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EXAMINATION OF LOCAL AND GLOBAL COHERENCE IN THE IMPAIRED DISCOURSE OF PATIENTS DIAGNOSED WITH MIXED APHASIA

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SUMMARY

Background: The study aimed to investigate the hypothesis indicating that the type of discourse influences the macro- and microstructure of the language used by Polish speakers diagnosed with mixed aphasia, and to demonstrate the discourse-specific linguistic properties in two groups of patients with mixed aphasia with either motor or sensory components compared to the neurotypical control group.

Material/Methods: Language samples were collected from people with mixed aphasia with motor component (10 subjects), sensory component (10 subjects) and the control group (10 subjects), matched in terms of age and education. Discursive tasks (a description of experiences related to the disease, a description of an important life event, sequential image description, single image description, fairy tale narrative, procedural discourse) were taken from the Aphasia Bank protocol for discourse tasks. The discourse samples were analyzed within the general terms of cohesion and coherence, the relations between them, and the influence of discourse genre on cohesion. Language samples were analyzed for consistency and coded. To obtain qualitative data SALT software was used. Then, a statistical analysis was performed.

Results: A greater number of utterances were recorded in mixed aphasia with sensory component, something which may occur due to difficulties in selecting the appropriate vocabulary and overproduction which does not affect the coherence of the elements, but results in grammatical and semantic breakdown. Research has shown that for those with mixed aphasia it is easier to achieve a higher degree of local coherence than global coherence. Analysis has shown that the statements of people with mixed aphasia are characterized by lower local and global coherence.

Conclusions: There is a necessity to continue the research to demonstrate the differences within other types of aphasia in Polish. Additionally, it is necessary for therapeutic activities to be undertaken so that those with aphasia could improve their linguistic functioning on a daily basis, especially in discourse production.

Key words: discourse examination, language, linguistic communication disorders, neurological speech therapy, speech therapy.

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INTRODUCTION

Aphasia is an acquired language disorder, which occurrence is associated with breakdown of the language functions: expression, speech comprehension, writing and reading or repetition abilities (Pąchalska 2011; Panasiuk, 2012; Watila, Belarabe, 2015; Sheppard, Sebastian, 2021; Krajewska, 2022). Inability to comprehend speech or create intelligible statements has a crucial impact on people's social, professional and everyday life, which is why aphasia is a burning problem. The most common cause of aphasia is a stroke located in the left middle cerebral artery, which accounts for 80% of cases of aphasia (Krajewska, 2022, 20-21; Polanowska 2016). Therefore, aphasia in adults is often secondary to stroke in the dominant cerebral hemisphere, present in 20% to 40% of acute stroke patients (Watila, Belarabe, 2015).

In medical sciences, such as neurology, aphasia is usually described as a symptom of damage to the central nervous system. But adopting a different, neurolinguistic, point of view applies that aphasia is a language disorder determined by biological factors. Research conducted in the field of neurolinguistics resulted in theoretical studies referring to mental organization of the language system (Luria, 1963, 1967, 1976). According to one of the pioneers of neurolinguistics, Roman Jakobson (1987, 96):

The application of purely linguistic criteria to the interpretation and classification of aphasic facts can substantially contribute to the science of language and language disturbances, provided that linguists remain as careful and cautious when dealing with psychological and neurological data as they have been in their traditional field.

In this sense neurolinguistics descriptions of language impairment caused by aphasia enable us to better understand processes which determine people's language functioning.

Among the many neurolinguistic definitions of aphasia that we can find around the world, it is worth mentioning the most commonly used, described by Pąchalska, Kaczmarek and Kropotov (2021), division of aphasia into**:**

- **non-fluent**, or motor aphasia, defined as a disorder of linguistic communication as a result of brain damage, consisting of difficulties in the correct construction of verbal utterances, resulting in articulation disorders and a significant slowing down of the speed of speech;
- **fluent**, or sensory aphasia, which is a disorder of linguistic communication as a result of brain damage, consisting mainly of difficulties in understanding speech, while the speed of speech is preserved;
- **mixed,** which is a combination of non-fluent and fluent aphasia.

