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CROSS-GENERIC DIMENSION OF THE PRODUCTION OF PHONOLOGICAL PARAPHASIAS AND NEOLOGISMS BY PEOPLE WITH APHASIA

A thesis submitted in fulfilment of the requirements

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To my beloved family and those with language brain-immured

DECLARATION

I hereby declare that the work presented for assessment in the master's thesis entitled "Cross-Generic Dimension of the Production of Phonological Paraphasias and Neologisms in Russian-Speaking People with Aphasia" is my own and has been written by me in its entirety. The information derived from the literature has been duly acknowledged in the text, and a list of references has been provided. I also certify that no part of this thesis work was previously submitted in part or full for another degree or diploma at this or any other institutions.

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ABSTRACT

Taking into account the still pending problem of uniformity versus heterogeneity with which the phonological deficit manifests itself across various aphasia syndromes as well as the virtual absence of any cross-generic explorations of the quantitative and qualitative production patterns of phonological and neologistic paraphasias, we have set the goal of enriching the present-day body of aphasiologic and neurolinguistic knowledge with novel theoretical and practical insights by getting a number of relevant questions answered. These include the ones about the syndrome-universality versus specificity of phonological errors, the effect of discourse elicitation genre on the number of erroneous productions and the diversity of their categories alongside the effect of within-genre task complexity on the phonological output of Russian-speaking individuals diagnosed with five different types of aphasia. To accomplish our goal, we have conducted a rigorous quantitative and qualitative hierarchical cluster analysis of the phonological errors detected in the interview samples of 18 participants whose oral productive performance on the tasks belonging to four distinct discourse genres was recorded on a high-quality sound-recording device and transcribed using the combination of the Jefferson Transcription System and the International Phonetic Alphabet one. The results obtained demonstrate that the phonological error production patterns cannot be relied on in distinguishing various aphasia types. They also show that each discourse genre is marked by its own degree of mental processing complexity and is, thus, associated with a numerically distinct picture of errors. Moreover, the degree of task complexity has been found to be a matter of individual perception. Last but not least, the previous researchers' findings pertaining to paraphasias have been compared to our data, and some of the earlier structural hypotheses have been unsupported. Our study is expected to be of great value and utility from the viewpoint of furthering the development of theoretical knowledge about the phonological breakdown in the language disorder under scrutiny specifically from the perspective of aphasics' engagement in everyday discourse situations, refining the existing speech production models or developing new more realistic and viable ones, and generating ideas for practical solutions in speech-language pathology.

Key Words: *aphasia, discourse genre, phonological deficit, paraphasia, the Russian language*.

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LIST OF ABBREVIATIONS

A = anticipatory (error, substitution)

ACT = action-based model of speech production, speech perception, and speech acquisition

AOC = ascertaining output correctness

BDAE = Boston Diagnostic Aphasia Examination

C = consonant (phoneme)

CA = consonant addition

CAS = consonant anticipatory substitution

CC = comparison-and-contrast (genre, plot)

CE = cause-and-effect (genre, plot)

CO = consonant omission

COVID-19 = coronavirus disease of 2019

CPS = consonant perseveratory substitution

CSUA = consonant substitution of uncertain aetiology

CV = consonant-vowel (sequence, structure)

CVC = consonant-vowel-consonant (sequence)

Circum = circumlocution

D = decreased (number of syllables)

DIVA = Directions Into Velocities of Articulators (model)

DNS = decreased number of syllables

EEG = electroencephalogram

Eng. = English (language)

F = female

FACTS = Feedback Aware Control of Tasks in Speech (model)

FS = false start

GEPPETTO = Gestures Shaped by the Physics and by a Perceptually Oriented Targets Optimisation (model)

HSFC = hierarchical state feedback control (model)

I = increased (number of syllables)

INS = increased number of syllables

IPA = International Phonetic Alphabet

IWB = intra-word break

L = left (hand)

LEWISS = Lexicon with Syllable Structure (model)

LRM = Levelt, Roelofs, and Meyer (model)

M = male

N/D = narration/description (genre, plot)

NHP = neurally healthy person

NR = no-response error

Neol = neologism

P = perseveratory

P = picture plot

PA = phonological approximation

POI = Phonological Overlap Index

PS = problem-and-solution (genre, plot)

PWA = person with aphasia

Persev = perseveration

R = right (hand)

Rus. = Russian (language)

SC = self-correction

SD = sound distortion

SFC = State Feedback Control (model)

SP = semantic paraphasia

SV = semi-vowel (phoneme)

SVA = semi-vowel addition

SVO = semi-vowel omission

TD = Task Dynamics (model)

UA = uncertain aetiology

V = vowel (phoneme)

VA = vowel addition

VAS = vowel anticipatory substitution

VC = vowel-consonant (sequence)

VO = vowel omission

VPS = vowel perseveratory substitution

VSUA = vowel substitution of uncertain aetiology

WS = word search

WSO = World Stroke Organisation

WSP = word-stress pattern error

CHAPTER 1: INTRODUCTION

1.1. Background

Over the last few decades, neurolinguistics has gained a firm foothold as one of the major branches of linguistics which is concerned with the analysis of language disturbances resulting from brain damage of various kinds through the lens of the language structure principles. As Basso et al. (2013) point out, despite the neutrality of the term "neurolinguistic" with respect to the linguistic theory it makes relation to, "any linguistically based approach to aphasia therapy" draws on the principle of the "internal organisation" of language describable by "a system of rules". The scholars additionally emphasise that "the neurolinguistic approach stresses the role of language in aphasia and analyses it according to principles of theoretical linguistics".

It should be made clear that aphasia research which nowadays forms an integral part of the discipline traditionally used to be the realm of neurologists, with psychologists and philosophers making occasional but essential contributions to the field. Linguists entered the picture only in the middle of the 20th century, viewing aphasia studies as a means of refining their knowledge about and understanding of the role of the brain in unimpaired speech, which in the course of time led to the adoption of the term "neurolinguistics" (Ahlsén, 2006).

One of those who tested general theories about language relying on the samples of disturbed aphasic speech was Roman Jakobson (1941). The scholar is generally considered to be the first to come up with a systematic description of the language disorder at issue within the structuralist framework. Alexander Luria, despite his principally being a psychologist and neuropathologist, employed insights from linguistics in his classifications almost from the outset. In length of time, Luria's appeal to linguistic theories began to become all the more perceptible. Noam Chomsky's theory of transformational grammar (1957) also had a significant impact "on the linguistically oriented aphasia research" (Ahlsén, 2006). The psychological reality of the theory was tested with the help of the data elicited from individuals diagnosed with aphasia. Importantly, its proponents' focus on morphology and syntax was conducive to that namely these aspects of language were most meticulously scrutinised by researchers. However, phonological studies were carried out as well. In 1967, Eric Lenneberg advanced his theory of the biological basis for language which fed on the

concepts of generativism. Later, in 1971, Harry Whitaker as well as some other scholars, e.g., Weigl and Bierwisch (1970), conducted a number of neurolinguistic investigations, relying on the transformational grammar framework. It is noteworthy that the debate about the competence and performance in aphasia continues through today.

Linguistic descriptions "equipped" neurolinguistics with the notion of levels within the language system (Whitaker, 1971). Neurological evidence for the separation of the levels was sought for from aphasic data. Whitaker (1972) underscores that "phonological structure is often studied independently from the other components of language". Moreover, in accord with him, "until recently, it has been studied in greater detail than these other components for obvious reasons". Among the latter, the scholar names the comparative easiness of measuring the phonological structure instrumentally and the alleged limitedness or finiteness of its content and scope.

Quite symbolically, it is with the exploration of phonology and human brain that the history of the neurolinguistic discipline in fact started off, with Paul Broca describing a loss of articulated language observed in his 1861–1865 clinical cases. At the present moment, research on the relation between brain mechanisms and phonological processes covers a large number of topics which for clear reasons cannot all be given proper consideration here.

What is much more related to our topic, the studies of paraphasic error patterns in various types of aphasia do not seem to outlive their topicality, with paraphasias being investigated in both case and cross-group studies. The question of commonality versus difference of the mechanisms underlying the production of phonological errors in different aphasia syndromes still stands. Researchers, in addition, wonder about the ways neologisms produced by PWAs come into existence and contemplate the nature of phonemic paraphasias. They also show a great deal of interest in finding out whether there exist certain universal rules that paraphasias follow as well as what physiological, phonetic, and phonological aspects have a bearing upon paraphasias being caused. Furthermore, there are studies comparing paraphasias in PWAs to slips of the tongue and pen in normal language users. Last but not least, attempts to relate paraphasias and neologisms to various models of speech production are made.

Even though multitudinous components of phonology have been addressed and numerous questions have already been answered, there is still much to be discovered. One of the issues which remain largely unresolved is the existence of a link between the kind and severity of paraphasias on the one hand and the discourse elicitation genres of the tasks presented to

people with aphasia on the other hand. While the topic of discourse in aphasia has been dealt with by some researchers, as far as our knowledge goes, none of them has explicitly or implicitly addressed the potential influence of genre on the manifestations of the phonological deficit in the discussed language disorder.

1.2. Statement of the Problem and Purpose of the Study

To begin with, as Literature Review will demonstrate, phonological and neologistic paraphasias have always been receiving decent amounts of attention from researchers, with abundant case and cross-group studies being conducted on the material of quite many languages in order to determine whether the error patterns are universal or syndrome-specific. This notwithstanding, the evidence available for the time being is to a considerable extent inconsistent. This means that we cannot develop a proper and thorough understanding of the mechanism(s) responsible for the production of phonological errors in different aphasics. The matter is even more complicated by the absence of a univocal syndrome classification which could be usable in all clinical contexts. Lack of solid knowledge in the area renders aphasia diagnostics more difficult and makes speech rehabilitation plans one-size-fits-all.

Vizel (2016) emphasises that variability in the way aphasia makes itself manifest is all too often given silent treatment for the reason of its being challenging to account for. Furthermore, when it comes to the main structural hypotheses pertaining to paraphasias and advanced by scholars examining the output of aphasic speakers of different mother tongues, there is a fair number of studies with contradicting results as well. What is more, whereas Russian cannot be seen as understudied, paraphasias have not caught the eye of too many scholars dealing with the language in question. Mindful that paraphasias make the core manifestation of the phonological deficit, this means that we currently have only scarce knowledge about its peculiarities in Russian-speaking PWAs. By extension, the aggregate picture of Russian aphasia can by no means be complete.

Second, insofar as discourse genres are concerned, this strand of research in aphasiology is marked by relative novelty, which implies that the currently accumulated scientific knowledge on the topic is in germ. Whilst scholars largely seem to see eye to eye with each other on that elicitation genre has a significant impact on PWAs' task performance with regard to their discourse, it is still a tall order to pinpoint whether the observed linguistic behaviour depends on the effect of the language impairment on the discourse of aphasics, or it is caused by the

influence of elicitation genre. By and large, there is no clear idea of how PWAs process discourse genres as well as whether they are guided by the same or different cognitive mechanisms as NHPs. Moreover, to the best of our knowledge, there can be found neither explicit nor implicit consideration of the potential effect of genre specifically on the manifestations of the phonological deficit in the language disorder at issue, including at the cross-group level.

The aim of the study boils down to our enriching the present-day body of aphasiologic and neurolinguistic knowledge with new insights, this being achieved by getting a number of relevant questions answered, namely, the ones about the uniformity versus heterogeneity of paraphasias across different types of aphasia, and the effect of discourse elicitation genre alongside task complexity on Russian-speaking PWAs' phonological output. To accomplish this purpose, we are going to set the following objectives:

- To carry out a rigorous phonological analysis of the PWAs' speech at the oral productive level during their performance of tasks falling into different generic categories, and evaluate the qualitative and quantitative characteristics of the detected phonemic paraphasias and neologisms;
- To identify a possible linkage, or correlation, between the generic task type on the one hand and the quantitative as well as qualitative distribution patterns of phonological errors produced by the PWAs diagnosed with different aphasia types on the other hand;
- To determine if the error patterns undergo any qualitative or quantitative changes as mental processing complexity of the tasks belonging to the same discourse elicitation genre increases;
- To discuss the possible reasons for the observed tendencies, with respect to both discourse genres and task complexity effects;
- To find out whether the quantitative and qualitative patterns of erroneous productions can be relied upon in distinguishing various aphasia syndromes;
- To test our findings against the most prominent theories and hypotheses (including structural ones) of phonological deficit in aphasia;
- To expound the theoretical and practical implications of the study.

1.3. Research Questions and Hypotheses

With an eye toward achieving the research aim and objectives outlined above, we have formulated three broad research questions.

- *Research Question 1*: Can there be found any correlation between the generic task type and the manifestations of the phonological deficit in aphasia? Put it otherwise, do phonological error patterns differ depending on the discourse elicitation genre of the performed task? Providing this is the case, is the difference of a qualitative, i.e. tasks belonging to different genres elicit different types, or categories, of errors, or quantitative type, i.e. some tasks simply elicit more errors than others? How can the difference be accounted for?
- *Research Question 2*: Do error patterns undergo any qualitative or quantitative changes with increasing complexity of the tasks within one and the same elicitation genre?
- *Research Question 3*: Is there any correlation between the quantities and types of errors produced and the various aphasia syndromes under examination? In other words, do PWAs diagnosed with different types of the language disorder exhibit any qualitative or quantitative differences in their error patterns? If certain dissimilarities are spotted, can these serve as a reliable basis for telling the aphasia syndromes apart?

Now, on the back of these questions, we have put forward three research hypotheses to be tested.

- *Hypothesis 1*: Each genre of elicitation is anticipated to be marked by quantitatively distinct error patterns. The tasks belonging to the cause-and-effect and problem-and-solution genres are expected to elicit most phonological errors since their mental processing is presumably more effortful, which can be explained by the fact that the participants have to talk about certain things that cannot be seen in the pictures provided, i.e. the visual cues are absent to a decent extent. By contrast, tasks representing the narration/description and comparison-and-contrast genres are hypothesised to delve out productions less abundant with errors as everything that the participants have to describe is present in the form of visual aid.
- *Hypothesis 2*: An increase in within-genre task complexity will entail both quantitative and qualitative changes in the error composition.

- *Hypothesis 3*: The phonological deficit is predicted to manifest itself in quantitatively and qualitatively different ways across the various aphasic syndromes under examination, regardless of the type of task being performed.

1.4. Significance of and Justification for the Study

Apart from valuable theoretical contributions which will be illuminated below, our study will redound to the benefit of society in general, considering staggering numbers of people diagnosed with aphasia annually as a result of stroke only. Besides impossibility of employment, appropriate social functioning of these individuals is seriously hampered. Therefore, as Code and Petheram (2011) rightly underscore, the issue of aphasia "is not merely of esoteric academic interest, but has significant impact on clinical concerns and service provision". The present research will contribute to raising the awareness of the broad public about aphasia. What is also crucial, it will yield certain insights as to how speech recovery plans employed by speech language pathologists can be improved.

Insofar as theoretical contributions are concerned, the study holds promise to fill a sizeable gap in our knowledge about the cross-generic dimension of the production of phonological and neologistic paraphasias by Russian-speaking people with aphasia of different types. This has the potential of enabling us to make a quantum leap in exploring the phonological breakdown in the language disorder under scrutiny, specifically from the perspective of PWAs' engaging in everyday discourse situations. The knowledge about this is expected to shed light on the situations of social encounter which are most strongly associated with aphasics' experiencing difficulties and frustration as well as feeling pressurised.

We will also gain a better understanding of how our brain processes the phonological information it sends for the output. Taking into account the absence of agreement as to the syndrome universality vs specificity of paraphasias, the study is promising for it empirically justifies the necessity of refining the existent aphasia classifications. Moreover, the insights gained are of much use in complementing and improving the already existing models of speech production or in developing new ones.

To sum up, our study is expected to be of great value and utility from the perspective of both furthering theory development and generating ideas for practical solutions in speech-language pathology.

1.5. Definition of Key Terms

The significance of staying on the same page with the reader should not be underestimated, for which reason we are committed to provide a number of the key notions recurring in the text of this research paper, i.e. “aphasia”, “discourse genre”, “phonological deficit”, “phonological paraphasia”, and “neologism”, with proper operational definitions.

Aphasia can elude definition because of its highly interdisciplinary nature since each discipline dealing with the disorder adopts a definition which most closely fits its focus, goal and major tenets. In our study, we will understand aphasia as an acquired language impairment resulting from focal brain lesions and affecting a person’s ability to produce and/ or comprehend speech as well as more often than not the ability to read and/or write.

As we explore the oral productive side of the linguistic ability, discourse genre is understood by us as a specific type of spoken communication which is marked by the use of peculiar language structure and is typically employed for a particular purpose in a particular context. Our research focuses on monologic discourse genres which will be discussed at length in the review of literature.

Depending on the area of it use, the term “phonological deficit” may acquire a multitude of broad and narrow definitions, which makes it rather nebulous. Nonetheless, we will refer to it as a disturbance of processing of the phonological information by the brain, with the focus being on speech production, as opposed to perception. Examples of the phonological deficit manifestations include deletions and insertions of phonemes, substitutions of intended phonemes with mistargeted ones, sound distortions, and the like.

Finally, we should introduce the core manifestations of the above-defined phonological deficit, namely, phonological and neologistic paraphasias, the latter often referred to simply as neologisms. Paraphasia is understood as the production of an unintended phoneme, syllable, or word, which occurs during an individual’s attempt at speaking or naming when there is no muscular dysfunction that makes sound articulation effortful and exigeant. Paraphasias can be verbal, also lexical or semantic, and literal, also phonemic or phonological. Paraphasic productions are considered to be neologistic when the contamination of the uttered word with extraneous phonemes is too heavy. The latter leads to the sub-lexical fragments not typical of a given language getting juxtaposed and the resulting word being nonsensical in context (Saling, 2007). Thus, it is most often conceived of neologisms as those uttered units that are phonologically unrelated to the target word. Taking into account a tall order of distinguishing

between a paraphasia and a neologism in aphasic speech, we have adopted Biran and Friedmann's (2005) conception of the distinction between the two. The scholars define phonemic paraphasias are non-words preserving "at least half of the segments and/or number of syllables of the target word". Conversely, neologisms are understood as non-words that preserve neither segmental nor metrical information in such amount.

1.6. Limitations and Delimitations of the Study

The weaknesses of the present research which have mostly been out of our control and which, thus, might have affected the results boil down to the following ones:

- Employment of the non-probability convenience sampling method for the inclusion of relevant elements of the population of interest, which has been motivated by restricted entry hospitals have been allowing during the COVID-19 pandemic period;
- Lack of homogeneity with regard to the background characteristics of the PWAs. There is certain degree of unbalance in terms of the participants' degree of disorder severity, post onset time, age, gender, level of education, and place of residence;
- Bilingualism of all but one participant, with some of them possessing additional passive or active knowledge of a third language.
- Unequal numbers of the PWAs representing each aphasia syndrome: we have not had the advantage to make the aphasia type groups numerically balanced.
- Limited timespan contingent on the study being a Master's thesis, and lack of funding.

The boundaries we have set so as to prevent our goals from becoming impossibly large to complete are as follows:

- Russian as the first language or one of the first languages, providing that we have dealt with bilinguals;
- Preserved phrase-level speech ability;
- Spared comprehension abilities.

CHAPTER 2: LITERATURE REVIEW

2.1. Aphasia: Nature and Scope of the Language Impairment

A quick glance at the dismaying statistical data published in the 2019 WSO (World Stroke Organisation) Global Stroke Fact Sheet reveals that over 13.7 million new strokes occur annually around the globe (WSO, 2019), with as many as 38% of them resulting in speech disorders, primarily aphasia and dysarthria (Kosivcova & Zakharov, 2017; Mitchell et al., 2020). The disorders of communication mentioned are associated with a significantly decreased likelihood of post-stroke employment as a result of frequently reduced rates of functional restoration. It is a pity to discover that a mind-boggling proportion of 84.5% of people have never heard the term “aphasia” (National Aphasia Association, 2016). In their survey of public aphasia awareness, Malyutina and Iskra (2017) report that relatives of stroke survivors are more worried about the acquired motor disturbance and, consequently, physical rehabilitation, thus, waving aside the significance of speech therapy provision for the vulnerable population. Thus, one cannot downplay the importance of raising public awareness about aphasia as well as the significance of rigorous investigation of the disrupted brain mechanisms in a bid to fully understand the character of speech disturbance to provide stroke sufferers with adequate and timely medical and logopedic assistance.

Aphasia is generally defined as an acquired neurological disorder which results from focal brain lesions and affects multiple aspects of communication: comprehension and production skills, the ability to read and write. Hallowell and Chapey (2008) point out that aphasia does not result from “a sensory or motor deficit, a general intellectual deficit, confusion or a psychiatric disorder”, which sets it apart from related communication disturbances, in particular dysarthria, aphemia and anarthria (Denes et al., 2020).

Although stroke is generally cited as the leading cause of aphasia (Ismagilov, 2005), neurosurgical interventions and head traumas can also induce a sudden disorder onset while growing brain tumours, infections, dementia and other neurodegenerative as well as demyelinating diseases of the CNS may be responsible for a slow process of the condition development (Devere et al., 2000; Okuda et al., 2001).

As for the neuroanatomy of aphasia, it is the left hemisphere that is believed to be the location area of the major speech zones forming a highly elaborate neurocognitive network. In accord with Hall and Hall (2021), about 95% of people have their left hemisphere as the

language-dominant one while in only 5% of cases it is either the right hemisphere or both of them that provide for speech innervation. “Classical” language centres include Broca’s area, Wernicke’s area, and the angular gyrus of the inferior parietal lobule. Other brain areas contributing to the process of speech formation are the insular cortex, the zones of the frontal and temporal lobes, the subcortical nuclei of the brain, and the cerebellum (Damasio et al., 1996; Dronkers, 1996; Tranel et al., 1997; Blank et al., 2002; Hillis et al., 2002; Karaci et al., 2008).

2.2. Types of Aphasia: Classifications and Frameworks

In the course of its development, neurolinguistics has been embracing a whole range of distinct views on the brain-language relationship, including localism, associationism, dynamic localisation of function, hierarchal or evolution-based view, and holism. It hence makes perfect sense that there have been proposed a substantial number of classification systems, with each of them identifying types of aphasia on the basis of a constellation of characteristic physical and behavioural features as well as representing a certain theoretical perspective of the language impairment, e.g., dichotomous, anatomically and/or behaviourally based systems alongside those based on disorder severity, or following some model of processing. In spite of their abundance and usefulness in gaining a general understanding of a person’s communication ability, the clinical utility of such classification systems is open to debate. This owes to quite frequent observations of patients whose symptoms simply do not match one aphasia type or fit any of the types (Vizel, 2016; Caramazza, 1984; Crary et al., 1992).

The two most influential frameworks in contemporary neurolinguistic science are the neoclassical and Lurian ones. The former school is inextricably linked with the names of Geschwind (1965), Goodglass (1973, 1976), Kaplan (1973) and others. It cherishes the ideas of associationism, is premised on the anatomical principle and distinguishes such disconnection syndromes as apraxia, agnosia and aphasia, the last of which has a connection to sensory and motor systems. Geschwind adopts the notion of cortical centre as the primary one, thinking of it as being an anatomical site and an accumulation of linguistic representations relating to a certain aspect of “processing” of these representations. The above mentioned disconnection syndromes result from the disruption in the connections between the two hemispheres of the brain as well as those within each of them. The neoclassical, or Boston, school, which presented an extension of Wernicke-Lichtheim’s model and has

increasingly been growing in popularity and influence since the 1960s in both America and Western Europe, has been profoundly affected by the tenets of the generative paradigm along with the tradition of test psychology. Table 1 below presents an overview of both the types of aphasia distinguished by the school and their prominent characteristics.

