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## Therapy Program to Improve the Perception of Speech Prosody

### SUMMARY

Prosodic disorders lead to the emergence of difficulties in the process of communication because prosodic phenomena perform multiple functions in communication. They occur in people with various types of speech, hearing and voice impairments. The effectiveness of logopedic therapies in cases of dysprosody depends on the appropriate choice of treatment: it must be suited to the patient's needs and capabilities and it must enable them to acquire competence and skills necessary for understanding prosodic phenomena and successfully using them in communication.

The article presents the authors' own program aimed at improving the perception of prosodic phenomena. The classification and description of individual exercises were based upon the published sources on phonetic and phonological specification of prosodic phenomena and their functions, prosodic disorders and therapeutic management of dysprosody.

**Key words:** speech prosody, improving auditory perception, therapy of prosodic disorders

### INTRODUCTION

Prosodic behavior accompanies the origins of speech development in ontogeny. Even then it already has intentional character and to a large extent improves a child's communication with the people around them. It also constitutes a phonic frame, a matrix which the child gradually fills in with segmental elements at the subsequent stages of speech development, and which enables him/her to organize their utterances in terms of timing, intonation, and motor activity (Bouvet, 1996; Höhle et al., 2009; Grassmann, Tomasello, 2010; Gratier, Devouche, 2011). Once

a child acquires the ability to differentiate and realize phonemes, prosodic structures lose their fundamental role in communication and prosodic development becomes less dynamic (Rymarczyk, 2003; Wells et al., 2004, Wysocka, 2012). Nonetheless, prosody continues to play a major role in conveying meanings and emotions in the speech of children and then adults. Prosodic competence also significantly influences the processes of perception and expression of speech.

Healthy prosodic development determines the acquisition of the ability to perceive prosodic phenomena, understand their meaning and adequately use them in an act of communication. This process is influenced by multiple factors, one of which is the level of ability in terms of physical hearing and hearing functions. What is also vital is the experience gained in various communication contexts as it enables the acquisition of the ability to adequately associate prosodic behaviors with situations in which they occurred, which is significant for the development of understanding of the meaning of prosodic phenomena. If this development is to proceed without disruption, the people in interaction with whom the language user acquires prosodic competence should exhibit communication behavior in which their body language and facial expressions are appropriate for the prosodic functions being performed. This enables the user to learn about the functions which prosody serves in an act of communication and about the prosodic characteristics of the speaker's individual emotions and intentions.

The proper functioning of the speech apparatus – in terms of its respiratory, vocal, articulatory, and co-ordination functions – and auditory control perform an important role in the development of productive prosodic skills (Szielkowska, Kazanecka, 2011). The specificity of prosodic structures employed by particular language users is also influenced by the prosodic patterns they have acquired: those present in the speech of people around them and those characteristic of a given language or dialect, but also those unique to an individual. Of great significance are also the emotions experienced by the speaker, which to a large extent determine the production of suprasegmental structures (Kotz, Paulman, 2011).

The aim of this article is to present the authors' own program for improving the perception of prosody, which can be applied to therapy of prosodic disorders, to developing prosodic competence and skills in children acquiring their native tongue as well as in people learning Polish as a foreign language, and to the activities in the field of artistic logopedics.

## PROSODIC PHENOMENA AND THEIR FUNCTIONS

The prosody of speech is defined as a set of suprasegmental features to which acoustic parameters of voice are assigned: articulation time (especially that of vowels, which carry prosodic features), the amplitude of vibrations (perceived

as loudness) and fundamental frequency (perceived as pitch), usually appearing in multi-syllable sequences (Wierzchowska, 1980). As a result of modulation, the above-mentioned acoustic features form suprasegmental phenomena: stress, intonation and speech rhythm, which have phonological character in the Polish language (Sawicka, 1995). Apart from the ones enumerated above, prosodic phenomena also include vowel length, tone, pauses and – in some broader classifications – even speech tempo (von Essen, 1967), which perform the expressive function in the Polish language (Dukiewicz, 1995; Szpyra-Kozłowska, 2002). Below, short descriptions of prosodic phenomena are presented. The list includes timbre (due to its significance in the program presented here); although it is not a prosodic phenomenon, it is a prosodic feature of speech signal which plays a vital part in conveying information about the speaker's emotion and their individual traits.