All types of aphasia can vary in severity: mild, moderate and severe. It should be add that severe mixed aphasia is define as global aphasia (cf. Pąchalska 2011; Morga et al. 2023).

That is a foundation of appropriately applied speech and language therapy focused on rehabilitation and restoration of language system. Therefore, the

speech therapy approach is clearly distinguished from the medical approach, since for speech therapists and speech pathologists, aphasia is a separate nosological entity, as well as the subject of diagnosis (Krajewska, 2022, 30-32).

To increase the effectiveness of speech and language therapy in case of aphasia or any other language impairment, it is necessary to conduct appropriate research focusing on particular aspects of language system (see also Pąchalska & Pólrola 2020). Focusing on local and global coherence in presented research may provide usefull descriptions and theoretical statements about discourse production and management in mixed aphasia.

MATERIALS AND METHODS

Aphasia is a language impairment that affects the production and comprehension of speech and other language communication skills. Because of its negative impact on quality of life and its contribution to psychological and social disintegration, frequently experienced by aphasic individuals, aphasia is a burning issue in our society. Recovery from aphasia is in fact a top-ten research priority for stroke patients (Pollock et al., 2012). Following the recommendations of evidence-based practice in speech-language pathology (Reilly, 2004), basic research in linguistics, psycholinguistics and neurolinguistics has contributed to initiatives aimed at reducing the adverse impact of aphasia on society by informing the development of tools and protocols for aphasia management. Linguistically based studies on aphasia have aimed to describe and characterise language impairment in aphasia by drawing on generative grammar theory (e.g., Caramazza & Zurif,1976; Bastiannse & van Zonneveld, 2006) or functional usage-based linguistic theories (e.g. Martínez-Ferreiro, Bastiaanse & Boye, 2020). Recently, we can observe an increase in linguistic analyses of discourse in aphasia (Bryant, Ferguson & Spencer, 2016), that is in research focusing on language units larger than a single sentence (Halliday & Matthieson, 2004). Wright (2011) argues that discourse is of interest to aphasiologists because: a) adults with aphasia experience difficulty communicating at the discourse level, b) analyses of discourse can be a method of assessing their social communication skills, and c) changes in discourse production can be used to evaluate response to treatment. Linguistic analyses of discourse in aphasia have to date addressed such topics as: discourse treatment (e.g., Dipper et al., 2020), description of discourse in aphasia (Bryant, Ferguson & Spencer, 2016; Panasiuk, 2019) discourse measures and analysis methods (Pritchard, 2017). The growing emphasis on discourse in linguistically informed research of aphasia seems to go hand in hand with the visible switch from impairment-based to functionally oriented aphasia therapy in clinical practice (Galletta & Barrett, 2014; Pąchalska, 2011, 2021), a possible impact of the International Classification of Functioning, Disability and Health (WHO, 2001) underscoring patient activity and social participation. Linguistic research needs to continue its strong interest in aphasic discourse in order to provide supporting evidence for ICF-based clinical implementations.

Studies on discourse in people with mixed aphasia

The aim of this article is to describe coherence in the examined discourses produced by Polish speakers, most often people suffering from aphasia, i.e. speech impairment caused by brain damage often due to stroke. In aphasia research, discourse is defined as a larger unit of language than a single sentence or as a type of message that serves specific purposes (e.g. a story, opinion or description of a procedure) (Halliday and Matthieson, 2004). Based on a recent systematic study a scoping review of empirical research on the Polish language in aphasia (Dębski, Wójcik-Topór & Knapek, 2021) it was found that the discourse of Polish-speaking people with diagnosis of aphasia "requires greater research attention […] to reflect the high interest discourse of people with aphasia in world literature".

