



DANUTA GRZESIAK-WITEK

Jan Kochanowski University of Kielce,
Poland

ORCID iD: 0000-0001-6959-9304

PAWEŁ WITEK

University of Humanities and Economics
in Łódź, Poland

ORCID iD: 0000-0001-8814-0654

PIOTR SOBOLEWSKI

Jan Kochanowski University of Kielce,
Poland

ORCID iD: 0000-0003-4646-1702

URSZULA NIEKRA

Jan Kochanowski University of Kielce,
Poland

ORCID iD: 0000-0002-7684-9516

KRYSTIAN TUCZYŃSKI

University of Rzeszów, Poland

ORCID iD: 0000-0001-8220-2199

APHASIC SPEECH DISORDERS: THERAPEUTIC APPROACHES TO MINIMIZE AGRAMMATISM IN APHASIC PATIENTS

ABSTRACT

The paper presents the concept and symptoms of agrammatism and paragrammatism, which belong to the most typical symptoms associated with speech disintegration in patients with aphasic speech disorders. Agrammatism is caused by damage to the anterior speech area and accompanies motor aphasia. It is characterized by the dominance of nouns, which are most often used in the nominative case, lack of function words, prepositions, pronouns, and incorrect grammar, resembling the telegraphic style. Paragrammatism, in turn, is a grammatical disorder typical of sensory aphasia. The paper presents research on agrammatism and paragrammatism in Poland and Germany, supported by examples of utterances produced by patients with aphasic speech disorders. The main emphasis was placed on the presentation of therapeutic approaches aimed at minimizing the number of agrammatism in the language of patients with aphasia.

Objective: *The objective of this study is to provide a comprehensive overview of the mechanisms underlying agrammatism and paragrammatism in aphasia patients and to present effective therapeutic approaches aimed at minimizing grammatical deficits. Special attention was paid to analyzing the communication barriers in two female patients (motor aphasia and sensory aphasia) and to developing and implementing a set of speech-therapy exercises designed to restore proper morphological and syntactic function.*

Methods: *This investigation employed a descriptive case-study design, characterizing two patients: P1 (56 years old, kinetic-motor aphasia) and P2 (72 years old, acoustic-gnostic aphasia). Samples of spontaneous speech, repetition tasks, and object-naming were collected both before and after a series of therapy sessions. The therapeutic program included exercises in automatic word sequences, sentence-completion tasks (with and without visual prompts), training in collocations and syntactic constructions, and text-based tasks targeting morphological gaps.*

Results: *Following the therapy cycle, both patients demonstrated increased speech fluency and more frequent use of correct grammatical forms. In P1, there was a marked reduction in omitted prepositions and inflectional endings, along with improved sentence organization. In P2, accuracy in using numerals and pronouns improved, and both semantic and phonemic paraphasias decreased. Objective analyses of the recordings and the therapist's subjective ratings both indicated significant progress in morphology and syntax.*

Discussion: *These results confirm the efficacy of targeted speech-therapy exercises in reducing agrammatism among patients with different aphasia types. In particular, sequential automation of grammatical structures and the incorporation of visual stimuli proved crucial. The discussion highlights the importance of individualizing therapy programs and the benefits of integrating traditional techniques with digital tools (e-learning platforms, computer software). Study limitations (small sample size, absence of long-term follow-up) are acknowledged, and directions for future research on optimizing language-therapy protocols are proposed.*

KEYWORDS *aphasia; agrammatism; paragrammatism; speech therapy; speech rehabilitation; language exercises.*

1. THE DEFINITION OF APHASIA

Aphasia is a highly complex phenomenon encompassing both aphasic speech disorders developed by patients and the classification of aphasia.

According to the theory proposed by Maruszewski (1966), aphasia is *a disorder caused by organic damage to specific brain structures, a partial or complete impairment of the mechanisms programming speech functions in an individual who had already mastered these functions*. Therefore, aphasia should not be identified with any specific disease. It is an acquired language disorder in all modalities, which manifests itself after an individual had learnt to speak (Walesch 1986). This disorder is caused by damage to the central nervous system (craniocerebral trauma, stroke, expansive process) or neurodegeneration leading to dementia. According to Pąchalska (2011), aphasia is a consequence of a structural destabilization, i.e. serious changes in the physical substance and systems of the brain associated with speech and language.

The paper discusses agrammatic speech disorders based on the classification of aphasia proposed by A.R. Luria: 1. kinesthetic motor aphasia, 2. kinetic motor aphasia, 3. dynamic aphasia, 4. acoustic-gnostic aphasia, 5. acoustic-mnesic aphasia, 6. semantic aphasia. Patients diagnosed with one of the first three types of aphasia, i.e. kinesthetic motor aphasia, kinetic motor aphasia or dynamic aphasia, experience difficulty in producing articulate speech, while the other three types (acoustic-gnostic aphasia, acoustic-mnesic aphasia and semantic aphasia) are associated with impaired reception of speech (Pąchalska, 2011).

1.1. Kinesthetic motor aphasia is caused by damage to the postcentral motor region, which is located in the inferior part of the parietal lobe, posterior to the central sulcus separating the frontal lobe from the parietal lobe. The postcentral region is known as the parietal operculum of the left hemisphere of the brain (in right-handers). As a result of its damage, the sense of movement within the articulatory apparatus is impaired, preventing proper positioning of the tongue, lips, and vocal cords, which are essential for sound production;

1.2. Kinetic motor aphasia is caused by damage to the motor precentral cortex, i.e. located anterior to the central sulcus, in the frontal lobe. The precentral region is located in the inferior frontal lobe of the left hemisphere (the so-called Broca's area). As a result of damage, the sequential (serial) organization of articulation is disturbed. A patient with kinetic motor aphasia is able to articulate individual sounds but experiences difficulties in switching from one articulation system to another (from sound to sound, or from word to word). This, in turn, causes disturbance of the sequential organization of a spoken word (Tomaszewska-Volovici, 1976, p.6-7).

1.3. Dynamic aphasia is caused by damage to an area in the frontal lobe of the left hemisphere (anterior of the Broca's area). The patient can correctly pronounce sounds and single words. Difficulties occur when attempting spontaneous speech, with an absence of verbal communicative initiative. Although these patients have no articulation difficulties, their speech is limited to single words and stereotypical phrases.