**Intonation**, understood as changes in voice pitch over time, is a prosodic phenomenon with enormous significance for communication. It is said to perform numerous linguistic functions, among which the most frequently mentioned include: segmentation function (intonation structures divide a phonic sequence into smaller units); grammatical function (which consists in signaling sentence types) and semantic function (intonation facilitates the communication of meaning and can sometimes even modify it) (Ropa, 1981). Intonation structures also assist the message sender in conveying emotions and characterize the speaker (Wierzchowska, 1971; Pakosz, 1983; Szkielkowska, Kazanecka, 2011).

**Stress** is a prosodic phenomenon whose role is to emphasize a specific element of language (usually a syllable) in a speech sequence. It is accepted that in the Polish language a stressed syllable is characterized by a combination of accentuating features (voice pitch and intensity as well as articulation time) (Dukiewicz, 1995; Sawicka, 1995; Demenko, 1999). According to the results of some studies (Jassem, 1962), a change in voice pitch plays the fundamental role in placing stress. Stress may be placed within a word when it falls on one of its syllables (word stress) or within a phrase – as sentence, logical or rhetoric stress (Wierzchowska, 1971; Dłuska, 1976; Toczyska, 2007).<sup>1</sup>

The main role of stress is to accentuate the elements which are semantically or structurally most crucial in a speech sequence; this allows the speaker to effectively convey their message and the listener – to clearly receive it (Wierzchowska, 1976). The functions that word stress performs in the Polish language are mainly

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<sup>1</sup> The problem of perceptual distinctiveness of word stress in the Polish language was researched by Maria Steffen-Batogowa (2000). The author considered numerous variables; their impact on the perceptual distinctiveness of stress was confirmed by the results of her studies. The variables include, among others: classification of words within which stress is placed as specific parts of speech; length of words; semantic-syntactic combinations of words with the neighboring lexical items; speech pace; style of the utterance as well as the speaker's competence in terms of speaking technique.

connected with delimitation (establishing boundaries between words) and giving rhythm to utterances (the occurrence of stress at similar time intervals within a phrase) (Dłuska, 1976; Sawicka, 1995). Phrase stress accentuates the elements which are semantically most important in an utterance. Sentence stress aids the speaker in emphasizing the part of the utterance which contains information that is new for the listener (rheme). Logical stress, which is optional, enables the speaker to emphasize the information which they themselves perceive as vital, thus helping the listener grasp the content of the message. Finally, rhetorical stress allows the speaker to highlight their attitude towards the presented utterance and to impose their point of view on the listeners (Dłuska, 1976).

**Speech rhythm**, together with tempo, vowel length and pauses, performs a crucial role connected with the temporal organization of elements of a phonic sequence in speech. The orderly timing of them facilitates the processes of speech expression and perception (Wagner, 2003; Młynarska, 2015). Rhythm is defined as the cyclical production of certain speech segments (Zellner-Keller, 2002). It has been observed that in the Polish language there is a tendency to produce phonological words in such a way that their actual or perceived duration time is equalized (Dukiewicz, 1995; Szpyra-Kozłowska, 2002; Wagner, 2012, 2015). It has features characteristic of both syllabic and accentual languages (Wagner, 2015). The perception of speech rhythm is influenced by vowel length structure, intonation, intensity and speech tempo (*ibid.*, p. 250).

**Speech tempo** depends on the duration time of the produced phonic segments and on the number and length of pauses. In an utterance, this phenomenon performs the expressive function, mainly connected with conveying information about the psycho-physical condition of the speaker (Wóycicki, 1960). Speech tempo also performs the informational function, which consists in signaling more and less significant fragments by the speaker (von Essen, 1967). This function is mainly seen in slow and moderate speech tempo, which gives the speaker more phonatory and articulatory control.