To date, most studies of aphasic discourse have been conducted with participation people with fluent or non-fluent aphasia (e.g. Martínez-Ferreiro, Vares Gonzalez, Rosell Clari and Bastiaanse, 2017), whose performance is often compared with efficiency control of neurologically healthy people (e.g. studies on anomic aphasia in Mandarin-Chinese by Deng et al., 2024). Previous research has shown that the discourse of people with aphasia is quantitively and qualitatively reduced and itis generally less coherent than the discourse of brain-healthy people (Stark at al., 2019; Lock & Armstrong, 1997). Additionally, people with aphasia who do not speak fluently have poor grammatical coherence skills (Marangolo et al., 2014), while people with fluent aphasia are characterized by a much poorer vocabulary consistency compared to brain-healthy individuals. Recently some researchers suggested also the need to complete research on discourse in aphasia in field of coherence (Stark, 2019), while the research should include other types of aphasia, not only fluent and non-fluent (Zhang, Geng, Yang, and Ding, 2020; Martínez-Ferreiro, Vares González, Rosell Clari and Bastiaanse, 2017). Moreover, in the field of Polish linguistic there is no recent studies conducted on coherence in aphasia. In an attempt to fill this gap in research, this study attempted to look at phenomena in mixed aphasia that are caused by damage to the left middle cerebral artery, the most common aphasia type diagnosed in a clinical setting. The analysis was performed using a general linear model (GLM), searching for relationship between two symptoms of aphasia, mixed aphasia with motor component and mixed aphasia with sensory component and language measures scores in examination.

Participants

10 patients diagnosed with mixed aphasia with motor component, 10 patients with mixed aphasia with sensory component and 10 brain-healthy patients constituting the control group were recruited to the Stroke and General Rehabilitation Department at the Ludwik Rydygier Specialist Hospital in Cracow and Polish Center for Functional Rehabilitation VOTUM in Krakow. The following inclusion and exclusion criteria were used: 1) mixed aphasia resulting from stroke verified by examination neuroimaging or clear medical diagnosis; 2) from 3 weeks to 36

months after the neurological event 3) concomitant apraxia and/or dysarthria allowed; 4) Polish as the first language according to self-report; 5) no dementia or comorbidities associated with significant cognitive problems consequences; 6) vision and hearing (alone or with assistance) adequate for the examination. Patients with aphasia were matched one-to-one on age, gender, and educational level to create three homogeneous samples between which comparisons could be attempted. Prior to recruitment, patients (or their proxies, if necessary) were asked to provide information consent to participate in the proposed project. This part of the recruitment process was regulated by permission and guidelines obtained from the Research Ethics Committee at Institute of Polish Glottodidactics of the Jagiellonian University and Institutional Review Regulations of the Management Board of Aphasia Bank.

Discourse elicitation and data gathering

The discourse data collection script consisted of 7 tasks consistent with the Aphasia Bank protocol: 1) *History of stroke*. This exercise is intended to elicit free speech in response to such questions as: What do you think your speech look like these days? Tell me about your first memories after stroke. What things did you do to feel better? 2) *Important even*t. This is something different free speech trigger task in response to the following message: Can you tell me a story about something important that happened in your life? It can be a happy event or a sad event from any time period – childhood, teenage years, most recent. 3) *Broken window*. 4) *Refused umbrella* and 5) *Rescue the c*at. Tasks 3-5 are intended to generate descriptive discourse in a response to the series of photos that tells a story. Participants have to tell a story with a beginning, middle and end. 6) *Cinderella*. In this task, participants are asked to tell a fairy tale inspired by a picture book. 7) *Ham and tomato sandwich*. This task triggers procedural discourse in response to the prompt: “Tell me how to make a ham and tomato sandwich”. The protocol used makes it possible to obtain samples of spontaneous, narrative, procedural discourse which are created based on pictorial material.

Coherence coding

Local coherence is defined as “the ratio of the meaning/content of the verbalization to the content of the verbalization immediately preceding the utterance made by an interviewer or the person being interviewed” and global coherence as “the relationship of the meaning or content of a verbalization to the overall topic of conversation” (Strauss Hough & Barrow, 2003). Polish adaptation of van Leer i Turkstra’s (1999) five-item coherence scales to assess local and global coherence discourse has been developed (Table 1). A forward and backward translation method was used for linguistic verification to ensure that both tools were equivalent (Sousa et al. Rojjanasrirat, 2011). The encoding rules used for local and global coherence are presented below.

