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Prototypical orofacial experience

SUMMARY

The author presents the analysis of the relation between the primary activities and articulation. By taking advantage of the terms connected with cognitive linguistics, one indicates the prototypical orofacial experience. They constitute the biomechanical basis of articulation. Compensational strategies, that is the primary and secondary ones are being distinguished.

Key words: disorders in primary activities, articulatory defects, primary compensation strategies, secondary compensation strategies, prototype

In the therapy of speech disorder, it is worth encountering not only the “landscape” in the surgery, but also with its generalized map.

TOWARDS THE HISTORY OF THE IDEA CONNECTED WITH SPEECH THERAPY

The development of speech is determined by the factors of biological and psychological-social nature, and – if we assume another perspective – it embraces individual learning and cultural learning. At the same time, both paths are the elements of the same developmental process. The former involves everything that human beings can acquire without other people’s engagement and without the things connected with cultural creation. Such skills may be, for example, some games with a tongue and fingers enabling the child to learn about the oral cavity, biting and chewing which, apart from preparing a piece of food, make the tongue

more flexible and contribute to the better mobility of jaws. On the other hand, the cultural learning is feasible owing to the presence of other men and products of cultural creation. Language, mathematics, chess, using different tools are such products.

Profiling the biological factors responsible for the development of speech, particularly in relation to the development of the phonetic-phonological system in the aspect of performance, is a subject matter of many reports. The particular authors categorize the kind of biological factors connected with the progression of articulation path in different ways, which causes that they cast light on several aspects of the problem issue connected with the development of speech. The researchers have been particularly keen on the development of the phonetic-phonological system for several dozen years. They have also been interested in its limited base, but also the biological activities, such as breathing, eating and drinking. Thereupon stimulating the development of the functions connected with feeding and drinking became one of the key tasks of the earlier therapeutic intervention, which is mentioned in many publications by therapists and researchers. No one is astonished by the therapist's teaching of breathing, drinking and eating in the cases of young and older patients. One of the precursory researchers who accepted that the biological activities (for example, breathing, drinking and eating) build the biomechanical basis of speech was Elzbieta Stecko. Her scholarly activity as well as the practical experience, which has been well known in Poland for several dozen years, contributed to the promotion and popularity of early intervention which involves – besides other areas of help – monitoring the correct development of the skill of breathing, drinking and eating (Stecko 1996, 2002). The fact the authors noticed the relevance of the biological functions in the face of articulation development may be encountered in different publications (for example, Stecko 1996, 2002, Mackiewicz 2001; Masgutowa Regner 2009; Konopska 2006; Pluta-Wojciechowska 2000, 2008, 2011, 2013; Łada 2012).

The speaking ability control procedure which is often propounded is the evaluation of children's different skills connected with food consuming and quenching thirst. This perspective is found in the publications of the authors mentioned here and in other ones, too. The issue that is strictly connected with biological functions in speech therapy has, therefore, been well known long since. Appreciating the relevance of these functions in the context of speech development is found in various research perspectives, among which the following ones might be mentioned:

- defining the model of the development of biological activities (Pluta-Wojciechowska 2009, 2011),
- searching for the paradigm of the diagnosis and the therapy of the biological activities,

- carrying out the research in the field of any relations between the development of biological activities and speech (Finnie 1994; Mackiewicz 2001; Hiie-mae, Palmer 2003; Pluta-Wojciechowska 2011, 2013; Serrurier, Badin, Barney, Boë, Savariaux 2012; Liśniewska-Machorowska, Pluta-Wojciechowska, Zaremba, Nowak 2007),

- determining the essence of the experience coming from the biological activities and their relation with articulation (Finnie 1994; Mackiewicz 2001, Hiie-mae, Palmer 2003; Serrurier, Badin, Barney, Boë, Savariaux 2012; Pluta-Wojciechowska 2011, 2013).

Applying the above developmental sequence of certain phenomena (that is, the model of development with the indication of the key symptoms which should appear in healthy children at some age) is a characteristic feature in the case of researchers searching for the essence and interpretation of the symptoms related to speech disorders. At the same time, it is worth noticing that due to the diagnostic aims we bear in mind, this model of the development of the given functions is indispensable. On the other hand, what is essential from the point of view of therapy carried out is the order of the occurring phenomena as this order determines – if we assume the metaphorical perspective – the order in which the formation of the given skills will take place. The order leads the child from the ability to use, for example, simple forms in its speech to the ability to use the more complex language constructions. In other words, it refers to the model of development of the given function which is given to us by nature, if, again – we accept the metaphorical image – we may personify it in this place.

We might also assume the simplified theory that appearing of the speech disorder in ontogenesis of the man also embraces some sequence of events which are more or less distant from one another. The researchers are, therefore, able to describe the way of formation of the disorders in a more or less detailed way taking into account the given chronology. We may state that the diagnosis is an attempt of reconstructing the process of appearance and the way of creation of defects. Hence, the research involves not only the register of the symptoms of the language use incompatible with the norm but also the research in the area of the factors which could contribute to the formation of the concrete speech dysfunction.