**Vowel length (Quantity)** is another prosodic phenomenon which influences the temporal organization of speech. In phonetics, it is defined as the duration time of speech sounds, dependent on the pace of speaking, the style of utterance, the syllable structure and the nature of the phone being articulated (Wierzchowska, 1980). In phonology, the phenomenon of vowel length is connected with the existence of the opposition between long and short vowels. In the modern Polish language, vowel length is not phonological and performs the expressive function. It frequently emphasizes the feature to which the speaker is referring using the lengthening of a phone to express, for instance, irony or admiration (Szpyra-Kozłowska, 2002). The lengthening of phones signals the finality of stress, intonation or intonation-stress units (Dłuska, 1976; Wagner, 2015).

In literature on the subject, a **pause** is most often understood as lack of signal in a phonic sequence (Kriger, 1979). It is a prosodic phenomenon which to a large extent facilitates utterance segmentation by the listener (Demenko, 1999; Szkiełkowska, Kazanecka, 2011). Different functions are also attributed to it: a stylistic function (defining the nature of the utterance), an interpretative function (allowing the speaker to freely and consciously structure a literary work interpreted using their voice) and also a semantic function (describing the pause as “an information carrier”) (Śniatkowski, 2002). The best-known classification of ways of filling pauses was proposed by Howard Maclay and Charles Osgood (1959). They identified two types of pauses: unfilled (defined as a period of acoustic silence) and filled ones. The second category is further divided into repetitions, non-lexical sound fillers as well as phenomena described as *false starts* (the speaker begins articulation, stops suddenly and then continues) (Maclay, Osgood, 1959).

**Tone**, also understood as voice pitch, cannot influence the meaning of words in the Polish language. It mainly depends on the speaker’s anatomical-physiological predispositions (sex, age), linguistic factors (the structure and subject of the utterance) and paralinguistic factors (the kind of information being conveyed, voice scale and the emotions accompanying the utterance) (Laver, 1995; Szpyra-Kozłowska, 2002; Wysocka 2016b). The emergence of pitch patterns in speech is also influenced by socio-linguistic factors connected with the regional varieties of the Polish language: an identification function is ascribed to tone (Szpyra-Kozłowska, 2002).

**Timbre** is the attribute of auditory sensation thanks to which the listener can describe sounds which are stable over time and have the same pitch, loudness and duration as being different (American National Standards Institute, in: Moore, 1999, p. 268). As a prosodic feature in speech it mainly performs an identification function, allowing recognition of the speaker (Jorasz, 1998; Ozimek, 2002). It is also connected with the emotional markedness of the utterance (Bloch, 2015).

## 1. SPEECH PROSODY IN COMMUNICATION

Speech prosody is a phenomenon which plays an extremely significant role in verbal communication. In the process of speech ontogeny, it is one of the first language elements which a child acquires. Owing to its segmentation function, the prosodic structure of speech allows the child to distinguish functional language units in a speech sequence, thus enabling him/her to continue develop language competence (Kwarciak, 1995; Bouvet, 1996; Wysocka, 2007).

Prosody performs numerous and varied functions in communication. According to the best-known classification, linguistic and paralinguistic functions are attributed to it. The above-mentioned classification is strictly connected with the

differentiation between linguistic (language) prosody and emotional prosody (Monrad-Krohn, 1947). Broader classifications also include an extra-linguistic function (Botinis et al., 2001). The linguistic function is closely connected to language structure. It enables segmentation of an utterance, accentuation of its most crucial elements or the signaling of different types of utterances by means of intonation contours. In the Polish language, the phenomena which perform linguistic functions include intonation, word as well as phrase stress and rhythm (Dłuska, 1976; Szpyra-Kozłowska, 2002). The paralinguistic function is an equally important function of speech prosody. It refers to the expression of emotions and to the manifestation of the sender's attitude to the utterance, the recipient and the communication situation. This function also supports the semantic message and enables modification of the meaning of the utterance by giving it a specific emotional tinge (Plante et al., 2002; Herzyk, 2003). The extra-linguistic function of speech prosody is connected with the characteristics of the speaker. It encompasses such individual features of the message sender as their age, sex and socio-economic status (Botinis et al., 2001).

