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SYNTACTIC COMPETENCE IN SPEECH DISORDERS – A NEUROSYNTACTIC PERSPECTIVE

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SUMMARY

Background: The article presents the research on syntactic competence from the perspective of neurosyntactics. One of the research aims was to show the differences in linguistic functioning between people with underdeveloped perceptual skills (oligophasia) – with damaged/underdeveloped neural modules responsible for syntax – and people with underdeveloped articulatory skills (dysarthria), without the abovementioned neural damage.

Material/ Methods: In order to obtain the normative syntactic structures, 180 children with unimpeded speech were studied first, aged 4-9. The main part of the research examined 15 patients with oligophasia and 15 patients with cerebral palsy dysarthria. The methods of the research involved the presentation of some newly-coined verbs to the study subject and the assessment of how well they managed to use them within a set of syntactic structures.

Results: The children with intellectual disabilities (oligophasia) showed a lower level of syntactic competence – 35.65% of their sentences were correct. The patients with dysarthria managed to produce successfully 62.95% of their sentences. The syntactic competence in statistically 13.6-year-old patients with dysarthria is equal to the syntactic competence of 7-year-old children without any speech disorders. In the case of oligophasia, the results are relatively worse. The statistical 13.9-year-old patient with intellectual disability performed the tasks at a level which was lower than an average 6-year-old with unimpeded speech.

Conclusions: Syntactic competence is largely dependent on the structure of the cerebral cortex, in which the neural networks responsible for linguistic competence are situated. Therefore, the acquisition of language cannot be seen as a matter of social and cultural interaction only. It is a form of subconscious knowledge, mainly biologically- and neurally-conditioned, which allows for the proper production of the syntactic structures.

Keywords: syntactic competence, neurosyntactics, oligophasia, dysarthria, cerebral palsy

INTRODUCTION

Several assumptions have been made before analyzing the syntactic competence of children with speech disorders. The first of them is the inclusion of *neurolinguistics* (a study of the relationship between the nervous system and the linguistic processes) within the broader term of *neuropsychology* (a study of the relationship between the nervous system and the cognitive processes). The second assumption calls for the creation of *neurosyntactics* – a narrow branch of neurolinguistics which deals with the relationship between the nervous system and syntactic competence (Michalik 2011).

The field of neurosyntactics is grounded in the definition of syntax by Stanisław Jodłowski, who calls it 'a study of the phenomena connected with joining words into groups' (Jodłowski, 1976:7). This approach, even though stemming from the perspective of traditional syntax, can be a starting point for a proper understanding of *syntagmatics* – the study of the creation of complex phrases (on a post-phonemic level) from simple extra-textual and intra-textual units (Grochowski, Karolak, Topolińska, 1984: 12-13). The creation of complex phrases takes place within the internal *I-language* – a natural knowledge of building grammatically correct sentences which all native-speakers possess (Mecner, 2005: 33).

SYNTACTIC COMPETENCE FROM THE PERSPECTIVE OF NEUROSYNTACTICS

The internal syntax of *I*-language (internalized language) tries to define the immanent competence of an ideal language user (Chomsky, 1982: 17) and is connected with the mental mechanism responsible for joining linguistic elements together. The syntax itself (as a synonym of 'grammar') enables us to 'reach into the structure of the human mind through the study of natural languages' (Mecner, 2005: 35) and to examine the complex process underlying the creation of syntactic forms.

Additionally, when we assume that linguistic competence – the subconscious linguistic knowledge – is defined as 'a grammatical knowledge, a functional ability, and a cultural knowledge' (Rittel, 1994: 27-34), syntactic competence itself can be seen as a part of linguistic competence. On this basis, syntactic competence – analogically to linguistic competence – should be defined as a subconscious knowledge which allows the user of language to create grammatically correct sentences (Chomsky, 1982: 14-16; Rittel, 1994: 29-30). In other words, syntactic competence is a specific, mentally conditioned ability to create syntactic structures. When seen as a subconscious mechanism and a mental ability which can be modified by cognition and interaction, the syntactic competence receives a mental shape and a cerebral localization in the form of the neural network – it becomes the field of study of neurolinguistics and, in particular, of neurosyntactics (Michalik, 2011: 9). In the spirit of moderate neurolocalizationism, which connects the elements of linguistic (and syntactic) competence with the particular parts of the brain but at the same time puts emphasis on their plasticity, a cere-

bral speech production region can be distinguished that is divided into two areas: 1) frontal (motor), with Broca's area (represented by Brodmann areas 44 and 45), responsible for speech production, and with Exner's writing area (area 6); 2) posterior (receptive), with Wernicke's area (area 42), responsible for the phonemic hearing and the utterance processing, and the written speech area, which integrates, interprets, and connects the visual, auditory, and sensory impulses that take part in the understanding of the written language subcode. Obviously, there are also other structures outside the speech production region which participate in the control of linguistic abilities. These include the: supplementary motor area, superior longitudinal fascicle with arcuate fasciculus, prefrontal cortex, orbitofrontal and hippocampal paralimbic spheres (Pąchalska 1999; Panasiuk, 2014: 390).

