6447-6456).

Dimić, D. & Dimić, N. D. (2003). *Funkcija čitanja govora sa usana* [The function of lipreading]. Beograd: Društvo defektologa Srbije i Crne Gore.

Dell'Aringa, A. H., Adachi, E. S., & Dell'Aringa, A. R. (2007). Lip reading role in the hearing aid fitting process. *Brazilian Journal of Otorhinolaryngology*, *73*(1), 95–99. doi.org/10.1016/s1808-8694(15)31129-0

Goebel, S. L. (2013). Effects of type of context on use of context while lipreading and listening. Independent Studies and Capstones. Paper 677. Program in Audiology and Communication Sciences. Washington: University School of Medicine. http://digitalcommons.wustl.edu/pacs_capstones/677

Goldschen, A. J., Garcia, O. N., & Petajan, E. D. (1996). Rationale for Phoneme-Viseme Mapping and Feature Selection in Visual Speech Recognition. In: Stork, D.G., Hennecke, M.E. (eds) *Speechreading by Humans and Machines.* NATO ASI Series, vol 150. Springer, Berlin, Heidelberg. doi.org/10.1007/978-3-662-13015-5_39

Isakovic, Lj. & Kovacevic, T. (2015). Комуникација глувих и наглувих-могућности и ограничења у образовању [Communication of the deaf and hard of hearing-the possibilities and limitations in education]. *Teme*, *39*(4), 1495−1514.

Isaković, Lj., Kovačević, T. & Dimić, N. (2016). Lip-reading with deaf and hard of hearing preschool children. In: S. Nikolic, R. Nikić, V. Ilankovic (Eds.) *Early Intervention in Special Education and Rehabilitation*, 195 – 207. University of Belgrade, Faculty of Special Education and Rehabilitation

Kovačević, T. & Isaković, Lj. (2019). Oblici neverbalne i verbalne komunikacije gluve i nagluve dece predškolskog uzrasta uzrasta [Forms of Non-verbal and Verbal Communication in Deaf and Hard of hearing Children of Preschool Age]. *Baština, 49,* 433-453. doi: 10.5937/bastina1949433K

Kovačević, T. & Isaković, Lj. (2020). Usvajanje znakovnog jezika kod gluve i nagluve dece predškolskog uzrasta [Adoption of the Sign Language with Deaf and Hard of hearing Preschool Children]. *Baština, 51,* 513-535.doi: 10.5937/bastina30-267

Kyle, F. E., Campbell, R., Mohammed, T., Coleman, M., & MacSweeney, M. (2013). Speechreading Development in Deaf and Hearing Children: Introducing the Test

of Child Speechreading. *Journal of Speech, Language and Hearing Research*, *56*, 416-426. doi: 10.1044/1092-4388(2012/12-0039)

Luce, P. A., & Pisoni, D. B. (1998). Recognizing Spoken Words: The Neighborhood Activation Model. *Ear & Hearing*, *19*(1), 1-36. doi.org/10.1097/00003446-199802000-00001

McGurk, H. & MacDonald, J. (1976). Hearing Lips and Seeing Voices. *Nature*, 264, 746–748. doi.org/10.1038/264746a0

Oliveira,L.N., Soares, A. D. & Chiari, B.M. (2014). Speechreading as a Communication Mediator. *CoDAS*, *26*(1), 53–60.

Ortiz, I. R. R. (2008). Lipreading in the Prelingually Deaf: What makes a Skilled Speechreader? *The Spanish Journal of Psychology*, *11*(2), 488-502. doi: 10. 4236/ce.2019.104053

Pinheiro, A. M. V., Rocha-Toffolo, A. C., & Vilhena, D. A. (2020). Reading strategies for the profoundly deaf Libras users: Benefi ts of speech and lip reading for strengthening linguistic skills. *Estudos de Psicologia (Campinas)*, 37, e190003. dx.doi.org/10.1590/1982-0 275202037e190003

Saraswati, G. W., Winarsih, S., Anisa, N., Rokhman, N., & Supriyanto, C. (2019). Developing BacaBicara: An Indonesian Lipreading System as an Independent Communication Learning for the Deaf and Hard-of-Hearing. *International Journal of Emerging Technologies in Learning*, *14*(4), (44-57). doi.org/10.3991/ijet. v14i04.9578

Shang, D., Zhang, X., Xu, X., & Peng, X. (2018). Speaker Recognition Based on Lip-reading: An Overview. *ICNCC 2018: Proceedings of the 2018 VII International Conference on Network, Communication and Computing* (247–251). doi.org/10. 1145/3301326.3301388

Soto-Faraco, S., Navarra, J., Weikum, W. M., Vouloumanos, A., Sebastián-Gallés, N., & Werker, J.F. (2007). Discriminating languages by speechreading. *Perception & Psychophysics*. *69*(2), 218-231. doi.org/10.3758/BF03193744

