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The Pace of Speech in Oligophasia

SUMMARY

The article presents the results of the research into the pace of speech of the students with oligophasia which results from the mild intellectual disability as compared to their peers with no disabilities. Both quantitative and qualitative aspects of the speech were analysed. The analysed criteria included: the number of syllables and phones used in the 30-second utterances, the number of pauses made and their characteristics, and the percentage of the pauses within the utterance. The material obtained in the research through the usage of *Audacity* software was subsequently analysed with the use of Shapiro–Wilk test and Mann–Whitney test.

Keywords: pace of speech, oligophasia

INTRODUCTION

The word “pace” usually signifies the notion of speed with which something happens (Dubisz 2003, 48), while the word “utterance” should be understood as “a specific sentence produced by the language user” (Polański 1999, 645). Therefore, the “pace of utterance” is intuitively connoted with the speed with which the specific sentence is uttered. This speed, which is usually related to the prosodic, articulative, and formative skills of the language user (Grabias 2012; Wysocka 2012), is also characterised by its pragmatic and discursive aspects. These aspects are the result of the pauses which appear within the phonemic string and which are subsequently analysed both in terms of quality and quantity. The pauses (their number and length) and the vowel length are the two main factors which determine the pace of speech.

The article presents the results of the research into the pace of speech of the students with oligophasia which results from the mild intellectual disability as

compared to their peers with no disabilities. The aims of the research were to shed new light on some of the deeply-anchored beliefs on oligophasia, to add some new aspects to our knowledge of this disorder which go beyond linguistic competence focus only, and, finally, to draw some conclusions of practical – diagnostic and therapeutic – character.

The choice of the research subjects was the result of two factors: firstly, intellectual disability is the most common form of developmental disorder (Maulik, Harbour 2011, in: Kaczorowska-Bray 2017)¹, secondly, 85% of intellectual disability cases are patients with mild intellectual disability (Komender 2002; Bobińska, Gałęcki 2010, in: Kaczorowska-Bray 2017).

PACE OF SPEECH AS A RESEARCH CATEGORY

The notion of speech pace is often confused with the pace of speaking, which is related to the fluency of speaking. This fluency, according to T. Woźniak, can be described as an

effortless construction of the phonemic string, comprehensible for the listener. It requires the continuous production of speech sounds which follow regular rhythmic patterns (phrases), lasting about 2–3 seconds, almost identically ordered according to the prosodic aspect. The phrases are filled with a various number of phones/syllables, depending on the speaking pace, with the average pace being 10–12 phones (4–5 syllables) per second. There is a short pause between the phrases, the duration of which is not strictly determined. However, it should not exceed two seconds so as not to become a meaningful unit of speech. (Woźniak 2012, 550)

With this in mind, the regular rhythmic patterns (phrases) lasting 2–3 seconds are usually used in the analysis of the pace of speaking (Woźniak 2012, 550; see also: Cholewiak 2016; 2017).

As mentioned above, the phrases are accompanied by the pauses which denote the lack of any sound within the acoustic chain. These pauses – meaningless for the analysis of speaking pace – are crucial in the analysis of the pace of speech. Such analysis encompasses both the phrases and the pauses and deals with the speech samples which are longer than a specific sentence. These speech samples feature multiple pauses which often shape the samples' meaning and understanding (Cholewiak 2016; 2017).

To sum up, the pace of speaking informs us about the number of phones/syllables within the sentence in relation to a specific time unit, while the pace of speech looks at a broader scope which includes the formal analysis of the pauses

¹ According to DSM-5, intellectual disability occurs in around 1% of the general population (2013, 38).

that accompany the phrases within the longer speech samples (Michalik et al. 2016, 86).

As stated above, the pace of speech is closely related to the notion of the pause. According to S. Śniatkowski, there are three kinds of pauses which can appear during the actual speech: the proper pause, the partly-filled pause, and the fully-filled pause (Śniatkowski 2002, 17). The proper pause (non-filled) is realized as a moment of silence between two subsequent elements of speech. The filled pause can manifest itself in three ways (in Śniatkowski 2002, 15–18): through a lexical item (usually the repetition of a word from the sentence or the phatic item), an articulated sound (prolonged vowel and consonantal group), or through an unarticulated extra-linguistic sign (e.g. coughing). As stated earlier, the pause can also be “partly-filled” (Śniatkowski 2002, 16; see also: Cholewiak 2016; 2017).