The description of the neurosyntactic interpretation of syntactic competence should be preceded by distinguishing two complementary processes: the processing and the production of sentences. In terms of sentence processing, the following phases can be differentiated in relation to their place of origin: 1) the identification of the word class (nouns and verbs) – the operculum, 2) the estimation of the linear and structural relations within the sentence – Broca's area, 3) the integration of syntactic elements – the left posterior superior temporal gyrus. It should be added that Broca's area plays a vital role in the perception of the rhythm and the analysis of linguistic sequences. In terms of sentence production, any neurolinguistic analysis faces the problem of linking together the phonological, prosodic, grammatical, semantic, and memory elements. This process involves the activity of the following areas of the left hemisphere: 1) the upper part of the superior frontal gyrus, 2) the frontal part of the temporal lobe, 3) the fusiform gyrus, 4) the angular gyrus, 5) the posterior part of the cingulate gyrus (in the corpus callosum), 6) the inferior frontal gyrus, 7) the operculum (Grabowska, 2011: 323-335).

Gregory Hickok's hypothesis can be seen as a part of the neurosyntactic approach of moderate neurolocalizationism. According to him, the processing of the syntax should be generally associated with the functioning of the temporal lobe areas (Hickok, Zurif, Canseco-Gonzales, 1993; see also: Grodzinsky, 2000). However, while using neuroimaging method for patients with cerebral injuries, Hickok noted that the frontal lobe takes part in language comprehension during the period of intense work, e.g. when processing grammatically complex sentences. Similar conclusions have been reached by Manfred Spitzer. In his opinion, the more grammatically complex the sentence is, the more frontally processed it becomes (Spitzer, 2007: 246; see also: Mazurkiewicz-Sokołowska, 2006: 331-332). The functioning of the cerebellum, which is a structure of the CNS that primarily governs the motor and postural sides of human functioning, also plays a significant role in several aspects of syntactic competence. Its right hemisphere becomes active while: 1) generating verbs which semantically match the visually presented nouns, 2) comprehending grammatically ambiguous sentences, 3) reading (Grabowska 2011: 335-337).

To summarize, syntactic competence, which is the subject of study for both the internalized *I*-grammar and for neuropsychology, neurolinguistics, and neurosyntactics, is dependent on the functioning of a broad neural network that is localized mainly in the structures of the cerebral cortex of the left hemisphere.

SYNTACTIC COMPETENCE RESEARCH

The aim of the undertaken research, which utilized the strategies characteristic for neurolinguistic experiments, was to describe the shape of syntactic competence in the chosen areas of the speech disorder. Specifically, it aimed at the discovery and the description of syntactic competence as a generative subconscious mechanism of putting words together (Mecner, 2005: 20).

The conclusions and the research from which they stem from focused on an analysis of the syntactic competence in children with intellectual disability (the first group of the speech disorders in the taxonomy of Stanisław Grabias) and compared it with the syntactic abilities of children with cerebral palsy dysarthria (the second group in Grabias' taxonomy) (Grabias, 2012: 54-56).

The first research group consisted of children with a mild intellectual disability and an IQ range of 50-70. From the clinical point of view, intellectual disability is a biological defect which irreversibly damages the structures and functions of the nervous system. Children with a mild intellectual disability are characterized by limited abstract thinking and the inability to synthesize information into the cause-and-effect relation. Depending on their IQ, they are able to create concepts with a varying degree of difficulty, which is a result of their specific thinking and interests that usually revolve around motor and sensory functioning. In the case of this group, we can talk of undeveloped perceptual skills – a deficiency in the functioning of the CNS. What is more, the factors that cause oligophrenia usually damage or significantly impede the proper development of the cerebral cortex structure in which the neural network responsible for the syntactic competence is located. On the other hand, a mild intellectual disability does not cause any significant limitations in terms of social and cultural interaction.