In the case of these three types of aphasia distinguished by A.R. Luria, the understanding of speech is generally preserved (Tomaszewska-Volovici, 1976, p. 7).

1.4. Acoustic-gnostic aphasia is caused by damage to the posterior part of the superior temporal ganglion in the left hemisphere. The damage leads to phonemic hearing disorder, i.e. the ability to distinguish and identify speech sounds appropriate for a given language, and consequently, problems with understanding and correct reproduction of word sounds, with loss of proper auditory control of pronunciation. Since the motor aspect of speech is preserved, patients with this type of speech disorder generate many words. However, these words are distorted as individuals with acoustic-gnostic aphasia replace one word with another, a similar-sounding word (the so-called verbal paraphasias). *In the most severe cases, the utterances of acoustic-gnostic aphasics bear little resemblance to the words of the Polish language, stereotypical phrases persist in their speech to some extent* (Tomaszewska-Volovici, 1976, p. 7).

1.5. Acoustic-mnestic aphasia is caused by damage to the mid-posterior part of the left temporal lobe. As a result, persistent auditory-verbal traces occur and the range of received verbal stimuli shrinks. Phonemic hearing is basically intact. A person with this type of aphasic disorder experiences

difficulty remembering and recalling a series of words. When attempting spontaneous speech, the patient searches for appropriate words, and produces verbal paraphasias and distorted words.

It should be noted at this point that both acoustic-gnostic and acoustic-mnemonic aphasias result from impaired auditory reception of speech.

1.6. Semantic aphasia is caused by damage to the temporal-parietal-occipital (TPO) junction of the left hemisphere. This region is responsible for the functions of domestic (feeling the position of, among others, speech organs), visual and auditory analyzers. Its damage results in an inability to synthesize simultaneously occurring elements. As a consequence, orientation in spatial coordinates becomes disturbed, with speech characterized by the inability to understand expressions that describe spatial relations (e.g. prepositional constructions, such as *the pen is on the book, the ball is under the desk ...*), as well as logical and grammatical constructions requiring simultaneous coordination of several elements, i.e. passive and comparative constructions, as well as different types of subordinate sentences (Grzesiak-Witek, 2013, p. 94). It should be emphasized at this point that these patients in fact rarely exhibit clear clinical pictures of disorders consistent with a given model type of aphasia according to A.R. Luria, as their injuries, vascular in particular, are rarely limited to only one cortical area. In practice, various forms of mixed aphasia are most often encountered (Tomaszewska-Volovici, 1976, p. 7)

1.7. A Critical Approach to A.R. Luria's Concept of Aphasia Classification

A.R. Luria's concept of aphasia classification, although it played a fundamental role in the development of neuropsychology and neurologopedics/speech-language pathology, now requires critical analysis in light of contemporary neurobiological models. Luria's approach is based on the theory of the systemic localization of functions, which assigns specific syndromes of disorders to damage in strictly defined cortical areas. In contrast to this perspective, Gregor Hickok and David Poeppel (2007, pp. 394–398) propose the Dual-Stream Model, according to which language processing does not take place in isolated centers, but rather within parallel, functionally differentiated neural networks.

2. THE CONCEPT OF AGRAMMATISM

Agrammatism is a manifestation of the linguistic consequences of impaired mechanisms responsible for programming speech functions. Etymologically, the term agrammatism means *lack of grammar*, i.e. *linguistic elements expressing the mutual relationships between the components of a sentence* (Volovici, 1976, p. 5). It is an evident symptom of the loss of grammatical skills in patients with aphasic speech disorders. The patient's difficulty in producing proper grammatical forms may be noted already during the first appointment with the patient (before the speech therapy diagnosis). The concept of agrammatism should be viewed in a broader aspect, as it relates not only to the lack of grammatical elements in a sentence but also to any disturbances in the grammatical correctness of sentences. Agrammatism can also be defined as the inability to grammatically formulate and syntactically arrange words in a sentence. The speech is dominated by nouns, often in the first grammatical case, it lacks function words, resembling the so-called telegraphic style. Research in the field of aphasiology has contributed to a broader view of the problem of agrammatism, and in addition to the previously known motor agrammatism associated with disorders typical of motor (nonfluent) aphasia, agrammatism typical of sensory (fluent) aphasia, now known as paragrammatism, has been distinguished. It is characterized by the impoverishment of lexical resources and the omission of grammatical morphemes (Panasiuk, 2019, p. 178).

Research on speech agrammatism was conducted already in the years 1902-1922 when papers on this disorder were published in Germany. A. Pick discussed agrammatism in his book entitled *Die agrammatischen Sprachstörungen* (1913). In his book *Motorische Aphasie mit Agrammatismus* (1914), another German researcher, E. Salomon, also described agrammatism, and more specifically, expressive agrammatism associated with difficulties in producing grammatically correct forms, as well as receptive agrammatism caused by difficulties in understanding grammatical constructions (Tomaszewska-Volovici, 1976, p. 10). In his research, E. Salomon concluded that these two disorders are independent of each other. In his publication *Über Agrammatismus* (1922), M. Isserlin described a patient with significant difficulties in formulating correct sentences despite good understanding of grammatical structures (Tomaszewska-Volovici, 1976, p. 10).

In German literature, agrammatism is attributed not only to disorders typical of motor aphasia. Conducted research has distinguished motor agrammatism typical of speech disorders as a result of motor aphasia, and sensory agrammatism characteristic of sensory aphasia (acoustico-gnostic according to Łuria). K. Kleist introduced the term *paragrammatism* to describe not so much the lack of formal exponents in the speech of persons with motor aphasia, but their incorrect use and mixing (ibid.). The first studies on aphasia were conducted in patients with damage to the anterior speech area that was associated with motor aphasia. In the 1960s, studies on grammar deficits associated with damage to the posterior part of the speech region and sensory aphasia appeared. The speech of patients with motor aphasic disorders is characterized by analogous mechanisms causing agrammatism, which develops secondary to misarticulation. In turn, they are caused by abnormal perception in patients with sensory disorders (Panasiuk, 2019, p. 180). Although earlier research on agrammatism in aphasia identified differences in the so-called grammatical behavior between patients with motor vs. sensory aphasia, it was only Kleist (1934) who classified these language disorders as agrammatism and paragrammatism: *The unmistakable similarity between this type of grammatical error and paraphrases, or the substitution of sounds or words, led me to speak of 'paragrammatism' as a second type of grammatical language disorder* (Kleist, 1934).