Systematic Analysis of Language Transcript (SALT)

The application of codes in coherence was essential for using the Systematic Analysis of Language Transcripts (SALT) software. This is a tool that standardizes the process of acquiring, transcribing and analyzing language samples. Using the program enables to objectivise the data gathering process and allows to share the data between other researchers involved in the examination. It includes a transcription editor, standard reports, and reference databases for comparison of collected data. It allows to obtain quantitative data that can then be subjected to other analyses, e.g. statistical ones.

Data analysis

In order to perform statistical analysis, 10 two-way analyzes of variance were performed in a mixed design 3 (group: mixed aphasia with motor component vs. mixed aphasia with sensory component vs. a patient from the control group) x 4 (type of task: spontaneous speech (spon) vs. telling a story (his) vs. telling a fairy tale (kop) vs. narrating a procedure (proc). The dependent variables in these analyzes were the following coherence indicators - L1, L2, L3, L4, L5, G1, G2, G3, G4 and G5. The within-subjects variable was the type of task the group was between the objects. The results of the analyzes of variance are presented in the Table 2.

Table 1. Five-point coherence assessment scale (for both local and global coherence)

Local coherence level	Description
L1	The utterance has no relation to the content of the (immediately) preceding utterance. It may be a radical change of topic, a comment on discourse, or an unintelligible utterance.
L2	The utterance contains multiple clauses, wherein one possibly relates to the content of the preceding utterance, but the other one may not.
L3	The utterance's topic generally relates to that of the preceding utterance, but with a shift in focus from the subject or activity of the preceding utterance; or the utterance is referentially vague or ambiguous so that the relation to the preceding utterance have to be inferred.
L4	The utterance contains multiple clauses, wherein one clause definitely relates to the content in the preceding utterance, but the other one may not.
L5	The topic of the preceding utterance is continued by elaborating, temporal sequencing, enumeration of examples or maintaining the same actor, subject, action or argument as the focus.
Global coherence level	Description
G1	The utterance is unrelated to a general topic or is a comment on discourse.
G2	The utterance contains multiple clauses, wherein one clause possibly relates to a general topic, and one does not.
G3	The utterance provides information possibly related to a general topic or is an evaluative statement without providing substantive information, or the topic has to be inferred from the statement.
G4	The utterance contains multiple clauses, wherein one clause relates directly to a topic and the other one relates indirectly.
G5	The utterance provides substantive information related to a general topic.

Source: van Leer, Turkstra (1999).

Table 2. Results of a 3x4 mixed-design ANOVA on the impact of the research group and the type of task performed on the level of individual cohesion indicators

		SS	*df*	*F*	*p*	η^2
L1	Group	0,59	2	4,39	**0,022**	0,25
	Type of task*	0,34	2,001	3,13	0,052	0,10
	Type of task x group*	0,13	4,001	0,61	0,660	0,04
L2	Group	0,00	2	10,51	**<0,001**	0,44
	Type of task	0,00	2,194	2,46	0,089	0,08
	Type of task x group	0,00	4,388	1,39	0,246	0,09
L3	Group	0,05	2	2,99	0,067	0,18
	Type of task *	0,08	2,098	2,34	0,103	0,08
	Type of task x group *	0,04	4,197	0,61	0,663	0,04
L4	Group	0,00	2	1,22	0,310	0,08
	Type of task	0,00	2,218	1,60	0,209	0,06
	Type of task x group	0,00	4,436	0,70	0,610	0,05
L5	Group	1,37	2	12,45	**<0,001**	0,48
	Type of task *	0,33	1,831	3,59	**0,039**	0,12
	Type of task x group *	0,22	3,662	1,22	0,314	0,08
G1	Group	0,35	2	1,92	0,167	0,12
	Type of task *	0,14	2,075	1,23	0,302	0,04
	Type of task x group *	0,14	4,15	0,63	0,648	0,05
G2	Group	0,00	2	1,77	0,189	0,12
	Type of task	0,00	2	0,47	0,627	0,02
	Type of task x group	0,00	4	0,22	0,927	0,02
G3	Group	0,04	2	1,67	0,207	0,11
	Type of task *	0,14	3	5,64	**0,001**	0,17
	Type of task x group *	0,05	6	0,97	0,454	0,07
G4	Group	0,00	2	1,10	0,347	0,08
	Type of task	0,00	2	1,17	0,319	0,04
	Type of task x group	0,00	4	0,95	0,445	0,07
G5	Group	0,85	2	6,76	**0,004**	0,33
	Type of task *	0,06	2,149	0,64	0,544	0,02
	Type of task x group *	0,24	4,297	1,28	0,287	0,09