The second research group consisted of children with dysarthria caused by cerebral palsy. Cerebral palsy (CP) is a group of permanent, non-progressive disorders of the CNS, mainly of the upper motor neuron, which appear in the early stages of nervous system development. The cerebral damage which happens in 2-3 years-old children impairs both their motor skills, which is connected with muscle tone, and sensory skills. Consequently, the cognitive skills of the child, including the linguistic skills, are also affected. Dysarthria caused by CP is a result of the damage to the neural system innervating the speech apparatus which results in breathing, phonemic, and articulatory difficulties. It can be assumed that dysarthria is a combination of motor and postural disorders (physical), sensory disorders (cognitive, perceptual), and mental disorders (Michalik, 2011: 209). The factors causing this type of dysarthria do not damage the cerebral cortex structures where potentially the syntactic competence is located (with

the exception of cortical dysarthria, which is beyond the scope of this research). However, they still impede the interactional, social and cultural potential of the patient. It should be noted that dysarthria non-resulting from cerebral palsy does not affect speech programming. For example, Olga Jauer-Niworowska and Bożena Strachalska state that: "The morphological and lexical plane of words is not impaired in dysarthria" (2013: 430).

THE METHOD AND THE DIAGNOSTIC TOOLS

The diagnostic method employed in the research presented its participants with a set of new linguistic units and assessed how they utilized them in the construction of syntactic structures. The new linguistic unit was a newly-coined word devoid of any general usage meaning. These new predicative forms, absent in everyday communication, were employed in order to distinguish between the structures that the children may have produced as a result of their previous linguistic experience and the structures which are truly produced with the use of syntactic competence. A skillful production of the syntactic structures would prove a properly working syntactic competence in children, the functioning of which is based on a group of abstract syntactic categories – the syntactic schemata. While organizing the research, it has been assumed that this subconscious and automatic syntactic mechanism is rooted, on the one hand, in the universal linguistic characteristics of all languages and, on the other hand, in the so-called parametrical characteristics – specific only for the native language of the user (Mazurkiewicz-Sokołowska, 2006: 15).

Assuming that nouns, verbs, and simple sentences are the basic grammar categories of all languages and lie at the center of all grammar theories (Taylor, 2007: 407), a diagnostic tool was created which consisted of three elements: the nominal element, the verbal element, and the basic S-V-O sentence structure (Łuczyński, 2004: 18).

Throughout the experiment, during the individual contact with the child, five illustrations were presented which depicted abstract situations non-existent in everyday life. In each of the situations, the doer of the action (the subject of the created syntactic structure) was a boy called 'Tom' (none of the children was named in such a way). The objects of the actions were also chosen with neutrality in mind – the selected words were: *a snail, a table, breakfast, a flower, grass*. The predicate was a newly-coined verb which the study subjects could not have encountered before in everyday situations. The following Polish forms were created: *donować* and *wokować* (conjugated with the inflectional suffixes *–ę* and *–esz*), *kobuszyć* and *ponić* (conjugated with the inflectional suffixes *–ę* and *–isz//-ysz*), and *urgać* (conjugated with the inflectional suffixes *–m* and *–sz*). Only one verb was chosen for the *–m* and *–sz* conjugation variant due to the occurring relatively rarely. All of the newly-created verbs adhered to the rules of Polish morphophonological syntagmatics (Kowalik, 1997: 41). The research subjects were expected to notice the name of the boy and the fact that he is the doer of

donować, *wokować*, *kobuszyć*, *ponić* and *urgać.* Such an arrangement made it possible to produce the conjugation variants according to the grammatical person and the grammatical tense, with the use of the S-V-O structure. This structure, Subject-Verb-Object, is one of the language universals (Chomsky 1982: 48-52) and the basic sentence structure in the Polish language. The basic sentence structure of a given language is called *the parameter*. The canonical structure for the produced sentences was therefore as follows: Tom *donuje (wokuje, kobuszy, poni, urga)* the snail (the table, breakfast, the flower, grass). In psycholinguistic terms, this basic structure can be described as an affirmative sentence in the active voice, which is later on transformed by the speaker (Kurcz, 1992: 25). The deep and universal linguistic structures are said to be in-born, while the produced surface structures are said to be connected with one specific language, here Polish, and with the idiolect of a given person with a varying degree of syntactic competence (Shugar, Smoczyńska, 1980: 23).

To sum up, the subjects of the study were to conjugate the verbs according to the grammatical person (Task 1), according to three grammatical tenses (Task 2), and to change the voice from the active into the passive (Task 3). The gerund form was used during the presentation of the verbs – the researcher presented the illustration saying: 'This is called *don*-ing (*wok*-ing, *kobusz*-ing, *pon*-ing, *urg*-ing).' The next step was introducing the boy – Tom – and the objects of the actions (a snail, a table, breakfast, a flower, grass). Then, a question was asked: 'If you were the boy, you would say: I'm… the snail (the table etc.).' The present tense conjugation was followed by the past and the future tense conjugations, using similar introductory sentences. The future tense conjugation was expected to involve the future complex tense of the Polish language, which children are capable of producing at the age of three. The last stage of the study was the transformation of sentences into the passive voice with the introductory sentence: 'Tom is *don*-ing the snail. The snail is being …?' The gerund form was repeated before every task to avoid the child forgetting the newly-coined verbs. Additionally, the order of the verb presentation was constantly being changed so as to start the tasks with a different verb and, therefore, a different conjugation pattern. The conjugation paradigms of the verbs have been included in the appendix.