The following article takes advantage of the model of development of biological activities and aims to discover at least some part of the mystery of the developmental program, which was prepared for children by nature by leading them “from the primary activities to the secondary one.” Our goal is, therefore, to try to define the core of the experience which is collected by the child during breathing, eating and drinking. This knowledge may become the basis of diagnosis and therapy of speech dysfunctions connected with breathing, drinking and eating. One may also be of great importance and assistance when it comes to the recon-

struction of formation process of the disorders of the development of phonetic-phonological system, which has just been discussed.

THE PRIMARY ACTIVITIES AND THE SECONDARY ACTIVITIES

Roman Jakobson, when commenting on the language development, introduced some sequence which defined the order of the appearing functions: the primary elements and the secondary ones. In the description of ontogenesis of language this concept was used by Maria Zarebina (1994). Jakobson's thought connected with ordering some phenomena may, however, be widened and a new perspective can be accepted. The perspective involves the primary activities¹ and, then, the secondary activities² (Pluta-Wojciechowska 2011, 2013).

The primary ones are the different functions taking place inside the oral-facial-pharyngeal space and appearing prior to the articulation of sounds understood as realizations of phonemes or they also accompany its development. The primary activities are of diversified nature. What is certain is the fact the list presented does not include all of them as ever, as I add new functions repetitively. The idea connected with the catalogue of the primary activities is rooted in the reflection connected with the fact the particular activities occurring in the oral-facial area (or even in the oral-facial-pharyngeal area) are the matters of interest in the case of many disciplines. The researchers representing different branches of knowledge analyze the given activity from their own stance and the particular methodological point of view. Dissemination of the knowledge concerning the same issues caused that I presented the catalogue of the activities naming them the primary activities.

As several researches in the field of speech therapy, pediatrics, neurology, laryngology, and physiotherapy show, the bone and muscular structures connected with the oral-facial-pharyngeal complex, and, particularly, the muscles of face, oral cavity, pharynx, and oesophagus are used by people to a different extent in the case of various activities. They are as follows:

THE PRIMARY ACTIVITIES:¹

- oral reflex movements,
- physiological breathing and breathing during high physical exertion,

¹ “**The primary activities** (primeval) are in particular such activities as breathing and food intaking as well as drinking. They develop on the basis of the primary motor system, but also, to a different degree, they are other non-verbal activities within the oral-facial complex, such as, for example, orofacial sensory activities, the way the head is put when lying, physiological activities, such as, yawning, coughing, etc., facial expression, autocheck, autoexperimenting, and orofacial autoplay, which constitute, together with the nervous system, the motor basis of speech in the prenatal and postnatal” (Pluta-Wojciechowska 2013, p. 305–306, in Pluta-Wojciechowska 2011, p. 125).

- consuming food and drinking,
- orofacial sensory system, that is 1) sensation inside the mouth; such features as texture, taste, food temperature and other features corresponding to different objects placed in the oral cavity; that is sensation of the oral cavity, but also 2) sensual impressions on the surface of face,
 - finding the comfortable position for the head when going to sleep, lying, carrying and feeding the baby,
 - self-stimulation, self-examination, self-experimentation, orofacial self-playing,
 - facial expression,
 - the functions of physiological character, frequently with the features of reflex movements, such as, yawning, coughing, snoring, sneezing, hiccupping, activated during the course of development (in the case of some children),
 - some disadvantageous habits connected with the organ of chewing, that is, parafunctions, and in my perspective, sucking, biting not connected with food,
 - expressing feelings and sensation, for example, smiling, kissing (the roots of the last element are probably connected with food consumption),

SECONDARY ACTIVITIES:²

- articulation (Pluta-Wojciechowska 2011, 2013).

The list is not only a catalogue, but it is a system of the activities which are related one to another and depend on one another. The youngest activity in the oral-facial space, which appeared in phylogenesis is articulation. That means it is prone to the influence of disadvantageous factors of primary character in relation to it. The links among the activities are presented beneath.

² “**The secondary activity** is speaking, which appears in the developmental process as the ectypal activity in relation to the primary activities. The primary feature and the secondary one are connected with ordering changes which appear in the course of development. What I mean by the secondary feature of speaking is, on the one hand – generally speaking – the fact that the extraordinary human skill developed in phylogenesis by using the earlier biological activities in an exceptional way, and, on the other hand, the fact that it starts to exist in ontogenesis and emerges as a result of progression of many functions, including those of biomechanical character and connected with the activities protecting oxygen and food supply” (Pluta-Wojciechowska 2013, p. 306, in Pluta-Wojciechowska 2011, p. 122).