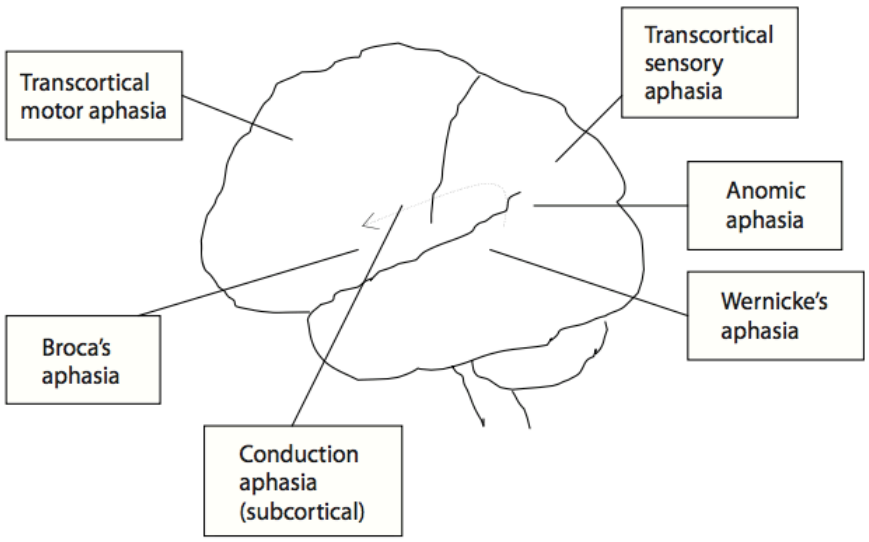
Table 1. *Aphasia types and their most typical lesion locations in accordance with BDAE*

Aphasia type	Lesion site	Speech fluency	Speech comprehension	Repetition	Naming
Wernicke's aphasia	Wernicke's area	+	-	-	-
Broca's aphasia	Broca's area	-	+	-	-
Conduction aphasia	Arcuate fasciculus	+	+	-	-
Transcortical sensory aphasia	Posterior parietal lobe	+	-	+	-
Transcortical motor aphasia	Supplementary motor area	-	+	+	-
Global aphasia	Vast cortical and subcortical areas surrounding the Sylvian fissure	-	-	-	-
Anomic aphasia	Angular gyrus (but localisation is often impossible)	+	+	+	-
Isolated speech area	"Watershed areas", i.e. borders between the areas of blood supply for different arteries	-	-	+	-

Researchers opting for the Boston classification of aphasia should pay careful attention to whether the basis for their assigning a study participant to any of its eight groups is the localisation of the brain lesion (see Figure 1) or a set of symptoms related to PWAs' linguistic behaviour. The two ways of classifying syndromes are not infrequently out of sync. In addition, the lesions often exhibit significant variance, with Table 1 capturing generalisations based on statistics. Still further, many people with aphasia are not easily classifiable, as has been pointed out somewhat earlier.

The other influential framework was advanced by Alexander Luria and enriched by Lev Vygotsky: it has its roots in the Russian neuropsychological tradition and is known as the dynamic localisation of function. In our research paper, we rely on the Lurian classification of

Figure 1. *Typical localisations of brain lesions associated with different aphasia types in accord with the neoclassical framework (adapted from Ahlsén, 2006)*



aphasia types for a number of reasons. First, this approach constitutes one of the two predominant clusters of influence in modern neurolinguistics. The role in its formation and development was also played by generative grammar and structuralism. Second, this cluster is most frequently associated with in-depth case studies, but group studies occupy a certain place here, too. The Lurian school has so far perhaps the strongest therapeutic tradition. In other words, the Lurian theory is directly tied up with the so-called "restoration of language functions" therapy. Third, speech language pathologists in most post-Soviet countries make use of namely Luria's aphasia type classification and, understandably, interpret the clinical manifestations of various aphasia instances as well as prescribe treatment based on this framework (Ahlsén, 2006).

Luria views the human brain as an intricate system wherein all functions are tightly interconnected, and simultaneous cooperation between several zones is an absolute prerequisite for the brain's performing a certain complex activity. Functions are seen as dynamically localised. There are three blocks (see Figure 2), or functional units, in our brain, and every task it performs requires cooperation between all of them. Table 2 presents both the types of aphasia identified by Luria and a brief listing of their distinctive features.

As Markashova et al. (2021) explain, the six types of aphasia within the considered classification are defined on the basis of the primary impairment, with each type relating to a

specific disturbance of speech processing. Namely, sensory aphasia results from the phonematic analysis impairment and, in Luria's (2013) terms, "word salad" speech impairments. Acoustic-mnestic aphasia is caused by the auditory-speech memory disturbance as well as the impairment of images and representations of the objects (Luria, 1966). Amnestic aphasia involves both this latter disturbance and the impairment of internal semantic web of notions. Despite their both being of the motor type, afferent and efferent motor aphasias are associated with different primary impairments: while the former has to do with kinetic organisation of subtle speech processes, the latter is related to kinetic analysis and synthesis (Luria, 1966, 2013). Finally, dynamic aphasia presupposes the impairment of speech coding and the active dynamic process of speech production. Moreover, it is marked by the disturbance of the grammatical aspect of speech (Akhutina, 2002, 2014).

***Table 2**. Types of aphasia with their associated blocks and zones as well as major characteristics*

Aphasia type	Block and zone	Characteristics
Afferent motor aphasia	Block II, sensory secondary zone	Phonological paraphasias and mixing speech sounds having similar articulation but different acoustic features; phonological approximations which are unsuccessful due to a lack of kinaesthetic feedback about the performed articulatory movements
Acoustic-gnostic, or sensory, aphasia	Block II, auditory secondary zone inclusive of Wernicke's area	Impaired ability to recognise and discriminate phonemes (disturbance of auditory comprehension); severe substitutions to which a PWA is non-responsive; fluent speech; intact syntactic and prosodic structure; severely impaired ability to repeat spoken language; disintegration of auditory structure of the word
Acoustic-mnestic aphasia	Block II, medial zones in the depth of the left temporal lobe	Paraphasias (especially of the exchange-error type) produced in naming and spontaneous speech, and resulting from the inability of long-term memory retainment of sequences of audio-verbal traces along with the inability of activating a correct word; difficulty in understanding directed speech; intact syntax and prosody
Amnestic, or semantic, aphasia	Block II, posterior tertiary zone involving the posterior and inferior parietal lobe or the border between the parietal and occipital lobes	Difficulties in naming objects which manifest themselves in the form of semantic paraphasias caused by disturbances in the semantic network, word searches, circumlocutions; problems in handling complex logical grammatical constructions, e.g., those expressing spatial, comparative or attributive relations
Dynamic aphasia	Block III, tertiary zone	Absence of spontaneous speech; serious problems in transforming a semantic plan into linearly ordered speech through "inner speech"; agrammatism; preserved repetition and naming skills

Aphasia type	Block and zone	Characteristics
Efferent motor aphasia	Block III, motor secondary zone inclusive of Broca's area	Perseverations; impaired ability to switch from one phoneme to another, which results in disrupted pronunciation of words; often intact pronunciation of isolated speech sounds

Figure 2. *Blocks and zones of the brain in accord with Luria (adapted from Ahlsén, 2006)*

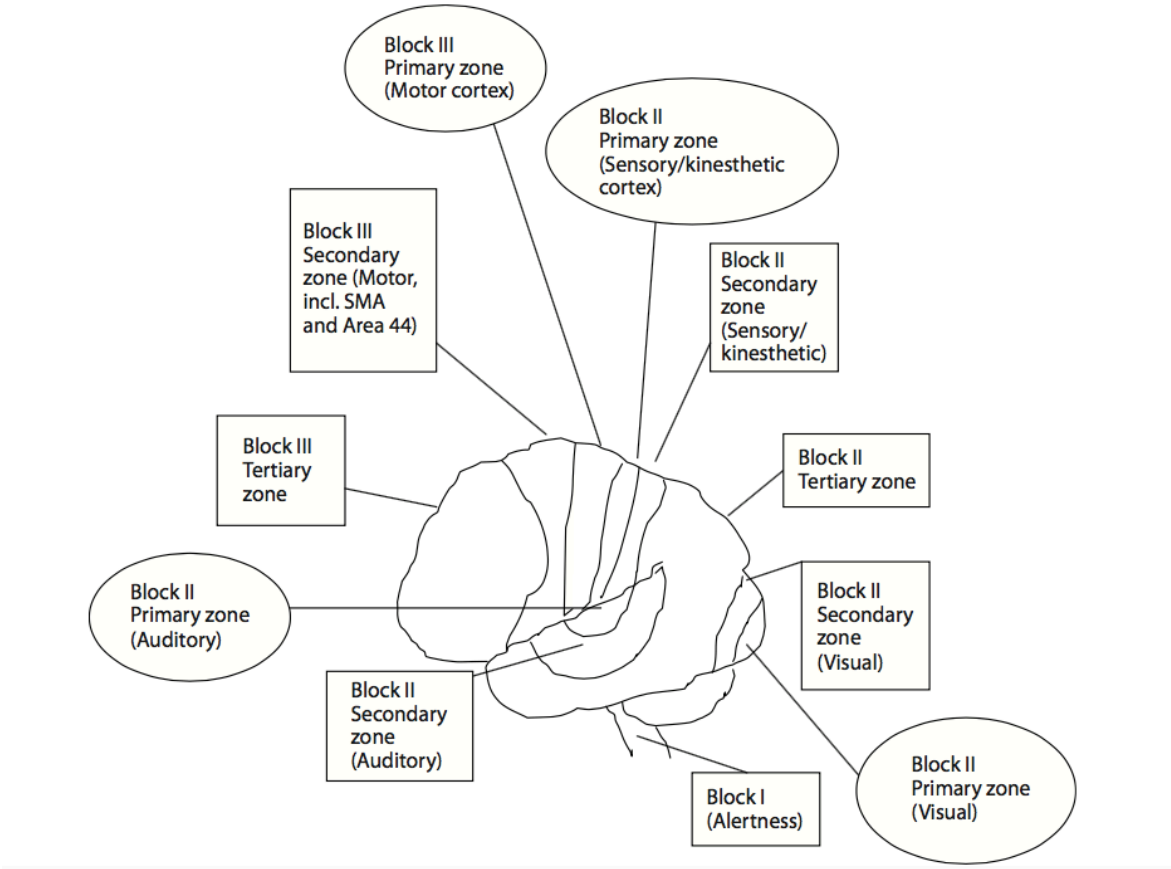
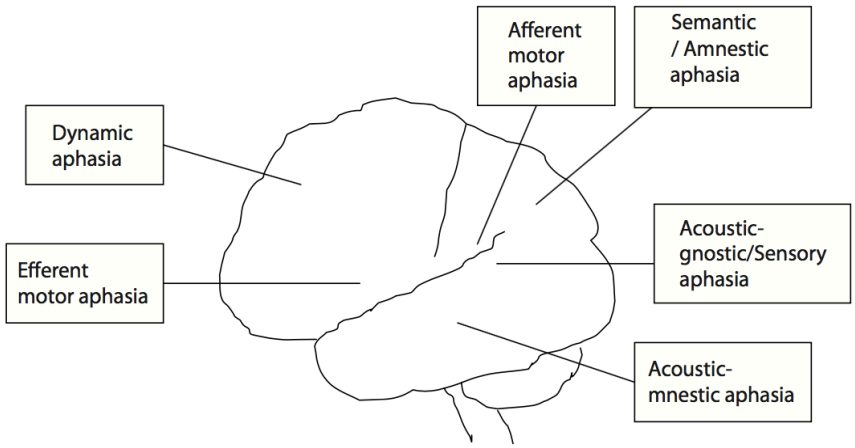


Figure 3. *Types of aphasia with approximate localisations of their main factor in accord with Luria (adapted from Ahlsén, 2006)*



2.3. Relevant Models of Speech Production

Over the past 50 years, the process of speech production has been approached by researchers working within a variety of scientific traditions including linguistics, psycholinguistics, neuropsychology, neurobiology, and motor control. Despite their allegedly looking at the different levels and aspects of the speech process, a thorough consideration of the advanced ideas reveals their impressive compatibility and convergence. Therefore, one should consider adopting an integrated approach, which holds promise to take the research in the discussed area up a notch (Hickok, 2014). It superficially appears that the division of labour between psycholinguistic and motor control models of speech production serves as the most illustrative example of the lack of interaction. The difference between them is generally accepted to be glaringly obvious. The former are assumed to limit themselves to "traditional" semantic, lexical and phonological levels, put it otherwise, they deal with higher-level processes involved in the production of oral language (e.g., Fromkin, 1971; Garrett, 1975; Shattuck-Hufnagel, 1979; Levelt, 1983, 1989, 1992, 1994, 1999; Dell, 1986; Kay et al., 1992; Bock & Levelt, 1994; Levelt & Wheeldon, 1994; Levelt et al., 1999; Dell et al., 1999; Biran & Friedmann, 2005; Chang et al., 2006; Romani et al., 2011). By contrast, the latter use the output of psycholinguistic models as the input to lower-level processes, i.e. those of articulation, that are modelled by motor-control architectures which involve such theoretical objects or computations as internal models, sensory feedback, controllers, efference copies, loops, plants and the like (e.g., Fairbanks, 1954; Guenther et al., 1998; Houde & Jordan, 1998; Bohland & Guenther, 2006; Coltheart, 2006; Guenther et al., 2006; Schaal et al., 2007; Tourville & Guenther, 2011; Ijspeert et al., 2013; Guenther, 2016). We will discuss the two categories of models in turn.

Motor control models are characterised by the crucial role of both sensory and external feedback. The internal forward model performs movement control in an online mode by evaluating the accuracy of movement commands and correcting their effects before external feedback. The latter is needed for the acquisition and regular update of the internal model as well as the detection and correction of unexpected disturbances. Models marked by these feedback properties are known as state feedback control models and are hypothesised to have a hierarchical organisation (Haruno et al., 2003; Grafton & Hamilton, 2007; Grafton et al., 2009; Diedrichsen et al., 2010). Furthermore, quite many models conceptualise the different aspects of speech motor control as layer-comprising modules. Some major models belonging

to this category include Saltzman and Kelso's as well as Saltzman and Munhall's TD model (1987; 1989); Guenther's DIVA model (1994; 2016); Perrier et al.'s GEPPETO model (2006); Kröger et al.'s ACTion-based model of speech production, speech perception, and speech acquisition (ACT) model (2009); Houde and Nagarajan's SFC model (2011); and Parrell et al.'s FACTS model (2019). As the authors of the last-mentioned model suggest, despite at times drastic differences observed when comparing these various models, certain points of agreement and commonalities can still be found: all of the models rely on higher-level motor planning, use feedback signals, lack time-variant adaptation, and have motor control kinematics and biomechanics as their focus. Lastly, the models are directly comparable due to their having tight connections with engineering approaches to motor control alongside being similar to traditional control-theoretic architectures (Parrell et al., 2019).

As for the psycholinguistic models, it is worth underscoring that the field of psycholinguistics has not yet proposed any model or any set of models that categorically characterises the process of speech production as either entirely holistic or componential. Moreover, the models put forward are undeniably different in many respects. In spite of their dissemblances, however, certain shared features can surely be found. First of all, all the models have emerged as a result of their creators concentrating upon the subject of the retrieval of linguistic components and their further assembly in connected speech. Second, the authors of all the models see eye to eye on a number of crucial points: 1) the representation of linguistic information takes the form of distinctive units; 2) linguistic information is represented on a hierarchy of levels; 3) the units are retrieved in a sequential order from higher levels to lower ones (Clarl & Clark, 1977). Third, there is general agreement among the models that access to semantics and syntax is an absolute prerequisite for accessing the phonological level of processing. Therefore, it is not surprising that psycholinguistic models of speech production commonly start with a message-level, or conceptual, representation and end with a phonological representation which serves as the input for the motor control system (Browman & Goldstein, 1992; Plaut & Kello, 1999). At times, one can see articulation being incorporated into the model as the third stage in the production of oral language (see Garrett's 1980 model; Levelt's 1999 blueprint of the speaker; Levelt et al.'s 1999 LRM model): it is at this juncture that scholars of today opt for a more integrated approach.

Psycholinguistic models can be of modular and non-modular types. The former are also known as serial processing models, and they picture the process of speech production as a

series of sequential stages or modules, with higher stages consisting of large units such as phrases and sentences and lower stages being made up of the former's smaller constituents such as phonemes, morphemes, etc. Crucial characteristics of these models are independence, i.e. non-interactiveness, of their modules and unidirectionality of the information flow, which implies that there is no place for feedback to the system. Among those researchers who have been insisting on the existence of a number of encapsulated, specialised and autonomous modules or processes of speech production are Fromkin (1973) with her Five Stage Model; Garrett (1984; 2000) with his Two-Stage Model; Bock and Levelt (1994); Shattuck-Hufnagel (1979, 1983) whose model of speech production famous for its Scan-Copier Mechanism and Check-Off Monitor; Laver (1980) with the production-based speech monitoring model; Levelt (1989) with his blueprint of the speaker alongside his 1993 model of language production; Levelt, Roelofs, and Meyer with the LRM Model (Levelt et al., 1999).

Non-modular, or parallel processing, accounts of speech production (Dell, 1985, 1986; MacKay, 1987, 1992; Kempen & Vosse, 1989; Trueswell et al., 1994; Rapp & Goldrick, 2000; Vigliocco & Hartsuiker, 2002; Chang et al., 2006), by contrast, make the case for architecture flexibility, which is premised on the principles of information flow bidirectionality and component interaction. In such models, the notion of feedback is paramount. The existence of feedback correction mechanisms has been supported experimentally (Lackner & Tuller, 1979; Motley et al., 1982; Nickels & Howard, 1995; Postma, 2000; Hartsuiker et al., 2005; Özdemir et al., 2007; Oppenheim & Dell, 2008; Huettig & Hartsuiker, 2010; Nozari et al., 2011; Hickok et al., 2011; Hickok, 2012). Non-modular models appear to be more promising for the reason of their ability to explain phenomena that cannot be accounted for by modular ones, i.e. phrase blends, wrong lexical items phonologically related to the targets in terms of their initial phoneme, and cognitive intrusions such as those observed in Freudian slips.

Now that both motor control and psycholinguistic models have been outlined, it is worth stressing that there have recently been attempts to bring the insights from computational motor control and psycholinguistics along with general linguistics, neuropsychology, and neuroscience together. Hickok has put forward two models, the state feedback control (SFC) one (Hickok et al., 2011) and the hierarchical state feedback control (HSFC) one (Hickok, 2014), with both of them offering an attempt at integrating the various traditions. An integrated approach is worth adoption because of the many previously neglected commonalities among the proposed models and their seemingly being pieces of one big

picture. Unfortunately, for the time being, there is no single, self-sufficient, all-inclusive model of speech production that could be seen as satisfactory with regard to all the dimensions of the considered process. Furthermore, there exist many factors affecting speech production that have never been incorporated in any model developed so far, e.g., emotional charge of the performed task and situational anxiety which have been shown to have effect on the frequency of speech errors and the length of reaction time (Clarl & Clark, 1977; Hinojosa et al., 2010). Since the humanity has not yet created a computer having the independent thought capacity and the ability to learn how to produce language with the generative power of human languages to convey those independent thoughts, we could only envisage the emergence of such a model in the more or less distant future. However, its potential excessive complexity may well render it too unwieldy to be systematically relied on.

2.4. Phonological Paraphasias and Neologisms: Theoretical and Empirical Backgrounds

First, we should give the notion of paraphasia a transparent operational definition. It is best understood as the production of an unintended phoneme, syllable, or word, which occurs during an individual's attempt at speaking or naming when there is no muscular dysfunction that makes sound articulation effortful and exigeant (Goodglass et al., 2001; Patterson & Chapey, 2008). Paraphasias have bearing on both segmental and metrical information: while some of them affect only segmentation, simultaneously preserving the information about word stress, number of syllables, and consonant-vowel structure of the target units, others do quite the opposite thing. The majority of paraphasias, however, impinge upon both the metre and segmentation, as Biran and Friedmann (2005) claim. We should principally distinguish between phonemic (also phonological, or literal) paraphasias which are mainly form-based, and semantic (also word, or verbal) paraphasias which can be both form- and meaning-based as well as unrelated (Ahlsén, 2006). Moreover, paraphasias can be neologistic when the contamination of the uttered word with extraneous phonemes is too heavy (Saling, 2007). Since neologisms are conventionally viewed as a special type of paraphasia and their illumination is expected to be more concise than that of phonological paraphasias, it seems sensible to carry neologistic errors over for consideration at this point in our elaboration.

First and foremost, it must be underscored that there is in essence no clear distinction between neologisms and phonological errors. Researchers hold different views on this issue,

which is especially true with regard to the question of whether the impairment source for neologisms and paraphasias is the one and the same, with different error types simply reflecting a severity range. Those who advocate for a single mechanism underlying the production of both neologisms and other paraphasia types (Lecours & Lhermitte, 1979; Dell et al., 1997b; Schwartz et al., 2004; Martin & Dell, 2007; Olson et al., 2007, 2015; Nozari et al., 2010; Buckingham & Buckingham, 2011) most commonly hypothesise the disturbance of lexical and phonological processes entailing weak and misdirected spreading of activation, which results in the selection of mistargeted phonology for output. As a result, the view is held that neologisms can be explained through paraphasias.

Butterworth (1979), who finds himself in the opposite camp and who is behind the idea of a special "generating device" that gets activated each time a word-finding problem is experienced by a PWA for a specific period of time, suggests that any transformation produced by a PWA should be seen as a phonemic error when the target word can still be identified. Supporting his views, Buckingham (1981) concluded that the recurring phonological patterns typical of neologisms could be explained as follows: neologisms produced by the "device" are regularly repeated, which leads to their perseveration. The overall alternative hypothesis boils down to that paraphasias and neologisms represent separate types of erroneous productions, with the latter type arising as a result of the lexical retrieval failure which leads to the generation of a totally unrelated or idiosyncratic phonemic sequence (Buckingham, 1990; Moses et al., 2004; Eaton et al., 2010). The degree of "target overlap", which is usually measured by means of calculating POI, or Phonological Overlap Index, is critical in the differentiation of the two error populations: while paraphasic errors boast a close relation to the target unit, neologistic formations are marked by very low "target relatedness", which conforms to a bimodal distribution. In their study, Pilkington et al. (2017) have spotted the existence of a close association between neologistic and perseverative errors in jargon repetition on the basis of the POI calculations. Bose and Buchanan (2010) also addressed the question about the source of novel non-word units produced by jargon aphasics. Their findings are highly compatible with those of previous scholars: they put forth the disturbed connection between semantics and phonology as the central deficit in jargon aphasia, which is additionally supported by the lesion site evidence. Rohrer et al. (2009) who examined both oral and written linguistic behaviour, in particular neologistic jargon, of two patients suffering primary progressive aphasia, similarly came to the conclusion that the

erratic activation of phonemes leading to neologistic productions is contingent on the disruption of connection between stored lexical representations and the pathways of language output. Watanabe et al. (2019) report on the wide occurrence of neologisms in logopenic progressive aphasia of which they are not actually typical. This points to the need of our paying increased attention to the proportion of produced neologisms detected in the non-fluent aphasia speech samples. Noteworthy, as Abou (2021) makes sure in the course of his case study, neologistic errors made in fluent jargon aphasia are perfect meaningful for a PWA, but naturally not for the hearer. This hypothesis is also worth testing since our selected population includes sufferers of fluent aphasia types.

Now that we have discussed neologisms, we are in a position to shed some light on phonological paraphasias which constitute a crucial unit of analysis in our research.

It must be underlined that the Continuity Hypothesis (termed by Dell et al., 1997b) holding that PWAs rely on the same, largely intact, representation system as language users with undisturbed linguistic abilities, with the difference being predominantly of a quantitative type, i.e. in the degree of processing efficiency (Freud & Strachey, 1975; Schuell et al., 1964; Saffran, 1982; Stemberger, 1984, 1985; Schwartz, 1987; Miller & Ellis, 1987; Marshall, 1977; Buckingham, 1986, 1992; Butterworth, 1992), is in the bad graces of modern neurolinguists. These days the idea about the disparity of a qualitative kind, which could be found in as early works as those written by Blumstein (1978), Dressler (1978, 1980), and Keller (1981) is given consideration with ever increasing frequency (Wise, 2003; Ruml et al., 2005; Berg, 2005; Pritchard et al., 2013).

For the reason that phonological paraphasias are assumed to result from a reduced sensitivity to structure (Berg, 2005), we consider it paramount to provide the reader with their laconic structural account. We will begin by looking at the monopositional errors, those that extend to only one position within an uttered unit, i.e. substitutions, additions, and omissions. Following this, bipositional errors, often mashed together under the umbrella term “metathesis” (Blumstein, 1973), will be considered. Before we will embark on our elucidation, though, it is worth stressing that given the fact of different PWA populations having various lesion sites as well as their speaking different mother tongues, it is natural to expect aphasia to be highly heterogeneous in the way it is manifest (Bates et al., 1991).