OLIGOPHASIA AND THE PACE OF SPEECH

Z. Tarkowski describes the language of a person with intellectual disability as “an independent system that is driven by specific rules which we need to discover and understand” (2005, 565). Using this definition as the basis, the authors of the article claim that

oligophasia is a communication disorder in intellectually disabled persons who cannot reach the standard level of concept building and its usage, which hampers their understanding of reality. The communication disorders, which can be noticed in all areas of language description, impoverish the process of conveying meanings, formulating thoughts and discovering the reality (culture). (Michalik 2011, 178)

As U. Jęczeń describes, despite the fact that “oligophasia is a notion with multiple meanings due to various ways in which speech disorders manifest themselves in speech development” (2015, 268), it is possible to discern some specific symptoms which are common for linguistic content, form, and substance alike. According to L. Kaczmarek (1977), the speech disorders of the intellectually disabled should be classified within the first group, i.e. linguistic *content* disorders. This, however, does not mean that disorders of *form* and *substance* are never noticed. In her recent research, Kaczorowska-Bray stated that the disorders of language form and substance are commonly noticed within the group of intellectually disabled persons and that their occurrence is much higher than in the general population (2017).

The description of the delayed speech development in oligophasia involves the disorders which mainly fall into the category of *content* and *form*, as speci-

fied by Kaczmarek (1977). The disorders include: slower pace of development of passive and active vocabulary, difficulties in creating sentences with two or more words – syntactic competence disorder, using incorrect grammatical forms – incorrect inflexion, difficulties in creating long and coherent pieces of speech – poor narrative skills (Jęczeń 2015, 268; Kaczorowska-Bray 2017). However, there are also disorders in the *pace* of speech which can be observed during the description of oligophasia symptoms. These include: slower pace of speech and decreasing fluency of speaking (Błeszyński 2013, 47), low verbal activity, difficulties in remembering proper words, difficulties in remembering proper names which take extended time to find (Kaczorowska-Bray 2012, 55–56), various difficulties in articulation (Jęczeń 2015, 268), stuttering (Gałkowski 1979, 192; Tarkowski 2003, 209). All of them affect the pace of speech of the persons with intellectual disability. With this in mind, the pace of speech may become one of the parameters for the description of intellectual disability (Grabias 2012) – on condition that we can prove the actual difference in the speech pace between people with intellectual disability and the general group.

THE PACE OF SPEECH IN OLIGOPHASIA – RESEARCH

The organisation and the conduct of the research

The aim of the research was to gain the insight into the pace of speech of persons with intellectual disability and to compare them to general population norms.² Another objective was to characterise the pauses in the speech samples both in terms of quality and quantity.

The first stage of the research included the recording of children's speech (for both disabled and non-disabled group).³ Each of the students knew the person who was responsible for the recording (student–teacher relationship). Several questions were asked during these individual meetings: What do you do in the classroom/group? What do you play with the group? What did you do in the clubroom? What have you done today? What did you do yesterday? What do you usually do at home? What are you going to do?

The obtained data consisted of audio recordings which were subsequently re-played multiple times in order to properly analyse the crucial phenomena

² The norms have been set by Anna Cholewiak in her doctoral research *Tempo wypowiedzi dziecięcych*, written under the supervision of dr hab. Mirosław Michalik, professor of the Department of Linguistics in the Institute of Polish Philology at the Pedagogical University of Kraków.

³ The recordings for the control group were made in one of the schools in Tarnów, the recordings for the oligophasia group were made in school for children with special educational needs in Jastrzębie in May 2017.

occurring within the speech samples. This part of the research made use of the Audacity software.⁴

The factors which were crucial for the analysis of the speech pace included the number of syllables and the number of phones within the speech sample. The specific fragment of the sample was selected, which had to be continuous and non-interrupted by the listener. The fragment was 30 seconds long. If the sample included several 30-second fragments, the initial one was always selected.

The first stage of the analysis involved listening to the whole speech sample. Multiple re-plays allowed the preparation of its simplified transcription – necessary for counting the number of phones and pauses.⁵ The transcription was also marked for the pauses – their duration and form.

The purpose of the second stage was to determine the pace of students' speech.⁶ This stage involved the quantitative and qualitative analysis of the pauses and specifying their percentage within the speech samples. It was also possible to determine the pace of speaking of the students by studying the differences in length between the duration of phones/syllables and the pauses. The sample description and analysis of the pace of speech of a 9-year-old with oligophasia have been presented below.