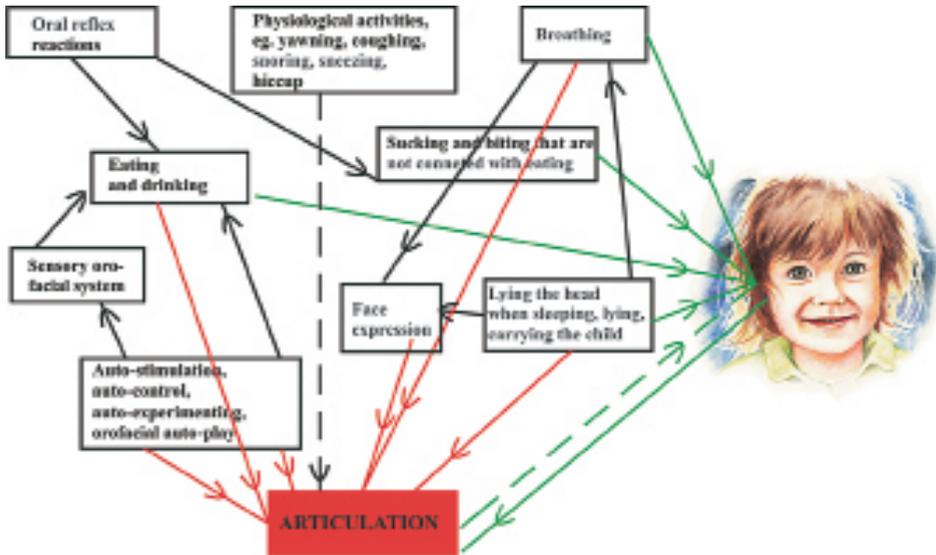


Chart 1. The main relations among the activities in the oral-facial space.

Source: D. Pluta-Wojciechowska, *Zaburzenia czynności prymarnych i artykulacji. Podstawy postępowania logopedycznego*, Ergo-Sum, Bytom 2013, p. 20.

The drawing symbolizes the oral-facial space in the morphological aspect. The solid line means the relations of the activities. The hash marks reflect our doubts which appear in connection with the questions: 1. What is the precise link between the physiological activities, for example, yawning, and the development of articulation? 2. Isn't the tongue pressure during articulation too strong? The first question was inspired by the experience from speech therapy during which such activities are used to exercise the soft palate. Probably during such activities as yawning or coughing, during the development the child "discovers" some positions and movements of organs and later, in a specific way, trains and consolidates them. The answer to the second question requires some more detailed discussion (see Pluta-Wojciechowska 2013, p. 128–136).

Source: D. Pluta-Wojciechowska, *Zaburzenia czynności prymarnych i artykulacji. Podstawy postępowania logopedycznego*, Ergo-Sum, Bytom 2013, p. 20.

While commenting on the primary activities, it should be emphasized that they ought to be the object of the speech therapy examination whose main aim is to explain the reasons of the speech dysfunction or establish a level of risk connected with the occurrence of speech defects. Thus, the research concerns the development of particular primary activities in comparison with the norm predicted for each patient depending on her or his age. It means that the speech therapist should be familiarized with the model of development of the particular primary activities, and the remarks concerning this issue may be found in several publi-

cations (Finnie 1994, Karłowska (ed.) 2008; Masgutowa, Regner 2009; Proffit, Fields 2001; Pluta-Wojciechowska 2009; Stecko 1996, 2002). On the other hand, the synthesis of the model of the activities connected with eating, drinking and breathing can be found in the work by D. Pluta-Wojciechowska (2011, 2013).

THE MEANING OF THE PRIMARY ACTIVITIES FOR ARTICULATION. DIFFERENT MEANS OF DESCRIPTION OF THE PHENOMENA

Bearing in mind the articles concerning the model of the primary activities connected with eating, I will not deal with this issue in the following paper. I will focus on the analyses aimed at defining the essence of experiences coming from repetitiveness of the activities connected with breathing, eating and drinking and at pointing to their role in the development of the articulatory skill instead.

One of the sources of inspiration for me that became the beginning of thought connected with the name *prototypical orofacial experience* was – which may be surprising – cognitive linguistics. This branch of linguistics is not that popular among the researchers dealing with speech therapy. My present interest in cognitive linguistics is related to the fact that the terms that are offered by this field may be benefited while explaining some difficult issues, for example, when commenting on the relation among eating, drinking, breathing and articulation. This relation is described in literature in the following way:

- mapping the feeding movements and breathing movements in articulation,
- the additional specialization of the organs serving to breathe and take in food,
- the secondary use of the organs,
- a biomechanical base of articulation,
- the primary activities as a biomechanical base of articulation,
- parallel character of the development of the activities connected with eating and articulation,
- the prototypical experience resulting from breathing and taking in food and drinking,

The particular phrases – in spite of the fact they concern the same phenomenon – describe it in a different way and therefore, they have various semantic values. I am deeply convinced that the means in which we will picture the relation between the biological factors and articulation has an influence on the kind of the afterthought accompanying the potential reader. As – according to J. G. Herder – “language assigns borders and the outline of the entire human cognition” (Herder 1969, p. 99, in: Grabias 2001, p. 41).