It should be noted that linguistic grammar disorders arise from two brain areas. Agrammatism develops as a result of damage to the motor speech center located in the third left frontal gyrus. As a result of motor aphasia, patients develop motor agrammatism, which is characterized by the telegraphic style, i.e. a simplified construction of sentences, dominated by the nominal style of speech. Paragrammatism, on the other hand, is expressed as disrupted sentence construction (Kleist, 1934) *In order to clearly distinguish between these two types of disorders, K. Kleist introduced the term paragrammatism to describe mixing and misuse of formal exponents in words rather than their lack, which is considered a characteristic feature of speech in individuals with motor aphasia* (Tomaszewska-Volovici, 1976, p. 10). Research has shown inflectional disorders, manifested as reduced morphemes, neutralization of inflectional features of grammatical forms of words, in the grammatical aspect of aphasic speech.

According to the theory by K. Goldstein (1948), aphasic grammar disorders can be defined by distinguishing two types of agrammatism, i.e. agrammatism of thoughts, manifested by disarranged speech, and agrammatism of language, expressed in difficulties in the proper use of grammar rules, as well as incorrect use of function words (functors). *Analyses of linguistic data have shown that aphasic utterances are characterized by reduced forms or functions of inflectional morphemes, a tendency to mix exponents of the grammatical functions of the word, the use of incorrect inflectional paradigms, as well as neutralization of the inflectional character of the grammatical forms of words. These phenomena could be regarded as a manifestation of the aphasic disintegration of language, the disintegration of the system, and the loss of language skills. Grammatical phenomena in aphasic utterances consist in the minimization of morphology, which is manifested, among other things, in immobilizing the inflected form of the noun in the nominative, and the verb in the infinitive* (Panasiuk, 2019, p. 208). Research conducted in the 1960s in the United States (Panasiuk, 2019, p. 178) also distinguished between motor agrammatism in the case of grammar disorders typical of nonfluent (motor) aphasia and paragrammatism to determine grammar disorders typical of sensory (fluent) aphasia (Panasiuk, 2019, p. 178). Thus, the term paragrammatism refers to grammatical disorders typical of sensory (fluent) aphasia, when patients speak fluently.

In this case as well, the above-mentioned concepts developed by German-speaking aphasia researchers should be viewed from the perspective of contemporary models. Although earlier theories undoubtedly constitute a foundation for understanding the nature of aphasia by describing its symptoms, they are not sufficient, since contemporary models not only describe the symptoms of aphasia in patients but, thanks to advanced neuroimaging methods and the neurobiology of language, also make it possible to understand why these symptoms occur. In light of contemporary models, the brain is a dynamic network (Hickok, Friederici, 2016), rather than a mosaic of rigidly defined centers, as assumed by localization theory (Kleist, 1934). Goldstein and Pick, in turn, represented a holistic approach, assuming that language is closely connected with cognitive processes, such as memory, abstract thinking, and attention. According to Pick (1913), agrammatism was regarded as an error of thinking and still finds application in psycholinguistics today, whereas

Goldstein (1948) defined aphasia as a loss of the abstract attitude, a concept that also remains an important point of reference in contemporary rehabilitation and clinical neuropsychology.

Yosef Grodzinsky does not define agrammatism merely as a simplification of speech, but as the result of damage to specific linguistic mechanisms in the brain (1984, 1986). He is the author of the Trace-Deletion Hypothesis (TDH), according to which, in individuals with Broca's aphasia, *traces* are deleted from syntactic representation. This process occurs through the movement of elements within a sentence, which consequently leads the brain to activate a so-called *default strategy*, whereby the role of Agent is assigned to the first noun in the sentence, often resulting in a change of meaning (1984, 1986). According to Grodzinsky, paragrammatism, by contrast, consists in the incorrect use of grammatical morphemes. Mirosław Michalik (2011) defines speech disorders as the result of dysfunction of the central language processor. Agrammatism and paragrammatism are manifestations of instability within the grammatical system or of a deficit in functional elements. Michalik emphasizes the role of the biological determinants of language and situates his analysis within the context of diagnosis and therapy (2011).

3. SYMPTOMS OF AGRAMMATISM AND PARAGRAMMATISM

Research in the field of aphasiology has contributed to a broader view of the problem of agrammatism, and in addition to the previously known motor agrammatism associated with disorders typical of motor (nonfluent) aphasia, agrammatism typical of sensory (fluent) aphasia, now known as paragrammatism, has been distinguished. It is characterized by the impoverishment of lexical resources and the omission of grammatical morphemes (Panasiuk, 2019, p. 178). In fact, patients rarely show signs of only one type of aphasia, which is also reflected in the overlap of the symptoms of agrammatism and paragrammatism in their speech. Agrammatism resulting from motor aphasia is characterized by disturbances in the fluidity and automation of articulation movements, with scanning speech, distortions of sounds, sound paraphasias,

the so-called telegraphic style of speech, and the use of simple sentences. The slow rate of speech in patients with such disorders makes it possible to investigate these aspects in detail. Analogous mechanisms causing agrammatism are observed in patients with motor and sensory aphasic disorders, i.e.:

1. a phonetic mechanism distorting the phonetic form of morphemes,
2. a systemic mechanism disrupting the distribution of inflectional units (Panasiuk, 2019, 2020).

Examples from the German language presented below confirm that grammar disorders overlap in various types of aphasia. Limited lexical resources can be observed in all types of aphasia, with motor aphasics showing disturbed fluency and automation of articulation movements. Multiple distortions of spoken sounds and paraphasias are present, with slow-pace, scanning speech.

Defining agrammatism and paragrammatism, K. Kleist came to the conclusion that patients presenting with the features of agrammatism and paragrammatism show similarities when speaking. *Tatsächlich gingen bei den von mir selbst und von anderen beobachteten Krankheitsfällen neben den Paragrammatismen stets auch mehr oder weniger deutliche agrammatische Satzfehler einher und in den meisten Fällen von Agrammatismus liefen auch paragrammatische Fehler mit* (1934). The issue of agrammatism in various types of aphasia was presented in the cited studies conducted among German-speaking patients. German is also a language with a rich inflectional system.