SYNTACTIC COMPETENCE IN UNIMPEDED SPEECH – PRELIMINARY RESEARCH

The research was carried out in 2011 in six age-groups of children (four-, five-, six-year-old children, and seven-, eight-, nine-year-old students) from two educational institutions in Jastrzębie-Zdrój – a city of 100,000 inhabitants in the Silesia region of southern Poland. A 1:1 children gender ratio was attempted. Only the children with unimpeded speech were chosen for the study. Left-handed children, children with mixed laterality, and dyslectic children were excluded. Additionally, only monolingual children were studied – children from families using the Silesian dialect were not included. In total, 180 children were tested, resulting

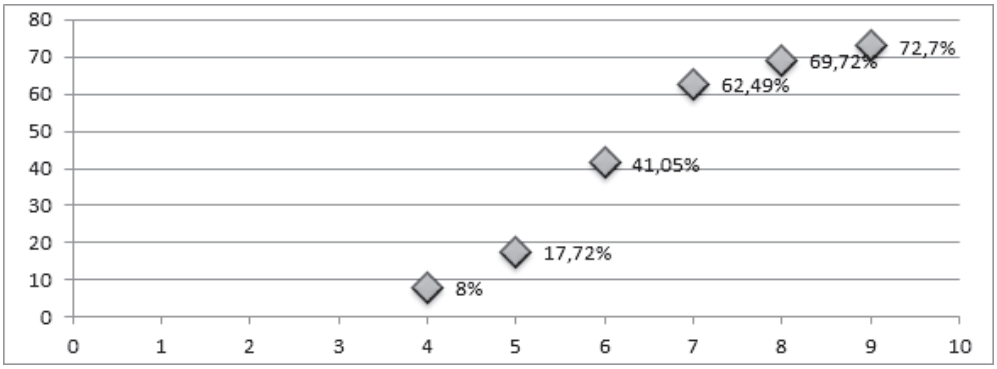

Chart 1. The increase in syntactic competence in relation to changing age. The horizontal axis denotes the age of the children. The vertical axis denotes the percentage growth of syntactic competence. The points on the chart indicate the degree and the value of syntactic competence at the given age (source: original research)

Table 1. The increase in syntactic competence in relation to the three selected conjugational patterns (source: original research)

Age	The percentage and the number of correct answers / the total number of structures (conjugation -ę and -esz)	The percentage and the number of correct answers / the total number of structures (conjugation -ę and -isz//-ysz)	The percentage and the number of the correct answers / the total number of structures (conjugation -m and -sz)
4-year-olds	17.89%/204/1140	0.79%/9/1140	2.63%/15/570
5-year-olds	33.6%/383/1140	5.88%/67/1140	9.65%/55/570
6-year-olds	61.58%/702/1140	23.86%/272/1140	34.39%/196/570
7-year-olds	77.37%/882/1140	46.32%528/1140	65.09%/371/570
8-year-olds	90.61%/1033/1140	50.44%/575/1140	66.49%/379/570
9-year-olds	91.23%/1040/1140	53.77%/613/1140	73.51%419/1140
Total	62.05%	30.17%	41.96%

Table 2. The increase in syntactic competence in relation to three grammatical tenses (source: original research)

Age	The percentage and the number of correct answers / the total number of structures (the present tense)	The percentage and the number of correct answers / the total number of structures (the past tense)	The percentage and the number of correct answers / the total number of structures (the future tense)
4-year-olds	11.9%/111/900	3.6%/36/900	6.9%/66/900
5-year-olds	25.33%/228/900	12.78%/115/900	15.22%/137/900
6-year-olds	45.11%/406/900	35.67%/321/900	42.56%/383/900
7-year-olds	66.56%/599/900	60.44%/544/900	59.67%/537/900
8-year-olds	79.89%/719/900	65.89%/593/900	64.11%/577/900
9-year-olds	81.89%/737/900	72.89%/656/900	65.33%/588/900
Total	51.78%	41.87%	42.29%

in 17,100 syntactic structures. The study made it possible to create a linear graph of the changing syntactic competence. Chart 1 shows the increase in the syntactic competence in relation to age.