While considering the issue of the development of the articulated speech in philogenesis, we might state that, as a result of the human needs connected with articulation, people had adapted the organs for it (the organs which originally take part in the activities related to eating and drinking as well as breathing). Thus, the speech organs are, in fact such organs whose the primary role was breathing, taking in food, and drinking. It happens in this way, as in the man does not exist an isolated skeletal-muscular-nervous system, which would be able to be used in articulation. There is, therefore, an additional specialization of the oral cavity and the nasal cavity (connected with breathing). Hence, the thesis becomes clearer, that is, during the biological activities there occurs some kind of training. One prepares people for articulation. The movements of speech organs while creating sounds use the same space as the one during eating, drinking and breathing.

As K. M. Hiiemae's and J. B. Palmer's (2003) research has shown, the movements of the organs performed during articulation and eating are not unified but they are only similar to one another to a different degree. The basic differences refer to the amplitude of the movements of the jaws which is different during biting and chewing and during articulating sounds. The shape of the tongue during swallowing is not identical with the one present during eating, although it is similar to that presented during articulation of some sounds (compare Pluta-Wojciechowska 2011, 2013; Serrurier, Badin, Barney, Boë, Savariaux 2012).

THE METHODOLOGICAL BASES OF ANALYSIS

The relation between breathing, eating and drinking and between articulation can be described by using different terms. It may also happen that we may use here the operational terminology connected with cognitive linguistics. In various analyses the operational term is applied due to the cognitive reasons and its main aim is the better explanation of the complicated matters. It can be stated that the operational term is a kind of the cognitive tool which is to facilitate the difficult issues and problems or a structure of terms which we cover a phenomenon which is analyzed in order to explain, comprehend and order it. In some cases the terms used to explain something are of metaphorical nature. The example where we use the different terms in order to explain the affair can be the term phoneme. One is pictured in different ways by using the operational terms.

By applying the above strategy while commenting on the biological bases of articulation in the case of children with cleft lip and cleft palate, as early as in 2000 I underlined the fact they are of prototypical nature (Pluta-Wojciechowska 2000, p. 117). I also noticed then that the child adapts the early experiences connected with breathing and eating due to the needs connected with articulation. Therefore, they can be described in the category of prototype for the child, because – simplifying some issues – on the one hand, they often occur and, on the other hand, the

child “benefits” from them during the phonetic development. The situation does not surprise us if we bear in mind the space where the activities connected with eating, breathing activity and articulation take place.

In order to understand the essence of the term *prototypical orofacial experience*, firstly, we have to say what the term *prototype* means. In the Dictionary of Foreign Terms, *prototype* (in Greek *prōtótýpon* comes from *prótos* = the first + *týpos* = reflection, pattern) is described as the primary and the earliest pattern of something which becomes the basis of creating or imitating something. It is the first model of machine or device which (after proper tests and experiments) is the basis of launching the full production of it (Tokarski 1971, p. 609).

Thus, from this perspective, *prototype* is something that is of primary nature. It also signifies that one thing is created on the basis of the model of something else. This perspective of the definition is colloquial and – as I may assume – reflects how non-scholars, non-linguists and, generally, non-experts perceive it (see the comment on the issue connected with the kinds of definitions, acc. to Taylor 2001, p. 108). In cognitive linguistics the term *prototype* has more detailed meanings.

In this place, there appears an afterthought connected with the question why scholars make up and introduce new terms or even offer some different meanings of the well-known words. It is an important issue and the answer to it will allow to comprehend an amazingly important issue in the context of this article which is associated with introducing the term *prototypical orofacial experience*. The introduction of this notion together with the explanation of its content will facilitate – in my opinion – our understanding of the complex issues and it also holds much meaning in the context of designing and carrying the speech therapy. It happens in this way as the prepared concept of *prototypical orofacial experience* may become the methodological line when designing such speech therapy programs in the case of defects of primary activities.

As regards the issue which we are considering, it is worth noticing that the scholar, when testing some part of reality and discovering new phenomena connected with it, desires not only to define its essence, but also to name it. In this way, the new knowledge has a chance to become an object of thinking, an object of analyses and syntheses and it may start to function in other researchers' minds. The reason for this is that fact that – as I mentioned before (when citing the words expressed by J. G. Herder) – “language defines the borders and outlines the whole human cognition”. Therefore, everything we discover may be given a name and it can additionally be defined. We may also clearly outline the borderline of the given category of the notion.