The review of a decent number of empirical studies calculating proportions of monopositional errors reveals the following picture: substitutions constitute the dominant type

of phonological errors in both fluent (Wernicke's and conduction) and non-fluent (Broca's) aphasia syndromes. This applies not only to English (Blumstein, 1973; Hatfield & Walton, 1975; Shewan, 1980; Goldman et al., 2001), but also to other languages, including Norwegian (Moen, 1993), German (Allerbeck, 2000), Spanish and Italian (Ardila et al., 1989; Ferreres, 1990; Romani & Calabrese, 1998; Caramazza et al., 2000; Caramazza & Chialant, 2000; Romani et al., 2002). The results of Pate et al. (1987) and Kohn (1989) examining the erroneous productions of English-speaking conduction aphasics, however, point to omissions as the most numerous error category: the researchers report on 47.8% and 46.2% of deletions, respectively. Moreover, French seems to be the only language whose native speakers diagnosed with conduction aphasia had as much as 52.4% of omissions in their speech, which makes the latter the preponderant error category in their case (Béland et al., 1990). All studies demonstrate the following rank ordering of monopositional errors: substitutions, omissions, and additions, regardless of the syndrome. Insofar as syndrome specificity is concerned, the only difference between non-fluent and fluent aphasics comes down to that in the case of the latter, the proportions for omissions and additions appear more balanced.

As for the contextual dependence of errors, it is unanimously held that aphasic speech is marked by a large proportion of errors with no apparent source unit from the context (Pate et al., 1987; Wilshire & McCarthy, 1987; Goldman et al., 2001; Wilshire, 2002; Söderpalm, 1979; Monoi et al., 1983; Niemi et al., 1985; Allerbeck, 2000). Schwartz et al. (1994) who examined the erroneous productions of English-speaking jargon aphasics, though, found that 54.2% of the errors could be attributed to some source in their immediate neighbourhood.

Context can motivate paraphasias, chiefly substitutions, in either an anticipatory or perseveratory way. It is almost universally agreed that aphasics show a marked tendency to produce more perseverations than anticipations, with the latter being more common in slips of the tongue made by normal speakers (Allison & Hurwitz, 1967; Hudson, 1968; Buckingham, 1985; Schwartz et al., 1994; Allerbeck, 2000; Knels, 2001). Goldmann et al. (2001) are the only researchers who report on a comparatively lower (36%) proportion of perseverations in English aphasic speech. An interesting observation is worth mentioning at this juncture: an increase in task difficulty has been shown (Moses et al., 2004) to alter the ratio of perseveratory versus anticipatory errors in slips of the tongue.

Now, proceeding with bipositional paraphasias, we should note that the sources on phonological speech errors in normal speakers conventionally distinguish between reversals

and switches. The researchers see eye to eye on the relative rarity of exchange errors across languages and syndromes (Söderpalm, 1979; Niemi et al., 1985; Kohn & Smith, 1990; Allerbeck, 2000; Goldman et al., 2001; Romani et al., 2002). Noteworthy, contextual errors can be of within-word and between-word types, with the former type being accepted as the norm, constituting the absolute majority of errors (Blumstein, 1973; Söderpalm, 1979).

There are also a number of relevant "structural" hypotheses about phonological errors, which will be discussed below in a nutshell. First, it is put forward that in terms of their size, error units produced by aphasics are nearly always segmental (Blumstein, 1973; Shewan, 1980; Kohn, 1989; Wilshire and McCarthy, 1996; Monoi et al., 1983; Dressler et al., 1986).

Another reasonable assumption has to do with the word-onset effect. While there are some claims (Vousden et al., 2000) about the increased vulnerability of word- and syllable-onsets in slips of the tongue, this tendency is much less pronounced in PWAs. In fact, the study carried out by Stark and Stark (1990) even points to the equal error-proneness of codas and onsets. Other empirical investigations of the word-onset effect (Burns & Canter, 1977; Kohn, 1989; Kohn & Smith, 1990, 1995; Wilshire & McCarthy, 1996; Allerbeck, 2000; Knels, 2001; Scwartz et al., 2004) reveal a rather impressive word-onset stability for different aphasia syndromes and languages. Perhaps the only scholar whose findings run counter to those of others is Blumstein (1973).

A third proposition to be illuminated is known as "the parallel syllable structure constraint", i.e. a tendency of consonants to interact with other consonants from identical positions within a syllable. Studies of PWAs speaking English (Kohn, 1989; Wilshire, 1998; Goldmann et al., 2001) and certain other languages (Dressler et al., 1986; Allerbeck, 2000; Knels, 2001) as their mother tongues clearly demonstrate, however, that the constraint is more frequently than not ignored in aphasia.

The final "structural" hypothesis holds that words containing more syllables are more error-prone as compared to those comprising fewer syllables. Indeed, the studies by Caplan (1987) and Pate et al. (1987) suggest that disyllabic words are considerably more vulnerable than monosyllabic ones.

Now, for the reason that our study explores manifestations of the phonological deficit in several aphasia types, it is of importance to take a look at the most fundamental cross-group investigations of phonological paraphasias. Among those who have conducted the earliest in-depth investigations of phonological paraphasias in various aphasia groups one can find

Blumstein (1973), Nespoulous and Borrell (1979), Nespoulous et al. (1982a), Lecours et al. (1983), Martory and Messerli (1983). However, only a minute amount of studies have aimed at comparing such sound-production errors across subject groups having different types of aphasia: these are the ones belonging to Blumstein (1973), Trost and Canter (1974), Burns and Canter (1977), Nespoulous and Borrell (1979), Nespoulous et al. (1982b), MacNeilage (1982), Martory and Messerli (1983), Nespoulous et al. (1987). The researchers mentioned strove to find out whether the error patterns were identical in all types of aphasia, thus following universal rules, or syndrome-specific. Blumstein (1973) was the first linguist heading off to conduct such a comparative analysis of phonological paraphasias in several distinct aphasia types. The researcher arrived at the conclusion that phonemic paraphasias were essentially the same in subjects characterised by different aphasia syndromes.

Contrary to the claim of Blumstein, Butterworth (1979, 1981) as well as Nespoulous et al. (1982b) insisted that there was an appreciable difference in error patterns typical of patient groups suffering different types of aphasia. Trost and Canter (1974), Guyard et al. (1981), MacNeillage (1982), Nespoulous et al. (1982b), Nespoulous et al. (1984), Canter et al. (1985) are among those who spotted significant differences in the error patterns exhibited by Broca's and conduction aphasics. The researcher who decided to somewhat depart from the traditional structuralist phonology framework and adopt an approach associated with non-linear phonology is Susan Kohn (1984, 1985). She pioneered in showing that various syndrome-related deficits that are accountable for phonological production errors display systematic difference in Wernicke's, Broca's and conduction aphasic subjects. Kohn came to the conclusion that each of the three aphasia syndromes is "identified with breakdown in a separate stage of the production system": she pinpointed that Wernicke's aphasics have a phonological deficit, conduction aphasics suffer disruption at the phonemic level, and Broca's aphasics have a phonetic disturbance. The hypotheses of phonological, phonemic and phonetic deficits were embraced with great relish by other scholars working within the psycholinguistic framework. Ellis, Miller and Sin also reported a lexical phonological deficit in Wernicke's type of aphasia in 1983, and Ellis in 1985. The 1984 study of Nespoulous, Joanette, Beland, Caplan, and Lecours alongside the 1987 study of Nespoulous, Joanette, Ska, Caplan, and Lecours focused primarily on conduction aphasia and reached the same conclusion as Kohn.

The issue of heterogeneity versus uniformity of phonological deficits has become in a sense overriding, with its calling attention to "taking the wraps off" the genuine nature of phonological breakdown in different groups of aphasia patients. Ideas already available for wide audience are still argued round and round, which can be explained by explicitly contradictory findings in the area. This, in its turn, is at least partially contingent on the elicitation methods being employed.

In line with Kohn, Dalton et al. (2018) provide in their study a detailed description of phonological paraphasias in discourse samples of twenty-six patients with three variants (logopenic, semantic, non-fluent) of primary progressive aphasia, and arrive at the conclusion that each variant exhibits its own idiosyncratic patterns of error production.

By contrast, Kurowski and Blumstein (2016) probe into the basis of phonemic paraphasias produced by seven individuals diagnosed with Broca's, Wernicke's and conduction aphasia. The researchers come to an important conclusion that irrespective of the syndrome and lesion site, paraphasias uttered by absolutely all participating PWAs preserve "an acoustic trace of the original target", which points to that paraphasic errors are not the products of correct implementation of mis-selected phonemes. Instead, they are generated by a common mechanism wherein erroneous productions serve as the reflection of the simultaneous activation of the target and competing units which results in the preservation of phonetic features of both.

Being at one with Kurowski and Blumstein, Berg (2005) whose study accommodates an overview of the most significant findings having to do with phonological paraphasias, slips of the tongue, and slips of the pen, concludes upon quite a balanced consideration of the literature that the aphasiological data displays a remarkable homogeneity across languages and syndromes. His claim is that phonological paraphasias cannot be relied upon in distinguishing different types of the speech disorder at issue since the processing problems of PWAs belonging to various aphasia types seem to "converge on the phonological level".

While we are gradually rounding up our discussion of the most prominent findings in the area of phonological deficits, it is worth pointing out that the comparative neurolinguistic studies of the kind illuminated above inspired investigations of the nature of mechanisms underlying the production of paraphasias versus mechanisms responsible for slips of the tongue in speakers with intact linguistic ability. Fromkin (1971), Buckingham (1980), and Garrett (1982) came to believe that paraphasias and slips of the tongue could be explained in

essentially the same way. The linguists concluded that both PWAs and normal speakers followed phonotactic rules, properly employed prosodic structures, and experienced problems with the same elements, in particular, with stressed lexical words and their initial phonemes.

Nevertheless, other researchers opposed the idea of inherent similarity between paraphasias and ordinary speech errors. Söderpalm (1979), for instance, managed to show clear differences between the two error types, pointing out that aphasia patients produce more paradigmatic errors (as compared to syntagmatic ones in normal speakers) and are less aware of their own errors. Afore-mentioned Berg (2005) reaches a truly interesting conclusion after comparing phonological paraphasias, slips of the tongue and slips of the pen to each other: with respect to as many as nine structural criteria, paraphasias bear much greater similarity to pen slips, with tongue slips being stand-alone in the sense that they have no special affinities with either of the two error categories. The bewildering observation is explained by Berg as follows: the oral output of PWAs and the written one of NHPs are "generated under a reduced structural representation", meaning "weak activation of structural nodes", with the reasons not being identical for the two modalities. In the former case, it is "an impaired transmission of activation among structural nodes" while in the latter, it is a slow rate of production. As compared to paraphasias and pen slips, tongue slips are associated with robust structural representation.

To sum up, this section has shed light on the concepts of phonological and neologistic paraphasias, the mechanism underlying their production, their structural peculiarities, similarity with and difference from erroneous productions of normal speakers, the issue of homogeneity versus heterogeneity of their surfacing in various types of aphasia as well as the potential effect of an elicitation method which should obligatorily be borne in mind.

2.5. Discourse Genres in Aphasia: Theoretical and Empirical Backgrounds

It stands to mention first that the topic of discourse nowadays enjoys heightened interest among researchers who conduct assessment and intervention experiments involving aphasic populations (Bryant et al., 2016; Pritchard et al., 2017). Noteworthy is that the field no longer treats discourse as a single entity marked by a single set of linguistic features. Eggins and Martin (1997), who stand behind the register and genre theory extensively employed in the study of discourse in aphasia, emphasise the profound influence that the context has on discourse and define discourse genres as "different ways of using language to achieve

culturally established tasks". Halliday (2004) also stresses that discourse is impossible without a context, with every level of discourse production being deeply affected by the situation of its production and its designed purpose. The fact that discourse genres are associated with immense variability is problematic for aphasiology since the existing evidence is not sufficient to serve as an adequate indication of which linguistic patterns and features should be expected to surface in a particular genre. In spite of this, a number of elicitation techniques are utilised for obtaining clinical discourse samples from PWAs, with each of them bringing to light different discourse genres which are in turn characterised by varying grammatical, lexical and other patterns. The challenge researchers in aphasiology are faced with boils down to evaluation of the discourse produced by PWAs, in the context of paucity of evidence with regard to drawing the distinction between aphasia-conditioned discourse impairment and normal effects of discourse genre. Indeed, on the one hand, both qualitative and quantitative properties of produced discourse are affected by different discourse genres (Ulatowska et al., 1983a; Ulatowska et al., 1983b; Van Leer & Turkstra, 1999; Coelho, 2002; Olness et al., 2002; Olness, 2006; Olness 2007). On the other hand, an impressive number of studies have established the fact of language being impaired in the discourse of PWAs (Bryant et al., 2016; Linnik et al., 2016; Kohn et al., 1989; Armstrong, 2001, 2005; Conroy et al., 2006; Cruice et al., 2014; Berndt et al., 1997; Webster et al., 2004; Webster et al., 2007; Whitworth et al., 2015; Cruice et al., 2014; Malyutina & den Ouden, 2016).

At this juncture, it must be clarified which discourse genres one conventionally talks about in the context of aphasiology. When it comes to conversational exchanges, Boyle (2011) distinguishes narrative, procedural, descriptive, and expository discourses. Webster et al. (2015) in their discussion of the major elicitation paradigms in discourse analysis of aphasic speech draw a dividing line between connected speech produced by PWAs when they describe pictures and the discourse produced by them in monologic and dialogic output. In the former case, one may find such generic tasks as complex picture description and picture sequence description. In the latter case, monologic discourse encompasses narratives, personal narratives, procedural narratives, and expositions. Meanwhile, dialogues include the genres of role play and conversation. Bryant et al. (2016) distinguish three types of discourse, namely expositional (also descriptive), narrative, and procedural ones.

It is worthy of note that studies of discourse in aphasia largely deal with its microstructure and macrostructure as well as informativeness (Byng & Black, 1989; Saffran et al., 1989;

Glosser & Deser, 1991; Thompson et al., 1995; Bastiaanse et al., 2006; Bird & Franklin, 1996; Rochon et al., 2000; Webster et al., 2007; Andretta & Marini, 2015; Weinrich et al., 2002). Stark and Fukuyama's (2020) explicitly pointing to "a considerable research-practice gap" is worth being mentioned as well: while the employment of several different elicitation methods is top of mind for modern researchers in comprehensive analysis of discourse, clinicians do not typically try to obtain multiple and varied samples. This is problematic, given that it is only if the data are obtained through a variety of distinct elicitation techniques that the most all-encompassing assessment of aphasic speech can be guaranteed (Cameron et al., 2010; Boyle, 2014). Studies that have demonstrated the effect of discourse elicitation genre on the output collected belong to Wright and Capilouto (2009), Fergadiotis et al. (2011), Ulatowska et al. (1981), Easterbrook et al. (1982), Glosser et al. (1988), Correia et al. (1989, 1990), Roberts and Wertz (1989), Brenneise-Sarshad et al. (1991), Brookshire and Nicholas (1994), Doyle et al. (1998), Olness (2006), Sahraoui and Nespoulous (2012), Dalton and Richardson (2015, 2019), Richardson and Dalton (2016), Dipper et al. (2018), Stark (2019), Stark et al. (2019), Stark and Fukuyama (2020), to name but a few. Noteworthy, the latter scholars have taken a look at the within-group effect of elicitation method, comparing the performance of participants diagnosed with different types of aphasia and suffering varying degrees of the disorder severity. Each discourse task was assumed to rely on "unique cognitive components", e.g., semantic memory in fictional story-retelling and episodic memory in narrative story-retelling (Bliss & Mccabe, 2006). The finding boils down to that for both groups, discourse microstructure bore most resemblance in tasks belonging to the same genre and was essentially separable across genres. There was also observed significant variance per task within the group of aphasic speakers, which was most logically accounted for by aphasia type and severity.

2.6. On the Peculiarities of the Russian Phonology

Russian is generally described as having five vowel phonemes, namely /i, u, e, o, a/ in stress-receiving syllables. These largely turn into two to three "mergers" in unstressed positions. The status of a sixth vowel, /ɨ/, as a phoneme in its own right, independent from /i/, is currently surrounded by tempestuous debate. Linguists representing the Moscow school suggest a five-vowel treatment and consider /ɨ/ an allophone of /i/ while linguists from the Saint-Petersburg school of phonology put forth a six-vowel analysis and claim an independent

status of /ɨ/ (Chew, 2003). One can observe considerable allophonic variation of Russian vowels. Such factors as stress and palatalisation, or softening, of adjacent consonants make a significant contribution to it. In the majority of unaccented syllables, only three phonemes (/u/, /a ~ o/, and /e ~ i/) can be distinguished which follow non-palatalised consonants, and as few as two (/u/ and /a ~ o ~ e ~ i/) which occur after palatalised ones. Two mergers, /a/ and /i/, stand out in particular: they have given rise to the phenomena of "аканье" and "иканье", respectively. Russian unstressed vowels are lower in intensity and energy spent on their articulation as well as shorter in length, as compared to their stressed counterparts (Crosswhite, 2000). Interesting is that this reduction of vowels does not find its reflection in the spelling of Russian, which sets it apart from other Slavic languages, in particular Belarusian. According to Avanesov (1975), there are two levels of vowel reduction in Russian: 1) vowels in syllables that precede the stressed experience a lesser degree of reduction whereas 2) those in other positions are reduced in a greater degree, which most conspicuously manifests itself in the realisation of unstressed /a/ and /o/ whose less-reduced and more-reduced allophones are [ʌ] and [ə], respectively. When analysing the speech samples, it is equally important to keep in mind that under some circumstances (e.g., in loanwords, a number of word-final inflections, conjunctions "но" (Eng. but) and "то" (Eng. then)) vowel-reduction rules do not apply in full (Avanesov, 1956; Zarva, 1993). Noteworthy, vowels may lose their voicing when they occur between two voiceless consonants in syllables receiving weak stress, e.g., "потому́ что" (Eng. because) [pə̥tʌˈmu ʂtə]. Taking into account mergers of different phonemes in unstressed syllables, one should be careful while assigning particular vowel phones to phonemes during the analysis of the aphasic speech samples. Finally, Russian may be said to have some or no diphthongs.

Insofar as consonants are concerned, there are thirty-four of them in Russian. The primary division is that between hard (non-palatalised, plain) and soft (palatalised) ones, which are predominantly paired. It is further possible to differentiate the consonants coming right in front of /j/, which gives one a total of four sets: /C, Cʲ, Cj, Cʲj/. /Cj/ can only be encountered at morphemic boundaries. In comparison with consonants in other Slavic languages, Russian soft consonants which precede another consonant more frequently retain their palatalisation. Velarisation, or uvularisation, of Russian hard consonants, which is most perceptible before the front /e/ and /i/ vowels alongside with lateral, velar and labial consonants, is yet another

phonological peculiarity, though, an academically disputed one (Padgett, 2001, 2003; Ashby, 2011; Bidwell, 1962; Lightner, 1972; Stankiewicz, 1962; Folejewski, 1962).

The major phonological processes characteristic of the Russian language include word-final devoicing of voiced consonants, voicing, and palatalisation, including assimilative one. As for the first process mentioned, one should say this is a truly idiosyncratic and all-embracive one (e.g., “дуб” (Eng. oak) [du**p**]), and the only environment in which it is inapplicable is when the following lexical unit starts with a voiced obstruent (Halle, 1959). Russian consonants are also common subjects to regressive assimilation of voicing and palatalisation (Jones & Ward, 1969) which are also observable at boundaries between words, providing one makes no deliberate pause to separate them. Remarkably, as opposed to many other languages, there is no assimilation by place in Russian nasals.

When it comes to consonant clusters, we should point out that, being one of Slavic languages, Russian tends to have quite lengthy sequences of consonant phonemes both in the onset and coda positions, with the maximal initial cluster comprising up to four consonants (Ostapenko, 2005; Proctor, 2009) and the maximal final cluster being occasionally made up of as many as seven consonants. Cases of cluster simplification and extension are common.

We will round up our discussion of the Russian phonology by noting that this stress-accent language has flexible and phonemic stress whose place within a lexical unit is conditioned by inter-morphemic interaction, since various morphemes can be stress-attracting, stress-preserving, or stress-fixing. Both primary and secondary stress is possible. Stress is largely indicated by the absence of vowel reduction, increased length of unstressed vowels, and greater intensity of pronunciation, including at the level of suprasegmental units (Chrabaszcz et al., 2014).

2.7. Statement of the Research Gap

There is little doubt that aphasia will not lose its scientific attractiveness for years to come as there is an overall increasing trend towards improving the quality of life. Our extensive, yet, understandably, non-exhaustive review of literature allows a decent display of the matters that have already been explored and found answers to. In particular, we have stayed focused on the productive side of the language disorder, first giving consideration to the most pertinent models of speech production and spotting the latest attempts at their fruitful integration. We have come to know that for the time being, we can see no single all-

embracing model coming for the very process of speech generation is a bunch of unknowns, regardless of how much the scientific community has already discovered about it. One of the core manifestations of the phonological deficit in aphasia, i.e. paraphasia, has always been receiving considerable attention from scholars who have delved into such aspects of paraphasic productions as major lesion loci responsible for their generation alongside aphasia syndromes they are most typical of, the underlying mechanism, ways of distinguishing between the main types of paraphasic errors, their difference from speech errors in neurally healthy people, and structural peculiarities, to tersely recapitulate. Paraphasias have been studied on the material of a good many languages, including English, French, German, Swedish, Italian, Spanish, Japanese, Hebrew. Furthermore, there has been carried out quite an abundance of single and cross-group investigations of paraphasias meant to find out whether the error patterns are universal or syndrome-specific. As of now, the evidence obtained is to an extent discordant, with the majority of researchers advocating for the view that each type of the disorder manifests itself in phonologically distinct ways. The issue of uniformity versus heterogeneity of phonological errors is, thus, far from fully resolved. Insofar as discourse genres are concerned, one can see this strand of research in aphasiology as relatively new, with scholars largely being in accord with each other on that elicitation genre exercises a significant influence on PWAs' task performance with regard to their discourse. However, it is admitted that it can be a tall order to determine whether the observed linguistic behaviour is contingent on the effect of the language impairment on the discourse of aphasics, or it is caused by the effect of elicitation genre.

Now, despite a telling number of studies pertaining to our chosen topic, it must be made clear that there is a dearth of research examining the production of paraphasias in Russian-speaking individuals with aphasia. While one may find some investigations of impaired speech within the domains of semantics, grammar and discourse (Akhutina et al., 2001; Dragoy & Bastiaanse, 2012; Linnik, 2016), to the best of our knowledge, there are very few studies looking namely at phonological errors in Russian PWAs' output. Semantic paraphasias have caught the eye of Gorokhova (2012) as well as Ovchinnikova and Pavlova (2017). The only two investigations of phonological paraphasias of which we are aware belong to Vinarskaya (1971) and Blinkov (1983; as cited in Glezerman & Balkoski, 2006). The former looked at the mechanisms employed by conduction aphasics in the production of literal paraphasias and discovered that the Russian-speaking PWAs with this syndrome make lots of

errors involving the soft-hard consonantal opposition. The latter scholar also studied the phonological output of native speakers of Russian diagnosed with conduction aphasia and found abundant instances of a mirror reversal of syllables. Obviously, both studies are very old and provide only scarce insights into the way phonological deficit is externalised in the speech of Russian aphasics.

Finally, it is already clear from the previous theoretical elucidation that there have so far been no cross-syndrome comparisons of PWAs' performance on generic tasks with regard to the phonological errors they make. Moreover, no investigations can be found which see into the combined effect of discourse elicitation genre and task complexity on the monologic spoken output of aphasics. Considering these gaps, the present study purports to add new details to the picture by getting some of the raised questions answered, namely the ones about the uniformity versus heterogeneity of paraphasias across different types of aphasia, and the effect of discourse elicitation genre alongside task complexity on Russian-speaking PWAs' phonological output. Our findings are expected to generate both theoretical and clinical value in neurolinguistics and aphasiology as its major branch.