As an example, below we present an anecdote *The Painter and the Fly*, told orally and written down by patients with motor and sensory aphasia:

motor aphasia (R.O.)

1. Leonardo da Vinci/malte aber immer/ah/ah/ah/jahrzornig/in
2. wut geraten/ / und der Gehilfe / der Gehilfe/ist schlecht dran
3. gewesen/ / und der / der Gehilfe/ah/m/ach das ist der Gehilfe/
4. chaut über den Maler //ah/s/über den Schultern/
5. ja/und die/Leonardo da Vinci ärgert das///ah und/ah/
6. Leonardo da Vinci/ah/wutend///die/die Palette und /ah/Lappen/
7. und die /ah/Topfchen an den/die Gehilfe an den Kn/
8. kopf schmeißen//und dann Gehilf/der Gehilfe ganz ruhig/
9. gelassen/hinnehmen/und da Vinc/sch/sturmte/aus dem Zimmer//

10. und der Gehilfe/malt einen/einen/Klecks auf die

11. stirn von der Mona Lisa

sensory aphasia (R.S.)

1. in Berlin/in/ahm/Italien/in Rom/war ein/beruhm/beruhmter
 2. Mann/der Maler/Vinci//der Maler/hatte wieder/fur zwei
 3. rund fur zwei Jahren ein /ein berühmten Mal/ahm/Mona
 4. Lisa/ahm/er war sehr/eitel/und schnell/und /ahm//und/
 5. blieb/blieb bei den Kindern//je nachdem / war er /ahm/ jahzorn/
 6. jah/jahzoch/nee/jahzeuch/jah//sehr/sehr jah/zeuch/und
 7. seine Gele/seine Ge/Gesellen/ahm/gingen/sofort/weg/denn
 8. auch/dieser/auch seine Geselle/seine Ge/seine Gesellen/
 9. waren//ahm///waren/waren Angst und Schrenk/Schrecht/
 10. Schrecht/Schrecht/Schl/und/Schl/Schlecht///und Angst//
 11. ahm//wieder einmal/hatte eine/hatte er eine neue /eine/
 12. Ges/eine neue Geselle/ahm/Al/Al/bo/Albor/ahm/der/
 13. dieser/dieser neue Geselle/war sehr sehr /fleissig/er versucht/
 14. alles/vor allem/vor allem/vor allem auch/das das/wie das
 15. Malen seines Meisters//ahm//Vinci/hatte das nicht so gern//
- (Peuser, 1978, p. 131-132)

In the above-mentioned case of motor aphasia, the dominance of nouns, omissions of function words, elisions of auxiliary verbs, substitutions of cases and gender, inflectional disorders, and noun morphemes inflected in various cases of the noun may be observed. It should also be emphasized that patients with motor aphasia show a significant deficit in metalinguistic texts and use neologisms. On the other hand, limited lexical resources, frequent repetition of words with numerous phonemic paraphasias, omission of function words and inflectional endings are observed in the text produced by a fluent patient with sensory aphasia. In patient R.O., there are difficulties in the grammatical formulation of utterances, that is, agrammatism, as well as the use of a telegraphic style. This contrasts with patient R.S., who produces long phrases but shows problems with their meaning. The speech style of patient R.S. may be described as so-called *word salad*, in which numerous semantic paraphasias occur; for example, when intending to refer to a painter, the patient says

Kindern (*children*). There are also morphological and inflectional errors, such as *as fur zwei Jahren* — an incorrect case form, namely the dative instead of the accusative — as well as neologisms, for example *Schreckt*.

In the speech of patient R.S., nouns also appear, but with numerous errors, including a lack of agreement between the gender of the noun and the appropriate adjective ending, for example *ein berühmten Mal*. In addition, errors occur in the use of verbs, particularly with regard to their correct form and tense.

4. OUR STUDY

The presented research is situated within the qualitative paradigm. Its main aim is to analyse the communication barriers occurring in two female patients, one of whom was diagnosed with motor aphasia and the other with sensory aphasia. Moreover, the aim of this study is to present a set of speech therapy exercises, appropriately selected for the difficulties described, intended to restore morphological and syntactic functions.

The study employed a descriptive case study model, which made it possible to present in detail the mechanisms of speech disorders in the patients. The selection of participants was purposive and included patients with different types of speech disorders: the first patient (P1), aged 56, diagnosed with kinetic-motor aphasia, and the second patient (P2), aged 72, diagnosed with acoustic-gnostic aphasia.

The diagnostic procedure used the Diagnostic Questionnaire for Speech Disorders, with Particular Emphasis on Aphasia and Dysarthria, for Adolescents and Adults (Szlapa, Tomasik, & Wrzesiński, 2019). Linguistic data were collected from various sources, including samples of spontaneous speech and tasks requiring repetition and object naming.

The analysis of linguistic data focused on assessing abnormalities within specific grammatical categories, using different criteria for each participant. The evaluation of the effectiveness of therapeutic interventions combined the results of recordings with the therapist's subjective assessment, as a result of which progress was observed in the patients' morphology and syntax.

A list of exemplary exercises consolidating the correct grammatical realizations of words can be found at the end of this paper.