Disorders of perception and expression of prosody partly or wholly prevent the performance of the above-mentioned functions. They cause difficulties in conveying as well as receiving the meaning of the message and the information about its sender. Prosodic disorders have varied etiology (see: Wysocka, 2012). Their causes may include dysfunctions of perceptual, productive, cognitive or emotional nature, manifesting themselves in numerous speech, hearing and voice impairments. They are observed, among others, in people with pragnosia (Milder et al., 2003; Maj, 2013; Wojciechowska, 2014; Panasiuk, 2015b), aphasia (Gurański et al., 2008; Siudak, 2011; Rosińczuk et al., 2014; Panasiuk, 2015a; Poleszak et al., 2016), dysarthria (Falk et al., 2011; Michalik, 2013; Mirecka, 2013; Rożek, Larysz, 2014), the damaged hearing organ (Chatterjee, Peng, 2008; Chin et al., 2012; Wysocka, Mackiewicz, 2016c, 2017), autism (McCann, Peppé, 2003; Bobkiewicz-Lewartowska, 2005; Paul et al., 2005), oligophasia (Pettinato, Verhoeven, 2009; Michalak-Widera, 2012; Jęczeń, Kozera-Wierzchoś, 2015), dyspraxia (Rosenbek and Wertz 1972; Shewan, 1980), specific language impairment [SLI] (Marshall et al., 2002; Wells, Whiteside, 2008; Cumming et al., 2015), voice disorders of various etiology (van Riper, Erickson, 1996; Dejonckere et al., 2001; Rzepa, 2010; Wysocka 2015). People with the above-mentioned disorders receive therapy aimed at improving the perception and expression of prosody.

## 2. IMPROVING THE PERCEPTION AND EXPRESSION OF PROSODY – THERAPY TECHNIQUES

A range of therapy methods and techniques are used in order to improve the perception and expression of prosody (see: Wysocka, 2016a). Such activity is part

of prosody disorders therapy, speech development stimulation and the process of improving the prosodic competence and skills in people wishing to refine their speech technique or learning foreign languages.

Among the programs used by therapists working with patients there are ones which are solely based on speech signal (Hargrove, McGarr, 1994; Baumgartner et al., 2001), but also ones which make use of other, especially musical, acoustic stimuli (Kowalska, 1989; Zoller, 1991; Rothstein, 2013) or visual stimuli (Rosenbek et al., 2006; Ballard et al., 2010).

Some programs include, apart from the structure of prosodic units, the functions of prosody in communication (mainly the connection between intonation contours and a specific type of utterance, the coding of emotional attitudes in prosodic structures, the segmentation function of pauses) (Rosenbek et al., 2006; Rothstein, 2013; Peppé, 2015).

The choice of appropriate strategies, techniques and programs depends on numerous factors, such as, among others, the causes of dysprosody, the patient's capabilities and the aims of the therapy.

Table 1 lists therapy techniques aimed at improving the perception and/or expression of prosody, applied in therapy and prevention schemes.

Table 1. Therapy techniques implemented in improving prosody perception and expression

Technique	Perception	Expression
discriminating between the characteristics of acoustic stimuli – speech signal and musical ones	+	
determining the characteristics of stimuli	+	
determining the characteristics of prosody structures	+	
matching the heard prosody productions to situations in which they are used	+	
putting stimuli into pairs on the basis of contrast	+	+
exaggerating contrasts of the characteristics of prosody structures	+	+
decreasing the intensity of the characteristics of prosody structures	+	+
clues: auditory, visual, kinesthetic	+	+
presentation of negative patterns	+	+
illustrating the characteristics of prosody structures	+	+
exercises on auditory and sensory self-monitoring	+	+
imitation of prosodic structures	+	+
delayed repetition	+	+

Ciąg dalszy Table 1.