CHAPTER 3: METHODOLOGY

In a bid to resolve the research questions posed at the end of the introductory part, we have conducted an empirical, conclusion-oriented, exploratory, one-time study employing a predominantly quantitative methodological approach, with some admixture of a qualitative one. Our quantitative statistical analysis of the data has been both descriptive and inferential in nature, with the data in our group study being rather broadly described.

3.1. Participants

In our study, we have availed the benefit of employing the non-probability convenience sampling method for the inclusion of relevant elements of the population of interest. The choice of research design has been motivated by the limited entry hospitals have been allowing during the COVID-19 pandemic period. 18 individuals clinically diagnosed with aphasia of different types and degrees of severity have taken part in the present study: our sample consists of 8 efferent motor aphasics, 5 afferent motor aphasics, 3 sensorimotor aphasics, 1 acoustic-gnostic and 1 acoustic-mnestic aphasics. Among these, 4 participants have been diagnosed with mixed aphasia syndromes, with one of the two types of aphasia observed being considered dominant. Insofar as the degree of severity is concerned, the sample comprises 7 individuals with mild, 5 with moderate, and 6 with severe speech disturbances. Post onset times vary greatly: from 4 days after establishing diagnosis to as many as 28 years from the disease onset. It is of importance to underscore that the diagnoses have been confirmed by both a neurologist and a speech-language pathologist. The locus of the lesion has in all cases been determined by means of computerised tomography scanning.

The age of the participants ranges from 21 in the youngest PWA to 83 in the oldest. The average age is 61. 12 males and 6 females have taken part in the study, which makes the sample rather unbalanced in terms of gender. Nonetheless, it is our belief that this does not affect the sample representativeness in any adverse manner. Almost all participants, 15 to be more precise, are right-handed whereas only 3 of them are left-handed. Similarly, the overwhelming majority of the PWAs, 14 to be specific, have secondary-level education, with the oldest one of them having lower secondary education. The youngest person with aphasia representing our sample has been home-schooled due to his medical condition hindering his attending educational institutions. The remaining 3 participants have university degree. As for

linguistic composition, all but one study participant are born bilinguals. Some of them boast complementary passive knowledge of other languages, including German, Polish, Latvian, and English. The linguistic background of Participant 8 is limited to the Russian language for the reason of the woman being a citizen of the Russian Federation. The linguistic diversity by which our sample is marked can obviously be accounted for by the Republic of Belarus, the primary fieldwork arena, having a pronounced bilingual situation. Finally, it is worthy of note that auditory comprehension skills were spared in all cases. A more detailed description of the participants can be found in Appendix B. To get circumstantial information on each participant in isolation, the readers are encouraged to familiarise themselves with Appendix A.

3.2. Instruments

The current study has aimed at examining the phonological productive side of speech, for which reason the use of a high-quality recording device has been a methodological necessity.

With the goal of testing the earlier outlined hypotheses, we have availed the benefit of using a semi-structured personal interview approach and developed four picture-description tasks to provide to our aphasic participants. This method of data collection has been aimed at eliciting monologic spoken discourse which, as underlined by Stark and Fukuyama (2020), enables the researcher to "evaluate everyday speech while retaining some experimental constraint" as well as yields "cognitive-linguistic information not measured on typical standardised tests". Bryant et al. (2016) see discourse elicitation in aphasia as "an ecologically valid and comprehensive means" of figuring out which processes of the language system are affected and which ones are spared. Insofar as the usefulness of picture-description tasks for eliciting paraphasias is concerned, the researchers vary in their opinions, with the general trend being more towards positive. Some of them (Croot et al., 2012; Petroi et al., 2014) claim that, as compared to such tasks as reading, repetition, naming and verbal fluency, picture description, being a connected speech task, elicits fewer phonological paraphasias. By contrast, others (Dalton et al., 2018) find such tasks "ecologically valid" for the reason of their allowing to take a look at words belonging to different classes. As is the case lately, researchers studying aphasia view picture description as an increasingly "promising technique" for it allows to make assessments of semi-spontaneous speech and is administered in a quick and easy manner. Moreover, it can provide data about "multiple aspects of speech production" (Gordon, 2008; Vandenborre et al., 2018; Johansson-Malmeling et al., 2020).

Mueller et al. (2018) consider the method additionally advantageous in that it is "less intimidating for patients to complete than impairment-based assessments".

All of the four developed tasks have been meant to validly and reliably measure the constructs of our interest, i.e. phonological and neologistic paraphasias of various kinds produced at both segmental and metrical output levels by the participating PWAs, and intended to represent a particular discourse genre: cause-and-effect, problem-and-solution, narration/description, comparison-and-contrast. For each of them, we have picked 7 easy-to-understand and culturally-appropriate picture plots which, crucially, have been associated with differing degrees of complexity in terms of performance effort required. The plots within each task type have been presented in such order that the mental load involved in their processing by the brain has been expected to increase gradually, with a slight but vitally important digression: two picture plots belonging to each of the four genres have been presented first, with the genres following the above-specified order. The first 8 picture plots have then been followed by the remaining ones, with 5 plots of each genre being presented in an orderly fashion. Schematically, the order of presentation can be illustrated in this way: *2P(CE) + 2P(PS) + 2P(N/D) + 2P(CC) + 5P(CE) + 5P(PS) + 5P(N/D) + 5P(CC)* (here "P" stands for "plots", "CE" for "cause-and-effect", "PS" for "problem-and-solution", "N/D" for "narration/description", and "CC" for "comparison-and-contrast").

Prior to the experimental stage, the same 28 picture plots were presented to 10 individuals without any language deficit to make sure that the pictures were clear in what they showed. It was shown that all of the chosen pictures were clear, culturally-sensitive and inoffensive. More extensive information on the tasks can be found in Appendix C.

3.3. Procedure of Data Gathering and Ethical Considerations

In order to collect the data needed for carrying out the present study, we have visited the neurological department for stroke patients at several hospitals and rehabilitation centres (see Appendix A for the information on each participant). A number of participants have been interviewed at their homes. The eligible volunteers have obligatorily been explained the code of actions and rules as well as provided with the consent form prepared beforehand in the Russian language in the format most optimal for people with aphasia: font Verdana, size 16, line spacing 1.5, sufficient white space after each key point, core concepts in bold type and underlined (Dalemans et al., 2009). The form together with its English translation can be

found in Appendix D. It is crucial that the information from the consent form has been both "spoken out and presented on hard-copy print out" (Dalemans et al., 2009). The participants have been given time and opportunity to read through it, but for the majority of the PWAs oral explanations sufficed. Every effort has been made to ensure that the instructions were understood by every participant in the study.

In view of both the afore-said and the fact that our research has involved representatives of a vulnerable population, it is necessary to emphasise that the basic principles underlying the ethical conduct of research with human participants (i.e. the three principles established in "The Belmont Report" (1979): 1) respect for persons with its stress on the participant's autonomy, 2) beneficence, and 3) justice) have been carefully observed. The participants have either signed the consent form themselves or, in the event of physical immobility, have been represented by their caregivers who were asked to put their own signatures.

The participants' speech has been recorded, of which they were aware. They were not time-constrained since we had no interest in fluency of their speech. Short breaks were made whenever it was felt necessary by the PWAs. The level of fatigue was constantly controlled. All in all, there have been collected a total of 18 samples of aphasic speech, with their mean duration being 26 minutes, taking into account there were a few outliers that took over 35 minutes to complete. This amounts to 8 hours of aphasic speech. The complete background information was obtained at the very end of the session from the neurologist or the caregiver.

3.4. Preparing the Data for Analysis

Before embarking on our analysis, we have carefully logged the information gathered from the study participants. There have been created minute records of all the background facts relevant to the study being carried out, including every participant's gender, age, handedness, level of education, languages spoken, place of residence, impairment aetiology and lesion site, type and severity of aphasia, therapy received (both inpatient and rehabilitation treatment). These data have then been tabulated. The notes made during the sessions with regard to the general linguistic behaviour of the enrolled PWAs have been brought into order and thoroughly systematised. Representativeness of the resulting cohort of participants of the entire population of aphasics has been determined. The data have then been meticulously screened for accuracy. We have made certain that the responses elicited are legible, understandable and complete. Moreover, we have checked whether the sample size used has

sufficient statistical power. We tend to believe that 18 speech samples of decent duration yield a considerable amount of useful data to draw valid inferences from. Finally, the potential scientific value of the data has been predicted, and every effort has been made to ensure that the data will be maintained and stored securely and confidentially.

3.5. Procedure of Data Analysis

Content analysis which seemed to be the most rational choice of an analytical technique has allowed us to take a close look at the categories emerging from the data. 8 hours of recorded phrase-level speech have been transcribed and coded using the combination of the Jefferson Transcription System and the International Phonetic Alphabet one, with the latter being indispensable in noting down the erroneous productions detected (Valdois et al., 2012; Hamann et al., 2019; Fabbro, 2021). The phonological aspect of the language impairment has been examined within the frameworks of structuralist and non-linear phonology, which is to say that the obtained data have been evaluated at the levels of segmental and metrical information. Considering this distinction, hierarchical cluster analysis has been carried out.

The first group has been thought of to consist of neologisms along with paraphasias of various kinds, namely, sequential, or exchange, errors, which can be seen as instances of word-level metathesis; environment errors, which include intra-morphemic blends, inter-morphemic blends, and phrase-level metatheses; substitutions, which can be anticipatory, perseveratory, and of uncertain aetiology; additions, alternatively called insertions; omissions, which are also referred to as deletions, or simplifications; and sound distortions. The second group has comprised errors pertaining to the word stress pattern, number of syllables, and CV (consonant-vowel) structure. Finally, we have taken a careful account of some additional error types. These include phonological approximations, perseverations, semantic paraphasias, circumlocutions, intra-word breaks, false starts, self-corrections, word-search attempts, no-response errors, and cases of ascertaining output correctness.

To bring the elucidation to its logical end, it should be clarified that there has been conducted a nuanced quantitative and qualitative analysis of all the errors spotted. For each of the four performed types of tasks, total amounts of erroneous productions detected have been calculated for each of the levels tackled as well as all combined. Lastly, graphics and diagrams have been generated, the spotted tendencies have been interpreted, and descriptive alongside inferential analysis has been conducted.

CHAPTER 4: RESULTS AND DISCUSSION

Being a combined Results and Discussion section, this chapter reports the results of the data analysis outlined in the Methodology as well as evaluates and discusses the most prominent and relevant trends of those detected. Moreover, it compares our research results to the already existing body of scientific knowledge in the area and highlights their significance. The findings are presented and elaborated on in four parts, the first three being in accord with the research questions posed along with the hypotheses advanced and the fourth one serving to provide further valuable insights into the structural peculiarities of the production of phonological and neologistic paraphasias.

4.1. Research Question 1: Genre-specific or universal phonological error patterns

In this part, we present and discuss the findings with regard to the first research question raised: can there be found any correlation between the generic task type and the manifestations of the phonological deficit in aphasia? On assumption that the question is replied in the affirmative, we have striven to get to know whether the difference is of a qualitative, in which case tasks belonging to different genres elicit different categories of errors, or quantitative type, in which case some tasks merely elicit more errors than others. Our first hypothesis, i.e. Hypothesis 1, has held that each elicitation genre will be marked by quantitatively distinct error patterns.

When it comes to shedding light on the most important findings coming to the fore in our research on Question 1, Diagrams 1–4 in Appendix G are helpful in bringing the major trends to the reader's attention. The results of the study demonstrate that the overwhelming majority of the participants, 13 of them (Participants 1, 2, 3, 5, 6, 7, 8, 11, 12, 14, 15, 16 and 17) to be more precise, have found the N/D task type to be the most challenging at all the scrutinised levels taken together, which amounts to as much as 72% of the participating PWAs. The same task genre has been found to cause the greatest difficulty in most participants (55%) at the segmental level of production as well, when taken in isolation. The PS generic task type conspicuously ranks second in the number of elicited erroneous productions, both at all the levels in total and at the segmental one alone, with 4 (22%; Participants 4, 10, 13, 18) and 5 (28%; Participants 4, 10, 13, 17, 18) aphasics, respectively. The third place is taken by the CE elicitation genre which has been shown to draw forth comparatively more errors at the

segmental level (17%; Participants 9, 12, 15) than across all the levels (only 6%; Participant 9). The study results are indicative of that generates the smallest number of both phonological and neologistic paraphasias (in 55% of the PWAs; Participants 1, 2, 3, 4, 8, 12, 13, 15, 17, 18) alongside errors of all the examined categories (in 44% of the PWAs; Participants 1, 2, 3, 4, 12, 15, 17, 18). From the perspective of the genres that have been the easiest to deal with, at least if judging by the yardstick of error frequency, the CE tasks place second, though, being associated with quite widely differing proportions of the participants at all the levels (22%; Participants 5, 6, 14, 16) and at just the segmental one (39%; Participants 5, 6, 8, 11, 13, 14, 16). Interesting to note is the observation that with respect to the elicitation of the smallest number of segmental errors, the CC and CE genres boast practically equal participant proportions, 44% and 39%, respectively. Finally, the shares of the PWAs who have found the PS and N/D genres the least challenging look almost mirror-like if taken a look at all the levels together and at the segmental one only: while 3 (17%) participants (7, 9, 11) have made the smallest number of errors of all kinds in the PS tasks and only 1 (6%) participant (10) in the N/D tasks, the fewest paraphasias have been produced by 2 (11%) participants (9, 10) in the N/D genre and by only 1 (6%) participant (7) in the PS genre. The inference that we can make from this result outline is that there is an obvious suggestion of a rather strong correlation between the elicitation genre of the task performed and the observed quantitative patterns of errors. Insofar as the potential presence of any substantial difference in quality is concerned, our data points to its practical absence. This implies that the kinds of errors spotted have not really been different in the four genres. Some minor differences have been detected, but their number never reaches statistical significance. Thus, our results seem to reliably suggest only the presence of a robust correlation of a quantitative kind between the elicitation genre and the errors made, with the kinds of the latter not being contingent on the generic type of the tasks performed.

As we gradually embark on the discussion of the reported findings, we are obliged to position them within the existing body of literature. The very thing that makes the current study unique and ground-breaking, i.e. our dealing with the phonological side of speech elicited by various generic tasks, simultaneously contributes to that our results are not directly comparable to those of previous researchers on genre in aphasia. This can be explained by the fact that although many of them have demonstrated genre-specific differences at various levels of speech production, predominantly lexical and grammatical, micro- and

macrostructural, for all we know, none of them has been concerned with the phonological dimension. Therefore, we can apparently be in agreement only with their general claim that aphasic speech is affected by the discourse genre within which it is produced. One study is worth being referred to on its own: Stark and Fukuyama (2020), though they were studying microstructure, have found it to be most similar in tasks falling within the same genre of elicitation as well as essentially separable across genres. The researchers have also reported on the considerable variance per task within the group of aphasic speakers, which was most logically accounted for by aphasia type and severity. While our research is different with respect to the level of speech production scrutinised, its results point clearly to the trueness of the former observation: the quantitative patterns of phonological errors that we have found substantially support the idea of genre separability. Nevertheless, the latter claim cannot be fully supported since our results do not appear to demonstrate that PWAs diagnosed with a particular type of the language disorder find certain genres easier to deal with than PWAs having some other type of aphasia. The amount of erroneous productions and, to a lesser extent, as we will see in the second part of the chapter, their qualitative composition in the samples have differed among the participating individuals. Quite logically, the type of aphasia and its severity do play an important role here, yet, we tend to believe that this is not likely to be contingent on the elicitation genre. To boot, a variety of individual factors, including even personal preferences for the kinds of tasks found engaging to go through, cannot but affect the general picture of error patterns.

Thus, by and large, if approached from the cross-generic perspective, the claim that aphasia displays great heterogeneity in the ways it manifests itself is only somewhat supported by our data (Bates et al., 1991). Genre-specific differences of a quantitative kind seem to speak in favour of the register and genre theory advanced by Eggins and Martin (1991) as well as the ideas of Halliday (2004). Namely, it appears to be true that every level of discourse production is affected by the situation in which it occurs and the purpose it serves. Finally, it must be underlined that Bliss and Mccabe (2016) are in all likelihood right when contending that each discourse task relies on unique cognitive components, which is why, as we assume, genres vary even in terms of their quantitative manifestations on the phonological level of production.

Drawing a conclusion, we can say that Hypothesis 1 has been shown to be only half true. As is indicated by our results, each of the four examined elicitation genres is associated with

quantitatively different error patterns. However, our prediction about the bigger number of errors in the CE and PS genres and the smaller one in the N/D and CC ones due to the latter being supported by visual cues has not been borne out. Indeed, in the case of the N/D tasks, the reverse appears to be true. Meanwhile, the performance of the participants on the CC tasks, i.e. their generally making much fewer errors in these, points to that we have not been wrong in this prediction of ours.

Having covered everything important which pertains to Research Question 1 and Hypothesis 1, let us summarise our major findings in a nutshell:

- The narration/description genre of elicitation has been found to be the most error-prone at both the segmental level alone and all the levels taken together. This is the case with the PWAs diagnosed with different aphasia types and degrees of severity. Easier mental processing, bigger amounts of elicited data and more lax output control contribute to the genre bringing to light more erroneous productions.
- The comparison-and-contrast genre elicits the smallest number of errors. This is explained by the participants performing the CC tasks having visual cues to rely on in speech production. Moreover, the amount of output is not particularly big.
- The cause-and-effect and problem-and-solution genres find themselves somewhere in the middle since the CE and PS tasks elicit limited amounts of speech, are not marked by the presence of immediate pictorial support as well as are apparently more challenging in terms of mental processing.

4.2. Research Question 2: Effects of within-genre task complexity

As a starting point in this part, it should be stressed that we are not leaving the topic of genre behind but are instead focusing on each of the four examined genres in more detail. What we are interested in is how and if error patterns differ in plots belonging to one and the same genre, yet, being associated with various degrees of complexity in terms of their mental processing. Thus, the second research question that we have posed to ourselves is as follows: do phonological error patterns undergo any quantitative and/or qualitative changes with increasing complexity of the tasks within one elicitation genre? It seemed rather logical to hypothesise that an increase in within-genre task complexity would entail both quantitative and qualitative changes in the error composition, that is to say, it would lead both to an increase in the number of erroneous productions and to the appearance of errors belonging to

other types. We can assume that even if the intermediate picture plots do not differ much in terms of the amount and kinds of errors made on them, there must definitely be a clear disparity between the two outmost plots. It is important that we send an unambiguous message on the discussed matter: by no means do we assume any kind of intellectual deficiency on the part of our PWAs. Instead, our talking about the cognitive aspect of task processing merely points to our expectation that certain picture plots are associated with an individual's keeping in mind and, thus, mentally handling more alternatives at the same time, which may well lead to the activation of much more related nodes (Dell, 1985). As we know, the simultaneous activation of numerous affinitive nodes may inhibit making the correct choice of intended distinctive units which are different in distinct aphasia syndromes. To find out if we have been right in our assumptions, the reader is invited to acquaint himself or herself with our findings below.

It is necessary to point out that although the tables presenting the error composition at all the tackled levels have been created for every participant and, even more so, for every discourse genre performed by him or her, it would not be possible to put as many as 72 tables here. Not only would it render the chapter and paper cumbersome and hardly digestible, it would also probably make the reader get lost in details and by extension overlook the aggregate picture, thereby disabling him or her from finding the answer to Research Question 1. To alleviate the reader's burden and simultaneously keep the much revealing representativeness, we have chosen to provide 5 tables, one per aphasia syndrome. One such table shows the quantitative composition of erroneous productions elicited from one participant diagnosed with a particular type of the aphasic disorder within just one generic task. This can be justified by that the error patterns do not differ drastically across the genres if looked at from the perspective of within-genre task complexity, as will be reiterated later.

Tables 1–5 in Appendix F clearly demonstrate that the number of phonological errors produced by our PWAs having different types and severity degrees of the speech disorder at issue does not incrementally grow from the first to the last, i.e. the seventh, picture plot. The absence of any significative quantitative difference is observed not only at all the levels taken together, but also at the individual ones, i.e. segmental and metrical taken separately. This picture is in evidence in all the five aphasia syndromes which are marked by all the three degrees of severity. To substantiate this conclusion of ours, let us describe the broad trends for one of the participants here.

Participant 16 (see Table 1) suffering severe sensorimotor aphasia produces relatively fewer errors when dealing with the first three picture plots, as compared to the remaining ones. However, a quick glance at these three plots taken in isolation from all the others reveals not an expected increase in error frequency, but quite the contrary: the first cause-and-effect plot, i.e. “Withered plant”, which is believed by us to be the easiest in mental terms elicits a total number of 23 errors while the second plot, i.e. “Burnt pie”, and the third one, i.e. “Missing the bus”, bring to light 13 and 10 erroneous productions, respectively. Furthermore, the error ratio in the fifth plot, i.e. “Tooth decay”, and the seventh one, i.e. “Marine litter”, is extremely and tellingly contrastive: 76 versus 32.

Since we have been interested not only in potential quantitative changes, but also in qualitative ones, it makes sense for us to present 5 more tables for the same participants and generic tasks, with the only differences of their unveiling the qualitative error composition. We have put those most intriguing occurrences that will further be discussed in more detail in deep crimson. Let us now discuss the protruding trends in order to find the answer to the second part of Research Question 2. We have assumed that picture plots consuming more mental efforts for their processing will elicit some kinds of errors that cannot be found in mentally easier plots.

If looked at superficially, there can be spotted certain qualitative differences in the error patterns produced by Participant 16, a severe sensorimotor aphasic, while performing the cause-and-effect generic tasks. Yet, this difference vanishes when Table 6 is given a second glance. Perseveratory substitutions and substitutions of uncertain aetiology begin to surface only in the forth plot (“Slipping on the ice”), however, the former do not make recurrent appearance in the last two plots (“Flunker” and “Marine litter”) while the latter are absent in the fifth (“Tooth decay”) and sixth (“Flunker”) plots. For this reason, it would be wrong to assume that their occurrence is somehow contingent on the increasing task complexity. Moving right along, errors of the additive type are first found in the forth plot as well, yet, none of them is produced in the last plot. What is more, metrical errors involving increased number of syllables have only been spotted in the fifth and sixth picture plots, but their number is insignificant to make any strong claims. Lastly, semantic paraphasias are only present in one plot (“Tooth decay”) and, importantly, not the last. Based on this reasoning, we may conclude that they cannot be seen as pointing to any qualitative difference caused by task complexity. Interesting, though, is the fact that this very plot has elicited the biggest number

of errors within the specified genre. Therefore, this remarkable occurrence of semantic paraphasias as well as our observing the greatest variety of error categories in the two plots ("Slipping on the ice" and "Tooth decay") which have proved to be the most error-laden for this participant may well indicate that there is some qualitative change induced by task complexity, if we assume that our perception of the latter does not coincide with the individual perception of Participant 16.

It is important to stress that situating the obtained findings against the previous theory and research is a difficult needle to thread because, as far as we are aware, there have been no attempts to examine the quantitative and qualitative effects of within-genre task complexity on the phonological errors produced by people with aphasia. The only scientific investigation to which we can rather tenuously relate our observations is the one conducted by Bliss and Mccabe (2016). Although the scholars talk specifically about distinct discourse genres, as opposed to tasks belonging to the same genre, they underscore that discourse microstructure, which was the focus of their research interest, is most similar among tasks within the same generic type. Such similarity might well be the case in our study, suggesting that the number and kinds of elicited phonological errors do not differ all that much across tasks falling within the same discourse genre. What we have found is actually quite diverging from this bold presumption. The spotted phonological errors do differ in quantity depending on the picture plot, even though there has not been observed the expected uptrend pattern. Even more so, some plots have been shown to boast a greater diversity of error categories while others a smaller one in the way that did not directly coincide with our expectations.

Since we have not managed to find the immediate evidence for Hypothesis 2, it makes sense to believe that every individual's perception of task complexity can be drastically different from that of other people, both neurally healthy and aphasic. The results by and large demonstrate that more kinds of errors appear on the more error-rich plots. There are, one must admit, some deviations which exhibit the biggest variety of error categories not exactly on the plots eliciting the greatest number of errors. For these there seems to be no rationale in our data, but they are in the minority, and, crucially, they usually pertain to the plots that come second or third from the error frequency perspective. Thus, the bottom line here is that one cannot rule out the possibility that every PWA perceives as more mentally strenuous namely those picture plots on which he or she has made most errors of the most diverse categories

rather than those we have considered to be the most complex to process. Significantly, then, the plots may follow an idiosyncratic order in each case.