When discussing the speech disorders, M. Michalik (2006) draws the reader's attention to the remarks made by another researcher who formulated his reflection concerning the question what science means. T. Hołówka writes: “[...] science is

continuation of common sense. It comes from everyday observation and it even shares initial assumptions [...] and some procedures with One of the crowd [and] thinking that is typical in the case of researchers is a kind of everyday thinking which is limited in some way” (Hołówka 1986, p. 53, in: Michalik 2006, p. 20). It becomes clear that in the scholarly terminology we use some terms deriving from colloquial language. However, here they gain a different order and scope (see in: Maćkiewicz 1996).

When writing about prototype, which we discussed above, it should be emphasized that this is one of the fundamental notions connected with the achievements presented by E. Rosch (1978). The researcher defines it as the prime example of the given category (1978). It is a basic notion of her concept which may be described as the theory of categorization³. The author writes: “[...] what we mean by prototypes may be described as follows: prototypes of a category are, generally speaking, the clearest and the most expressive cases among all the members of the category defined in an operational way as human judges about the top-class member of the category” (Rosch 1978, p. 40). The contexts which the researcher used while building her own concept were L. Wittgenstein’s discoveries (1972). The researcher indicates that the notions are inhomogeneous and introduces the term *the familial similarity*.

Rosch’s theory had an influence on cognitive linguistics. It is, however, difficult to discuss all the standpoints concerning categorization presented by the authors dealing with categorization, including the one based on prototype (see: Lakoff 1987; Lakoff, Johnson 1988; Langacker 1987, 1995, 2003, Taylor 2001, Trzebiński 1981, Nowakowska-Kempna 1995, 2000a, 2000b). The researchers emphasize the fact that something that occurs with the highest frequency becomes typical, representative, and, according to it, in this meaning, prototypical. Taylor writes: “[...] the elements of a category gain the position of prototypes because we have more often to do with them” (Taylor 2001, p. 83–84). When commenting on the nature of the prototype, another researcher – G. Kleiber notices that in the prototype there are “attributes having the maximum meaning for the category” (Kleiber 2003, p. 75–76).

M. Michalik uses the perspective identified by K. Korzyk (1999) and distinguishes a few aspects of it: referential, statistical, psychological-functional and anatomical-physiological (Michalik 2006). The researcher proposes a two-aspect perspective of the category (center – periphery), and he also cites E. Tabakowska’s

³ In literature, the classic categorization based on the necessary and sufficient features is distinguished from the categorization based on the prototype. J. R. Taylor writes: “Possibly, the clearest difference between the classic category and the prototypical category is the fact that the classic categorization allows for only two possibilities, that is, either something is an element of the category or is not, while the fact that something belongs to a prototypical category is a question of degree” (Taylor 2001, p. 86).

relevant words that “[...] creation of the categories and assigning elements to them depends in a relevant way on the sensual human experience and on the psychic/mental parameters conditioning our perception and cognition” (Tabakowska 1995, p. 45, dist. DPW).

Taking into account the above ideas, we may make assumption that “prototype is the prime example of a category which is justified – if we take into consideration and justify it through its frequency, typical character, representativeness, and the fact that it marks norms as well as the fact that it is equipped with essential features of a category. When bearing in mind »the degree of similarity« to the prototype, the example which is compared gains the status of a good, medium or weak case of the given category. We should notice that the categories built on the basis of the prototype have the gradual character and are based on the scale. We have to strengthen the fact that the prototype is the term which is operational and cognitive and one may be used as a tool facilitating the description of a set of features/properties of the given class” (Pluta-Wojciechowska 2013, p. 43). Thus, the term prototype is connected with frequency, representativeness, and a typical picture of some phenomena. Due to the fact that it occurs more frequently than others, it becomes the center of a category. R. J. Taylor distinguishes two interpretations of the term prototype: we may refer it to the central element of the category or to a group of central elements of the category (Taylor 2001, 93).

PROTOTYPICAL OROFACIAL EXPERIENCE

Ontogenesis of *Homo sapiens* is connected with an amazing phenomenon – learning which is related to the possibilities which are given to people by the brain which is able to receive, process and store stimuli. Even a young child can learn by means of two systems: the individual and cultural one. At the same time, from the moment of birth those two developmental paths are linked and – which should be emphasized – they are the parts of one developmental process.

Z. Muszyński writes: “[...] the world [...] is organized according to categories by the subject equipped with categories developed in the course of the biological, social and cultural development” (Muszyński 1996, p. 30, dist. DPW). The question arises about the natural and neurological bases of the categorization which result from the biological features of the human organism. The careful reading of the writings by G. Lakoff i M. Johnson (1988) allows to state that the experience of oneself and the experience of oneself in relation to the outer world is the basis of formation of the human being’s system of notions (Lakoff, Johnson 1988, p. 36–84).