Table 3. The increase in syntactic competence in relation to passive voice transformation (source: original research)

Age	The percentage and the number of correct answers / the total number of structures (active into passive voice)
4-year-olds	9.6%/15/150
5-year-olds	16.67%/25/150
6-year-olds	40%/60/150
7-year-olds	67.33%/101/150
8-year-olds	65.33%/98/150
9-year-olds	60.67%/91/150
Total	43.26%

Table 4. The increase in syntactic competence in relation to grammatically singular persons (source: original research)

Age	The percentage and the number of correct answers / the total number of structures (1st singular)	The percentage and the number of correct answers / the total number of structure (2nd singular)	The percentage and the number of correct answers / the total number of structures (3rd singular)
4-year-olds	19.33%/87/450	2%/9/450	14.67%/66/450
5-year-olds	28.89%/130/450	5.78%/26/450	27.78/125/450
6-year-olds	58.22%/262/450	28%/126/450	50.89%/229/450
7-year-olds	68.44%/308/450	53.11%/239/450	70.67%/318/450
8-year-olds	74.67%/336/450	66.67%/300/450	74.67%/336/450
9-year-olds	76.22%/343/450	72.22%/325/450	74.22%334/450
Total	54.29%	37.96%	52.15%

Table 5. The increase in syntactic competence in relation to grammatically plural persons (source: original research)

Age	The percentage and the number of correct answers / the total number of structures (1st plural)	The percentage and the number of correct answers / the total number of structures (2nd plural)	The percentage and the number of correct answers / the total number of structures (3rd plural)
4-year-olds	6.89%/31/450	-	4.44%/20/450
5-year-olds	22.44%/101/450	4.67%/21/450	17.11/77/450
6-year-olds	45.56%/205/450	23.11%/104/450	40.89%/184/450
7-year-olds	68,89%/310/450	46.67%/210/450	65.56%/295/450
8-year-olds	71.,78%/323/450	63.11%/284/450	68.89%/310/450
9-year-olds	73.11%/329/450	71.56%/322/450	72.89%/328/450
Total	48.11%	34.85%	44.96%

The tables presented below include the detailed data on syntactic competence in the children without any speech disorders.

The results obtained in this part of the study confirm a gradual growth in syntactic competence. This means that children actually learn the grammar instead of relying on an in-born grammatical module. If the syntactic competence was reliant only on an in-born linguistic processor (parser), it would be impossible to observe its development in relation to age. Therefore, it can be said that the syntactic competence of children with unimpeded speech is mainly dependant on

Table 6. Syntactic competence in children with oligophasia in relation to grammatical categories (source: original research)

verb	correct answers	conjugation	correct answers	tense	correct answers	persons	correct answers
donować	84.44% 190/285	-ę; -esz	47.19% 269/570	present	49.11% 221/450	1.sing.	49.33% 111/225
wokować	35.11% 79/285			past	28.89% 130/450	2.sing.	26.67% 60/225
kobuszyć	30.53% 87/285	-ę; -isz//-ysz	23.68% 135/570	future	29.33% 132/450	3.sing.	45.78% 103/225
ponić	16.84% 48/285			voice	33.33% 25/75	1.pl	36.44% 82/225
urgać	36.49% 104/285	-m; -sz	36.49% 104/285			2.pl	26.22% 59/225
						3.pl	30.22% 68/225
the percentage and the number of correct sentences / all answers – the level of syntactic competence				35.65% 508/1425			

the growth of the cognitive skills and on the ability for linguistic, social, and cultural interaction.

The results obtained in this preliminary research constituted a benchmark for the study of syntactic competence in children with speech disorders.

THE SYNTACTIC COMPETENCE OF PATIENTS WITH OLIGOPHASIA

This group encompassed 15 students with oligophasia, with an average age of 13.9. The research was carried out in 2011 at the Special Education Schools Group No.10 in Jastrzębie-Zdrój. The subjects of the study completed the tasks within, on average, approx. 11 minutes. The description and the analysis of the material were made using the conjugation paradigms that have been included in the appendix.

The preliminary age-related research into the patients showed a very low level of linguistic competence (see also: Michalik 2010). This is why the author decided not to categorize the analysis into any age-related groups – creating a chronology of linguistic competence acquisition would not yield any meaningful results in the case of this particular research group.

508 structures out of 1425 which were expected in the research group were correct in terms of grammatical person, gender, tenses, and word order. 917 structures contained a syntactic mistake, which eliminated them from the correct conjugational patterns. The ratio of correct-incorrect structures was 35.65%-64.35%.