The fragment of speech produced by the student with oligophasia (9-year-old):

wcoraj kilo byłem w (-y) [1.88 s.] sklepie (-) [1.01 s.] po (-) [0.24 s.] iksboksa (-) [0.52 s.] to jes taka gra (- to jes taka -) [1.71 s.] taki fsytnik (-) [0.15 s.] do plyt albo (-y) [0.84 s.] taka (-) [0.35 s.] no taki (i on takie -) [1.24 s.] z konselkom (-yy -m) [4.84 s.] jak kcie mozna (fs) [0.29 s.] tak (-y) [1.12 s.] fsytać (-) [0.25 s.] gra (-) [0.3 s.] w takim (- w takim na - w takim) [2.3 s.] albo jes

Number of phones	122
Number of syllables	46

Pace of speech: 4.06 phones/s (1.53 syllables/s).

⁴ Audacity Team (2014). Audacity®: Free Audio Editor and Recorder [Computer program]. Version 2.1.0 retrieved from <http://audacity.sourceforge.net/> [access: 19.09.2015].

⁵ The transcription follows the general spelling rules and includes the grammatical mistakes as were made by the students.

⁶ It was impossible to use computer software to automatically determine the pace of speaking because it cannot calculate the pauses which are partly or fully filled.

	Number of the pauses	Duration of the pauses
Total pauses	15	17.04
Non-filled pauses	7	2.82
Filled pauses	1	0.29
Partly-filled pauses	7	13.93

Percentage of the pauses in the fragment of speech: 56.8%.

The characteristics of the research group

The research group included 16 children with mild intellectual disability and was compared in terms of the obtained data to the group of 16 students without any disabilities. The characteristics of the research group have been presented in Table 1.

Table 1. Comparative characteristics of the groups

Comparative criteria	Students without oligophasia	Students with oligophasia
Average age (in years)	9.1	9.3
Average IQ	norm	60 II
Sex ratio – girls/boys	5/11	5/11

Source: original research.

The study deliberately did not use the criterion of the so-called *mental age*, even though it is often used in similar studies. The main assumption of this criterion is to use the control group of students which are *younger* than the research group of students in order to achieve the same mental age as opposed to the actual age of the students. The mental age criterion has not been used mainly due to the relatively young age of the students with intellectual disability. Generally, people with mild intellectual disability function at the mental level of 9–10-year-olds⁷ – it would be impossible to know to which mental age the research group should be compared if they were, at that moment, at the age of 9. With this in mind, the authors decided to use the biological age criterion for the research (see: Kaczorowska-Bray 2017).

⁷ According to ICD-10 (1998, 128) classification, persons with intellectual disability reach the following mental age development: severe disability – 3–6-year-old; moderate disability – 6–9-year-old; mild disability – 9–12-year-old (see: Kaczorowska-Bray 2017).

The results – the quantitative analysis

In order to verify the hypothesis about the possible differences in speech pace between the two research groups, the following criteria were studied: average pace of the speech (phones/syllables + the duration of the pauses), average pace of speaking (phones/syllables), the average ratio of the pauses in the speech (number + percentage data), average duration of the pauses, average duration of the proper pauses, average duration of the fully-filled pauses, average duration of the half-filled pauses.

Table 2. The data obtained through the criteria and parameters of the research

Comparative criteria – research parameters	Control group – students without oligophasia	Research group – students with oligophasia
Average pace of speech	7.1975 phones/second 2.99375 syllables/second	6.60625 phones/second 2.750625 syllables/second
Average pace of speaking	11.226875 phones/second 4,66625 syllables/second	10.990625 phones/second 4.563125 syllables/second
Average ratio of pauses	12.5625 (~ 13 pauses) 35.895%	14.375 (~ 14 pauses) 40.52875%
Average duration of the proper pauses	4.319375 s	5.639375 s
Average duration of the fully-filled pauses	1.380625 s	0.995625 s
Average duration of the partly-filled pauses	5.069375 s	5.525 s
Number of research subjects	16	16
The age of the subjects	9.1	9.3

Source: original research.

The estimated values of the data obtained in the research show some differences between the parameters of the two research groups. However, the significance of these differences should be statistically analysed.