Annotation. * - Mauchly's test significant. The result with the Greenhouse Geisser correction was reported

RESULTS

The analysis for L1 showed a statistically significant main effect of the group (Fig. 1). After conducting a post-hoc test with Bonferroni correction, it is known that the subjects in the control group (M = 0.19; SD = 0.15) had statistically significantly lower results in L1 than the subjects in the group with mixed aphasia with sensory component (M = 0 .35; SD = 0.19), p = 0.032. However, there were no significant differences between the group with mixed aphasia with motor component (M = 0.32; SD = 0.23) and the other groups.

In the analysis in which L2 was the dependent variable, a statistically significant main effect of group was found. In order to check what this effect was, a post-hoc test with Bonferroni correction was performed. Subjects who had mixed aphasia with sensory component (M = 0.01; SD = 0.02) had significantly higher levels of L2 coherence across tasks than subjects who were in the control group (M = 0.00; SD = 0.01), p = 0.001 and than those with the mixed aphasia with motor component group (M = 0.00; SD = 0.00), p < 0.001.

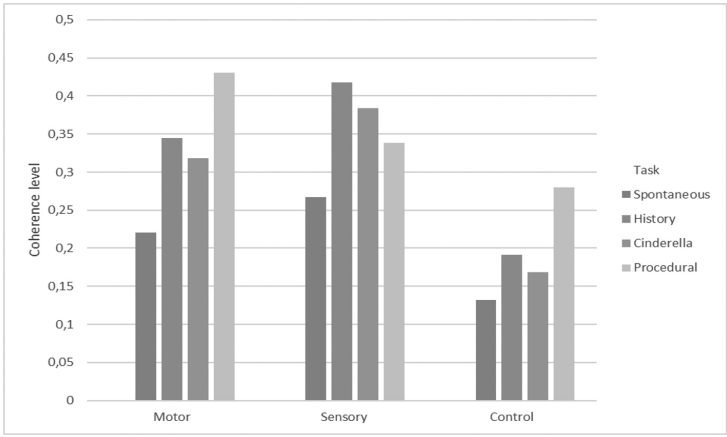

Fig. 1. Influence of discourse genre and disorder on L1 index
Source: own material

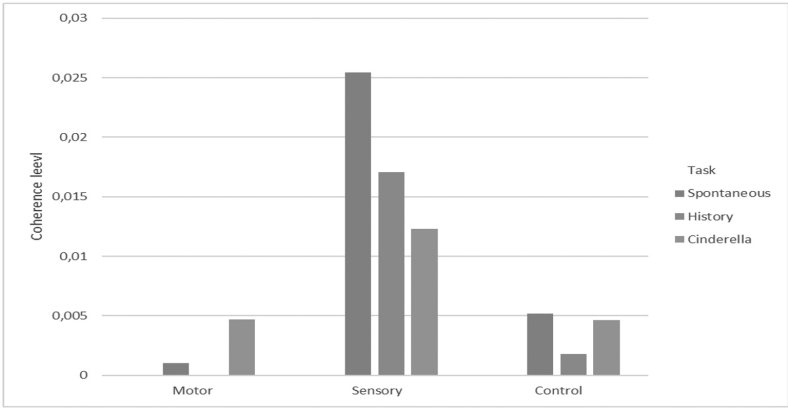

Fig. 2. Influence of discourse genre and disorder on L2 index
Source: own material