We can now effectuate a conclusion and answer Research Question 2 more explicitly by saying that error patterns do seem to undergo both quantitative and, to a less noticeable extent, qualitative changes as complexity of plots within one and the same discourse elicitation genre increases. However, the degree of task complexity is in all likelihood a matter of individual perception, which means that the order of increasing mental complexity in which we as researchers put the plots within one genre is by no means a touchstone. Consequently, Hypothesis 2 can only be said to be true providing that we take into account the individual variability in the perception of task complexity.

4.3. Research Question 3: Syndrome-specific or universal manifestations of the phonological deficit in aphasia

In this section, we are setting sights on answering our third and last research question: does the phonological deficit in aphasia manifest itself in quantitatively and qualitatively different ways in various types of the considered speech disorder? Otherwise stated, do distinct types of aphasia differ with respect to the number of erroneous productions as well as the diversity of the surfacing error categories? Insofar as the latter is tackled, we are also more broadly interested in the levels of phonological processing that are most strongly affected by aphasia. Our third hypothesis holds that there is indeed a correlation between the types of errors produced and individual aphasia syndromes: the phonological deficit is predicted to find expression in quantitatively and qualitatively different error patterns across the various aphasic syndromes under examination, regardless of the type of task being performed. We believe that we hereby make an educated guess since the preponderance of cross-group empirical investigations of phonological paraphasias which have been deliberated on in the review of literature points to a perceptible difference in the patterns of erroneous productions associated with different types of the aphasic disturbance (Trost & Canter, 1974; Butterworth, 1979, 1981; Guyard et al., 1981; MacNeillage, 1982; Nespoulous et al., 1982b; Monoi et al., 1983; Nespoulous et al., 1984; Kohn, 1984, 1985; Canter et al., 1985; Ellis et al., 1985, 1987; Nespoulous et al., 1987; Dalton et al., 2018). As it has been underscored, although the findings in the area are to a certain extent controversial (for an antagonistic view, see Blumstein, 1973; Berg, 2005; Kurowski & Blumstein, 2016), which is at least in part

dependent on the method of eliciting data, the dominant view in contemporary neurolinguistics is that of appreciable syndrome-specificity, or heterogeneity, of the phonological deficit manifestations (Bates et al., 1991). Taking this into account, it has seemed more rational to take namely this stand as our departure point in hypothesising.

Before we go ahead with presenting our findings statistically and discussing them critically, trying to position them within the cumulus of previous research studies, let us remind the reader that our sample of 18 individuals includes 1 PWA suffering acoustic-gnostic aphasia (Participant 1), 1 PWA diagnosed with acoustic-mnestic aphasia marked by certain elements of efferent motor one (Participant 8), 3 PWAs with sensorimotor aphasia (Participants 6, 9 and 16), 5 PWA with afferent motor aphasia (Participants 2, 5, 10, 14 and 18), and 8 PWAs having efferent motor aphasia (Participants 3, 4, 7, 11, 12, 13, 15 and 17), with three of them exhibiting mixed symptomatic pictures. It is also worth pointing out that we will cover the topic in the following manner. First, within-syndrome comparisons will be made, which means that we will try to get an insight into how similar or different the error patterns elicited from the participants having the same diagnosis are. In so doing, we will shed light on the groups of sensorimotor, afferent motor and efferent motor aphasics taken in isolation. Participant 1, an acoustic-gnostic PWA, and Participant 8, an acoustic-mnestic PWA, are stand-alone cases, for which reason they will be kept rested for a while and discussed thereafter. Following within-syndrome comparisons, across-syndrome ones will be drawn, whereby all the five types of aphasia represented in our sample will be tackled together. This will enable us to determine whether our data provide support to the earlier cross-group studies.

As Tables 11–13 in Appendix F clearly indicate, Participants 6, 9 and 16 have had in common the relative preservation of the metrical-level processing, with the produced errors involving almost exclusively changes of the CV structure and the number of syllables. However, there have been spotted noticeable quantitative differences at the metrical level among the individuals. Furthermore, the shares of decreased versus increased syllabic numbers have been demonstrated to differ among these PWAs. Insofar as the distribution of segmental-level and additional error types is concerned, there has not been found any clear-cut touchpoint among the participants: while segmental errors have been the most numerous category for two of the three PWAs, one aphasic has made errors of additional types most of the time. Importantly, whereas the qualitative error composition at these levels has been

similar among the participants, the error frequency patterns have been shown to vary between Participant 9, on the one hand, and Participants 6 and 16, on the other hand. Therefore, one can say that there is some degree of within-syndrome variation with respect to both types and numbers of the produced errors in the sensorimotor group. Luria does not distinguish this type of aphasia as a separate one in his classification, for which reason it is logical to assume that sensorimotor aphasia will combine the features of acoustic-gnostic aphasia, also known as sensory aphasia, and two motor aphasias, i.e. afferent and efferent, thus, touching on the auditory and sensory secondary zones of Block II as well as the motor secondary zone of Block III. From the point of view of sensory disturbance, there are expected to be non-responsive substitutions and rather fluent speech while from the perspective of motor deficit, there should be abundant phonological paraphasias, unsuccessful phonological approximations and perseverations. Apart from perseveratory productions, disrupted pronunciation of words is another trait which generally marks the efferent motor aphasic speech. Now, what we have observed largely falls under this description: segmental errors, of which phonological paraphasias constitute a hefty share since they only do not include neologistic productions, have been among the most frequent; in a similar fashion, approximations and perseverations have also been abundant, with the former predictably yielding poor returns. Moreover, substitutions have invariably been the second most numerous error category at the segmental level. Nonetheless, intra-word breaks typical of severe motor aphasias have taken a heavy toll on the pace of speech which was far from fluent in all the three cases. Lastly, interest-provoking is that lack of kinaesthetic feedback about the performed articulatory movements cannot be claimed with confidence in this group of ours because, on the one hand, it has found its reflection in the relative rarity of self-corrections, but, on the other hand, phonological approximations assuredly point to the participants' awareness of the errors made.

We will now proceed with the elucidation of erroneous productions observed in the group of our afferent motor aphasics. Participants 2, 5, 10, 14 and 18 have had different degrees of disorder severity, from mild to severe, and post onset times ranging between just 13 days and well over 12 years from the disease onset. More detailed information on the participants' background can be found in Appendix A while Tables 14–18 in Appendix F offer insight into which error categories have surfaced more often as compared to others in each PWA's speech sample. Our findings for the group can be summarised as follows. An important feature all the

five PWAs share is that the segmental level has been demonstrated to be the most phonologically deficient, with the numbers of segmental errors, though, differing widely among the participants. This has been explained by the individual propensity to generate large or small amounts of output when describing things. If not for neologisms which exhibit drastically different quantitive patterns of occurrence in the five samples, the segmental errors could be said to be ordered by frequency in the following manner: omissions, substitutions, sound distortions and additions, at least for the overwhelming majority of our PWAs. Furthermore, the former two error types have been found to mainly involve consonantal phonemes while insertions have been shown to involve equal shares of consonants and vowels. From the point of view of contextual motivation, substitutions have most of the time had either an uncertain source or been perseveratory in nature. When it comes to the metrical-level errors and those belonging to additional error categories, it has been observed that three of the afferent motor aphasics have made the second largest number of erroneous productions at the metrical level, with both CV structure and syllabic number errors being present in decent amounts, whereas two of the PWAs have produced more errors of additional types. Insofar as the latter are concerned, it is indicative, according to our reckoning, that there has not been detected any discernible quantitative and qualitative pattern of error distribution. Thus, while there are certain similarities in the scrutinised samples, especially at the segmental level, points of dissimilitude must not be overlooked. Rounding up our elaboration on the afferent motor aphasia group, it is worth comparing our data to what Luria proposes to be the case for the syndrome under consideration. In accord with the scholar, the most prominent symptomatic features of afferent motor aphasia which affects the sensory secondary zone of Block II include phonological paraphasias and approximations. As for the former, we can say for sure that in our group of afferent aphasics, the segmental errors, most of which are phonological paraphasias, have made up the swingeing majority of all the erroneous productions. So far as the latter is concerned, it must be admitted that although phonological approximations were present in all the five samples, their number has not always been great even in the speech of those Participants, i.e. 5 and 10, for whom they were the most voluminous error category among the additional ones. On top of that, approximations have been practically absent from the sample of Participant 18. Therefore, this latter feature cannot really be considered as defining in our study.

Our last within-syndrome comparison deals with the group of efferent motor aphasics which is the most numerous. There are 8 individuals with this diagnosis involved in our research — Participants 3, 4, 7, 11, 12, 13, 15 and 17. Five of these PWAs have a mild form of the language disorder, two of them suffer a moderate one, and one person — severe. The post onset times vary wildly from only 4 days to as many as 28 years from the disease incursion. More detailed background information on each participant can be found in Appendix A. Just like in the previous two within-syndrome comparisons, we have added Tables 19–26 to Appendix F in order to provide our reader with a more fit-for-purpose representation of the detected error patterns. The most important points that have come to the fore are presented further. First, there has been spotted a clear and equal division of the participants into two groups from the perspective of the phonological production level that was found the most strongly affected: segmental-level errors have been most frequently made by exactly half of the efferent motor PWAs whereas additional error types have been most often produced by the other half. The metrical level has been demonstrated to be the least severely disturbed for the overwhelming majority of the participants. Moreover, it is at this level that the most regular qualitative pattern of error distribution has been found. On balance, the qualitative composition of the eight samples has been very much similar, but their ordering in terms of occurrence frequency has varied considerably. Half of the participants have had in common that their most numerous segmental-level error type was represented by substitutions which demonstrated a marked tendency to be consonantal and unmotivated by the context. The other half have most often produced omissions, predominantly consonantal as well. Additions have most of the time been balanced in terms of inserted phonemes, but not really common in our samples. Neologisms, despite their being present in the speech of all efferent motor aphasics, have drastically differed in numbers across the samples. There has been found even less regularity with regard to error frequency patterns among the additional error categories, even though the error compositions have been qualitatively resemblant. Lastly, the quantitative picture has been shown to differ a lot among the aphasics both at a very general level of all the error groups and within each of the levels taken in isolation.

Alexander Luria characterises this type of aphasia as affecting the motor secondary zone of Block III, which also includes Broca's area. As its most common linguistic symptom, the scholar names perseverations that arise from a person's inability to change the position of articulatory organs so as to produce a new phoneme. In contrast to this, our results show that

despite perseverations being very common in some PWAs (but, crucially, not in others), they have not even once been found the most numerous category among the additional error types. Furthermore, our samples have obviously contained a wide variety of different error types, even those that are not conventionally seen as symptomatic of efferent motor aphasia by Luria.

Before we will make a general across-syndrome comparison and arrive at a definite conclusion, thus, answering our third research question, we should shed light on the two types of the language disorder that have not yet been discussed. We will begin with the sample of Participant 1 diagnosed with acoustic-gnostic, or sensory, aphasia of a mild form. The sample was obtained from him just 18 days after the disease onset. The reader is encouraged to turn to Appendix A to get deeper insights into the PWA's background. Table 27 in Appendix F reports on his erroneous productions in the manner best suited for our current purpose.

Participant 1 has experienced the most serious difficulties at the level of segments where he has produced a total number of 264 errors. As compared to this, the PWA has generated almost three times as few metrical-level errors and over six and a half times as few errors of additional types. At the segmental level, omissions have been found the most numerous group, with those that are consonantal in nature being preponderant. Substitutions have run second, with the prevalence of contextually unmotivated consonantal ones. Neologisms, sound distortions and additions have also been quite frequent, with the latter error type tending to involve consonant phonemes more often than vowel ones. The number of environment errors has never reached statistical significance in the considered sample. The participant has been shown to alter the CV structure most of the time when it comes to the metrical level. Changes in the number of syllables have been present in a decent amount as well, with the overwhelming majority of them involving decreased syllabic number. Among the additional error types, word search attempts and phonological approximations have been detected in most appreciable numbers. Last but not least, it should be stressed that, quite different from what Luria names as the major linguistic manifestations of the aphasia syndrome under examination, substitutions have only taken second place, judged by the frequency of their occurrence in the sample, with omissions being the most numerous segmental error category.

Our last PWA on whose performance we will report is Participant 8 having moderate acoustic-mnestic aphasia with the elements of efferent motor one. The post onset time in her

case was 4 years and 9 months. Further information on the participant's background can be found in Appendix A. Table 28 in Appendix F offers a detailed insight into the quantitative and qualitative patterns of elicited errors. It has been found that the impressive majority of errors produced by Participant 8 belong to additional types: there have been 648 of them in total. As compared to this, the number of segmental-level errors has been 9 times smaller while that of metrical-level ones has been 18 and a half times smaller. Extremely frequent among the additionally considered error types have been word search attempts and phonological approximations. Other categories with noticeable error amounts include false starts, perseverations and cases of ascertaining output correctness. At the level of segments, the most copious error type has been that of substitutions which were produced in an average number of 7,25 per generic task. There have been slightly fewer omissions in the sample, i.e. 5,5 deletion errors on average. Additions and neologisms which came third and forth have not been plenty whereas sound distortions have not even reached the statistical significance threshold in terms of their quantity. Noteworthy, errors of the additive kind have been almost exclusively consonantal in nature. Finally, when it comes to the metrical level, Participant 8 has tended to change the consonant-vowel structure comparatively more often than the number of syllables.

In accordance with Luria's description, acoustic-mnestic aphasia impinges upon the medial zones of the left temporal lobe of Block II and is marked by the presence of paraphasias, especially of the exchange-error type, which is primarily accounted for by PWAs' inability to activate a correct word from the long-term memory. What we observe in the case of Participant 8 is the result of her trying to restrain the output so as to consciously avoid incorrect word options. This translates to a relatively small number of segmental-level errors of which paraphasias constitute the bulk. Instead, attempts at finding right lexical units paired with efforts to come close to their right phonological shape by means of approximations are present in ample quantities. Rather frequent occurrence of other additional error types such as false starts, semantic paraphasias and circumlocutions are equally indicative of the memory retrieval problems experienced by the PWA. Perseverations are symptomatic of efferent motor aphasia with the elements of which the individual has been diagnosed. By ascertaining output correctness, Participant 8 tries to commit the targets to memory in a bid to remember them for future reference. Self-corrections point to the aphasic's awareness of her language deficit. Finally, it is of importance to note that neither environmental nor sequential errors have been

detected in the considered sample, therefore, there is no reasonable basis for speaking about exchange errors in the case of Participant 8.

At this point, we will bounce over to the discussion of potential differences and similarities among the five types of aphasia represented in our study.

We have compared the syndromes in terms of each individual level of phonological production. The segmental level has been found to be the most strongly affected for two of the three sensorimotor PWAs. Crucially, while their qualitative patterns of erroneous productions have largely been similar, the same does not apply to the quantitative patterns of error distribution in their samples. Afferent motor aphasics demonstrate the identical tendency towards sharing mostly the same error categories with each other, which are, though, represented variously in numerical terms among the individuals. The samples obtained from the participants with this diagnosis have also displayed a certain degree of order regularity, notably, a stronger and more telling one as compared to the above-considered aphasia type, for the number of PWAs in this group has been bigger. In the efferent motor group, the level of segments has been found the most severely disturbed for half of the participants only. Just like in the case of the previous two syndromes, the qualitative composition of errors has been similar throughout the samples, which means that the same error categories have been present in the speech of all efferent motor aphasics. Nevertheless, in distinction from the earlier discussed types of aphasia, there has been no clear ordering of these categories in terms of their occurrence frequency: for half of the PWAs, substitutions have been the most error-rich group whereas for the other half, omissions have been the most common type. Our acoustic-gnostic PWA has experienced the biggest difficulties with the segmental level, by analogy with all the afferent motor aphasics, the majority of sensorimotor ones and half of the efferent motor ones. As opposed to the majority of sensorimotor PWAs, all the afferent motor PWAs, half of the efferent motor PWAs, and our one and only acoustic-gnostic individual, the segmental level has only been the second most strongly affected by the phonological deficit in acoustic-mnestic aphasia. Before we proceed with the illumination of the next level, it is prudent to comment on neologisms, which have been in focus in our research, separately. Across all the five aphasia syndromes, though present, neologistic paraphasias have exhibited oftentimes drastically different quantitative patters as well as occupied different places in frequency orderings. For this reason, this error type cannot be considered a distinctive feature of one particular aphasia syndrome.

Now, insofar as the metrical level is concerned, it has been relatively preserved in the sensorimotor group in which the participants have nearly always changed the consonant-vowel structure or altered the syllabic number. Importantly, the shares of omitted versus added syllables have differed substantially among the group members. As opposed to the relative preservation of the metrical level in the samples of sensorimotor aphasics, this very level has been the second most strongly affected for the majority of afferent motor PWAs, namely three of them. One point of similarity between the previously considered type of aphasia and this comes down to that there have almost exclusively been only CV structure and syllabic number errors. What the afferent motor group additionally shares with the sensorimotor one is that there have not been detected any discernible regularity in the quantitative and qualitative patterns of error distribution. Much as for the sensorimotor aphasia syndrome, the metrical level has been found to be the least severely disturbed for efferent motor aphasics. What makes this group special so far, though, is that there has been spotted the most regular qualitative pattern of error distribution, i.e. the number of omitted syllables has invariably been greater than that of added syllables among all the five participants. The quantitative picture of erroneous productions has still been widely differing across the samples, which is coincident with our observations for the two former aphasia types. The metrical level has been the second most voluminous with respect to the number of errors produced by our acoustic-gnostic PWA, which places him in close quarters with the afferent motor aphasics. For our one and only acoustic-mnestic PWA, the level has ranked third, thus, being the most preserved one. This is equable to the sensorimotor and efferent motor groups.

Last but not least, let us give consideration to the additional error types scrutinised in our study. Only one sensorimotor aphasic has made the greatest number of such errors, as opposed to the segmental and metrical ones. Although the error categories have been more or less the same among the three PWAs in this group, their quantitative distribution patterns have been different. In contrast to the sensorimotor aphasics, additional categories of erroneous productions have not been found the most error-rich for any of the afferent motor aphasics. In a fashion similar to that observed for the sensorimotor aphasics, there have been spotted no salient quantitative and qualitative error patterns. By contrast, half of the efferent motor PWAs have had additional error types as the most strongly affected. Even though the error categories represented have been much similar, there has been found no clear ordering of these in terms of their occurrence frequency. There has been even less regularity in this, as compared to what

we have had for the afferent motor participants. Despite the resemblance of qualitative composition, the number of errors belonging to additional types has varied considerably among the aphasics within the group, which is something characteristic of all the aphasia syndromes. Our acoustic-gnostic aphasic has been the only one for whom the additional categories have been the poorest in erroneous productions. In distinction from him, our acoustic-mnestic PWA has had the biggest number of such errors, just like half of the efferent motor aphasics.

A meticulous consideration of the differences and similarities among the various aphasia syndromes demonstrates that while there can be detected noticeable dissemblances in the way the disorder manifests itself in these, they still cannot serve as a reliable basis for clear delineation between one type of aphasia and another. This can be explained by the fact that the majority of features are shared by at least two groups of PWAs in our study. Moreover, while some distinct peculiarities surface in the productions of the PWAs who are the only representatives of a particular aphasia type, we cannot take these idiosyncrasies as seriously as we would have if there had been a whole group of individuals demonstrating the same patterns. Within-syndrome variation which is rather significant also contributes to our difficulty in providing a clear demarcation for the analysed aphasia types. Therefore, it seems that the most logical conclusion to be drawn from our discussion is that the deficit manifestations at the phonological production level render not that much assistance in discriminating the various syndromes we have taken a look at.

Having compared all the five types of the language disorder under scrutiny and reached a conclusion regarding the possibility of their differentiation exclusively at the level of phonology, it is necessary to locate our findings within the existing body of literature, especially those cross-group studies that our literature review gives an account of. What we have found appears to be to a decent degree in line with Blumstein (1973) who stressed the universal nature of paraphasias across different types of aphasia and focused on substitution errors of the paradigmatic axis. In our study, this error type has been shown to be predominantly consonantal for all the five types of aphasia. Although there has been a difference among the syndromes as to whether the substitutions generated by the respective PWAs were contextually unmotivated or perseveratory, there have always been several aphasia groups sharing the same kind of substitutions. It is not unthinkable that the concurrence of results in our research and that of Blumstein could be contingent on the chosen

method of elicitation, i.e. spontaneous speech, which was subjected to criticism by Kohn for a number of reasons. However, our study, as opposed to Blumstein's work, has examined both the level of single words and the phrasal level, thereby factoring the context in.

Kohn's findings (1984, 1985) are worth to be compared to ours as well since this scholar is perhaps the most influential and cited among those who have advocated for the idea that phonological paraphasias can help distinguish different types of aphasia. Other researchers include Trost and Canter (1974); Butterworth (1979, 1981); Guyard et al. (1981); MacNeillage (1982); Nespoulous et al. (1982b); Monoi et al. (1983); Nespoulous et al. (1984); Canter et al. (1985); Ellis, Miller and Sin (1985, 1987); Nespoulous et al. (1987); Dalton et al. (2018). Kohn has discussed, in particular, Broca's, Wernicke's and conduction aphasic disorders. It is worth reminding the reader that the scholar has established the presence of a phonetic disturbance in Broca's aphasia, a phonological disturbance in Wernicke's aphasia, and a phonemic disturbance in conduction aphasia. It is rather challenging to find direct correspondences between these classificatory types of aphasia and those that we have scrutinised, with the latter being classified in accord with Luria's framework of the dynamic localisation of function. This implies that it is not the lesion site that is in focus. Thus, our acoustic-gnostic, or sensory, aphasia which has to do with phoneme discrimination and selection difficulties corresponds to Wernicke's aphasia more or less clearly. Acoustic-mnestic aphasia is close to anomia in Bostonian classification, yet, anomia is to an extent broader, involving not only word form but also lemma selection. The situation is even more complicated with afferent motor aphasia which results in problems with articuleme selection and which is covered by Broca's and mixed anterior aphasias. It goes without saying that Broca's aphasia is wider in scope, additionally affecting motor programming, syntactic organisation and even verbal planning to a certain degree. Tellingly, efferent motor aphasia is associated with the disturbance of motor programming in the first place as well as syntactic organisation and verbal planning, but it does not have any direct impact on articulation patterns. This means that efferent motor aphasia can also be put into correspondence with Broca's aphasia, though, the former is narrower with regard to its range of influence. Finally, sensorimotor aphasia which combines the symptoms of motor and sensory syndromes is extremely hard to locate within the neoclassical framework in principle. This leaves us only with afferent and efferent motor aphasias alongside acoustic-gnostic one to be elucidated with regard to Kohn's findings.

Logic suggests that the two motor types of aphasia should be marked by the PWAs' inability to recode phonemic strings in a proper way. They should have preserved access to phonemic and syllabic structures of target words as well as available articulatory configurations (this at least in efferent motor aphasia). It is the transition between the latter that is disturbed in efferent motor aphasics. The integration of context-sensitive phonological information is most commonly problematic for both syndromes. Notably, from the point of view of a schematic model of phonological production in neurally healthy individuals (Shattuck-Hufnagel, 1979; Kohn, 1985), the phonetic disturbance is associated with the third and latest of the three successive stages one goes through when producing a word. To find out the truth, we have to take a look at the changes involving non-distinctive features, and failures in coarticulatory adjustments, the latter being applicable only to efferent motor aphasia. Now, we have classified sound changes that do not lead to the production of a completely different phoneme as sound distortions. In the case of efferent motor PWAs, we can see that the overwhelming majority of samples contain sound distortions in more or less adequate amounts, it is only in the speech of Participant 12 that errors of this type have not reached the statistical threshold, i.e. 1,5 sound distortions on average per generic task. Omissions and additions may lend evidence to the adjustments of articulation taking place. Together with sound distortions, this is in tune with Keller's Gesture Reduction Hypothesis (1984). In all but one sample, i.e. that of Participant 15, within the efferent motor aphasia group, omissions have been either the most or second most numerous type at the segmental level. Additions have also been present in all cases, but in far smaller quantities. This may well speak in favour of the strongly pronounced phonetic deficit in efferent motor PWAs. However, as has become clear from this Results and Discussion section, PWAs diagnosed with other types of aphasia do have the same error categories represented in their speech, for which reason it is hard to draw a definitive conclusion. We can also consider whether the syllabic structure has been largely preserved in the considered group of aphasics. It should be put in remembrance that in the majority of our efferent motor participants, six of them to be more precise, the metrical level has been the least deficient. However, it is only in one sample, that of Participant 15, that CV structure and syllabic number errors have been statistically insignificant. For the rest of the group members, the amounts of metrical-level changes have been rather appreciable, suffice it to mention that Participant 11 has made a staggering average number of 36 CV structure changes and 9,5 alterations of the number of syllables. All of this is not at all

supportive of the presence of merely phonetic disturbance in efferent motor aphasics. Notably, the fact that some diagnoses in this group were mixed could have contributed to such an intricate picture.