The results – statistical analysis

The statistical analysis of the obtained material consisted of three areas of data: 1. The average pace of speech (in phones/s & syllables/s) and the average pace of speaking (in phones/s & syllables/s); 2. The average ratio of pauses within the speech (percentage data) and the average duration of the proper pauses (in seconds); 3. The average duration of the fully-filled pauses (in seconds) and

the average duration of the partly-filled pauses (in seconds). The selection of the above areas resulted from the character of the data and its influence on the kinds of tests that had to be used.

Area 1. The average pace of speech and the average pace of speaking

In order to check the relationship within the data, the parametrical test t was carried out. This type of test was chosen because of the normal distribution of the variables. The type of distribution was checked with the use of the Shapiro–Wilk test.

All of the analyses were carried out with the statistical significance level set at $p = 0.05$, which means that the statistical probability of 95% was the borderline value throughout the study. If $p > 0.05$, it was assumed that the risk of changes in variables within the groups was too high to state that the variables are truly responsible for those changes. In such a case, the variables are statistically insignificant. If $p < 0.05$, it is possible to dismiss the zero hypothesis, which assumes the equality of the averages/medians.

Table 3. The statistical analysis of the average pace of speech and the average pace of speaking

Variables	Group					
	Norm			Oligophasia		
	<i>M</i>	<i>SD</i>	<i>Me</i>	<i>M</i>	<i>SD</i>	<i>Me</i>
The average pace of speech: phones/s	7.2	1.3	7.1	6.6	2.3	6.2
The average pace of speech: syllables/s	3.0	0.5	3.0	2.8	1.0	2.6
The average pace of speaking: phones/s	11.2	1.5	11.5	11.0	2.3	10.1
The average pace of speaking: syllables/s	4.7	0.6	4.7	4.6	1.1	4.2

M – average; *SD* – standard deviation; *Me* – median (Q50)

Source: original research.

The test did not show any statistically significant differences ($p > 0.05$) in the areas that were investigated. It means that the group does not produce any significant differences in the average pace of speech or the average pace of speaking. The graphical representation of the results has been shown in Charts 1–4.

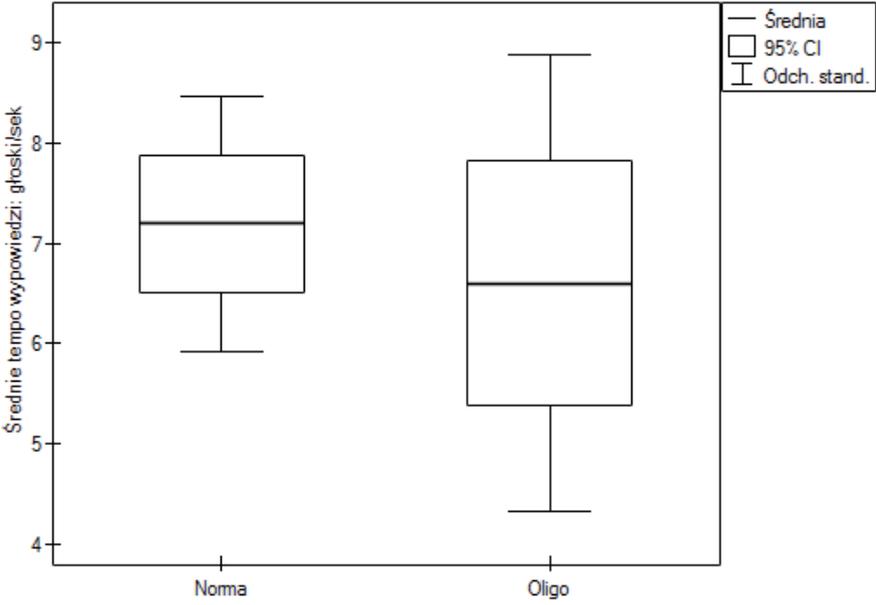


Chart 1. The average pace of speech: phones/second
Source: original research.