We may ask what derives from the abovementioned deliberation? In the course of the development the young child collects experiences and, in a way, organizes them – and, as I assume – the child also gains experiences which come

from breathing, eating and drinking. They form a general model, base, matrix, patterns, movements, for example, the tongue or lip movements, due to the frequency of their occurrence and due to the frequency of experienced senses. They are the ones that become for the child the most elaborated activity which is often experienced during performing primary activities. That is why they become a matrix, **a prototype for other movements**, for example, articulation. Therefore, as a result of the frequency of the occurrence of some systems, compositions, positions and movements of the organs during the primary activities, the experiences coming from them have the prototypical character. In other words, it means that some settings, positions and movements of the organs within the oral-facial space which frequently take place are representative for the activities taking place during breathing, eating and drinking. The typical character of these activities, their frequent occurrence and representativeness cause that they become the basis, the prototype for articulation.

How, therefore, could the term prototype be used in the analyses of the movements and positions of the organs observed during eating, drinking and breathing? We may imagine, for instance, the category *the movements and positions of the tongue and lips during eating, drinking and breathing*. The analysis will show that some movements and positions of the organs take place during these activities much more often and in this way they are constantly trained and consolidated in everyday biological activities. It may be stated that, from the point of view of the theory of prototypes, they gain the status of the prototypical activities. What results is the assumption that every child that is healthy achieves some prototypical orofacial experience connected with primary activities. At the same time, the unhealthy child, for example, with the developmental defect within labial-facial area also gains some prototypical orofacial experience, but in this case, one has a different character in comparison with the healthy child.

What is indispensable in the analyses of prototypical orofacial experiences is the discrimination of its type in order to not only control it, but also to make them useful in the diagnosis and projecting the speech therapy. We necessarily have to underline the fact that the birth means some continuation of the development taking place during prenatal life. Thus, the bases all of the functions, including breathing, eating and speaking, should be found in the prenatal period (Kornas-Biela 1998). Hence, the child's orofacial experiences that are related to the activity of the organs at the prenatal stage should also be shown in the context of the category of prototypes for the development of speech, in it, the articulatory ability.

We may think of the biomechanical basis of articulation which is some sort of base for articulated speech in the kinesthetic aspect. One is associated with production of various orofacial experiences, including, particularly, the ones connected with breathing, eating and drinking in the prenatal and postnatal period of life. This peculiar basis is connected with experiences taking place in different

moments of life that the child gains during the primary activities, particularly during eating and breathing. What we may assume is the fact that the way in which the biomechanical basis of the articulated speech is created takes the following form presented in the following diagram:

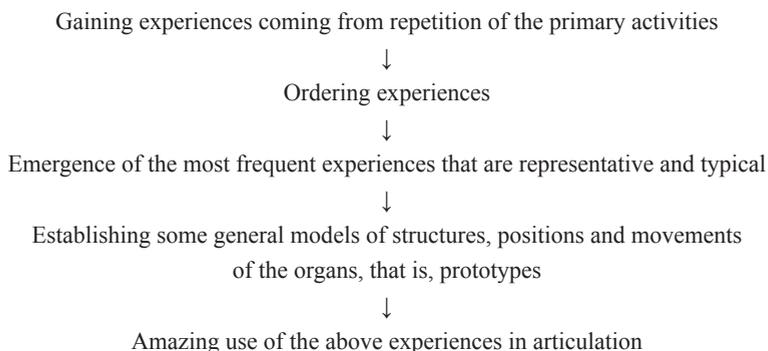


Diagram 1. Formation of biomechanical basis of the articulation

Source: D. Pluta-Wojciechowska, *Zaburzenia czynności prymarnych i artykulacji. Podstawy postępowania logopedycznego*. Bytom 2013, p. 153.

The interesting question is what the prototypical orofacial experiences consist in. We might take for granted some general ideas and indicate that “prototypical experiences rooted in the primary activities establish some kind of sensual reception for the lips, the tongue, the cheeks, the jaws and the palate. They embrace four categories of phenomena – biochemical prototypes, which define the essence of prototypical experiences connected with the orofacial area during the primary activities, that is:

1. Relations and positions of the organs in the oral cavity.
2. The movements of the organs:
 - a. synchronic, that is, the ones which coexist,
 - b. consecutive, the ones occurring in the defined order.
3. The breathing cooperation.
4. The ability within muscles of the orofacial unit, which allows not only to execute the following tasks connected with drinking, eating and breathing, (the tasks which are defined by the developmental program), but also to face a new task, that is, articulated speaking” (Pluta-Wojciechowska 2013, p. 153).

In this context we may assume that “the biomechanical prototype is an operational term of cognitive character which relates to the phenomena occurring most often and the phenomena that are typical and representative in the oral-facial

space and are connected with the primary activities” (Pluta-Wojciechowska 2013, p. 153–154). The distinguished prototypes are used during the development of the articulatory ability which is certified by the research results presented by Barbara Sambor and Izabela Malicka (and which are supervised by the author). We should bear in mind the fact that the model of the description may be used not only in the case of description of healthy children’s experiences but also in the case of ill patients’ ones. Such children also gain the orofacial prototypical experiences; however, these experiences are different than in the case of the healthy children. What is however important here is the fact that they may be described according to the formula of the distinguished biomechanical prototypes.