In all the samples of our afferent motor aphasics, the frequency of sound distortions has been rather decent, ranging between 4 and 12,25 such errors on average per task. Omissions and additions have also been numerous, ranging between average amounts of 7,75 and 41,25 as well as between those of 3 and 11,5 erroneous productions per one generic task. Despite this quite convincing evidence, the syllabic CV structure and number have been more than noticeably altered. This discrepancy can probably be accounted for by the absence of immediate correspondence between Broca's aphasia and afferent motor one.

Since acoustic-gnostic aphasia can be placed in correspondence with Wernicke's aphasia, it must be easier to check this part of Kohn's theorising. The scholar suggests the existence of a phonological disturbance in this syndrome, which means that the access to the stored lexical phonological representations is disrupted. This leads to errors stemming from incomplete or inaccurate information about the phonemes constituting an intended word as well as its consonant-vowel structure. Having this in mind, we should logically give the segmental and metrical level deficiencies a second glance. Substitutions, additions and omissions that may signal about the underlying phonological deficit are tellingly abundant, with the level of segments being the most strongly affected one. Given the lack of necessary information about the phonemes within a target, it makes perfect sense that one replaces the expected phonemes with others, adds new ones or omits some. The plentitude of CV structure errors, i.e. 25,25 erroneous productions on average per task, additionally supports the idea of Kohn with regard to Wernicke's aphasia.

It can be concluded that while our sample of acoustic-gnostic aphasic provides enough support for Kohn's hypothesis holding that each type of aphasia is associated with a different underlying deficit, those of afferent and efferent motor aphasics are only partially supportive, which may well be dependent on the rationale for the two classifications, that adhered to by Kohn, i.e. the neoclassical classification, and that employed in our research, i.e. the dynamic localisation of function one. This has conditioned the absence of direct correspondences between the considered syndromes. Lastly, before we move on, it is worth emphasising that although afferent motor aphasia used to be treated as equivalent to conduction aphasia (Goldstein, 1948; Hecaen & Albert, 1978), it has been shown that these two syndromes

should be viewed as separate (Lhermitte et al., 1980; Valdois et al., 1988). It is for this reason we do not equate them in this discussion of ours.

Now, speaking generally, our findings suggest that at least as far as the level of phonological production is concerned, there is a decent amount of inter-speaker variation within one and the same aphasia syndrome while the samples obtained from PWAs having different diagnoses do not seem to have any clear demarcation lines among them. In light of this, the idea of Bates et al. (1991) that it is very natural to expect aphasia to display high heterogeneity in its manifestations, given the diversity of lesion loci and the variety of spoken languages, definitely has a resonance. Of course, there is a whole range of different factors at play which have the potential to bring about multiple idiosyncrasies. It must be admitted that our population of aphasics has been heterogenous in many respects, e.g., age, gender, level of education, languages spoken, post onset times, rehabilitation treatment and speech therapy sessions provided, etc. Just like normal speakers produce slips of the tongue which involve various types of errors, it may well be the case with aphasics. If it is really so, then the Continuity Hypothesis may be true, and these may be different degrees of processing efficiency that play a role. What is more, Berg (2005) might have the point when contending that one cannot rely on phonological paraphasias in distinguishing different types of the speech disorder at issue. The reader should be reminded that, according to the scholar, the processing problems of PWAs belonging to various aphasia types seem to "converge on the phonological level". They result from the "weak activation of structural nodes" which is not properly transmitted among them. Therefore, there is a great deal of homogeneity in the ways aphasia is manifest across languages and syndromes. As for our study, if not homogeneity, but discernible lack of strong-pronounced heterogeneity, has indeed been observed. The last thing, we may buy to some extent into Kurowski and Blumstein's (2016) belief that paraphasic errors are products of a breakdown in the common mechanism, rather than of correct implementation of wrongly selected phonemes. The researchers put forth the idea that the target gets activated simultaneously with the competing units which leads to the preservation of phonetic features of both. As plausible as it may seem, our study lends no direct evidence to this proposition.

Finally, observing that the theoretical assumptions about node activation seemingly hold up, we consider it quite conceivable that our findings best fit in with the models of parallel processing, especially Dell's (1985) connectionist model of speech production, which provide

for feedback correction mechanisms. This explains at least partially why PWAs having different aphasia syndromes make errors belonging to various categories, even those that are not usually associated with their particular types of the language disorder, as well as why there cannot be drawn any clear dividing line between one syndrome and another.

We will round up this section by sending a clear message to the reader about our findings. In defiance of all expectations, Hypothesis 3, which had it that the phonological deficit would be manifest differently, in both quantitative and qualitative ways, across the various aphasic syndromes under examination, has not been borne out. As has been demonstrated, there seems to be no strong correlation between the types of phonological errors produced by PWAs and their respective aphasia syndromes. It is difficult to distinguish one aphasia type from another only on the basis of phonology. Interestingly, though, there has been found appreciable within-syndrome variation in some, but not all, aspects. The spotted idiosyncrasies in the quantitative and qualitative patterns of error distribution clearly point to that the currently accepted and widely relied on symptomatology is not as black and white as it may seem. Idiosyncrasies appear to prevail and distort the across-syndrome comparative picture, preventing us from unambiguously delineating the syndromes. We have adhered to the dynamic localisation of function framework which is premised on the view of speech as one of the complex functional systems that rely on different brain regions being jointly activated. In part due to this, the lack of clear across-syndrome heterogeneity with the simultaneous presence of inter-speaker variation becomes less puzzling. Nonetheless, there are still some things, in particular, those of the structural character, that should and will be considered in the next and last section of this chapter so that we could arrive at a more complete picture.

4.4. Other interesting findings from testing the previous researchers' hypotheses

This last section of the Results and Discussion chapter serves to provide the reader with a number of interest-provoking insights primarily into the structural nature of phonological paraphasias as well as the production mechanism of neologistic ones. This means that we will devote all our attention to the segmental level only. The findings on phonological paraphasias will be presented in two parts, with one of them elaborating on the detected monopositional errors and the other commenting on the spotted bipositional errors. Furthermore, the major structural hypotheses illuminated in the review of literature will also be tested. Neologisms will be reported on separately afterwards.

Let us begin our illumination of the monopositional errors with refreshing our memory on that a considerable number of researchers in aphasiology have claimed that substitutions constitute the dominant type of phonological errors in the category, this being applicable to both fluent and non-fluent aphasics speaking a variety of mother tongues (Blumstein, 1973; Hatfield & Walton, 1975; Shewan, 1980; Ardila et al., 1989; Ferreres, 1990; Moen, 1993; Romani & Calabrese, 1998; Allerbeck, 2000; Caramazza et al., 2000; Caramazza & Chialant, 2000; Goldman et al., 2001; Romani et al., 2002). Their studies have additionally dragged to light that the monopositional erroneous productions tend to appear in the following order ranked by occurrence frequency: substitutions, omissions, and additions, regardless of the syndrome. The only concession which is made when it comes to syndrome specificity boils down to that non-fluent and fluent aphasics differ merely in that the latter PWAs generally have more balanced proportions of omissions and additions.

At this point, before we present the relevant statistical data on the issue raised, it is useful to provide illustrations of the discussed error types as they appear in the samples of our aphasics. Participant 11 having severe efferent motor aphasia with elements of amnestic one produces the sequence /ɪˈzoɲ bɐˈbotʲ/ (the target is /ʂʲɪˈzoɲ r̠ɐˈbotʲ/; Rus. “сезон работы”; Eng. “season of work”) when he describes the comparison-and-contrast plot “Summer and winter”. In trying to say that people usually reap the harvest somewhere at the end of the summer period and, therefore, have to work hard during this time, he makes two monopositional errors: he omits the target voiceless palatalised alveolar /ʂʲ/ at the beginning of the first word, and replaces the voiced alveolar rolled /r̠/ in the second word with the voiced bilabial plosive /b/. The latter case of phoneme ousting is notable in that it is a clear anticipatory substitution: the lexical unit contains /b/ as the onset consonant of the second syllable, and it is under its influence that the participant ends up uttering one more /b/ at the beginning of the word in place of the intended target. The speech of Participant 16 provides for a vivid exemplification of an addition error: when describing the activity of the girl in the comparison-and-contrast plot “Clean and dirty”, he wants to produce the word /ˈmiɬə/ (Rus. “мыло”; Eng. “soap”), but involuntarily inserts /k/, with the resulting lexical unit being /ˈmiɬkə/. Noteworthy, while it is completely normal to use this word in Russian when one wishes to point to the small size of the object, the feeling of frustration that accompanies uttering of the word indicates that the PWA’s attempts at getting rid of this intrusive phoneme are yet again fruitless.

We turn now to our findings with respect to the monopositional errors. Diagram 5 clearly indicates that the majority of the participating aphasics, i.e. 61% of them, have tended to produce bigger amounts of omissions than substitutions. This share amounts to as many as 11 PWAs out of the total number of 18. Among the non-fluent aphasics which include sensorimotor and efferent motor ones, Participants 3, 7, 9, 15 and 17 have exhibited a stronger predilection towards substituting phonemes rather than omitting them. Among the non-fluent individuals with aphasia which include afferent motor, acoustic-gnostic and acoustic-mnestic PWAs, only Participants 5 and 8 have been more prone to leave out phonemes rather than replace them with mistargeted ones. While it is hard to tell that a sheer number of the non-fluent PWAs whose samples have been found richer in substitutions really point to that the tested hypothesis could be true for this group of aphasics, on balance, our data suggest that there is a more pronounced tendency for the generation of omissions, as compared to substitutions, if we make no division between expressive and receptive PWAs. On that note, it can be concluded that the hypothesis stating the prevalence of substitution errors in aphasia has not been verified in our study. Before we move on, it is worth stressing that this finding of ours is, however, quite in line with those obtained by Pate et al. (1987) and Kohn (1989) who have examined the monopositional errors produced by English-speaking conduction aphasics, a fluent group of PWAs: the scholars point to omissions as the most numerous error category. What is more, Beland et al. (1990) have also found significantly bigger amounts of omissions, as opposed to substitutions, in the samples of their French-speaking conduction aphasics, which might suggest that the picture may be shaped by the language spoken by the PWAs.

Illuminating the kinds of rank orderings we have had in our research, it should be pointed out that as Diagram 6 makes clear, the swingeing majority of our PWAs, i.e. 61% of them, have not been found to follow the pattern observed by the previous scholars, that is to say, 1) substitutions, 2) omissions, and 3) additions. Because omissions have been the most voluminous error group for most of our participants, it is not surprising that the most common rank ordering is the one where omissions precede substitutions while additions bring up the rear. Thus, the results are suggestive of that the rank ordering hypothesis has not been borne.

We have additionally put to the test the idea about fluent aphasics' proportions of produced omissions and additions being more balanced as compared to those observed for non-fluent individuals with aphasia. As may be inferred from Table 29 in Appendix F, for the majority of our receptive PWAs, the shares of deletions and insertions have been found to be utterly

unbalanced. It follows that the examined hypothesis has been tried and found wanting in a greater or lesser degree.

Let us finally focus more on substitutions to see if the claim about the relative absence of the contextual dependence of errors in aphasia is true or not. While there are studies suggesting equal shares of contextual and non-contextual errors, e.g., that of Pate et al. (1987) who have examined the phonological paraphasias on the material of the English-speaking Wernicke's and conduction aphasics, most attempts at investigating the role of the contextual factor in the considered language disorder reveal a stronger proclivity of PWAs for making contextually unmotivated errors, in particular, substitutions (Söderpalm, 1979; Monoi et al., 1983; Niemi et al., 1985; Wilshire and McCarthy, 1987; Allerbeck, 2000; Goldman et al., 2001; Wilshire, 2002). This has been shown to hold for a variety of languages, though, there is no data about this on Russian. Interestingly, Monoi et al. (1983) have observed the tendency of Japanese-speaking individuals having Broca's aphasia to make more than twice as many consonantal substitutions of uncertain aetiology than vocalic ones. Notably, studies in which it has been demonstrated that contextual errors are at least slightly more numerous than non-contextual erroneous productions are few (Schwartz et al., 1994). The last note to make is that insofar as contextual errors are concerned, there is general agreement in the paraphasia literature that perseveratory substitutions boast higher frequency than anticipatory ones (Allison & Hurwitz, 1967; Hudson, 1968; Buckingham, 1985; Schwartz et al., 1994; Allerbeck, 2000; Knels, 2001). While it has been possible to test the hypotheses regarding error contextual dependency, there is one advanced by Moses et al. (2004) and stating that the increasing difficulty of performed tasks changes the ratio of perseveratory versus anticipatory errors in tongue slips which could not been reliably tested on our PWAs because of the earlier reported idiosyncratic complexity order of tasks as perceived by the study participants.

Table 30 provides a clear indication of that both of the hypotheses seem to be true. When it comes to the share of contextually unmotivated substitutions, one can infer for the table data that there is a large quantity of them in the samples. Only 2 of our 18 PWAs, i.e. Participants 9 and 10 diagnosed with sensorimotor and afferent motor aphasia types, respectively, have produced a number of substitutions with no contextual source which has been smaller than that of perseveratory phoneme replacements. For all the remaining participants, substitutions of uncertain aetiology have been dominant, even though at times only slightly more so. Considering this evidence, it is hard to deny the truth of the claim that substitutions with no apparent source in the context make up a substantial portion of all monopositional errors

within the considered category. Insofar as the contention about the prevalence of perseveratory substitutions over anticipatory ones is concerned, Table 31 reveals that there can indeed be observed a pronounced tendency of aphasics to produce more errors of the former kind. The proclivity of our aphasics for perseveratory errors confirms the previous researchers' hypothesis. Last but not least, it is worthy of note that the majority of contextually unmotivated substitutions and substitution errors in general have been found to involve consonantal phonemes as opposed to vocalic ones. To a certain extent, then, this supports the finding of Monoi et al. (1983) whose Japanese-speaking Broca's aphasics have produced a considerably bigger amount (70%) of such substitutions affecting namely consonants. In our study on the material of Russian, this appears to be applicable to all the five types of aphasia under scrutiny.

Having discussed the monopositional errors, we will continue with the bipositional ones which traditionally include reversals and switches. It should be reminded that researchers such as Söderpalm (1979), Niemi et al. (1985), Kohn and Smith (1990), Allerbeck (2000), Goldman et al. (2001), Romani et al. (2002) see eye to eye on that these are relatively rare in aphasia of various types affecting individuals who speak different native languages. Moreover, Blumstein (1973) and Söderpalm (1979) point out that being contextual, such errors together with perseveratory and anticipatory substitutions are most often of the within-word type, as opposed to the between-word one.

We should now exemplify bipositional erroneous productions relying on our study samples. We have chosen to treat reversals and switches together as sequential, or exchange, errors which can also been viewed as instances of word-level metathesis while an additional category of environment errors in our analysis has included intra- and inter-morphemic blends as well as the cases of phrase-level metathesis. The first error type, i.e. sequential errors, can be exemplified with a unit produced by Participant 12 having efferent motor aphasia with the elements of acoustic-mnestic one. The woman generates a rather complicated example of such an error: instead of the intended /ɻɐmʲɪˈn̪aɾɪɪ/ (Rus. "ламинарии"; Eng. "laminaria") in the description of the CE plot "Marine litter", she utters /l̪ʲɪˈmaɾɪɪ/. The resulting unit contains a decreased number of syllables, i.e. four instead of the required five, and can actually be analysed in two different ways. On the one hand, one may say that there occur two omissions of the phonemes constituting the first syllable of the word, i.e. those of /ɻ/ and /ɐ/, alongside two substitutions, i.e. those of /mʲ/, which is replaced with /l̪ʲ/, and /n̪/, which is replaced with /m/. On the other hand, it may perhaps be a bit more logical to assume that what has

happened to the lexical unit is a reversal involving two vowel phonemes, i.e. /ɐ/ and /ɪ/, with the former acquiring a slightly altered quality as a result of becoming stressed. In addition, the syllable /n̪a/ is omitted altogether, which comes as a consequence of the participant's getting puzzled by the metathesis in the first place. Importantly, under the influence of the outlined alterations, the voiced velarised dental lateral /l̪/, often alternatively referred to as dark, undergoes a change of the articulation place to become the voiced palatalised alveolar lateral /l̪ʲ/ whereas the voiced palatalised bilabial nasal /mʲ/ turns into the voiced bilabial nasal /m/ by simply losing its palatalisation.

The second error type, i.e. environment errors, can be illustrated with the form /ˈs̪ɨbʊ/ uttered by Participant 2 with afferent motor aphasia in place of the target one /ˈbus̪ɨ/ (Rus. "бусы"; Eng. "bead necklace") when completing the PS plot "Mom's torn bead necklace". One can easily notice that the syllables within the lexical unit swap places, yet, the word stress pattern, notably, remains the same. This is an instance of inter-morphemic blend: while the voiced bilabial plosive /b/ and the voiceless alveolar fricative /s̪/ are exchanged within the boundaries of the root, the vowel phonemes /u/ and /ɨ/ do so, with one of them being part of the root as well and the other occurring in the affix. Noteworthy is that all the phonemes change their original and intended places.

As for our findings, a quick glance through the participant tables in Appendix A reveals that the overall number of errors in both categories has been negligibly small: there have been made as few as 19 sequential errors and 4 environmental errors by all our PWAs, with 8 aphasics producing no such errors at all. Cases of metathesis which have been detected in the samples of the remaining 10 PWAs have never reached the statistical significance threshold: their average number per generic task has varied between 0,25 and 1,25 errors. Therefore, we may say that the hypothesis about the relative rarity of such erroneous productions has been confirmed in our study of the Russian-speaking PWAs.

When it comes to the claim of Blumstein (1973) and Söderpalm (1979) about the preponderance of within-word errors in aphasia, as opposed to between-word ones, we must say that it has also been corroborated. In particular, we have found that 67% of all the errors made belong to the former type while only 33% of them represent the latter type. This finding implies that the distance between the error and the source unit largely tends to be rather small.

The last but one portion of the Results and Discussion chapter in general and this section in particular will be devoted to our findings from testing the four "structural" hypotheses illuminated in the review of literature.

As Diagram 7 demonstrates, the first structural hypothesis stating that error units are most of the time segmental in size has been borne out. We have found that in 73% of all cases, these are single segments, i.e. individual phonemes, that have been affected by the phonological deficit in aphasia. To provide an example, let us turn to an error elicited from Participant 8 in the N/D plot "Baking biscuits". The PWA produces a contextually unmotivated consonantal substitution in the target word /pʲɪˈt͡ɕeɲʲjə/ (Rus. "печенье"; Eng. "biscuits"), with the resulting form being /vʲɪˈt͡ɕeɲʲjə/: the voiceless palatalised bilabial plosive /pʲ/ is replaced with the voiced palatalised labio-dental fricative /vʲ/. Our detecting a considerably greater amount of erroneous productions which are segmental in size supports the findings of Blumstein (1973), Shewan (1980), Monoi et al. (1983), Dressler et al. (1986), Kohn (1989), Wilshire and McCarthy (1996) who have studied English-, Japanese- and German-speaking PWAs. It appears that the Russian language is affected by the phonological deficit in an analogous manner from the perspective of error size.

Proceeding with the second structural hypothesis which has it that the tendency of aphasics towards making more errors in word and syllable onsets is not very much pronounced, we must point out that it has been disproved in our research study. Diagram 8 makes it obvious that for our PWAs diagnosed with different types of aphasia, errors occurring at the very beginning of a word and, especially, syllable have been in the absolute majority. They have amounted to as much as 91%. The word-onset effect can be illustrated with the help of the following examples. Participant 1 describes the thing being stolen from a gentleman's pocket in the PS plot "Pickpocket" as /ɐʂɨˈl̪ʲək/ whilst the target is /kɐʂɨˈl̪ʲək/ (Rus. "кошелёк"; Eng. "purse"). He omits the word and syllable initial voiceless velar plosive /k/. Insofar as coda vulnerability is concerned, we must also give some relevant examples. When describing the CE plot "Slipping on the ice", Participant 10 produces the form /pɐʂkɐˈznuɬʲə/ instead of the target /pɐʂkɐl̪ʲˈznuɬʲə/ (Rus. "поскользнулся"; Eng. "slipped" (the masculine singular form)). The error which involves the omission of the voiced palatalised alveolar lateral /l̪ʲ/ consonant occurs in the syllable coda. It is worth stressing that syllable nuclei also seem to be quite vulnerable. We have calculated the shares for onset, nucleus and coda vulnerability effects, apart from the shares for onsets and codas only. It has been found that onsets exhibit greater

vulnerability in 57% of all cases, nuclei in 37%, and codas in just 6%. It follows that vowel peaks become affected significantly more often than codas. However, regardless of whether we take nuclei into consideration or not, word and syllable onsets still seem to be the most affected part of the syllable. Therefore, our data do not appear to give support to either Stark and Stark (1990) who have observed the equal error-proneness of codas and onsets, or to Burns and Canter (1977), Kohn (1989), Kohn and Smith (1990, 1995), Wilshire and McCarthy (1996), Allerbeck (2000), Knels (2001), Scwartz et al. (2004) who have reported on the relative word-onset stability. Our results are, yet, at least partially in line with those of Blumstein for Broca's and conduction aphasics: the scholar has detected an appreciably bigger number of errors in word-initial positions.

The third structural hypothesis has had to do with the principle of the parallel syllable structure constraint. To exemplify the application of the principle, let us point to the unit uttered by Participant 12 in the N/D plot "Finding an egg in the bush", i.e. /ˈvɨ̪ʊkʲɪ̪sʲə/ (the target is /ˈvɨ̪ʊpʲɪ̪sʲə/; Rus. "вылупился"; Eng. "hatched out" (the masculine singular form)), which involves a perseveratory consonantal substitution of the voiceless bilabial plosive /pʲ/ by the voiceless velar plosive /kʲ/. It is of importance that the immediately preceding lexical unit /v ˈgn̪ʲəzdɨ̪kʲə/ (Rus. "в гнёздышке"; Eng. "in the nest"; the noun carries a diminutive suffix) contains /kʲ/ in the onset of its third syllable. Since the mistargeted unit has the described substitution in the onset of the third syllable as well, it makes perfect sense to say that the PSSC principle has been observed in this case. It is important to emphasise that our data have been demonstrated to be at odds with the findings of Dressler et al. (1986), Kohn (1989), Wilshire (1998), Allerbeck (2000), Goldmann et al. (2001), and Knels (2001) who claim that individuals suffering the language disorder at issue are more prone to ignore the named principle. In particular, as one may see from Diagram 9, PSSC has been observed in more than half of all the error cases detected in our samples, i.e. in 58% of them.

The forth and last structural hypothesis to be considered has held that multisyllabic words display a stronger tendency to get under blow as compared to monosyllabic lexical units. As Diagram 10 indicates, this seems to be true in our study and, thus, it lends support to the findings of Caplan (1987) and Pate el al. (1987). It is reflected by the shares in the diagram that monosyllabic words have constituted only 8% of the phonological error cases while disyllabic words have stood for 16% of the instances. As compared to these, the greatest numbers of errors have been made in trisyllabic (26%) and tetrasyllabic (33%) lexical units.

In addition, it has been demonstrated that words containing five and six syllables amount to 11% and 6% of the error cases, respectively, which is not much. However, it is paramount to keep in mind that words of such decent length are contemporaneously not that numerous in the samples of individuals suffering aphasia.