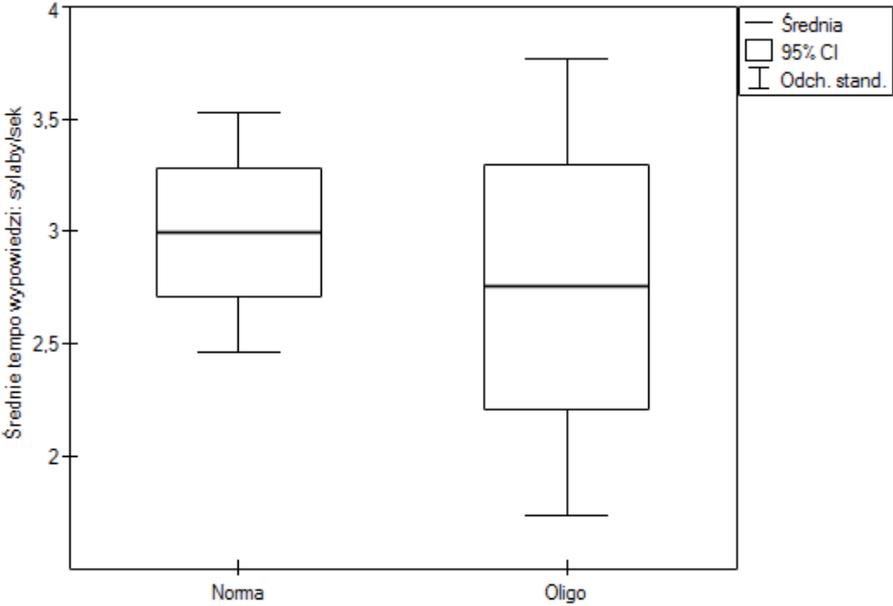


Chart 2. The average pace of speech: syllables/second
Source: original research.

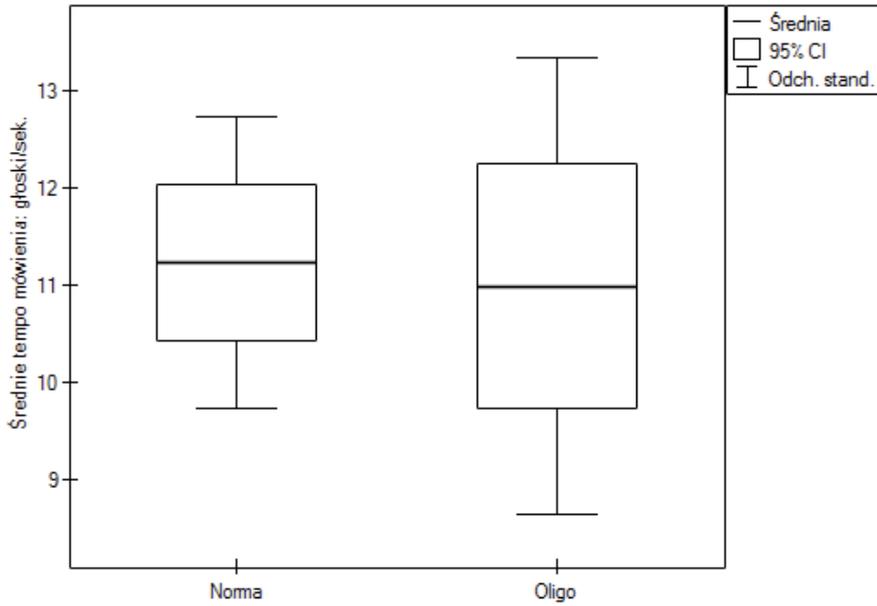


Chart 3. The average pace of speaking: phones/second

Source: original research.