Soto-Faraco, S., Calabresi, M., Navarra, J., Werker, J. F. & Lewkowicz, D. J. (2012). The development of audiovisual speech perception. In A. Bremner, D. J. Lewkowicz, & C. Spence (Eds.), *Multisensory Development* (Chap 9, pp. 207-228). Oxford: Oxford University Press. doi:10.1093/acprof:oso/9780199586059.003.0009

Spehar, B., Goebel, S., & Tye-Murray, N. (2015). Effects of Context Type on Lipreading and Listening Performance and Implications for Sentence Processing. *Journal of speech, language and hearing research: Journal of Speech, Language and Hearing Research*, *58*(3), 1093–1102. doi.org/10.1044/2015_JSLHR-H-14-0360

Sweetow, R.W. & Sabes, J. H. (2006). The Need for and Development of an Adaptive Listening and Communication Enhancement (LACE TM) Program. *Journal of the American Academy of Audiology*. 17, 538–558. doi.org/10.3766/jaaa.17.8.2

Trussell, J. W., & Easterbrooks, S. R. (2017). Morphological Knowledge and Students Who Are Deaf or Hard-of-hearing: A Review of the Literature. *Communication Disorders Quarterly*, *38*(2) 67-77. dx.doi.org/10.1177%2F1525740116644889

Tye-Murray, N. (2014). *Foundations of aural rehabilitation: Children, adults, and their family members*. Canada: Nelson Education, Scarborough, ON, Canada

Ugwuanyi, L. T., & Adaka, T. A. (2015). Effect of Auditory Training on Reading Comprehension of Children with Hearing Impairment in Enugu State. *International Journal of Special Education*, *30*(1), 58–63

Wickware, A. (2014). The Impact of Speechreading Programs on Adults with Hearing Loss: Literature Review. *National Speechreading Project CHHA-AMEC*.

УЛОГА И ЗНАЧАЈ ЧИТАЊА ГОВОРА СА УСАНА

Тамара Ковачевић, Љубица Исаковић
Универзитет у Београду, Факултет за специјалну едукацију и рехабилитацију, Београд, Србија

Резиме

Читање говора са усана дуго времена интригира стручну јавност. Многи аутори указују на то да су први симболи гласовног говора упућивали слушаоца првенствено на лице и уста саговорника. И данас, када говор достиже висок степен развоја, гледањем саговорника у лице и уста настојимо да добијемо више информација о ономе што је предмет нашег разговора. Визуелни део у разумевању говора игра велику улогу, нарочито у условима велике буке и при постојању препреке између саговорника, када настојимо да слушајући говор пратимо и покрете говорних органа како бисмо примили више информација и разумели поруку. Што су тешкоће у перцепцији акустичких подражаја веће, визуелни модалитет добија веће значење.

Читање говора са усана и лица саговорника обухвата говорника (експедијента) и онога који чита говор (перципијента). Зависи од визуелне перцепције и аудитивне перцепције, те посебно од мисаоне обраде примљених података. Да би се информација разумела, фонд знања језика експедијента и перципијента морају се поклапати и један другоме прилагођавати.

Основни циљ рада је да прегледом доступне литературе укаже на улогу, значај, специфичности и бенефите и ограничења читања говора са усана.

На способност читања говора са усана утиче низ фактора. То су речник и добро познавање говорног језика, граматике и свакодневног и идиоматског изражавања. Схватање језика је најзначајније за доброг читача говора, због тога што читање говора укључује способност да се користи контекст, што може бити пресудно за уклапање у текућу конверзацију. Степен познавања појмова и читљивост гласова нашег језика су такође значајни фактори. Адекватно усвојени и стабилни појмови се добро читају и када је видљивост гласова од којих су састављени слабија. Добар читач говора узима у обзир и друге компоненте, као што су гестови, говор тела, фацијалне експресије и мотивација. Такође, тренингом, односно увежбавањем, ова вештина се може усавршавати.

Глуве и наглуве особе треба да користе и преостале слушне способности да би попуниле контекст који им недостаје. Може се рећи да доброг читача говора чине количина тренинга, схватање језика, дужина трајања слушног оштећења, степен слушног оштећења, емоционални фактори и визуелне способности.

Ограничења читања говора, односно ситуације које доводе до проблема у читању говора са усана су многобројне. Сам говорник је прва карика у читању говора. Уколико он има специфичне покрете артикулатора, брз или успорен говор, лошу мимику, и/или сувишне покрете главе и тела, читање говора са усана ће бити отежано. Затим, многи средински фактори утичу на лошу концентрацију и слабљење пажње, док се може рећи да и сам говор и његова природа значајно утичу на читање говора са усана и лица. Што је већи број слабо видљивих или невидљивих гласова неког језика, као и у случајевима када речи на уснама изгледају исто или слично, читање је теже.

Међутим, добри читачи говора са усана ове проблеме превазилазе на различите начине. Ослањају се на контекст говора, те на добру визуелну и аудитивну пажњу, а користе се и методе које олакшавају споразумевање. У раду су приказани и различити приступи учењу читања говора с усана.