Technique	Perception	Expression
speech shadowing	+	+
prompting	+	+
giving feedback	+	+
breathing, phonation and articulation exercises		+
guided expression		+
modeling prosodic productions		+
speech expression exercises using gross motor skills		+
rhythmic speaking		+
individual and group reading		+
individual and group singing		+
group speaking		+
using prosodic behavior customarily related to the situation		+
adjusting the produced prosodic structure to the type of utterance, intention and situation	+	+
dialogue and narration production	+	+
drama	+	+

Source: Authors' own specification based on Hargrove and McGarr (1994).

### 3. THE AUTHORS' PROPOSED PROGRAM OF AUDITORY PROSODIC TRAINING

Prosodic differences between individual languages constitute an impediment to the universal use of foreign language programs and therapy techniques in the process of improving prosodic competence. Among the Polish sources there are few studies on the methodology of work on speech prosody. Such attempts have been made mainly in the cases of children with the damaged hearing organ (Sieńkowska et al., 2000; Gubrynowicz, Sieńkowska, 2001). The only fully developed program for treating prosody disorders, which contains the description of methodological assumptions and individual exercises, is also aimed at children with hearing loss. It was compiled by Alina Kowalska-Pińczak (1989). This program, suited to the needs of people with the damaged hearing organ, focuses on the issues which are crucial in such cases: the improvement of emission functions and auditory perception in terms of the characteristics of musical and speech sig-

nals important for the perception of speech prosody and for controlling its expression. Music and instrumental music practice as well as vocal practice constitute a considerable part of the program.

The need to develop the authors' own program presented in this article resulted from lack of modern, multi-dimensional and widely available study helping to systematize therapy aimed at improving the functions which determine the perception and expression of prosody as well as the perception of individual prosodic phenomena. The presented program contains the authors' own methodological solutions and exercises. We are convinced that it encompasses all the skills crucial to the acquisition of the ability to perceive prosody. Due to varying etiology and specificity of prosodic disorders, it is necessary to adjust particular therapy techniques employed within the program to the individual needs and capabilities of the patient.

The presented program includes exercises whose aim is to improve auditory perception in terms of sound parameters crucial to the perception of individual prosodic phenomena. We advise using the sounds of music in many of the exercises proposed in the program. The connection between prosody and music is based on the existence of an analogy between the structure of language constructions, especially suprasegmental ones, and music constructions (Sloboda, 2002), and on the existence of similarities in the neurological organization of processes involved in perceiving the sounds of speech and the sounds of music (Maess et al., 2001; Koelsch et al., 2004; Skupio, 2013). The influence of musical stimulation on the improvement of prosodic skills has been confirmed by numerous study results (among others: Kowalska, 1989; Thompson et al., 2004; Nitsch, Hüther, 2001; Kwaterkiewicz, 2016). Owing to its multiple phylogenetic, ontogenetic, acoustic and physiological relationships with speech, singing plays a special role in developing prosodic skills (Patel, 2017).

It is necessary to improve the perception of prosodic phenomena in people whose difficulties with perception of prosody result primarily from hearing problems; hence measures undertaken in this area focus on improving hearing abilities and attention and memory processes on which those hearing abilities rely. During the perception training it is extremely important to adjust the difficulty level of tasks to the patient's capabilities. At the initial stages of the training, the tasks should be performed either with the therapist's assistance, or with the use of auxiliary stimuli (i.e. visual ones) illustrating the intensity or modifications of a given sound characteristic, or with the aid of hand movements performed in response to the occurrence of an acoustic stimulus and its characteristic. Individual tasks should also consist of a lower number of elements, while the characteristics and phenomena whose perception is being improved should be heavily emphasized in the exercise material.

The proposed perception exercises include:

1. Exercises improving auditory functions in terms of the perception of speech and music sounds:
  - auditory discrimination of sound characteristics: loudness, pitch, timbre, length;
  - determining the characteristics of a sound and their source;
  - auditory attention and selectivity;
  - auditory memory.