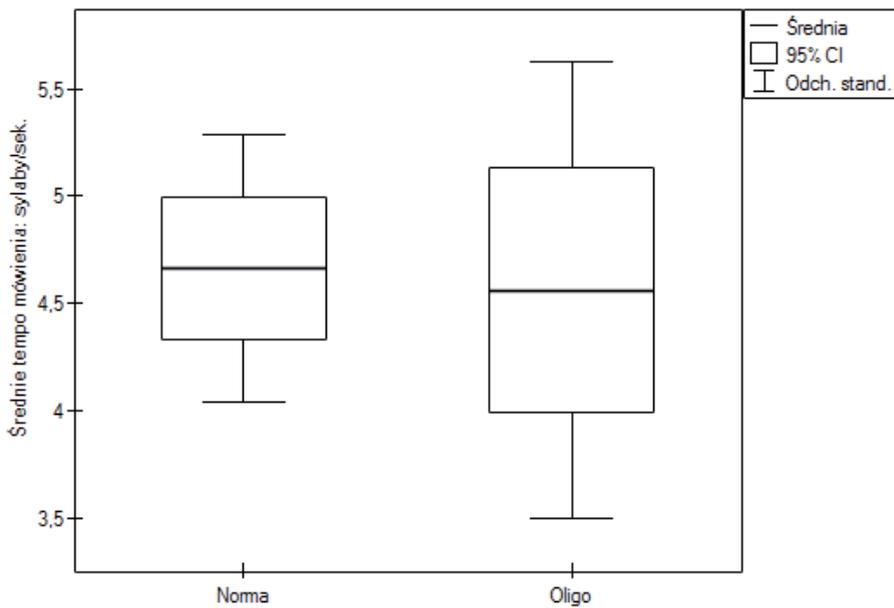


Chart 4. The average pace of speaking: syllables/second

Source: original research.

Area 2. The average ratio of pauses in speech samples and the duration of the proper pauses

The analysis of these parameters involved the usage of the same statistical tests as the previous one. The results are shown in Table 4.

Table 4. Statistical analysis of the average ratio of pauses in speech samples and the average duration of the proper pauses

Variables	Group					
	Norm			Oligophasia		
	<i>M</i>	<i>SD</i>	<i>Me</i>	<i>M</i>	<i>SD</i>	<i>Me</i>
The average ratio of pauses in speech samples: number	12.6	2.8	12.0	14.4	2.4	15.0
The average ratio of pauses in speech samples: %	35.9	6.5	36.3	40.5	12.2	38.4
The duration of the proper pauses: seconds	4.3	2.3	4.6	5.6	2.6	5.8

M – average; *SD* – standard deviation; *Me* – median (Q50)

Source: original research.

The performed test did not show any statistically significant differences in any of the study areas ($p > 0.05$). Therefore, it can be stated that the norm/oligophasia groups do not produce any significantly different results within the following areas: the average ratio of pauses in speech samples (number), the average ratio of pauses in speech samples (%), the duration of the proper pauses (seconds). The graphical representation of the results has been shown in Charts 5–7.

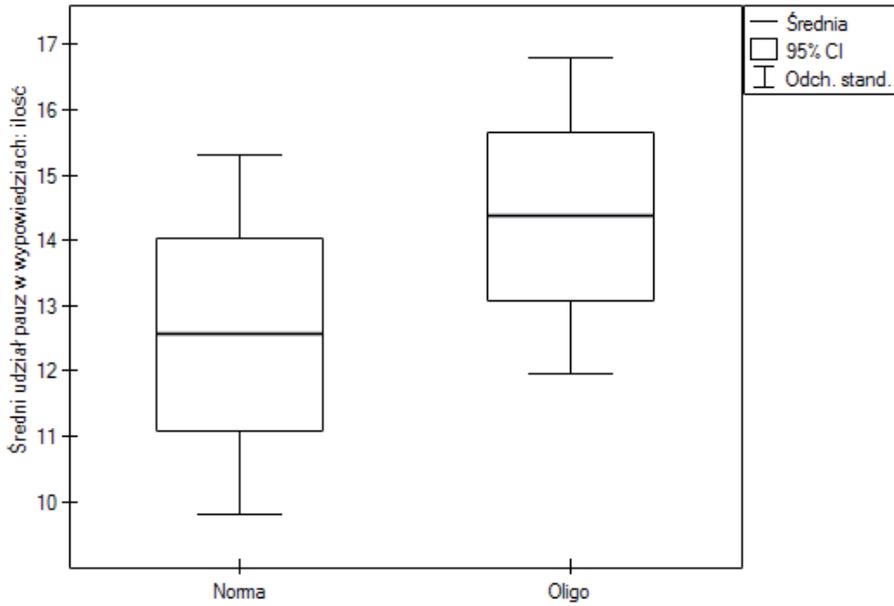


Chart 5. The average ratio of pauses in speech samples: number

Source: original research.