P1 (patient no. 1; 56 years; higher education) (speech therapy diagnosis: kinetic motor aphasia); damage to the speech motor center, i.e. the inferior premotor area of the left frontal lobe. Symptoms manifested by the patient:

- telegraphic-style, effortful, agrammatical speech;
- the patient does not inflect words by cases, e.g. *there is no plate* [plate]; *lies on the cupboard* [cupboard]; *walked with a dog* [with a dog];
- difficulty expressing modality with the grammatical mood categories (a grammatical mood category is a morphological means of expressing the modality of the sentence and allows the speaker to express their attitude to the presented reality. The grammatical mood in the Polish language specifies the volitional (imperative) and conditional modality. The realis mood is a member of the morphological opposition (Grzegorzczkowska, 1984, p. 133-135)); lack of conditional mood in favor of dominant realis mood: ST (speech therapist): *Would you like to go home now?* P (patient): *I want to go*;
- erroneous implementation of the grammatical number category manifested by replacing the plural with the singular, e.g. *daughter* [daughters], *shoe* [shoes]; *there is [are] daughters at home*; *the children is [are] standing* (In the case of conjugation, the number is an intratextual category, syntactically dependent on the number category of the noun);
- reduction of reflexive pronouns and tendency to use the active voice, e.g. *she washes* [she washes herself]; *he undresses* [undresses himself];
- pronouns are virtually absent, occasional pronouns like: *she [he] is sitting at the TV...*; *she gave me the wrong shirt* [he gave me the wrong shirt] (Additionally, difficulty with the implementation of the grammatical category of gender and, in the last example, the neutralization of the declension form of the adjective, may be observed);
- lack of future tense forms, which are usually replaced by present tense forms, e.g. *My husband goes tomorrow* [My husband will come tomorrow]; *Then I read the cards* [Then I'll read the cards] (The sporadic use of future tense forms was noted by J. Panasiuk: *It seems that this results not so much from the difficulties implementing this grammatical*

category by aphasics, but from the way they view reality. The situation related to the disorder makes patients with aphasia rather reflect on the current state; the future emerges in the near perspective, usually expressed grammatically in the present tense [...] (Panasiuk, 2020, p. 104));

- evident disorders of all forms of expressive speech: dialogical, spontaneous, narrative;
- problems with repeating more difficult words and naming objects, activities, and features: *um* [umbrella], *bu* [builds], *gre* [green];
- some lexemes appear spontaneously in the correct form, e.g. *house, lamp, wardrobe*. This indicates that producing short words, most often nouns in the nominative case, which are most common in everyday language, is preserved;
- certain names of activities are limited and often omitted in statements: *He ... [repairs] the TV set; She ... [is doing] her hair*;
- the patient also omits function words, e.g. conjunctions: *He's eating bread [and] sausage*, and prepositions: *He's sitting [on] the sofa; He is going [to] the church; Kielce [In Kielce]*;
- notorious abbreviations: *He.. shopping...shop*. Very simplified sentences with incorrect grammatical construction appear: *Little girl yawning*. Inability to organize utterances in the form of a sentence following syntactic rules.

Furthermore, the patient's speech is dysprosody, and the incorrect intonation and disturbed accent make it difficult to understand. Disorders of fluent articulation sometimes occur in conjunction with the perseveration of a previously uttered word, e.g. *Bru ... brushing shoes* [lacing shoes], the patient earlier produced the following sentence: [he/she] *is brushing* [his/her] *teeth* (*The reason for this is an impaired sequential organization of articulatory muscle movements with the simultaneously preserved function of the muscles themselves* (Jodzio, Nyka, 2008, p. 16)).

P2 (patient no. 2; 72 years; secondary education) (speech therapy diagnosis: acoustic-gnostic aphasia); damage to the left posterior part of the first temporal gyrus. Symptoms manifested by the patient:

- accelerated speech with episodes of logorrhea; the speech *from oneself* preserved and relating to events from the past with a characteristic *aphasic jargon*;
- inability to understand speech, which is compensated by excessive talking and jargon phrases, used inappropriately in a given situation, e.g.:
ST: *Shall we practice speaking?*
P2: *Thank you I'm fine;*
ST: *Please raise your right hand*
P2: *What should I cook?*
- difficulties repeating sequences of words, e.g. *cat – forest – house* and sentences, e.g. *a boy on a meadow* [A boy is running on a green meadow], and in naming, e.g. *shawt* [shoes]; *It's a building, a building, no, it's a bottle* [It's a bottle];
- agrammatism combined with semantic paraphasia, e.g. *I don't have a plate* [I don't have a mug]; *It's on the table* [It's on the shelf]; *Woman is pouring vodka* [Woman is pouring water]; *You can be tall or small* [You can be tall or short];
- agrammatism combined with phonemic paraphasia, e.g. *A man is going by ca* [by car]; *Gentlem play chess* [Gentlemen play chess]; *A woman is doing laundry a wash...chine* [A woman is doing laundry in the washing machine] (Phonemic paraphasia refers to the substitution, omission or addition of phonemes in a word);
- auditory agrammatism, which occurs when speaking or attempting to read, e.g. *cat* [cats];
- disorders of numerals, e.g. *woman here, here, here and here* [women] (there were many women in the picture, and the patient pointed to each of them instead of forming the plural form);
- letter substitutions in written words, e.g. *binht kiten* [bright kitchen]; *rind wime* [red wine].

5. TREATMENT OF AGRAMMATISM

The first step is to activate habitual sequences. In the case of agrammatical speech, it is an excellent training to disinhibit speaking, which also allows for avoiding consolidation of nonfluent, telegraphic-style speech. Exercises based on automated speech, including word sequences (names of days of the week or months, reciting known poems, singing songs) are proposed for the initial stage of aphasia therapy (Jastrzębowska, Pelc-Pękala, 2001, p. 711). In the proposed therapy, automatic sequences should be used as an introductory element of significant practical importance (training of fluent transition between speech segments), but also to motivate patients to continue speech therapy exercises (the patients see a chance to quickly rebuild the language based on the easy activation of sequences).

The next step is to activate fixed expressions, e.g. [cut]... *and run, look for ... [a needle] in a haystack, it won't[hurt] you*. The form of providing verbal material may differ, depending on the patient's ability level. An easier version can be used, in which the missing element is indicated in a picture (its name should be given in the appropriate form). A written version, where the missing word is replaced with dots and the patient is asked to complete it by themselves, is more challenging.

Another group of exercises represents a variant of the previous set of tasks using paradigmatic (associative) semantic relationships. This time, the patient is asked to complete sentence constructions based on the principle of opposition, e.g. *A student can be hardworking or ...; A man can be tall or ...; A dress can be short or ... (long). Speech can be clear or (mumbling – for a vast set of verbal material, see Strachalska (2009).*

Completing expressions with missing elements is another proposed group of tasks with a lower level of difficulty. The exercises contain comparative phrases, e.g. *as poor as (mouse)* These are selected examples of colloquial language, idiomatic comparisons, taken from a collection of exercises by B. Strachalska (2009). Pictorial material used as a hint for the missing lexeme may be utilized for this type of exercise.