While working with patients whose problems with prosody perception result from hearing disorders, the above exercises should constitute the first stage of the improvement program.

2. Practice proper: exercises on the perception of individual prosodic phenomena: intonation, stress, rhythm, tempo and vowel length, and on the perception of emotional prosody (combined with facial expressions, gestures, and illustrative material).
  - I. The first group of exercises includes **exercises on auditory functions**. The perception of speech prosody to a large extent depends on biological factors. Among them, efficient (healthy) auditory perception – in terms of physiological hearing and auditory functions – plays a crucial role (in: Kurkowski, 2002). The presented program includes exercises stimulating various auditory functions necessary for the acquisition of the ability to perceive individual prosodic phenomena: discrimination of specific sound characteristics, the ability to determine sound characteristics and source, auditory attention and selectivity as well as auditory memory.

## EXERCISES ON DISCRIMINATION

These exercises are based on the procedure of alternative forced-choice. The stimuli are presented in pairs, and the person performing the task is supposed to decide whether the given stimuli are the same or different. Such exercises develop the following abilities:

- discrimination of the loudness of sounds of classical music and sung and spoken vowels and syllables; at first, discriminating between extreme loudness levels: quiet and loud (*piano – forte*), then between three loudness levels: quiet – moderate – loud (*piano – mezzo piano – forte*);
- discrimination of gradual changes in loudness: louder and louder / quieter and quieter (*crescendo, decrescendo*);
- discrimination of the pitch of sounds of classical music and sung and spoken vowels and syllables (from extreme pitch values to moderate ones);
- discrimination of gradual directional changes in pitch values (higher and higher / lower and lower);

- discrimination of the length of sounds of classical music and sung and spoken vowels and syllables;
- discrimination of gradual changes in the length of stimuli;
- discrimination of rhythmic structures (from simple, homogenous units to complex structures);
- discrimination of the tempo of sounds of classical music and sung and spoken vowels and syllables; at first discriminating between the extreme tempo levels: fast – slow (*allegro* – *adagio*), then between three tempo levels: fast – moderate – slow (*allegro*, *moderato*, *adagio*);
- discrimination of the timbre of sounds of musical instruments and human voices.

### EXERCISES ON DETERMINING THE CHARACTERISTICS OF SOUNDS AND THEIR SOURCES

Association exercises aim at developing the ability to connect the parameters of sounds of speech and music with specific ideas and to use these ideas when describing the perceived sounds of speech and music, and prosodic and musical phenomena. The discussed exercises improve:

- determination of the loudness of sounds of instrumental music and sung and spoken vowels and syllables; determination of the gradual changes in loudness;
- determination of the pitch of sounds of instrumental music and sung and spoken vowels and syllables; determination of the gradual directional changes in pitch;
- determination of the length of sounds of instrumental music and sung and spoken vowels and syllables; determination of the gradual changes in length;
- determination of the tempo of sounds of instrumental music and sung and spoken vowels and syllables; determination of the gradual changes in tempo;
- determination of the source of sounds of instrumental music and human voices of different timbre.

### EXERCISES ON AUDITORY ATTENTION AND SELECTIVITY

The purpose of exercises improving auditory attention and selectivity is to develop active and conscious perception of sound stimuli in the recipient. These abilities also play a crucial role in distinguishing the elements in a speech

sequence, vital for understanding the message. The exercises are based on the following forms of activity:

- responding to the occurrence of a stimulus;
- responding to the occurrence of the stimulus of specific parameters;
- deciding whether two sound sequences (of varied pitch, intensity, duration time and timbre) are the same or different (with no delay);
- responding to a change in a specific sound parameter (pitch, loudness, length);
- distinguishing specific sound stimuli from acoustic background;
- distinguishing from a sound sequence the stimuli which differ from others in terms of the intensity of a specific characteristic (loudness, pitch, length) or in terms of timbre;
- determining the pitch, loudness and length of two-, three- and four-unit sequences of sounds of music and human voices (for example, low – low – high; loud – quiet – quiet; long – short – long).