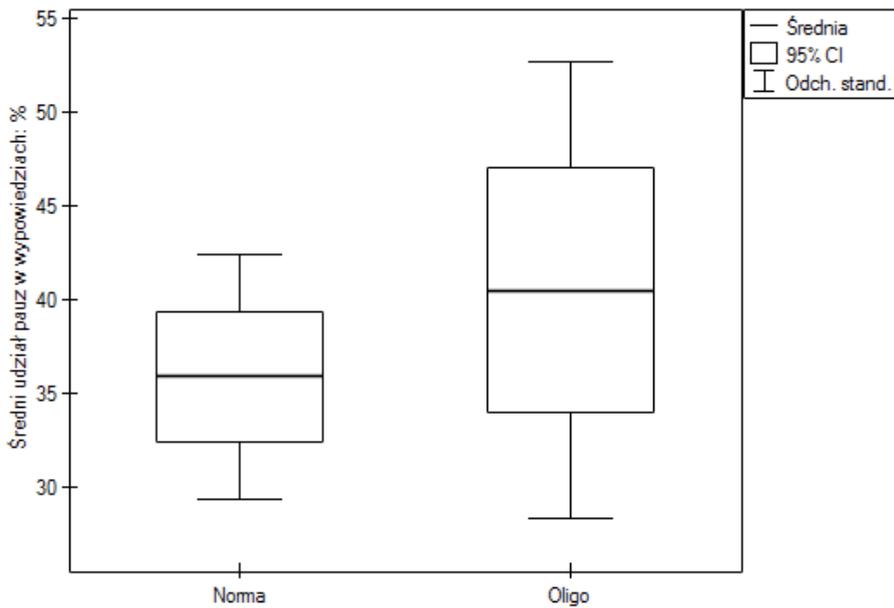


Chart 6. The average ratio of pauses in speech samples: %

Source: original research.

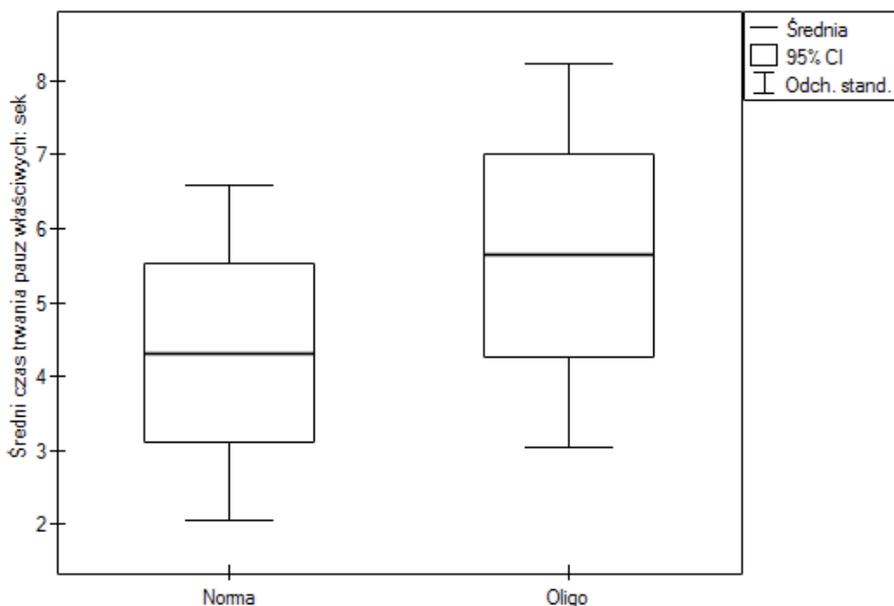


Chart 7. The average duration of the proper pauses: seconds

Source: original research

Area 3. The average duration of the filled pauses and the party-filled pauses

The analysis of these parameters involved the usage of the Mann–Whitney test (also called Wilcoxon test for independent pairs). The selection of the test resulted from the character of the variables that was different from normal (which was earlier checked with the Shapiro–Wilk test) – see areas 1 and 2 of the statistical analysis. The results are shown in Table 5.

Table 5. Statistical analysis of the average duration of the filled pauses and the party-filled pauses

Variables	Group							
	Norm				Oligophasia			
	<i>M</i>	<i>Me</i>	<i>Min</i>	<i>Max</i>	<i>M</i>	<i>Me</i>	<i>Min</i>	<i>Max</i>
The average duration of the filled pauses: seconds	1.4	0.8	0.0	3.8	1.0	0.3	0.0	4.5
The average duration of the party-filled pauses: seconds	5.1	5.7	0.0	7.9	5.5	4.8	2.4	13.9

M – average; *Min* – minimum value; *Max* – maximum value; *Me* – median (Q50)

Source: original research.