SIMILARITY OR MAPPING OF THE MOVEMENTS IN ARTICULATION?

While commenting on the relations among the movements of the organs taking part in eating and drinking which are performed by the same organs during articulation, K. M. Hiiemae, J. B. Palmer (2003) indicate that these movements are similar to one another but they are not the same (compare Serrurier, Badin, Barney, Boë, Savariaux 2012; Pluta-Wojciechowska 2013).

The drawings presented in the authors’ publications show the positions of the tongue during eating and drinking and they prove much similarity in movements. This is even visible in some gaps in the tongue when food is swallowed and during the articulation of some sounds. The authors emphasize the differences between the organs performing the movements during eating and speaking. The most essential differences are as follows: the amplitude of the movements of the jaw (during speaking it is much lower than during eating), the presence of asymmetrical movements of the tongue during passing food on the chewing surface of the teeth and during taking the food that remained out of the side parts of the oral cavity (such movements are not observed during articulation unless there exists some type of speech defect).

We could also notice in the diagrams the shapes of the tongue during eating and articulating; if we base our knowledge on articulatory phonetics, we will also bear in mind the fact that the shape of the tongue during articulatory movements is more complicated than during swallowing. What is more important, the analyses taking into account only the shape of the tongue during eating and articulating are narrowing the problem to a certain degree. It would be advisable to support them with other parameters, such as, the position of the hyoid bone or the movement of the palate as well as the lateral walls of pharynx.

We could accept the researcher’s hypothesis that the movements of the tongue observed during articulation are the subclass of the movements of this organ observed during eating and drinking, but not only with reference to swallowing,

which is often the object of comparison. We mean several different movements which are performed by this organ during all activities connected with eating, namely, drinking, eating by means of the spoon, biting pieces of food, taking the food out of the sides of oral cavity, etc. (compare Hiiemae, Palmer 2003; Serrurier, Badin, Barney, Boë, Savariaux 2012; Pluta-Wojciechowska 2013).

In my opinion, this hypothesis should be widened (Pluta-Wojciechowska 2013). We may assume that the articulatory movements are probably the subgroup of the large group where we may find the movements and positions of the organs engaged in other primary activities. Thus, here we mean such ones which are not only connected with eating and drinking, but also the movements and positions which take place during breathing, auto stimulation, auto check of the oral cavity, auto experimentation, auto play (within the orofacial area), the activities such as yawning, grunting, etc. From my standpoint, during these activities, and particularly, during the ones connected with eating, the child experiences several discoveries and learns different possibilities connected with the organ kinesthetic abilities. That constitutes an extraordinary base. One can see a wide scope of movements of organs, particularly, of the tongue. One may speculate and suppose that in these activities we may probably find such movements which the child takes advantage of during articulation of sounds of the natural language. In this set there are also such movements and positions which will not be used by the child during speaking as his mother tongue does not contain any sounds requiring the given movement. We do not feel surprised because learning to speak is an effect of individual and cultural learning.

In the future, interdisciplinary research in the area of the relation eating articulation will take into account the methods of picturing, we should take into consideration not only the tongue shape, but also other organs and their positions and space relations of the whole oral-pharyngeal complex, the movements of jaws, hyoid bone and tongue. The basis of the research should be interdisciplinary, complex, and it should use the modern methods of picturing. Thus, according to what has just been said, it would be advisable to look for the answer to the question, for instance, whether the movements of the tongue during eating are in agreement with the patterns of articulation. At the same time, one should remember about biomechanics of the whole set of bones and muscles which are involved in these activities, (not only the tongue). The indispensable element is the cooperation among doctors, bioengineers, linguists and speech therapists. This is an extraordinary group of specialists whose job could lead to a discovery of the secret of the articulated speech. It is worth noticing that K. M. Hiiemae's and J. B. Palmer's (2003) hypothesis is confirmed by the research carried out by the following researchers: A. Serrurier, P. Badin, A. Barney, L.-J. Boë, C. Savariaux (2012). They conducted objective experimental studies connected with functioning of the organs of oral cavity during speaking and eating. The next step of their

work was the comparison of the models of movements of the organs used when eating and articulating. It turns out that the range of movements of the tongue during eating reaches almost the same level as the range of movements of the tongue during articulation (Serrurier, Badin, Barney, Boč, Savariaux 2012).