In the analysis in which L5 was the dependent variable, a statistically significant main effect was noted for both the type of task and the group (Fig. 3). A post-hoc test with Bonferroni correction for the main effect of group showed that subjects in the group with mixed aphasia with sensory component (M = 0.24; SD = 0.15) had a statistically significantly lower level of coherence in L5 than subjects in the control group (M = 0.50; SD = 0.16). However, there were no statistically significant differences between the group of patients with mixed aphasia with motor component (M = 0.37; SD = 0.22) and the other groups. In turn, when it comes to the main effect of the type of task, the subjects obtained higher results in the level of L5 coherence during spontaneous discourse (M = 0.44; SD = 0.19) than when telling a fairy tale (M = 0.32; SD = 0, 22, p = 0.026) and telling picture sto-

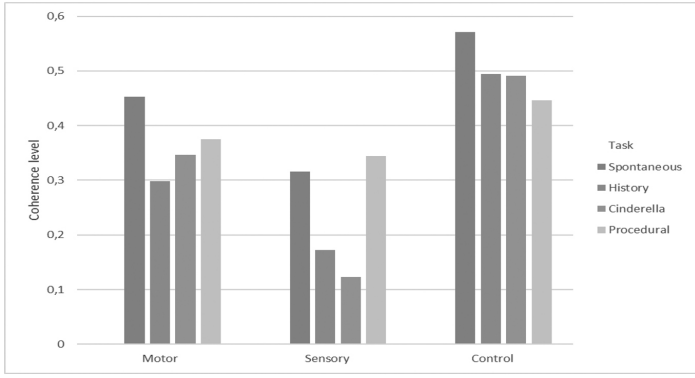

Fig. 3. Influence of discourse genre and disorder on L5 index
Source: own materials

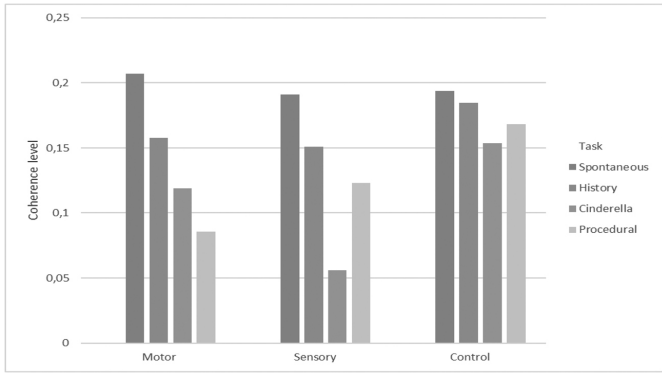

Fig. 4. Influence of discourse genre and disorder on G3 index
Source: own materials

ries (M = 0.32; SD = 0.18, p < 0.001).However, there were no significant differences between the procedural discourse task (M = 0.39; SD = 0.27) and the others.

In the analysis in which G3 was the dependent variable, only a statistically significant effect of task type was obtained (Fig. 4). It turned out that subjects in the spontaneous discourse task (M = 19.7; SD = 0.08) obtained statistically significantly lower results in G3 coherence than when they told a fairy tale (M = 0.11; SD = 0.09), p = 0.004. There were no differences for the tasks related to telling picture stories (M = 0.16; SD = 0.09) and procedural discourse (M = 0.13; SD = 0.12).

A statistically significant main effect was found for the group in the analysis in which G5 was the dependent variable (Fig. 5). A post-hoc test with Bonferroni correction showed that there was a statistically significant difference between the control group (M = 0.39; SD = 0.18) and the group of people with mixed aphasia with sensory component (M = 0.19; SD = 0, 18). However, there were no differences between the group of people with mixed aphasia with motor component (M = 0.30; SD = 0.21) and the other groups.

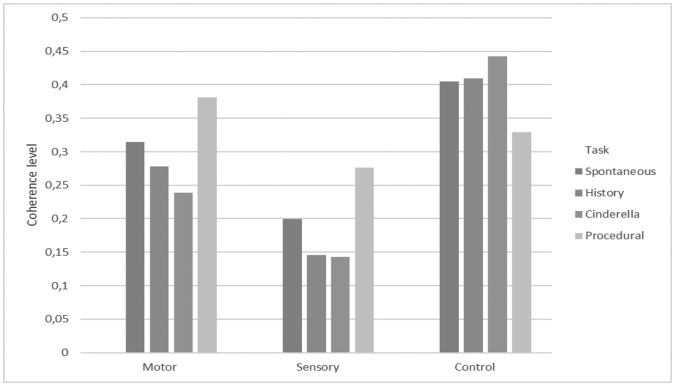

Fig. 5. Influence of discourse genre and disorder on G5 index
Source: own material