The performed Mann–Whitney test did not show any statistically significant differences in any of the study areas ($p > 0.05$). Therefore, it can be stated that the norm/oligophasia groups do not produce any significantly different results within the following areas: the average duration of the filled pauses and the average duration of the party-filled pauses. The graphical representation of the results has been shown in Charts 8–9.

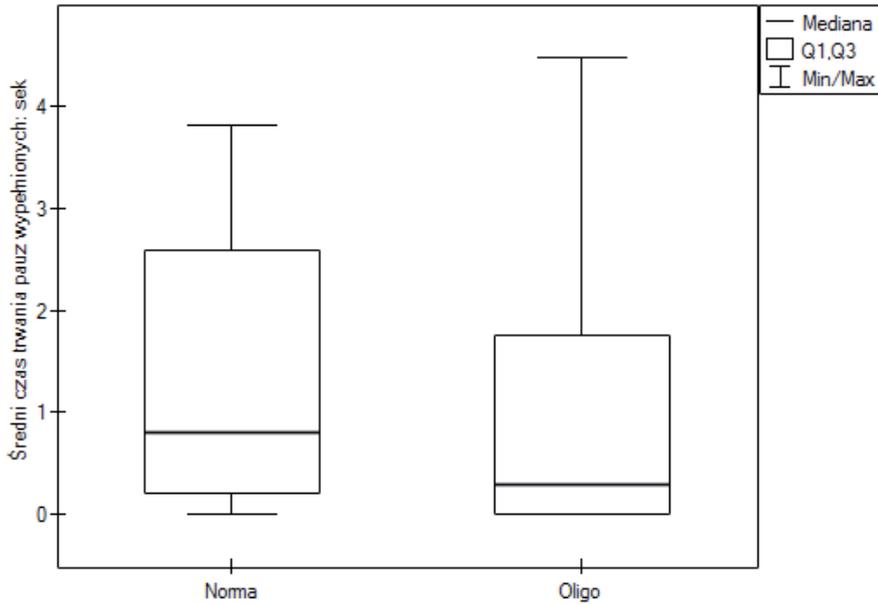


Chart 8. The average duration of the filled pauses: seconds

Source: original research.

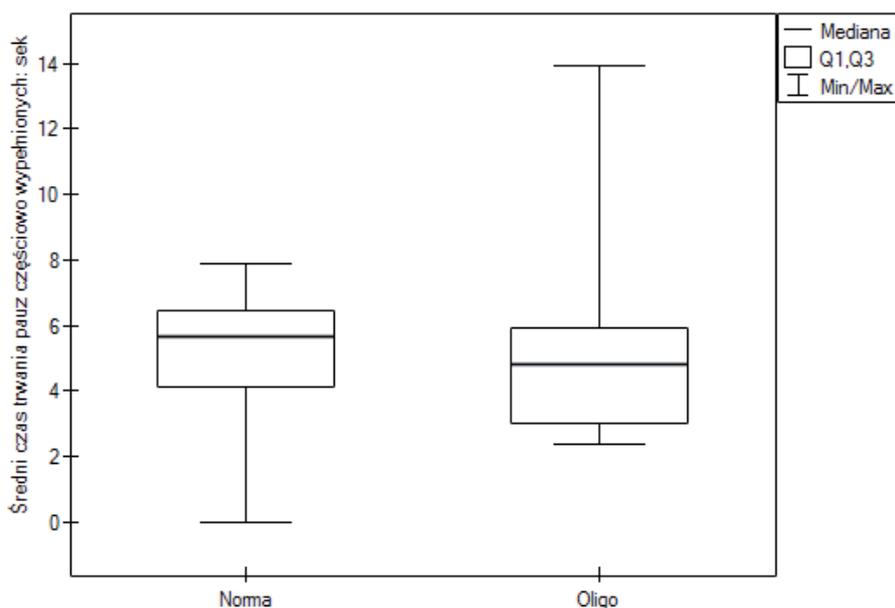


Chart 9. The average duration of the party-filled pauses: seconds
Source: original research.

CONCLUSIONS

The statistical analyses did not confirm the hypothetical differences in the pace of speech of the two study groups. It should be kept in mind that this outcome may be the result of the relatively low number of participants within the research groups (N=32). However, if the results were to be corroborated by the research with broader number of participants, the general belief of the Polish speech therapists that people with oligophasia are characterised by “slower pace of speech, disorders of speech fluency, and frequent stuttering” would have to be verified.

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