Activating fixed syntagmatic collocations, e.g. *cloudy (sky), millet (groats)*. The verbal material, which is the basis for this group of tasks, uses lexical

collocations, which are semantically limited (It is optimal to choose adjectives that can be combined with single noun lexemes for this group of exercises) . Since two-word phrases may be more challenging in activation of the missing names compared to the previous verbal material (see Section 4), they should be preceded by exercises with fixed expressions and habitually consolidated comparative expressions.

This is followed by training at the level of sentences based on their semantic/formal relationships, e.g. *Mom has set the* (table); *The gardener is watering...* (flowers, plants). Missing forms are clearly marked by the use of specific words and inflected forms in a given syntagm (Strachalska, 2009, p. 17).

Exercises involving completing sentences with lexemes in the appropriate inflectional form. Initially, constructions consist of simple sentences accompanied by pictorial material, e.g. *I'm sitting on* (couch). *I'm watching ...* (TV), are used. *The boy is going to* (a photo of the boy entering the park); *The woman is selling....* (illustration of a woman serving bread); *People are waiting at* (a bus stop) etc. (Illustrations from Cieszyńska (2009) may be used in this type of exercise). The introduction (in either graphic or spoken form) of the context that prompts a given grammatical form of the word makes it easier for patients to complete the task.

Then, more complex sentences without the support of illustrations may be used. In this type of exercise, sentences with gaps are also used, in which the missing word is in the middle of the sentence, e.g. *The child brushed* (teeth) *and went to sleep. The man got on the* (bus) *and went to work.* In the final stage, this type of training can be performed using entire stories, in which appropriate forms of nouns, verbs and other different parts of speech must be used.

The introduction of the patient's independent reading of a text with gaps, with filling in the missing inflected forms is an important element of the therapy. A person with aphasia can only activate them verbally or, in a more difficult version, write them down. In the latter case, a computer program for independent exercises (without the participation of a speech therapist) is useful (For example Afa-System program, which includes e.g. Nouns in sentences – nouns in context (writing) tasks; see Afasystem, <https://www.afasystem.pl/afasystem.html>). It is an extensive set of exercises

for aphasic patients, and the computer program makes it easier to correct mistakes. The patient can fill in the gaps by typing the words, and if the wrong form is entered, the program will show the correct form.

Formulating answers to questions, which will require the use of given lexemes in an appropriate grammatical form, is another group of exercises. It is important to initially prompt the answer with an illustration. Syntactic constructions that facilitate the use of prepositions, e.g. ST: *Where is the man having dinner?* P: *The man is having dinner in the kitchen*, should also be used. In this case, illustrations showing spatial relationships are extremely useful.

It is important to practice a given inflectional category as part of agrammatism therapy. In order to practice the grammatical category of a case, the speech therapist needs to prepare verbal materials that will require the use of, for example, genitive. It is worth choosing a full set of exercises so that the patient can practice the use of genitive, e.g. *There is no in the store (butter, bread, milk). The performance lacked ... (audience, music, applause).* The dative can be practiced in sentences like: *I was looking closely at ... (an exhibition, a child, a person).* Other grammatical cases require equally rich verbal material.

Exercises to practice the correct grammatical use of words based on picture stories taken from the program proposed by J. Cieszyńska (2009), prompting the use of prototype verbs, nouns and adjectives. In the case of verbs, a group that describes activities related to action and movement should be chosen and used in the past, present and future tenses. It is important to combine these verbs into ready-made syntactic schemes with nouns, e.g. *wash (what?) legs, face; go (by what?) by bus, tram.* Additionally, nouns can be combined with adjectives or other nouns, e.g. *wine (what?) red, soup (what?) tomato; tea (with what?) with lemon, with sugar (These are common word combinations used in everyday communication; their selection was based on the frequency and pragmatic criteria (Cieszyńska, 2009, p. 3). The realization of nouns and adjectives is practiced with the use of ready-made syntactic schemes).*

For patients with aphasia and difficulties in reading (dyslexia), verbal material enriched with illustrations can be used for training. The text may contain pictures showing a given object/activity/feature, which will have to be replaced with a word in an appropriate grammatical form.

Exercises that involve correcting sentences with semantic and phonetic errors, e.g. *In autumn, lives (leaves) fall from the trees; A shoemaker repairs shoots (shoes)* – for sample vocabulary resources for exercises, see Miechowska (2018).

The exercises presented above are only selected examples of speech therapy practice with aphasic patients. An expressive program developed by D. Grzesiak-Witek as part of speech therapy for patients with motor aphasia can also be proposed during treatment to minimize agrammatism in the patients' language. It aims to stimulate the patient to construct statements on their own at three different levels: I. expression and combinations of sounds; II. expression of words; III. expression of sentences. The third level is recommended for agrammatism and can be combined with the introduction of the final stages of the auditory program, i.e. auditory perception of short subject + verb sentences and simple extended sentences (with adjuncts for the subject and verb) (Grzesiak-Witek, 2013, p. 197-199).

Sets of tasks for dyslexic patients may be an inspiration in the search for verbal material for syntactic training. For example, the patient can be instructed to compose a simple unexpanded sentence from the words written on labels, initially given in the correct form to make the task easier (e.g. *A student is reading*). Once the patient has mastered the appropriate word order, it is possible to introduce more challenging tasks, such as arranging sentences from the words given, following the appropriate grammatical rules (e.g. *to shine, sun*). Next, the level of difficulty should be increased by asking the patient to arrange simple extended sentences from the available labels, e.g. 1) *to do, well, at, school, student*. 2) *to go, family, vacation, during, holiday, seaside, on*. In this set of exercises, the patient's task is to create grammatically correct and semantically coherent sentences. Different variants of this training may be proposed, e.g.:

- creating sentences from a list of words given in the basic form, where the main task is to change the grammatical form, as the word order is already correct;
- creating sentences from the given words in the correctly inflected form, but in a random order, e.g.: *members, dog, positive, all, to show, to, family, must, attitude*;

- creating sentences from the list of words given in the basic form so that the word order and grammatical form are correct (For list of exercises, see Czarnkowska, Lipa, Wójcik-Topór (2016); Reid (2018).