As far as the inflectional suffixes are concerned, the results were as follows: 47.19% of the answers were correct in the conjugation –ę and –esz, 36.49% in the conjugation –m and –sz, and 23.68% in the conjugation –ę and –isz//-ysz. In the case of grammatical tense the following results were obtained: the present tense – 49.11% of the answers were correct, the past tense – 28.89%, the future

complex tense – 29.33%. The transformation into the passive voice was successful in 33.33% of all the answers. In terms of the proper conjugation of grammatical persons a certain pattern was observed – 1st and 3rd persons singular were the easiest to construct (49.33% and 45.78% of the answers were correct, respectively) and 2nd persons singular and plural were the most difficult (26.67% and 26.22% of the answers were correct).

Table 6 contains the detailed percentage/numerical data related to all of the grammatical categories used in the description of syntactic competence for patients with intellectual disability. The table presents the percentage values, the number of correct structures, and the total number of the structures produced within the research.

In general, the patients with oligophasia caused by a mild intellectual disability, whose average age was 13.9, showed a low level of syntactic competence. Only 35.65% of their answers were correct. This result does not reach the level of syntactic competence for a 6-year-old child without any speech disorders (see also: Chart 1). Patients with oligophasia are characterized by two factors: their neuropsychological functioning (anatomical/functional disorders of the cerebral cortex) and their social functioning (unimpeded interaction with other language users). When taken into consideration, these factors indicate that it is the damage of the innate linguistic module which is responsible for the low level of syntactic competence. If syntactic competence was dependent on the social and cultural interaction ability , the results of the children with a mild intellectual disability would have been better.

SYNTACTIC COMPETENCE OF THE PATIENTS WITH CP DYSARTHRIA

The experiment was conducted on a group of 15 children with dysarthria caused by cerebral palsy. Their average age was 13.6. The research took place at the same time and in the same location as previously. The subjects of the

Table 7. Syntactic competence in children with CP dysarthria in relation to grammatical categories (source: original research)

verb	%	conjugation	%	tense	%	persons	%
donować	78.60% 224/285	-ę; -esz	74.21% 423/570	present	80.44% 362/450	1.sing.	71.11% 160/225
wokować	69.82% 199/285			past	68.22% 307/450	2.sing.	59.11% 133/225
kobuszyć	58.25% 166/285	-ę;-isz//-ysz	52.98% 302/570	future	41.33% 186/450	3.sing.	68.89% 155/225
ponić	47.72% 136/285			voice	56.00% 42/75	1.pl	63.56% 143/225
urgać	59.65% 170/285	-m; -sz	59.65% 170/285			2.pl	56.89% 128/225
						3.pl	60.44% 136/225
the percentage and the number of the correct sentences / all answers – the level of syntactic competence				62.95% 897/1425			

study completed the tasks on average within about 15 minutes. 897 structures out of 1425 which were expected in the research group were correct in terms of grammatical person, gender, tenses, and word order. 528 structures contained a syntactic mistake, which eliminated them from the correct conjugational patterns. The ratio of correct-incorrect structures was 62.95% - 37.05%.

As far as the inflectional suffixes are concerned, the results were as follows: 74.21% of the answers were correct in the conjugation –ę and –esz, 59.65% in the conjugation –m and –sz, and 52.98% in the conjugation –ę and –isz//-ysz. In the case of grammatical tense the following results were obtained: the present tense – 80.44% of the answers were correct, the past tense – 68.22%, the future complex tense – 41.33%. The transformation into the passive voice was successful in 56% of all answers. In terms of the proper conjugation of the grammatical persons the same pattern was observed as in the previous group – 1st and 3rd persons singular were the easiest to construct (71.11% and 68.89% of the answers were correct, respectively) and 2nd persons singular and plural were the most difficult (59.11% and 56.89% of the answers were correct).

Table 7 contains the detailed percentage / numerical data related to all of the grammatical categories used in the description of the syntactic competence of CP dysarthria patients. The table presents the percentage values, the number of the correct structures, and the total number of the structures produced within the research.

In this research group, a relatively high level of syntactic competence can be noticed. In 62.95% of cases the answers of patients with dysarthria were correct. Taking into consideration the fact that there is no damage in the linguistic areas of their cerebral cortex and that it is very difficult for these children to interact linguistically and socially, it can be assumed that it is the cerebral linguistic areas that play the vital role in the creation of syntax. Otherwise, the results would have been worse due to the limited linguistic interaction of the patient.

COMPARATIVE ANALYSIS

The results of the research show a higher level of syntactic competence in the children with CP dysarthria – 62.95% of their answers were correct. In the patients with oligophasia the percentage was lower – 35.65%.