### EXERCISES ON AUDITORY MEMORY

Exercises on auditory memory aim at improving the ability to recall the auditory patterns of specific prosodic structures, which enables the decoding and analysis of information included in the prosody of the heard utterances as well as the use of these patterns in one's own prosodic behavior. In this group of exercises, the component modifications introduced in order to raise the difficulty of the task include: 1) the lengthening of the pauses between the stimulus and the response by the person doing the exercise and/or between the stimuli provided one by one within the same activity; 2) the increasing of the number of elements which make up the structures presented in the tasks. Exercises on auditory memory encompass the following activities:

- discriminating between single sounds differing in terms of pitch, loudness, and timbre; the sounds are provided in pairs, with long intervals between the stimuli;
- discriminating between paired sequences of music sounds of varied pitch, loudness, length and timbre;
- discrimination of rhythm structures (from simple homogenous units to complex structures);
- discriminating between paired sequences of music sounds of the same or different loudness (quieter and quieter, louder and louder), of the same or different length (shorter and shorter, longer and longer), of the same or different pitch (higher and higher, lower and lower) and of varied tempo (faster and faster, slower and slower); the sequences are separated by intervals;

- reproducing musical rhythmic structures present in the musical and language material using natural accompaniment (clapping, tapping, rapping) or musical accompaniment (with the aid of musical instruments);
  - reproducing sound sequences of varied pitch, loudness and length using musical instruments.
- II. The second group of perception exercises consists in **practice proper**: the **exercises on improving the perception of prosodic phenomena**: intonation, stress, rhythm and vowel length as well as the so called emotional prosody, which constitutes a specific combination of their characteristics. The exercises entail the use of the previously acquired skills in auditory functions in order to shape the perception of individual prosodic phenomena.

## EXERCISES ON THE PERCEPTION OF INTONATION

The aim of this group of exercises is to develop the ability to perceive specific intonation patterns, especially within phrases, as well as the ability to associate intonation contours with the type of utterance which they signal. The exercises on perception of intonation are intended to develop the following abilities:

- discriminating between paired words and sentences with rising and falling intonation contours;
- determining the direction of intonation change (rise and fall) in words and phrases of different lengths;
- discriminating between paired words and sentences with rising-falling and falling-rising contours;
- determining the direction of intonation change: rising-falling vs. falling-rising;
- discriminating between paired words and sentences with varied intonation patterns, more complicated than the above-mentioned oppositions of rise vs. fall and falling-rising vs. rising-falling (i.e. rising contour – falling-rising contour, falling contour – falling-rising contour, falling contour – falling contour) and determining the direction of intonation changes in those patterns;
- determining the type of utterance (i.e. a statement, a question, a command) on the basis of the heard intonation contour;
- determining the appropriateness of the intonation contour produced by the therapist for the type of the utterance.

## EXERCISES ON THE PERCEPTION OF STRESS AND RHYTHM

Their purpose is to practice the ability to perceive phrase and word stress as well as rhythm-stress structures which emerge as a result of repetition of word stress over time. The exercises are based on the following activities:

- discriminating between paired sentences differing (or not) in terms of the placement of phrase stress (i.e. *Lubię śpiewać./Lubię śpiewać* [I like singing. / I like **singing**.]);
- identifying the stressed word in a phrase;
- discrimination of the placement of word stress in the presented pairs of two- and multi-syllable words (i.e. *lokomotywa, lokomotywa* [locomotive, locomotive]);
- identifying the stressed syllable in two- or multi-syllable words;
- identifying the correct placement of stress in two- or multi-syllable words read by the therapist in accordance with the orthophonic norm or against it (i.e. *sympatyczny*, NOT: *sympatyczny* [sympathetic, and not **sympathetic**]);
- responding physically (for example by clapping) to the phrase and word stress repeated in a speech sequence;
- discriminating between voice interpretations of strongly rhythmized text excerpts differing in terms of rhythmic organization, for example, consisting of iambs (- ' -) or amphibrachs (- - ' -); optionally with the use of clapping as a reaction to the stressed syllables heard.