The choice of exercise material (e.g. when selecting words from a dictionary) should consider the level of difficulty as well as the frequency and semantic criterion. First of all, it should contain lexemes and expressions essential to everyday communication. Additionally, when developing a speech therapy program, the minimum grammar established in glottodidactics should be considered. It is important to introduce structures taken from spoken language that will be used by patients in specific situations. Linking the resource of grammar rules with relevant communication principles is necessary for the therapy of agrammatism in patients with aphasic speech disorders (Cieszyńska, 2009 ; Grzesiak-Witek, 2013).

6. DISCUSSION AND CONCLUSIONS

The research on agrammatism in patients with aphasia (in Poland and Germany) mainly focused on the description of their mechanisms in patients with motor and sensory disorders. Most researchers investigating grammatical phenomena in aphasia relied on the concept of language deficit and linked agrammatism with the loss of grammatical skills. In addition to the description of the mechanisms underlying agrammatism, the study assessed irregularities in particular grammatical categories. The analysis performed during the research demonstrated that the grammatical form of a word in aphasia is implemented with abolished inflection and through the incorrect use of inflection morphemes (Panasiuk 2019, 2020). This is very important information for practicing neuro-speech therapists; however, it is essential for them to acquire knowledge on the ways to minimize agrammatism in their patients' language. Therefore, this study aimed to present the limitations in verbal communication of two female patients with aphasic speech disorders (motor aphasia and sensory aphasia (the fragments of the patients' statements

quoted above were collected during a speech-language assessment and from different communication situations occurring during speech therapy.

Research on aphasia speech disorders has been conducted by scientists of various disciplines, including linguists, neurologists and psychologists, for over a hundred years. Based on the results of research on agrammatism in aphasia, differences in the so-called *grammatical behavior* were found between patients with motor and sensory aphasia. Two different brain regions are responsible for grammatical disorders, with agrammatism arising as a result of damage to the motor center for speech, which is located in the third left frontal gyrus. It should be noted that the severity of language disorders depends on the degree of brain damage. This complicated correlation between language and the brain, and vice versa in many respects encourages further aphasiology research as clinical observations of patients with aphasic disorders play an important role in understanding brain dysfunctions, as well as help create models of learning processes and brain functions.

Conducting research with aphasic patients from Poland and Germany requires an individual approach to each patient. It is beyond doubt that every person, including those affected by certain limitations due to aphasia, shows the need for communication, although there are situations when the intentions of these people are not properly implemented. Patients with aphasic speech disorders should undergo intensive neurological and neuropsychological therapy. Rehabilitation involves the need to improve cognitive, emotional and personality dysfunctions. Therefore, it represents a broad therapeutic approach.

The treatment of agrammatism is only a small element of measures aimed at achieving grammatically correct speech, which is the basis for improving verbal functioning and returning to independence and occupational activity. Rebuilding the language system (depending on the type and severity of aphasia) is a tedious process that requires consistency and patience from both the therapist and the patient.

Rebuilding the language system (depending on the type and severity of aphasia) is a tedious process that requires consistency and patience from both the therapist and the patient. Traditional therapeutic approaches focus on direct interaction, structured speech exercises, and neuropsychological

rehabilitation. However, modern digital tools are increasingly being integrated into speech therapy to enhance the rehabilitation process.

In recent years, e-learning has become a valuable supplement to conventional aphasia therapy, enabling remote language exercises and interactive education to support recovery. The integration of digital technologies into speech therapy allows for regular grammatical and lexical training, which is crucial in the treatment of agrammatism and paragrammatism (Rocławska-Daniluk, 2023). As Plichta and Jagoszewska (2017) emphasize, educational platforms can be an effective support system for individuals with communication disorders, particularly when access to traditional therapeutic methods is limited (Plichta & Jagoszewska, 2017).

By incorporating e-learning into speech therapy, materials can be tailored to the individual needs of patients, allowing for the personalization of exercises and real-time tracking of therapy progress (Mikołajewska & Mikołajewski, 2012). Furthermore, e-learning platforms are often equipped with feedback mechanisms that enable patients to receive immediate corrections of language errors, thereby enhancing the effectiveness of therapy and increasing motivation to learn (Kaptur & Wiecha-Kartowska, 2017).

Research findings indicate that digital tools in aphasia therapy may be effective for individuals with limited mobility, for whom visits to a speech and language therapist pose a challenge. The study by Palmer et al. (2019) confirmed that self-managed computer-based therapy makes it possible to maintain the intensity of exercises in the home environment and can bring significant benefits to patients.

Additionally, Marzec-Jóźwicka (2020) notes that the development of digital competencies among both therapists and patients facilitates better use of e-learning's potential in speech therapy (Marzec-Jóźwicka, 2020).

Despite its numerous benefits, it is important to acknowledge that e-learning cannot replace direct interaction with a specialist. As Rocławska-Daniluk (2023) highlights, online therapy should complement rather than replace traditional therapeutic methods (Rocławska-Daniluk, 2023). By integrating modern digital tools with classical therapy techniques, the most effective results in speech and communication rehabilitation can be achieved.