On the basis of statistical analysis, information was obtained that, regardless of the type of discourse, lower local coherence was observed in the group of people with mixed aphasia with sensory component. The L2 index in this group was the highest. The L5 index was statistically significantly lower in the group of patients with mixed aphasia with sensory component, compared to the control group, especially in narrative discourse and picture story telling. These tasks require maintaining the chronology of events and cause-and-effect thinking, which may be impaired in the case of additional language difficulties in aphasia.

The level of the G3 index in global coherence was significantly higher in the group of patients with mixed aphasia with sensory component in the spontaneous speech task than in narrative discourse and fairy tale telling.

In the case of the G5 index, there is a significant difference between the control group and the group of patients with mixed aphasia with sensory component in all types of discourse. The highest global coherence was observed across all groups in the procedural discourse task. This may indicate the production of discourse, where the patient relates the procedure itself to his own experience, an everyday activity that in some cases is also performed automatically. Hence, it is easy to talk about it. Interestingly, the group of people with mixed aphasia with motor component had the greatest coherence in procedural discourse than the other groups. This may be due to limitations in implementation and production, therefore, compared to the control group, patients from this group spoke for a shorter time, also using keywords, without referring to their own preferences in performing activities.

For narrative discourse with pictorial support, the group with mixed aphasia with sensory component achieved the lowest coherence. Here it can be assumed that difficulty with cause-and-effect thinking, understanding the relationship of events and the need to maintain attention may have an impact. Certainly, the difficulty of choosing the right lexical units matters. Even though there are more utterances, their coherence is much smaller in global coherence.

At the same time, in the proposed study of the course, a lower level of local than global cohesion is observed in all study groups. This is due to the fact that each discourse, in addition to the intelligibility of the topic and cause-and-effect thinking, requires good linguistic skills, understanding and coherence also at the grammatical and lexical level, which is often impaired in the case of people with aphasia.

It is certainly important to consider discourse in therapy as a means of communication in society, while improving the functioning and quality of life of a person with aphasia. There is a need for a broader view of discourse, taking into account its global coherence, and not in the analysis of the grammatical or lexical structure itself (Dipper, Carragher, Whitworth, 2023). Hence, multi-level discourse research will be of great importance, which will allow the implementation of appropriate strategies and methods in the therapy of people with aphasia.

DISCUSSION

Presented in the paper coherence examination of the discourse of Polish language speaking people diagnosed with mixed aphasia clearly shows that difficulties in maintaining speech coherent (locally and globally) are significant and also symptomatic for aphasia. Well-known in the specialized literature distinction on fluent (sensory) and non-fluent (motor) aphasia is also noticeable in case of discourse's coherence examination: patients diagnosed with mixed aphasia with sensory component found it more difficult to maintain discourse coherent while their utterances tend to be more grammatically complex and extended (see Wójcik-Topór, Malina, Michalik, 2024). The overall conclusion from the research is that maintaining global coherence is more demanding for patients than maintaining local coherence, no matter if aphasia is diagnosed or not.

As expected, the control group produced more coherent output across all discourse tasks: spontaneous speech, picture description, narration and procedural discourse. To keep text coherent, subjects had to demonstrate high cognitive and linguistic functioning. Particular discourse tasks were focused on different aspects of organizing and planning subjects' speech and relied on different language and cognitive abilities: spontaneous discourse elicitation does not rely on visual material such as pictures, but relies on other cognitive abilities: memory, speech organization and planning; picture description rely the most on the visual material, but also requires appropriate planning and organizing speech and maintaining the sequence of cause and effect among the utterances; narrative discourse task based on Cinderella fairy tale also requires from subjects proper cognitive functioning in field of memory, cause-and-effect thinking, planning speech and maintaining right order of telling events; procedural discourse relies the most on invoking a proper procedure (making a ham and tomato sandwich) and it requires from subjects ability to plan and organize their speech and present particular actions in right order. Disorganization of language functions in aphasia impairs execution of those discourse tasks in a significant extent.