In terms of the correct conjugation of the verbs the results were as follows: the conjugation -ę and -esz – 74.21% of the structures were produced successfully in the dysarthria group, 47.19% in the oligophasia group; the conjugation -ę and -ysz/-isz – respectively 52.98% and 23.68% of the sentences were properly formed; the conjugation with the inflectional suffixes -m /-sz: 59.65% of the answers were correct in the group of children with cerebral palsy, while 36.49% in the group of children with a mild intellectual disability.

As far as grammatical tenses are concerned, the following results were obtained: the present tense – 80.44% of the answers were correct in the dysarthria group, 49.11% in the oligophasia group, the past tense – respectively 49.11%

Table 8. The percentage of correct answers in the category of grammatical person Source (original research)

grammatical person of the verb	percentage of correct answers in the oligophasia group	percentage of correct answers in the dysarthria group
1st person singular	49.33%	71.11%
2nd person singular	26.67%	59.11%
3rd person singular	45.78%	68.89%
1st person plural	36.44%	63.56%
2nd person plural	26.22%	56.89%
3rd person plural	30.22%	60.44%

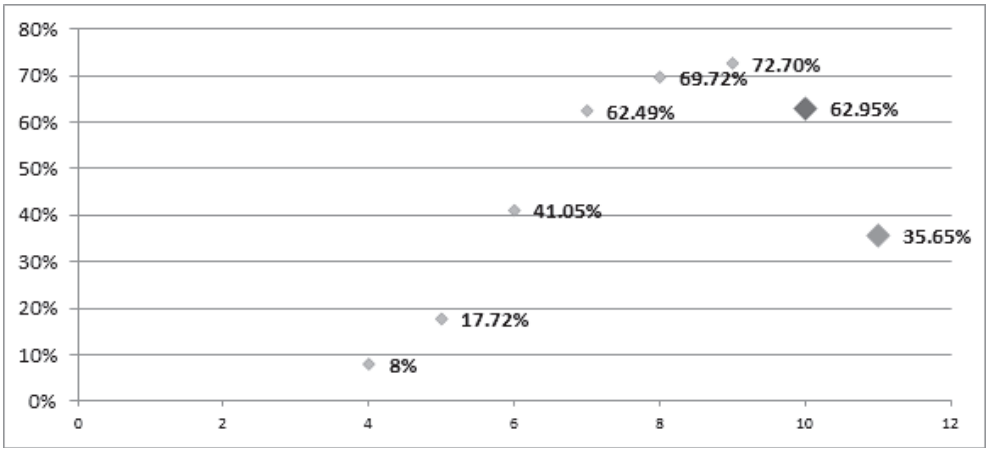

Chart 2. Syntactic competence of patients with dysarthria (red) and oligophasia (blue) in relation to the syntactic competence of children without any speech disorders (source: original research)

and 28.89% of the structures were produced successfully, the future tense – 41.33% of the sentences were properly formed in the cerebral palsy group and 29.33% in the intellectual disability group. In the case of the transformation into the passive voice the results were as follows: 56% of the answers were correct in the dysarthria group, 33.33% in the oligophasia group.

The results obtained from the sentences produced in the last of the grammatical categories – grammatical person – have been included in Table 8. The columns contain the percentage data relating to each of the research groups.

SUMMARY

The level of syntactic competence in all the research participants with speech disorders was relatively low when compared to that of the children with unimpeded speech. The syntactic skills of the children with dysarthria, at the statistical age of 13.6, match those of the 7-year-old children without any speech disorders. It the case of the patients with oligophasia the results are worse. This group, with the statistical age of 13.9, managed to construct the sentences with a skill level slightly lower than that of the 6-year-olds. Chart 2 illustrates the above-mentioned relations.

The patients with intellectual disability, whose cerebral neural areas responsible for linguistic and syntactic competence are probably damaged or underdeveloped, proved to have a significantly lower level of syntactic competence. These patients have no problems with social interaction and sensory functioning.

The children with CP dysarthria managed to complete the research tasks much better. Their cerebral structures responsible for linguistic and syntactic competence are undamaged. However, they have substantial difficulties in social interaction due to the deep dysfunction of their sensory apparatus.

The depth of the disorders in the syntactic performance and their analysis in terms of the grammatical categories made it clear that the syntactic competence of the patients with speech disorders is essentially different than the syntactic competence in people with unimpeded speech.