REFERENCES

- Afasystem. (19.02.2023). <https://www.afasystem.pl/afasystem.html>
- Blanken, G. (1991). *Einführung in die linguistische Aphasologie. Theorie und Praxis*. HochschulVerlag.
- Cieszyńska, J. (2009). *Diagnoza i terapia zaburzeń afatycznych*. Wydawnictwo Edukacyjne.
- Czarnkowska, M., Lipa, A., Wójcik-Topór P. (2016). *Ćwiczenia operacji myślowych. Terapia umysłowa osób dorosłych*. Wydawnictwo WiR.
- Friederici, A. D. (2011). *The Brain Basis of Language Processing: From Structure to Function*.
- Goldstein, K. (1948). *Language and Language Disturbances*. Ronald Press.
- Grabias, S. (2012). *Logopedia. Teoria zaburzeń mowy*. Wyd. UMCS.
- Grodzinsky, J. (1984). *The syntactic characterization of agrammatism*. *Cognition* 16(2), 99-120.
- Grodzinsky, J. (1986). *Language deficits and the theory of syntax*. *Brain and language* 27 (1), 135-159.
- Grzegorzczkova, R. (1984). *Gramatyka współczesnego języka polskiego. Morfologia*. PWN.
- Grzesiak-Witek, D. (2011). Afatyczne zaburzenia mowy jako utrudnienie w komunikacji interpersonalnej. *Oblicza komunikacji – bariery – zaburzenia – możliwości*, 141 – 154. Wydawnictwo K2Lider.eu.
- Grzesiak-Witek, D. (2013a). *Diagnoza i terapia logopedyczna osób z afazją motoryczną. Odbudowanie kompetencji językowej i systemu językowego*. Wydawnictwo Naukowe Uniwersytetu Papieskiego Jana Pawła II w Krakowie.
- Grzesiak-Witek, D. (2013b). *Poziom słuchu fonematycznego u osób z afazją semantyczną na podstawie badań*, [w:] *Wokół problematyki zaburzeń mowy. Z doświadczeń polskich i słowackich*. (pp 89-115). Wydawnictwo Uniwersytetu Rzeszowskiego, Wydawnictwo Diecezjalne.
- Grzesiak-Witek, D., Sobolewski, P. (2010). Zaburzenia komunikowania się chorych w wieku podeszłym w naczyniopochodnych chorobach mózgu. *Edukacja zdrowotna w naukach medycznych i społecznych. Część II.*, 175-185.
- Hickok, G., Poeppel, D. (2007). The cortical organization of speech processing. *Nature Reviews Neuroscience*. 8. 393-402.
- Hickok, G. (2022). Computational Neuroanatomy of Language.
- Hickok, G. & Friederici, A.D. (2016). The brain's language networks. *Nature Reviews neuroscience*, 17(10), 652-654.
- Jastrzębowska, G., Pelc-Pękala, O. (2001). *Diagnoza i terapia afazji, dysfazji. Logopedia. Pytania i odpowiedzi*. 687-715. Wydawnictwo Uniwersytetu Opolskiego.
- Jodzio, K., Nyka, W. (2008). Zaburzenia językowe oraz mowy w praktyce ogólnolekarskiej. *Forum Medycyny Rodzinnej*, t. 2, nr 1, 14-22.
- Kaptur, E., & Wiecha-Kartowska, E. (2017). LOGOPED (I) A ONLINE, czyli o internetowym rynku usług logopedycznych.
- Kleist, K. (1934). *Gehirnpathologie*. Barth.
- Łuczyński, E. (2015). Badanie kompetencji gramatycznej osób z zaburzeniami mowy. *Metodologia badań logopedycznych z perspektywy teorii i praktyki*. 56-64.

- Maruszewski, M. (1966). *Afazja. Zagadnienia teorii i terapii*. PWN.
- Marzec-Jóźwicka, M. (2020). Digitalny imigrant czy digitalny tubylec? Kilka uwag o kompetencjach techniczno-medialnych współczesnego nauczyciela polonisty.
- Michalik, M. (2011). *Kompetencja składniowa w normie i w zaburzeniach. Ujęcie integrujące*. Wyd. Naukowe Uniwersytetu Pedagogicznego, Kraków.
- Miechowska, A. (2018). *Znów mówię – pokonać afazję*. Wydawnictwo Harmonia.
- Mikołajewska, E., & Mikołajewski, D. (2012). Dobór komputera dla osób niepełnosprawnych – doświadczenia własne.
- Niekra, U. (2017). Wielojęzyczność u osób z zaburzeniami o typie afazji. Rekonesans zagadnień. *Logopedia*, Polskie Towarzystwo Logopedyczne. 211-218.
- Niekra, U. (2019). A cognitive understanding of aphasia. *Cognitive Theories in their application to different languages and discourse cultures*, UJK Kielce. 133-142.
- Pąchalska, M. (2012). *Afazjologia*. Wyd. PWN.
- Palmer, R., Dimairo, M., Cooper, C. et al. (2019). Self-managed, computerised speech and language therapy for patients with chronic aphasia post-stroke compared with usual care or attention control (Big CACTUS): a multicentre, single-blinded, randomised controlled trial. *The Lancet Neurology*. 18. 821-833.
- Panasiuk, J. (2013). *Afazja a interakcja. Tekst – metaTekst – kontekst*. Wyd. UMCS.
- Panasiuk, J. (2016). Badanie sprawności gramatycznej w normie i zaburzeniach mowy. *Nowa Audiofonologia* 5 (2). 9-17.
- Panasiuk, J. (2019). *Język a komunikacja w afazji*. Wyd. UMCS.
- Panasiuk, J. (2020). Agramatyzm w afazji. *Logopedia* 49. 95-123.
- Panasiuk, J. (2017). Agramatyzm w afatycznych zaburzeniach mowy. *Studia logopedyczne-lingwistyczne*. 169-210.
- Peuser, G. (1978). *Aphasie. Eine Einführung in die Patholinguistik*. München.
- Pick, A. (1913). *Die agrammatischen Sprachstörungen. Studien zur psychologischen Grundlegung der Aphasielehre*. Springer-Verlag.
- Plichta, P., Jagoszewska, I., & others. (2017). Specjalne potrzeby edukacyjne uczniów z niepełnosprawnościami.
- Przybisz-Piwko, M. (2000). Realizacja struktur językowych a podsystemy języka u osób z afazją. *Logopedia* 27. 81-92.
- Reid Gavin, (2018), *Dysleksja. Podręcznik praktyka*, Harmonia.
- Rocławska-Daniluk, M. (2023). Speech and language therapy in pandemic distance learning.
- Seniów, J. (2006). Poudarowe ogniskowe zespoły poznawcze w kontekście rehabilitacji. *Zeszyty Metodyczno-Naukowe AWF nr 20*, 141-152.
- Strachalska, B. (2009). Ćwiczenia usprawniające aktualizację wyrazów w mowie osób z afazją, Wydawnictwo: Akademia Pedagogiki Specjalnej.
- Szłapa, K., Tomasiak, I., Wrzesiński, S. (2019). *Kwestionariusz diagnostyczny zaburzeń mowy ze szczególnym uwzględnieniem afazji i dysartrii dla młodzieży i dorosłych*. Wydawnictwo Harmonia.
- Tomaszewska-Volovici, H. (1976). *Agramatyzm w afazji*, PAN.
- Wallesch, C., Papagno, C., (1988). Subcortical aphasia. *Aphasia*, 49-78.