Even though local coherence examination provided higher results, the influence of the task type was significant: the highest results of L5 index in procedural discourse task may be caused by specificity of the task – giving instruction should be as precise and accurate as it is possible; patients rarely made digressions and they also continued the main topic: preparing a ham and tomato sandwich. Considering findings from the three age-matched groups of subjects: control group, group of patients diagnosed with mixed aphasia with sensory component and group of patients diagnosed with mixed aphasia with motor component, the paper results present that the discourse tasks type used to elicit utterances matters also in the case of local and global coherence (see also Stark, 2019).

Comparing total local coherence results with total global coherence results in the group of patients diagnosed with mixed aphasia with either sensory or motor component and in control group, it can be concluded that subjects in each group reached higher score in local coherence examination than in global coherence examination (Fig. 6). Maintain global coherence – correspondence of utterances made by patients with general topic of the conversation – is more difficult to maintain for patients both with and without aphasia diagnosis. According to figure 6, the global coherence examination is more vulnerable for disruptions among the discourse, than local coherence study, regardless of whether subjects are diagnosed with aphasia or not.

Presented research is also a voice in the debate over the validity of using a five-item scale to measure coherence. As already mentioned, the scale developed by van Leer and Turkstra (1999) was used for the study and adapted to Polish-speaking realities. In fact, this scale is an adaptation and extension of the five-point scale previously created by Glosser and Deser (1990).

Originally, Glosser and Deser gave statements a score from 1 to 5, where 5 signified very high thematic conference while 1 signified a lack of logical connection. In the same way points were awarded in the present study, however,

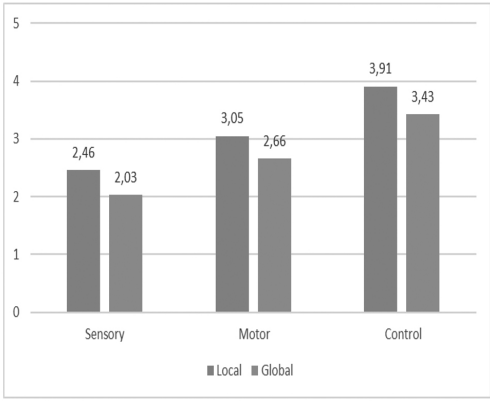

Fig. 6. Average score in local and global coherence according to five-point coherence assessment scale.
Source: own materials

this was done with reference to the guidelines which are recorded in Table 1 and which were created by van Leer and Turkstra. As for counting average scores, van Leer and Turkstra collapsed the scores into three rating levels: low coherence (scores 1 and 2), medium coherence (score 3) and high coherence (scores 4 and 5), and then calculated the percentage of occurrence for each level, which is different from the scale's original creators. In later studies, Coelho and Flewellyn (2003) used an adaptation of van Leer and Turkstra (1999), and Hough and Barrow (2003) used Glosser and Deser's (1990) five-item rating scale. Both Coelho and Flewellyn and Hough and Barrow found that their control groups had higher global coherence scores compared to clinical participants. In different study, Rogalski et al. (2010) also used an adapted version of the Glosser and Deser (1990) van Leer and Turkstra (1999) coherence rating scale, but only scores of 5, 3 and 1.

Due to the divergent approaches to calculating mean scores, Wright, Capilouto and Koutsoftas (2013) examined the relevance and reliability of the scale with reference to five grades and, as the researchers themselves suggested, to four grades. Both scales - the five and four-degree scales were found to be valid, reliable and relevant. For this reason, the original five-item form of counting the average score was used in this study, and this research provides further confirmation of the reliability of this tool.

Future directions

Conducting research on aphasia can provide linguists and neurolinguists valuable information about brain processing of language and cognitive functions, and speech therapists – new therapeutical implications, hence there is a need to continue examinations in aphasia-impaired discourse. As research was conducted using Aphasia Bank protocols, the elicited Polish texts and also results of data analyses should be shared with global community of researchers, educators and clinicians working with aphasia, who contribute in Aphasia Bank shared database.

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