In the field of speech therapy, plenty of attention is devoted to the biological conditioning of language and language patterns of behaviour. Although people use several languages with various sets of sounds, some of them are common. The consequence of the hypothesis that the movements during articulation are a subgroup of those movements which are observed during the primary activities is creating a good basis for the well-known hypothesis, that is, the thesis saying that each child can learn each language depending on which language he or she experiences from birth or even earlier. The formulated hypothesis expresses, in my opinion, one of the aspects of the biological preparation of the child for speaking. The activity of organs during the primary activities create an unusual universum which the child takes advantage of while learning to speak. In this context we may recall the fact that sounds are the realization of phonemes and they start to exist as an effect of some relation of the biological, social and psychological factors (Grabias, 1997). During ontogenesis of the phonetic-phonological system there occurs an extraordinary association among the development of the primary activities, the auditory perception, the social-cognitive abilities which activate cultural learning, and also training in creating sounds and other areas of the child's functioning which are strictly connected with the development of phonetic skill (Pluta-Wojciechowska 2011, 2013).

B. Mackiewicz, while indicating the role of the eating activities in the development of articulation, uses the term mapping (2001). I believe this relation is not that simple, although this author's perspective is essential. It seems that revealing the relation between the biological activities and articulation gains the new perspective if we describe the movements of the speech organs during the primary activities on the basis of the prototype and the radial category and if we use the phrase "from the primary activities to the secondary activity", "the biomechanical basis of articulation, and "the prototypical orofacial experience". I think these notions may reflect the complexity of the process of using the movements rooted mainly in eating, drinking and breathing in articulation.

THE BROAD UNDERSTANDING OF THE REALIZATION PROCESSES

If we accept that the primary activities, particularly eating, drinking and breathing, make the biomechanical basis of articulation, we may wonder whether the realization processes could assume the broad form. In this perspective the speech therapist would take into consideration: 1. The control of the structure of

speech organs, 2. The control of the motor abilities of speech organs by means of tests, 3. The control of the primary activities, mainly, eating, drinking and breathing (Pluta-Wojciechowska 2013).

PRIMARY COMPENSATIONAL STRATEGIES AND SECONDARY COMPENSATIONAL STRATEGIES

While describing the disorders in primary activities and the disorders in the realization of phonemes, they may be interpreted in the context of the compensation strategies used by the child (compare Pluta-Wojciechowska 2010, 2013). Each wrongly articulated element is a compensation strategy, as it is a proof of the fact that the patient experiences some difficulty in producing a normative sound. The patient's speech organs, while producing a defective sound perform the defective movements and, in this way, they compensate for the difficulties. The situation is similar to the case when there are pathological factors which make it impossible to breathe, to eat or to drink easily. In this case the patient also "switches on" the compensation mechanism.

I suggest distinguishing the primary and secondary compensation strategies. As I understand it, "primary compensation strategies concern makeshift positions and movements of the organs of the orofacial space occurring during the activities, such as breathing, eating, drinking and they are connected with the dysfunction of these activities caused by the activity of some pathological factors. On the other hand, secondary compensation strategies refer to makeshift systems, positions and movements taking place during disorders in the realization of phonemes. Ones are often of phonetic nature" (Pluta-Wojciechowska 2013, p. 282). The Diagram 1 shows the pathological mechanism of the disorders with the primary activity and the secondary activity in mind. Assuming the function by other organs or another part of the organ reveals the real and convenient possibilities in the case of an individual connected with the given function, for instance, eating, realization of phoneme/phonemes.

In spite of a lack of precise data concerning the given relations, the daily practice reveals the correctness of the hypothesis which has been assumed. It is supposed that secondary compensation strategies used during realizations of phonemes in many cases correspond to the compensation strategies observed during disorders of the primary activities. It is obvious that the precise research should be carried out to get more insight into the issue, which, as I know, is happening and the initial results confirm the assumptions.

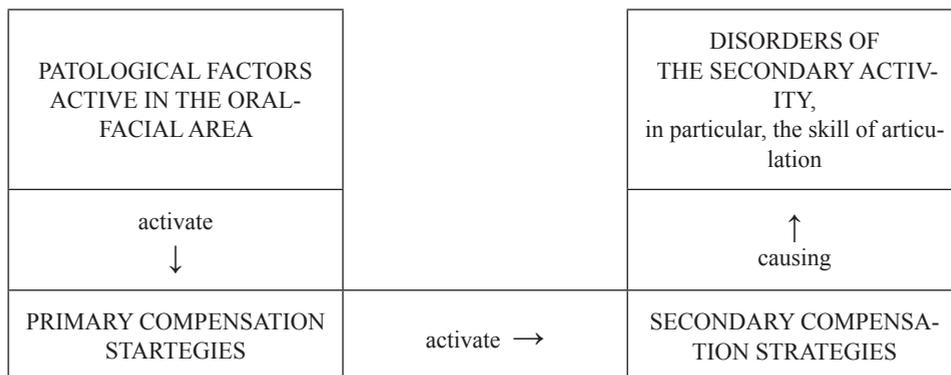


Diagram 1. The patomechanism of the disorders in the development of speech in the case of pathological factors acting in the oral-facial area

Source: Pluta-Wojciechowska, *Zaburzenia czynności prymarnych i artykulacji. Podstawy postępowania logopedycznego*, Bytom, Ergo-Sum 2013, p. 283.

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