The last portion of the current section will be devoted to neologistic paraphasias. Before we present our findings, it is worth exemplifying the error category. Some of those uttered by Participant 2 with moderate afferent motor aphasia include /ˈr̲atəvʲɪk/ (the CE plot "Burnt pie"), /gʊˈɻ̪ɨk/ (the PS plot "Child and house fire"), /ɐɬɐpˈdop/ (the PS plot "Hooked on a fence nail"), /ˈd̪ʲitər̲ə/ (the N/D plot "Baking biscuits"), etc. Moving on to the results, we should note that perhaps the most protruding finding with regard to these errors boils down that, as we have made clear earlier when answering Research Question 3, the quantitative patterns of distribution within the category do not seem to be contingent on the syndrome of the considered language disorder. Although these are afferent motor aphasics, namely Participants 2 and 14, who have produced the biggest numbers of neologisms, there have notably been other afferent motor PWAs, i.e. Participants 5, 10 and, to a lesser extent, 18, who have made far fewer errors belonging to this group. Thus, giving support to the findings of Watanabe et al. (2019), our data have shown that neologisms seem to find their way even into the speech of PWAs diagnosed with aphasia types other than those commonly associated with neologistic productions, i.e. primarily fluent ones. Moreover, almost always the neologisms generated by our PWAs were meaningful to them, which confirms the view of Abou (2021).

It must be admitted that given the focus of our study, it has not been really possible to determine whether it is some single mechanism underlying the production of both neologisms and phonological paraphasias, which would mean that these error types are inherently related to each other (Lecours & Lhermitte, 1979; Dell et al., 1997; Schwartz et al., 2004; Martin & Dell, 2007; Olson et al., 2007, 2015; Nozari et al., 2010; Buckingham & Buckingham, 2011), or whether these should better be treated as two separate kinds of erroneous productions (Butterworth, 1979; Buckingham, 1981, 1990; Moses et al., 2004; Eaton et al., 2010). In order to test Butterworth's "generating device" hypothesis, we would need to conduct a longitudinal study enabling us to follow the speech recovery process of each participant. Our research, however, was not intended as such. This, in combination with our empirical observations of the amount of phonological (both segmental and metrical) information preserved in both types of paraphasias, has at least partially contributed to our inclination to align ourselves more with

Lecours and Lhermitte's two-step hypothesis. We tend to believe that neologistic paraphasias are to a certain extent related to phonological ones and can even occasionally be explained through them, though, the scope of this relation between them is hard to accurately establish on the basis of what we have examined. This can be explained by our choice of the elicitation method, i.e. spontaneous speech, which makes it more difficult to spot connections between novel non-words uttered by the PWAs and their intended targets.

To round up this section, we consider it prudent to reiterate in a nutshell the major findings that have come to the fore in our testing of the previous researchers' structural hypotheses pertaining to paraphasias:

- Among the monopositional erroneous productions, omissions rather than substitutions have been the most dominant type of phonological errors for the majority of our PWAs, both fluent and non-fluent. Notably, the group of efferent motor PWAs has been shown to split into two, with one half of its members making the greatest number of substitutions and the other half producing omissions most frequently. Furthermore, our one and only participant with acoustic-mnestic aphasia has generated the biggest quantity of substitutions.
- With regard to the frequency ranking of monopositional errors, we have found that 11 out of 18 aphasics in our study did not follow the ordering predicted by the previous scholars. In the case of our PWAs, omissions have prevailed over substitutions while additions, in tune with the common view, have brought up the rear. Furthermore, contrary to other studies, we have found that most of the fluent aphasia samples are utterly unbalanced in terms of the proportions of omissions versus additions in them.
- In agreement with what has been done before us is our following finding: a large proportion of errors have no apparent source unit from the context, which implies that the overwhelming majority of our speech samples contain the biggest number of substitutions having uncertain aetiology rather than anticipatory or perseveratory ones. Moreover, the juxtaposition of only anticipations and perseverations within this error category has revealed that there is a noticeable tendency of the PWAs to produce more substitutions of the perseveratory nature. This is consistent with the earlier findings for aphasia.
- Insofar as the bipositional errors are concerned, we have confirmed the hypothesis dominant in the scholarly circles that such errors are relatively rare. It has additionally

been found that most of the contextual errors are of the within-word type, which is also in chime with the results obtained by other researchers.

- With respect to the four structural hypotheses of a more general kind, we have discovered the following. First, the earlier researchers' claim has been corroborated that error units are almost always segmental in size, as compared to those involving consonant clusters as well as VC and CV sequences. Second, while it is contended by some scholars that the tendency towards word-onset vulnerability is not very much pronounced in aphasia, our data seem to suggest otherwise. Third, it has been demonstrated that the parallel syllable structure constraint is not always ignored by PWAs. Our results point to that there is a certain tendency for consonants to interact with other consonants from identical positions within a syllable, however, it is not too strong. Fourth and last, it has been found to be true that words containing more syllables are more error-prone as compared to those comprising fewer syllables.
- Lastly, we have come to believe that neologistic paraphasias are at least to some extent related to phonological ones from the point of view of the mechanism of their production.

CHAPTER 5: CONCLUSIONS AND IMPLICATIONS

5.1. Conclusions

It is prudent to sum up what has been discovered in the course of this study by recapitulating the findings for each of the research questions and the respective hypotheses.

When it comes to Research Question 1, it must be said that while we have managed to detect appreciable quantitative differences in error patterns across the four genres, our hypothesis as to which genres are mentally more complex has not been fully corroborated. In particular, the narration/description genre of elicitation has been found to be the most error-laden for all the levels considered and for the PWAs having different aphasia syndromes and degrees of disorder severity. This has been explained by easier mental processing, bigger amounts of elicited data and more lax output control associated with the specified genre. The comparison-and-contrast genre has dragged out to the surface the smallest number of errors, most likely, due its providing the foothold of explicit visual cues and being poor from the perspective of output amount. The cause-and-effect and problem-and-solution genres have been found to elicit moderate quantities of erroneous productions, thus, positioning themselves in the middle.

Answering Research Question 2, we should note that although the numerical patterns of error distribution have been shown to differ across the plots representing one discourse genre, and the plots richer in erroneous productions have essentially been found to include a bigger diversity of error categories, the plots did not follow the complexity order we had anticipated. This has led us to assume the possibility that every PWA perceived as more mentally strenuous those picture plots on which he or she made most errors of the most manifold types rather than those we viewed to be the most complex to process. Thus, it is logical to believe that every individual's perception of task complexity can be drastically different from that of other people, both neurally healthy and aphasic. Our second Hypothesis, therefore, can be held true only on provision that the individual variability in the perception of task complexity is taken into account.

Research Question 3 tapping into the issue of syndrome-specificity of the phonological deficit can be answered as follows: we have found no strong correlation between the quantities and kinds of paraphasias produced by the PWAs and their respective aphasia syndromes. The implication here is that the phonological productive level of speech cannot be

relied on in distinguishing between various types of aphasia. Since we have undertaken the task of testing the previous researchers' structural hypotheses pertaining to paraphasia, we should laconically comment on our findings in this respect as well. While our data have confirmed the hypotheses about the prevalence of contextually unmotivated monopositional errors, the rarity and predominantly within-word character of bipositional errors, the preponderance of units segmental in size, and the increased error-proneness of multisyllabic words, the other ones have not been supported. Namely, we have found that our Russian-speaking PWAs have most often made omission errors, with these being followed by substitutions and then additions. We have also demonstrated that word and especially syllable-onsets exhibit increased vulnerability in our aphasics' samples. Moreover, the parallel syllable structure constraint has been observed on a decent number of occasions. All this bids defiance to the previous researchers' findings. A final note to make is that our data analysis has made us believe that neologisms are at least in part related to phonological paraphasias in terms of their production mechanism.

5.2. Implications

Now that we have recapitulated our most prominent findings, it makes perfect sense to talk about their practical and theoretical implications. We will begin with the former.

- Our cross-generic insights seed the idea that with an eye towards the restoration of the speech function, speech language pathologists should be encouraged to provide their aphasic patients with appropriate kinds of generic tasks, being guided by both the recovery stage and individual preferences of aphasics. The comparison-and-contrast genre can be a jumping-off place for PWAs having severe forms of the disturbance as well as those finding themselves in the early recovery period. With the passing of time and the amelioration of signs, tasks of the cause-and-effect as well as problem-and-solution genres can be introduced since they are marked by the more strenuous mental processing effort. Furthermore, these are crucial for re-establishing the linkage between the language use and the execution of social functions. Finally, narration/description tasks are best given last of all, considering that this genre has been found the richest in erroneous productions.
- Generally speaking, pictorial tasks appear to be extremely useful in restoring the language function. They provide patients with necessary visual cues to rely on, thereby kindling enthusiasm and helping aphasics feel not that helpless and pressurised.

- Our findings with respect to the effects of within-genre task complexity make us suggest that speech language pathologists should not insist on their own judgements of task simplicity or complexity when devising rehabilitation plans and choosing tasks to be presented first and last. Individual perceptions of their patients are far more important.
- It is of paramount importance that the plots chosen for inclusion into the speech rehabilitation material are culturally specific and inoffensive since the majority of stroke-sufferers exhibit hyperemotivity.
- Insofar as our findings on the issue of syndrome-universality versus heterogeneity of phonological deficit manifestations are concerned, we have brought out the implication that the currently accepted and widely used descriptions of symptomatology marking various types of aphasia are still imperfect. There is nowadays a growing recognition that symptoms may and do, in fact, mix, giving at times completely unpredictable pictures of the disorder. This points to the need for refining the existing classifications or creating new ones which would display greater flexibility.
- Our finding no clear-cut quantitative and qualitative patterns of error distribution which could unambiguously distinguish the five analysed types of aphasia implies that diagnostic batteries should not be based solely on the phonological criteria. Ideally, such batteries should test all the possible levels of the linguistic system.
- The structural account of paraphasic productions that is silhouetted from our testing the previous researchers' hypotheses makes us believe that SLPs should pay increased attention to omission errors, especially in the case of acoustic-gnostic, afferent motor and sensorimotor PWAs.
- It appears that naming and repetition tasks can be as useful for speech restoration as description tasks, if judged from the perspective of wide context being absent or present.
- Special heed should be paid to consonantal phonemes, as they have been found to be more vulnerable than vowels for the majority of our PWAs. Furthermore, speech therapists are recommended to address perseveratory errors more carefully as compared to anticipatory ones when developing speech recovery tasks.
- Unless too hindering, bipositional errors do not necessarily have to be given much prominence in tasks.
- It is highly likely to be helpful if some time is devoted to practice consonant clusters found especially challenging by PWAs as well as troublesome CV and VC sequences.

- Since we have found that the parallel syllable structure constraint is not always ignored by aphasics, certain improvements can possibly be achieved by practicing specially designed word combinations or collocations with emphasis being laid on the onsets and codas of their constituent elements.
- SLPs should tackle onsets of syllables and lexical units with particular care. Phonological cues giving PWAs the first phoneme or syllable of the target may prove very effective in speech therapy.
- Tasks involving the production of shorter words, e.g., monosyllabic and disyllabic ones, should be the preferred choice of SLPs working with severe aphasics along with those having short post onset times. Longer lexical units should be introduced gradually.
- The production of neologistic paraphasias is best not be discouraged because in most cases, for aphasics themselves, neologisms make perfectly meaningful units with the help of which they can communicate at least something. Individuals with fluent aphasia often rely on intonation and tone unit boundaries in speech generation. The feeling of having even minimal communication ability is vital for many PWAs.

It is easy to notice that the obtained knowledge makes it possible to devise improved speech rehabilitation plans, at least for Russian-speaking individuals with aphasia.

When it comes to the major theoretical implications, we should note that the current study deepens our present-day understanding of how the brain, both damaged and normal, works. It also contributes to the accumulation of our knowledge on how and with what mental effort PWAs process various discourse genres. Moreover, it stresses the significance of an individual factor in the way the language disorder is manifest at the generic level, and underscores the importance of accounting for interpersonal variation in the perception of task complexity. The study provides us with a better grip of the differences and similarities among the various aphasia syndromes, which are found at the phonological production level. It sheds light on the peculiarities of the quantitative and qualitative patterns of phonological errors produced by the Russian-speaking PWAs having in their majority a bilingual linguistic background. Finally, it contributes to the substantiation of the hypotheses advanced by the previous researchers in the field as well as complements certain theories of the language deficit.

5.3. Suggestions for Further Research

It can be suggested that subsequent investigators should strive for a greater homogeneity among their aphasic participants on as many personal variables as possible. Moreover, the problem is best be studied with the involvement of more participants diagnosed with each syndrome in order to make the study more representative and generalisable. In addition, the types of aphasia not represented in our research are highly recommended for inclusion since this will surely enable researchers to draw richer across-syndrome analyses. Attempts should also be made to isolate the influence of Belarusian alongside other languages spoken by the PWAs in the Republic of Belarus on Russian when the latter is the language being tested. Furthermore, there can be conducted comparative studies of Russian-speaking PWAs for whom Russian is the only mother tongue and those who speak it as one of their native languages. The oral productive performance of Russian-speaking aphasics may be compared to that of PWAs speaking typologically close languages, e.g. Ukrainian and Belarusian. Discourse genres other than those four we have taken a close look at may be studied using the same or similar framework of analysis. Taking into account the fact that we have not managed to demarcate the five aphasia syndromes on the basis of the phonological deficit only, our recommendation is that subsequent explorers consider the manifestations of the lexico-grammatical deficit as a much more reliable basis in distinguishing aphasia types. Lastly, we suggest that a number of structural hypotheses of paraphasias that have found to be false or wanting in our study of Russian-speaking aphasics should be replicated or tested on the material of other languages which have not yet been scrutinised.

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APPENDICES

Appendix A. Tables with detailed information about each of the study participants

Information on Participant 1	
Age	62
Gender	Male
Hand	Right
Education	Higher
Languages	Russian, Belarusian, German (limited passive knowledge)
Place of residence	Navahrudak (town), Hrodna region, Belarus
Aetiology and lesion site	CVA leading to the disorder of cerebral circulation in the superior temporal gyrus of the upper-temple area
Post onset time	18 days
Type and severity of aphasia	Mild acoustic-gnostic aphasia
Therapy	Inpatient treatment in the neurological department for stroke patients of the Navahrudak Central District Hospital from 06/09/2021 to 06/23/2021 Rehabilitation treatment (including speech therapy sessions) at the health facility Astroulya Regional Psychiatric and Neurological Hospital (the village of Astroulya, Lida district) from 07/26/2021 to 08/13/2021
General linguistic behaviour	Preserved fast fluent speech; no pauses hampering the speech flow; well-managed tone group boundaries; pronounced tendency of gesture reduction; mildly impaired auditory comprehension; undisturbed grammaticality; reporting on the interestingness of going through the tasks.

Error category	Error type	Cause and effect task	Problem and solution task	Narration / description task	Comparison and contrast task
Segmental level	Sequential errors	0	0	0	0
	Environment errors	1	0	0	0
	Substitutions	15 Anticipatory: 2V + 4C Perseveratory: 0 Of uncertain aetiology: 3V + 6C	13 Anticipatory: 3C Perseveratory: 1C Of uncertain aetiology: 2V + 7C	28 Anticipatory: 1V + 2C Perseveratory: 1V + 8C Of uncertain aetiology: 3V + 13C	14 Anticipatory: 2V + 3C Perseveratory: 1V + 7C Of uncertain aetiology: 1C
	Additions	7 = 1V + 6C	5 = 3V + 2C	1C	3 = 2V + 1C
	Omissions	27 = 6V + 21C	30 = 11V + 19C	47 = 10V + 37C	19 = 6V + 12C + 1SV
	Sound distortions	4	9	5	6
	Neologisms	8	7	9	6
	Total	**62**	**64**	**90**	**48**
Metrical level	Word stress pattern	0	0	1	0
	Number of syllables	7 = 6D+1I	12 = 10D+2I	10D	9 = 7D+2I
	CV structure	24	23	39	15
	Total	**31**	**35**	**50**	**24**
Additional error types	Phonological approximations	0	3	6	0
	Perseverations	0	0	0	0
	Semantic paraphasias	1	0	1	1
	Circumlocutions	0	0	0	0
	Intra-word breaks	2	0	0	1
	False starts	1	2	2	0
	Self-corrections	1	1	0	1
	Word search	1	2	6	4
	No-response errors	1	1	0	0
	Ascertaining output correctness	0	1	0	1
	Total	**7**	**10**	**15**	**8**
Total amount of errors made on all levels		**100**	**109**	**155**	**78**

Information on Participant 2	
Age	66
Gender	Male
Hand	Right
Education	Secondary
Languages	Russian, Belarusian, Polish
Place of residence	Orkavichy (village), Hrodna region, Belarus
Aetiology and lesion site	Intra-cerebral haemorrhage in the left-hemisphere lower parietal sections of the cerebral cortex located behind Rolandic fissure
Post onset time	13 days
Type and severity of aphasia	Moderate afferent motor aphasia
Therapy	Inpatient treatment in the neurological department for stroke patients of the Navahrudak Central District Hospital from 06/07/2021 to 06/22/2021 Rehabilitation treatment (including speech therapy sessions) at the health facility Astroulya Regional Psychiatric and Neurological Hospital (the village of Astroulya, Lida district) from 06/24/2021 to 07/14/2021 Rehabilitation treatment at the health facility the Lubcha Central District Hospital from 07/15/2021 to 07/29/2021
General linguistic behaviour	Perfectly spared intonation contours extending over several tone groups; preserved tone group boundaries; markedly fluent speech; no strenuous efforts in producing the linguistic output; lack of intentional accentuation of certain lexical units by means of stress; tongue clicking of uncertain aetiology; perception of the produced neologistic units as meaningful; deliberate lengthening of vowel sounds which most probably serves as a normal pause compensation strategy; rare expletives which are likely to be the vestiges of speech emboli; retained understanding of addressed speech; highly positive attitude towards completing the tasks.

Error category	Error type	Cause and effect task	Problem and solution task	Narration / description task	Comparison and contrast task
Segmental level	Sequential errors	1	1	2	0
	Environment errors	0	0	0	0
	Substitutions	21 Anticipatory: 0 Perseveratory: 1V + 7C Of uncertain aetiology: 1V + 12C	17 Anticipatory: 1C Perseveratory: 1V + 5C Of uncertain aetiology: 3V + 7C	35 Anticipatory: 1V + 3C Perseveratory: 4C Of uncertain aetiology: 7V + 20C	12 Anticipatory: 2V + 2C Perseveratory: 0 Of uncertain aetiology: 8C
	Additions	2 = 1V + 1C	2 = 1V + 1C	10 = 4V + 5C + 1SV	7 = 3V + 3C + 1SV
	Omissions	35 = 11V + 24C	25 = 12V + 13C	43 = 17V + 24C + 2SV	13 = 6V + 6C + 1SV
	Sound distortions	6	8	12	7
	Neologisms	101	131	149	67
	Total	**166**	**184**	**251**	**106**
Metrical level	Word stress pattern	0	0	3	0
	Number of syllables	12 = 11D+1I	13 = 12D+1I	21 = 18D+3I	9 = 6D+3I
	CV structure	16	16	30	11
	Total	**28**	**29**	**54**	**20**
Additional error types	Phonological approximations	33	29	40	28
	Perseverations	12	26	18	13
	Semantic paraphasias	16	21	11	8
	Circumlocutions	1	1	0	6
	Intra-word breaks	7	6	4	0
	False starts	8	6	13	6
	Self-corrections	3	3	3	1
	Word search	15	11	15	15
	No-response errors	0	1	0	0
	Ascertaining output correctness	2	0	1	0
	Total	**97**	**104**	**105**	**77**
Total amount of errors made on all levels		**291**	**317**	**410**	**203**

Information on Participant 3	
Age	52
Gender	Female
Hand	Left
Education	Vocational secondary
Languages	Russian, Belarusian
Place of residence	Shchorsy (agrotown), Hrodna region, Belarus
Aetiology and lesion site	Head injury leading to cerebral haemorrhage in the anterior superior frontal lobe of the left hemisphere of the brain
Post onset time	28 years
Type and severity of aphasia	Mild efferent motor aphasia
Therapy	Inpatient treatment at the public health facility the Lubcha Central District Hospital in the year of 1994
General linguistic behaviour	Preserved or restored fluency of speech; repetitive use of certain structures as a means of allowing herself some time to cogitate the depicted plot; avoidance of using the personal pronouns; grammatically correct gender endings on verbs; pronounced emotional response to the pictures provided; production of more abundant oral output during the description of the pictures to which she has an emotional attachment; desire to complement the description of emotionally-charged plots with stories from her own life; expressed bilingual influence; comments on the experienced inability to find the right word, e.g., “I can't express it”, “How can I put it here?”, “It got stuck in my head”, with occasional capitulations.

Error category	Error type	Cause and effect task	Problem and solution task	Narration / description task	Comparison and contrast task
Segmental level	Sequential errors	0	1	1	0
	Environment errors	0	0	0	0
	Substitutions	12 Anticipatory: 1V + 2C Perseveratory: 1V Of uncertain aetiology: 8C	11 Anticipatory: 1V Perseveratory: 1C Of uncertain aetiology: 2V + 7C	48 Anticipatory: 4C Perseveratory: 8V + 13C + 1SV Of uncertain aetiology: 6V + 16C	6 Anticipatory: 1C Perseveratory: 1V + 2C Of uncertain aetiology: 2C
	Additions	5 = 3V + 2C	3 = 2C + 1SV	12 = 6V + 5C + 1SV	0
	Omissions	7C	17 = 5V + 12C	39 = 10V + 28C + 1SV	7 = 2V + 5C
	Sound distortions	10	8	24	9
	Neologisms	0	11	9	1
	Total	**34**	**50**	**132**	**23**
Metrical level	Word stress pattern	0	1	1	0
	Number of syllables	3I	5D	16 = 10D+6I	2D
	CV structure	8	17	35	2
	Total	**11**	**23**	**52**	**4**
Additional error types	Phonological approximations	6	6	9	0
	Perseverations	2	6	18	0
	Semantic paraphasias	2	4	8	2
	Circumlocutions	2	12	8	4
	Intra-word breaks	1	1	2	1
	False starts	1	3	17	4
	Self-corrections	0	3	7	0
	Word search	6	5	25	7
	No-response errors	2	5	0	5
	Ascertaining output correctness	0	2	0	0
	Total	**22**	**47**	**94**	**23**
Total amount of errors made on all levels		**67**	**120**	**278**	**50**

Information on Participant 4	
Age	83
Gender	Male
Hand	Right
Education	Lower secondary
Languages	Russian, Belarusian
Place of residence	Lauryshava (village), Hrodna region, Belarus
Aetiology and lesion site	Intra-cerebral haemorrhage induced by stage 3 arterial hypertension and resulting in a lesion situated in the lower part of the left premotor area of the brain
Post onset time	2 years
Type and severity of aphasia	Mild efferent motor aphasia
Therapy	Inpatient treatment in the neurological department for stroke patients of the Navahrudak Central District Hospital from 07/08/2019 to 07/21/2019 Rehabilitation treatment (including speech therapy sessions) at the health facility Astroulya Regional Psychiatric and Neurological Hospital (the village of Astroulya, Lida district) from 07/22/2019 to 08/10/2019
General linguistic behaviour	Short tone groups with preserved boundaries; slowness of the general speech rate; very long pauses which frequently mark the beginning of the plot description; rhetorical questions aimed at getting the interviewer's attention to the difficulty being experienced by the PWA during the task completion; abundant use of demonstrative pronouns with which almost every utterance commences; resultant analogous syntactical structures; prevalence of nominal sentences; occasionally disturbed subject-verb agreement; unimpaired gender declension; lack of confidence in the answers or descriptions produced which is manifest in the employment of such expressions as "maybe", "or something", "or what", "this will be", "ostensibly", "somehow", etc.; overall positive attitude and frequent laughing.