## EXERCISES ON PERCEPTION OF TEMPO AND VOWEL LENGTH

These are intended to develop the ability to perceive a specific realization tempo and, at the same time, vowel lengths of individual segmental elements of a phonic sequence, to perceive variations in the tempo (speaking rate) and pauses, which to a large extent affect speech tempo. This group includes the following exercises:

- discrimination of the duration time of vowels and syllables presented in pairs or multi-element chains;
- determining the length of vowels and syllables;
- discrimination of the realization tempo of paired words, word groups and phrases produced at various rates; initially, discriminating between extreme values (fast – slow), then with the use of moderate tempo;
- determining the realization tempo of words, word groups and phrases;
- discrimination of gradual changes in the realization tempo of segments in words, phrases and longer utterances, and their characteristics;

- discriminating between phonic sequences differing (or not) in terms of the number of pauses, their placement and length;
- identifying the placement of pauses in a phonic sequence;
- determining the number and length of pauses occurring in a phonic sequence.

## EXERCISES ON PERCEPTION OF EMOTIONAL PROSODY

Their aim is to develop the ability to associate individual characteristics of speech sounds and specific features of prosodic phenomena with particular emotional markedness of an utterance as well as the ability to recognize emotions encoded in prosody. What may prove helpful at the initial stages of work is the use of visual materials illustrating individual prosodic characteristics or emotions. The exercises develop the following abilities:

- discrimination of the prosodic emotional markedness of paired utterances;
- determining the emotional markedness of an utterance on the basis of its prosodic characteristics (possibly with the use of materials showing facial expressions typical of individual emotions, gestures or names of emotions);
- determining the prosodic characteristics of utterances marked with specific emotions (i.e. their length, loudness, average pitch, the range of changes in pitch, realization tempo, timbre) – with the optional use of visual materials illustrating the particular phenomena;
- determining whether the heard prosodic production is appropriate for the semantic content of the utterance (i.e. *Jestem zły. Jestem smutny. Cieszę się* [I'm angry. I'm sad. I'm happy].);
- determining whether the prosodic realization of an emotion agrees with the presented facial expression or a specific emotion name, with the use of utterances which are emotionally neutral in terms of their semantic content (i.e. *Piję mleko* [I'm drinking milk].); optionally with the use of visual material (labels with names of emotions, photographs or drawings showing facial expressions typical of particular emotions);
- identifying the emotional markedness of utterances where it is not appropriate for their semantic content (for example, the sentence “*Boli mnie głowa* [I have a headache].” marked with happiness rather than sadness), with the option of using visual materials.

## CONCLUSIONS

Prosodic phenomena perform a significant role in language communication. All the disorders in the perception and expression of speech prosody can lead to

the emergence of difficulties in communication; it is, therefore, vital to take appropriate preventative or therapy measures. The choice of therapy strategy and techniques suited to the genuine needs and capabilities of the patient is one of the factors which determine the acquisition of prosodic competence and skills. It is necessary to individualize the perception-improvement activities due to the varied etiology of prosodic disorders and to the varied aims of actions taken as part of logopedic therapy, speech development stimulation, artistic logopedics or teaching Polish as a non-native language. The listed factors must be taken into consideration while defining the scope of logopedic therapy and planning and administering the treatment.

The program presented in this article encompasses a variety of exercises which are based not only on speech signal, but also on music and visual stimuli so as to ensure that the patient is as actively engaged as possible and enable multi-modal perception of prosody. The program includes activities which improve auditory functions, tasks preparing for the perception of speech prosody and practice proper: exercises on prosody whose aim is to develop the perception of individual prosodic phenomena – intonation, stress, rhythm, tempo, and vowel length as well as emotional prosody. When administering therapy, it is necessary to adjust the technique of conducting individual exercises to the needs and capabilities of the patient.

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