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Appendix. The conjugation paradigms of the newly-coined predicate elements

1) bezokolicznik: donować **koniugacja: -ę, -esz**
temat cz. teraź.: donuj- **temat cz. przeszłego: donowa-**

cz. teraź.			
ja	donuję	my	donujemy
ty	donujesz	wy	donujecie
on ona ono	donuje	oni one	donują
cz. przeszły			
ja	donowałem/-łam	my	donowaliśmy/-łyśmy
ty	donowałeś/-łaś	wy	donowaliście/-łyście
on ona ono	donował/-ła/-ło	oni one	donowali/-ły
cz. przyszły			
ja	będę donował/-ła//donować	my	będziemy donowali/-ły//donować
ty	będziesz donował/-ła//donować	wy	będziecie donowali/-ły//donować
on ona ono	będzie donował/-ła/-ło// donować	oni one	będą donowali/-ły// donować

strona czynna: Tomek donuje ślimaka.
strona bierna: Ślimak jest donowany przez Tomka.

2) bezokolicznik: wokować **koniugacja: -ę, -esz**
temat cz. teraź: wokuj- **temat cz. przeszłego: wokowa-**

cz. teraź.			
ja	wokuję	my	wokujemy
ty	wokujesz	wy	wokujecie
on ona ono	wokuje	oni one	wokują
cz. przeszły			
ja	wokowałem/-łam	my	wokowaliśmy/-łyśmy
ty	wokowałeś/-łaś	wy	wokowaliście/-łyście
on ona ono	wokował/-ła/-ło	oni one	wokowali/-ły
cz. przyszły			
ja	będę wokował/-ła//wokować	my	będziemy wokowali/-ły//wokować
ty	będziesz wokował/-ła//wokować	wy	będziecie wokowali/-ły//wokować
on ona ono	będzie wokował/-ła/-ło// wokować	oni one	będą wokowali/-ły//wokować

strona czynna: Tomek wokuje budzik.
strona bierna: Budzik jest wokowany przez Tomka.

3) bezokolicznik: kobuszyć **koniugacja: -ę, -isz // -ysz**
temat cz. teraź.: kobusz- **temat cz. przeszłego: kobuszy-**

cz. teraź.			
ja	kobuszę	my	kobuszymy
ty	kobuszysz	wy	kobuszycie
on ona ono	kobuszy	oni one	kobuszą
cz. przeszły			
ja	kobuszyłem/-łam	my	kobuszyliśmy/-łyśmy
ty	kobuszyłeś/-łaś	wy	kobuszyliście/-łyście
on ona ono	kobuszył/-ła/-ło	oni one	kobuszyli/-ły
cz. przyszły			
ja	będę kobuszył/-ła//kobuszyć	my	będziemy kobuszyli/-ły//kobuszyć
ty	będziesz kobuszył/-ła//kobuszyć	wy	będziecie kobuszyli/-ły//kobuszyć
on ona ono	będzie kobuszył/-ła/-ło// kobuszyć	oni one	będą kobuszyli/-ły//kobuszyć

strona czynna: Tomek kobuszy śniadanie.
strona bierna: Śniadanie jest kobuszone przez Tomka.

Appendix (cont.). The conjugation paradigms of the newly-coined predicate elements

4) bezokolicznik: ponić **koniugacja: -ę, -isz // -ysz**
temat cz. teraź.: poń- **temat cz. przeszłego: poni-**

cz. teraź.			
ja	ponię	my	ponimy
ty	ponisz	wy	ponicie
on ona ono	poni	oni one	ponią
cz. przeszły			
ja	poniłem/-łam	my	poniliśmy/-łyśmy
ty	poniłeś/-łaś	wy	poniliście/-łyście
on ona ono	ponił/-ła/-ło	oni one	ponili/-ły
cz. przyszły			
ja	będę ponił/-ła//ponić	my	będziemy ponili/-ły//ponić
ty	będziesz ponił/-ła//ponić	wy	będziecie ponili/-ły//ponić
on ona ono	będzie ponił/-ła/-ło//ponić	oni one	będą ponili/-ły//ponić

strona czynna: Tomek poni kwiatek.
strona bierna: Kwiatek jest poniony przez Tomka.

5) bezokolicznik: urgać **koniugacja: -m, -sz**
temat cz. teraź.: urga- **temat cz. przeszłego: urga-**

cz. teraź.			
ja	urgam	my	urgamy
ty	urgasz	wy	urgacie
on ona ono	urga	oni one	urgają
cz. przeszły			
ja	urgałem/-łaś	my	urgaliśmy/-łyście
ty	urgałeś/-łaś	wy	urgaliście/-łyście
on ona ono	urgał/-ła/-ło	oni one	urgali/-ły
cz. przyszły			
ja	będę urgał/-ła//urgać	my	będziemy urgali/-ły//urgać
ty	będziesz urgał/-ła//urgać	wy	będziecie urgali/-ły//urgać
on ona ono	będzie urgał/-ła/-ło//urgać	oni one	będą urgali/-ły//urgać

strona czynna: Tomek urga trawę.
strona bierna: Trawa jest urgana przez Tomka.