Error category	Error type	Cause and effect task	Problem and solution task	Narration / description task	Comparison and contrast task
Segmental level	Sequential errors	0	0	0	0
	Environment errors	0	0	0	0
	Substitutions	7 Anticipatory: 1C Perseveratory: 1C Of uncertain aetiology: 1V + 4C	9 Anticipatory: 2C Perseveratory: 1V + 2C Of uncertain aetiology: 1V + 3C	5 Anticipatory: 0 Perseveratory: 1C Of uncertain aetiology: 4C	1 Anticipatory: 0 Perseveratory: 0 Of uncertain aetiology: 1C
	Additions	2 = 1V + 1C	0	1V	0
	Omissions	7 = 4V + 2C + 1SV	13 = 4V + 9C	14 = 7V + 7C	13 = 3V + 10C
	Sound distortions	4	3	3	2
	Neologisms	4	8	3	3
	Total	**24**	**33**	**26**	**19**
Metrical level	Word stress pattern	0	2	0	0
	Number of syllables	5 = 4D+1I	4D	9 = 8D+1I	3D
	CV structure	6	10	8	10
	Total	**11**	**16**	**17**	**13**
Additional error types	Phonological approximations	0	6	9	1
	Perseverations	6	3	0	4
	Semantic paraphasias	0	2	4	1
	Circumlocutions	2	5	3	3
	Intra-word breaks	0	0	0	0
	False starts	1	2	5	2
	Self-corrections	1	1	0	1
	Word search	5	9	7	3
	No-response errors	3	11	8	5
	Ascertaining output correctness	0	1	2	1
	Total	**18**	**40**	**38**	**21**
Total amount of errors made on all levels		**53**	**89**	**81**	**53**

Information on Participant 5	
Age	53
Gender	Male
Hand	Right
Education	Secondary
Languages	Russian, Belarusian
Place of residence	Shchorsy (agrotown), Hrodna region, Belarus
Aetiology and lesion site	Intra-cerebral haemorrhage in the left hemisphere of the brain induced by stage 3 arterial hypertension and resulting in a lesion situated in the intermediate post-central area 1 of Brodmann
Post onset time	1 year
Type and severity of aphasia	Mild afferent motor aphasia
Therapy	Inpatient treatment in the neurological department for stroke patients of the Navahrudak Central District Hospital from 07/08/2020 to 07/21/2020 Rehabilitation treatment (including speech therapy sessions) at the health facility Hrodna Regional Hospital for Medical Rehabilitation from 07/27/2020 to 08/16/2020
General linguistic behaviour	Relatively short tone groups having clearly delineated boundaries; general speech fluency; frequent, marked pausation at appropriate points; intact intonation contours; predominance of the falling tone; preponderance of simple sentences, sometimes containing homogeneous predicates; continual use of demonstrative pronouns, which believably has a compensatory function; omission of personal pronouns; taking no extra time to think before embarking on the plot description.

Error category	Error type	Cause and effect task	Problem and solution task	Narration / description task	Comparison and contrast task
Segmental level	Sequential errors	0	1	0	0
	Environment errors	0	0	0	0
	Substitutions	4 Anticipatory: 0 Perseveratory: 1V Of uncertain aetiology: 2V + 1C	11 Anticipatory: 1V + 2C Perseveratory: 3C Of uncertain aetiology: 5C	14 Anticipatory: 2V + 2C Perseveratory: 7V Of uncertain aetiology: 1V + 2C	5 Anticipatory: 0 Perseveratory: 2C Of uncertain aetiology: 1V + 2C
	Additions	1C	6 = 2V + 3C + 1SV	5 = 3V + 2C	7 = 4V + 2C + 1SV
	Omissions	9 = 3V + 6C	6C	14 = 4V + 9C + 1SV	2C
	Sound distortions	3	6	4	3
	Neologisms	0	5	0	3
	Total	**17**	**34**	**37**	**20**
Metrical level	Word stress pattern	0	0	0	0
	Number of syllables	3D	2I	7 = 4D+3I	3I
	CV structure	6	9	10	5
	Total	**9**	**11**	**17**	**8**
Additional error types	Phonological approximations	1	4	3	4
	Perseverations	0	0	0	1
	Semantic paraphasias	2	0	2	1
	Circumlocutions	1	0	0	1
	Intra-word breaks	0	2	0	3
	False starts	0	0	0	1
	Self-corrections	0	0	0	0
	Word search	2	1	2	1
	No-response errors	0	0	1	0
	Ascertaining output correctness	0	0	0	0
	Total	**6**	**7**	**8**	**12**
Total amount of errors made on all levels		**26**	**52**	**62**	**40**

Information on Participant 6	
Age	68
Gender	Female
Hand	Right
Education	Higher
Languages	Russian, Belarusian
Place of residence	Vitebsk (city), Vitebsk region, Belarus
Aetiology and lesion site	Cardioembolic cerebral infarction in the left carotid basin, dated 07/25/2020 and induced by coronary heart disease and stage 2 arterial hypertension; right-sided hemiplegia
Post onset time	1 year
Type and severity of aphasia	Severe sensorimotor aphasia (early recovery period)
Therapy	Inpatient treatment in the neurological department for stroke patients of the Vitebsk Regional Clinical Hospital from 07/25/2020 to 08/08/2020 Rehabilitation treatment (including speech therapy sessions) at the health facility “Eleos Rehabilitation Centre” (Minsk, Belarus) from 04/13/2021 to 08/10/2021
General linguistic behaviour	Good understanding of addressed spoken language; non-fluent speech; extremely short tone groups; perceived lack of distinct tones and tone group boundaries, which is due to the PWA’s stretching of sounds within lexical units as well as frequent intra-word breaks; entrenched speech emboli; lengthy pauses; tongue clicking; feeling of frustration; regular pointing to the objects in the pictures in her bid to compensate the poor oral output; looking at the interviewer in an attempt to get some help in describing the plot; disturbed repetition skill; helpfulness of coupled and reflected uttering; strongly felt desire to be helpful to the interviewer.

Error category	Error type	Cause and effect task	Problem and solution task	Narration / description task	Comparison and contrast task
Segmental level	Sequential errors	0	0	0	0
	Environment errors	0	0	0	0
	Substitutions	5 Anticipatory: 1V + 1C Perseveratory: 1C Of uncertain aetiology: 1V + 1C	7 Anticipatory: 1C Perseveratory: 1C Of uncertain aetiology: 5C	28 Anticipatory: 4C Perseveratory: 3V + 4C Of uncertain aetiology: 3V + 14C	14 Anticipatory: 1C Perseveratory: 1V Of uncertain aetiology: 6V + 6C
	Additions	4V	14 = 7V + 7C	7V	3V
	Omissions	12 = 3V + 9C	15C	39 = 11V + 25C + 3SV	21 = 3V + 15C + 3SV
	Sound distortions	0	3	2	0
	Neologisms	6	13	8	11
	Total	**27**	**52**	**84**	**49**
Metrical level	Word stress pattern	0	0	0	0
	Number of syllables	7 = 3D+4I	7I	18 = 11D+7I	6 = 3D+3I
	CV structure	9	11	21	14
	Total	**16**	**18**	**39**	**20**
Additional error types	Phonological approximations	8	52	20	16
	Perseverations	0	0	0	0
	Semantic paraphasias	7	18	21	7
	Circumlocutions	0	0	0	0
	Intra-word breaks	19	41	78	67
	False starts	9	17	15	24
	Self-corrections	0	0	0	0
	Word search	22	31	0	8
	No-response errors	2	0	0	0
	Ascertaining output correctness	0	0	3	3
	Total	**67**	**159**	**137**	**125**
Total amount of errors made on all levels		**110**	**229**	**260**	**194**

Information on Participant 7	
Age	21
Gender	Male
Hand	Left
Education	Homeschooling
Languages	Russian, Latvian
Place of residence	Riga, Latvia
Aetiology and lesion site	Cerebral hemorrhage leading to the lesions in Broca's area and pre-somatosensory zone, cerebral spastic infantile paralysis
Post onset time	18 years
Type and severity of aphasia	Moderate efferent motor aphasia
Therapy	Annual rehabilitation treatment at the health facility "Eleos Rehabilitation Centre" (Minsk, Belarus)
General linguistic behaviour	Use of complex sentences with proper conjunctions; contemporaneous improper tonal division of such sentences; linguistically unnecessary pauses, e.g., between the subject and the predicate, on the one hand, and the transitive object, on the other hand; pauses as a means of allowing extra thinking time; production of prolonged word-unrelated sounds probably in a bid to recall a target unit or avoid silence; repetitions of the already uttered units signalling the experienced difficulty in finding the right word or expression; feeling of frustration following an unsuccessful attempt at recollecting a lexical unit; apologising for the aborted attempts; reporting on the challenging nature of the narration/description generic tasks.

Error category	Error type	Cause and effect task	Problem and solution task	Narration / description task	Comparison and contrast task
Segmental level	Sequential errors	0	0	0	0
	Environment errors	0	0	0	0
	Substitutions	13 Anticipatory: 2V + 2C Perseveratory: 2C Of uncertain aetiology: 2V + 5C	16 Anticipatory: 0 Perseveratory: 4C Of uncertain aetiology: 3V + 9C	42 Anticipatory: 0 Perseveratory: 7V + 7C Of uncertain aetiology: 28C	28 Anticipatory: 0 Perseveratory: 7C Of uncertain aetiology: 21C
	Additions	1SV	0	4V	0
	Omissions	9 = 2V + 7C	4 = 2V + 2C	8= 4V + 4C	18 = 11V + 7C
	Sound distortions	7	7	7	11
	Neologisms	3	2	11	0
	Total	**33**	**29**	**72**	**57**
Metrical level	Word stress pattern	0	0	0	0
	Number of syllables	2D	2D	8 = 4D+4I	11D
	CV structure	5	2	7	14
	Total	**7**	**4**	**15**	**25**
Additional error types	Phonological approximations	11	7	18	11
	Perseverations	3	0	0	3
	Semantic paraphasias	7	5	4	4
	Circumlocutions	0	2	0	0
	Intra-word breaks	2	1	0	0
	False starts	3	2	4	0
	Self-corrections	2	0	0	3
	Word search	11	16	28	21
	No-response errors	1	1	0	0
	Ascertaining output correctness	0	2	7	4
	Total	**40**	**36**	**61**	**46**
Total amount of errors made on all levels		**80**	**69**	**148**	**128**

Information on Participant 8	
Age	69
Gender	Female
Hand	Right
Education	Vocational secondary
Languages	Russian
Place of residence	Moscow, Russia
Aetiology and lesion site	Recurrent (10/21/2016, 09/18/2017) cases of intra-cerebral haemorrhage in the left hemisphere of the brain induced by stage 3 arterial hypertension; severe right-sided hemiparesis and right-sided hemihypesthesia; lesions in the middle portion of the left temporal lobe
Post onset time	4 years 9 months
Type and severity of aphasia	Moderate acoustic-mnestic aphasia with elements of efferent motor aphasia
Therapy	Inpatient treatment in the neurological department for stroke patients of the State Budgetary Institution of Healthcare of the City of Moscow "Diagnostic Centre No. 5 of the Department of Health of the City of Moscow" Branch No. 2 from 10/21/2016 to 11/03/2016 and from 09/18/2017 to 10/01/2017 Rehabilitation treatment (including speech therapy sessions) at the health facility “Eleos Rehabilitation Centre” (Minsk, Belarus) from 04/15/2020 to 05/25/2020 and from 12/23/2020 to 08/05/2021
General linguistic behaviour	Attempts at providing nuanced descriptions of the pictures; frequent word searches and phonological approximations, joy at recollecting a target unit, desire to repeat the initially forgotten word in a bid to memorise it for the future use; reporting on the inability to recollect a lexical unit and the resulting feelings of frustration; attempts at restraining the output so as to consciously avoid incorrect word options; relatively abundant circumlocutory descriptions as a compensation method; frequent false starts; preserved spontaneous speech and the ability to repeat; increased use of pronouns, in particular, demonstrative and personal; heightened emotional colouring of speech; tone accentuation; showing interest in the degree of success in task completion, desire to please the data gatherer.

Error category	Error type	Cause and effect task	Problem and solution task	Narration / description task	Comparison and contrast task
Segmental level	Sequential errors	0	0	0	0
	Environment errors	0	0	0	0
	Substitutions	3 Anticipatory: 1V Perseveratory: 0 Of uncertain aetiology: 2V	5 Anticipatory: 0 Perseveratory: 2V + 1C Of uncertain aetiology: 2C	18 Anticipatory: 1V + 3C Perseveratory: 3V + 3C Of uncertain aetiology: 1V + 7C	3 Anticipatory: 1C Perseveratory: 1C Of uncertain aetiology: 1V
	Additions	0	3 = 1V + 2C	7C	0
	Omissions	1V	6 = 1V + 5C	11 = 7V + 4C	4 = 2V + 2C
	Sound distortions	1	2	0	0
	Neologisms	1	1	3	3
	Total	**6**	**17**	**39**	**10**
Metrical level	Word stress pattern	0	0	0	0
	Number of syllables	1D	2 = 1D+1I	7D	2D
	CV structure	1	6	14	2
	Total	**2**	**8**	**21**	**4**
Additional error types	Phonological approximations	34	67	66	14
	Perseverations	5	26	21	4
	Semantic paraphasias	3	5	16	3
	Circumlocutions	7	16	4	5
	Intra-word breaks	0	0	7	0
	False starts	10	21	17	12
	Self-corrections	1	8	14	2
	Word search	30	43	98	32
	No-response errors	3	1	7	1
	Ascertaining output correctness	9	5	28	3
	Total	**102**	**192**	**278**	**76**
Total amount of errors made on all levels		**110**	**217**	**338**	**90**

Information on Participant 9	
Age	69
Gender	Male
Hand	Right
Education	Secondary
Languages	Russian, Belarusian
Place of residence	Minsk, Minsk region, Belarus
Aetiology and lesion site	Cerebrovascular disease: cardio-embolic cerebral infarctions in the left carotid arterial system dated 08/18/2019 and 12/24/2019; plegia of the right arm, severe spastic paresis of the right leg, convulsive syndrome (generalized convulsive seizure from 08/06/20); late recovery period. Ischemic heart disease: post-infarction (2017) and atherosclerotic myocardial scarring, atherosclerosis of the aorta and coronary arteries; 2nd degree circulatory failure
Post onset time	1 year 7 months
Type and severity of aphasia	Severe sensorimotor aphasia
Therapy	Inpatient treatment in the neurological department for stroke patients of the health care institution the Minsk City Clinical Hospital No. 5 from 08/18/2019 to 08/31/2019 and from 12/24/2019 to 01/06/2020 Rehabilitation treatment (including speech therapy sessions) at the health facility “Eleos Rehabilitation Centre” (Minsk, Belarus) from 05/13/2021 to 08/12/2021
General linguistic behaviour	Non-fluent speech; extremely short tone groups with clear-cut boundaries; welcoming the interviewer’s questions about the objects and people depicted but not those about the reasons and solutions, i.e. reported difficulty of the cause-and-effect and problem-and-solution generic tasks; feeling of frustration resulting from the failed attempts at producing target units; tongue clicking; entrenched speech emboli; unintended repetitive production of the mistargeted units; disturbed repetition skill; minor presence of inaccurate repetition.

Error category	Error type	Cause and effect task	Problem and solution task	Narration / description task	Comparison and contrast task
Segmental level	Sequential errors	0	0	0	0
	Environment errors	0	0	0	0
	Substitutions	21 Anticipatory: 0 Perseveratory: 11C Of uncertain aetiology: 3V + 7C	8 Anticipatory: 1C Perseveratory: 3C Of uncertain aetiology: 3V + 1C	6 Anticipatory: 0 Perseveratory: 4C Of uncertain aetiology: 2C	12 Anticipatory: 1V Perseveratory: 9C Of uncertain aetiology: 1V + 1C
	Additions	3V	2V	3V	3 = 2V + 1C
	Omissions	4C	7C	3C	3 = 1V + 2C
	Sound distortions	10	0	7	7
	Neologisms	29	28	22	31
	Total	**67**	**45**	**41**	**56**
Metrical level	Word stress pattern	0	3	0	0
	Number of syllables	3I	2I	3I	3 = 1D+2I
	CV structure	11	3	4	3
	Total	**14**	**8**	**7**	**6**
Additional error types	Phonological approximations	15	6	7	3
	Perseverations	0	0	10	22
	Semantic paraphasias	16	5	4	0
	Circumlocutions	0	0	0	0
	Intra-word breaks	0	2	0	6
	False starts	0	0	2	3
	Self-corrections	3	0	0	0
	Word search	8	3	23	6
	No-response errors	2	2	0	2
	Ascertaining output correctness	3	0	0	1
	Total	**47**	**18**	**46**	**43**
Total amount of errors made on all levels		**128**	**71**	**94**	**105**

Information on Participant 10	
Age	53
Gender	Male
Hand	Right
Education	Higher
Languages	Russian, Belarusian, English
Place of residence	Minsk (city), Minsk region, Belarus
Aetiology and lesion site	Transient ischaemic attack (TIA) leading to the disorder of cerebral circulation in the portion of the superior parietal area 7 of Brodmann in the left hemisphere of the brain
Post onset time	12 years 6 months
Type and severity of aphasia	Mild afferent motor aphasia
Therapy	Inpatient treatment in the neurological department for stroke patients of the health care institution the Minsk City Clinical Hospital No. 10 from 01/13/2009 to 01/21/2009 Rehabilitation treatment (including speech therapy sessions) at the health facility Aksakaushchina Republican Clinical Hospital of Medical Rehabilitation (the village of Aksakaushchina, Minsk region) from 02/02/2009 to 02/23/2009
General linguistic behaviour	Very high fluency and fast rate of speech; rather short tone groups; unimpaired use of intonation patterns and tonal division of the utterances; an increase in the number of errors and, consequently, a decrease in speech intelligibility with the acceleration of speech generation; reporting on that when he forgets to consciously attend to his speaking rate, especially in stressful and emotional situations, his listeners cease to understand him; opening up over his desire to speak at a slower pace: “I can’t say that I'm bad at speaking. I'm in a hurry to speak. And I want to speak more slowly. It doesn't work”; production of more profuse output during the description of the plots linked to his life experiences; rich vocabulary.

Error category	Error type	Cause and effect task	Problem and solution task	Narration / description task	Comparison and contrast task
Segmental level	Sequential errors	0	0	0	0
	Environment errors	0	0	0	0
	Substitutions	8 Anticipatory: 2C Perseveratory: 2C Of uncertain aetiology: 4C	6 Anticipatory: 2V + 1C Perseveratory: 1V + 2C Of uncertain aetiology: 0	8 Anticipatory: 0 Perseveratory: 1V + 4C Of uncertain aetiology: 3C	11 Anticipatory: 0 Perseveratory: 3V + 4C Of uncertain aetiology: 4C
	Additions	1C	5 = 3V + 2C	2C	6 = 3V + 3C
	Omissions	22 = 8V + 14C	43 = 16V + 27C	20 = 1V + 18C + 1SV	26 = 10V + 14C + 2SV
	Sound distortions	7	8	5	5
	Neologisms	8	5	2	2
	Total	**46**	**67**	**37**	**50**
Metrical level	Word stress pattern	0	2	0	0
	Number of syllables	8D	19 = 16D+3I	1D	13 = 10D+3I
	CV structure	22	28	20	17
	Total	**30**	**49**	**21**	**30**
Additional error types	Phonological approximations	4	4	5	7
	Perseverations	0	4	0	1
	Semantic paraphasias	2	4	1	2
	Circumlocutions	0	0	0	0
	Intra-word breaks	0	2	0	2
	False starts	1	2	1	3
	Self-corrections	2	1	1	0
	Word search	1	3	9	4
	No-response errors	0	0	1	0
	Ascertaining output correctness	1	1	1	0
	Total	**11**	**21**	**19**	**19**
Total amount of errors made on all levels		**87**	**137**	**77**	**99**

Information on Participant 11	
Age	55
Gender	Male
Hand	Right
Education	Vocational secondary
Languages	Russian, Belarusian
Place of residence	Lida (city), Hrodna region, Belarus
Aetiology and lesion site	Atherosclerotic cerebral infarction in the left carotid arterial system dated 10/28/2020; late recovery period
Post onset time	9 months
Type and severity of aphasia	Severe efferent motor aphasia Elements of amnestic aphasia
Therapy	Inpatient treatment in the neurological department for stroke patients of the Lida Central District Hospital from 10/05/2020 to 10/18/2020 Rehabilitation treatment (including 11 speech therapy sessions) at the health facility Astroulya Regional Psychiatric and Neurological Hospital (the village of Astroulya, Lida district) from 11/19/2021 to 11/21/2021 with subsequent transfer to the department of anaesthesia and reanimation; from 01/14/2021 to 01/29/2021; from 07/11/2021 to 07/31/2021
General linguistic behaviour	Extremely short tone groups often extending over only one lexical unit; frequent, marked pauses separating the units which should come together within one tone group; predominant use of the falling tone; stress accentuation of the lexical units beginning a tone group; decrease in voice volume towards the end of an utterance; aborted attempts of word production; poor vocabulary, i.e. employment of only high-frequency words; extensive use of modal auxiliary verbs, which can, in all likelihood, be explained by the relative easiness of their conjugation in comparison with that of finite verbs.

Error category	Error type	Cause and effect task	Problem and solution task	Narration / description task	Comparison and contrast task
Segmental level	Sequential errors	0	0	0	0
	Environment errors	0	0	0	0
	Substitutions	18 Anticipatory: 2C Perseveratory: 3V + 2C Of uncertain aetiology: 2V + 9C	10 Anticipatory: 1C Perseveratory: 4C Of uncertain aetiology: 5C	13 Anticipatory: 1C Perseveratory: 7C Of uncertain aetiology: 2V + 3C	14 Anticipatory: 1V + 6C Perseveratory: 1V + 2C Of uncertain aetiology: 2V + 2C
	Additions	4 = 1V + 3C	5 = 3V + 2C	7 = 3V + 4C	6 = 3V + 3C
	Omissions	39 = 11V + 27C + 1SV	44 = 6V + 38C	65 = 6V + 58C + 1SV	54 = 5V + 48C + 1SV
	Sound distortions	10	6	23	13
	Neologisms	18	27	31	29
	Total	**89**	**92**	**139**	**116**
Metrical level	Word stress pattern	2	1	1	0
	Number of syllables	12 = 11D+1I	9 = 6D+3I	9 = 6D+3I	8 = 5D+3I
	CV structure	22	33	51	41
	Total	**36**	**43**	**61**	**49**
Additional error types	Phonological approximations	5	2	5	2
	Perseverations	2	5	12	5
	Semantic paraphasias	1	3	10	0
	Circumlocutions	0	0	0	0
	Intra-word breaks	0	1	2	0
	False starts	4	1	3	0
	Self-corrections	0	0	3	2
	Word search	12	4	7	6
	No-response errors	1	1	1	1
	Ascertaining output correctness	3	0	0	0
	Total	**28**	**17**	**43**	**16**
Total amount of errors made on all levels		**153**	**152**	**243**	**181**

Information on Participant 12	
Age	71
Gender	Female
Hand	Right
Education	Vocational secondary
Languages	Russian, Belarusian
Place of residence	Lida (city), Hrodna region, Belarus
Aetiology and lesion site	Acute lacunar infarction in the left carotid system leading to the disorder of cerebral circulation in the anterior branch of the left middle cerebral artery
Post onset time	24 days
Type and severity of aphasia	Mild efferent motor aphasia Elements of acoustic-mnestic aphasia
Therapy	Inpatient treatment in the neurological department for stroke patients of the Lida Central District Hospital from 07/02/2021 to 07/20/2021 Rehabilitation treatment (including speech therapy sessions) at the health facility Astroulya Regional Psychiatric and Neurological Hospital (the village of Astroulya, Lida district) from 07/21/2021 to 08/02/2021
General linguistic behaviour	Present spontaneous speech, which tends to be rather telegraphic at times, with frequently occurring disruptions of smooth speech flow; clearly expressed division of speech into tone groups, which is achieved by means of pausation; in-situ boundaries of tone groups; emphasis (strong stress) given to nouns; involuntary repetitions of words, abundant perseverations and phonological approximations; slightly pronounced agrammatism (agreement), mild difficulties in switching from one articulatory act to another; reports on sequential errors happening in her “inner speech”; rich vocabulary; relatively unimpaired (mostly preserved) intonation of speech segments, including declarative and interrogative sentences; long pauses marking the beginning of oral performance on practically every task.

Error category	Error type	Cause and effect task	Problem and solution task	Narration / description task	Comparison and contrast task
Segmental level	Sequential errors	1	0	0	0
	Environment errors	0	0	0	0
	Substitutions	12 Anticipatory: 1V + 2C Perseveratory: 2V + 4C Of uncertain aetiology: 3C	9 Anticipatory: 1V + 3C Perseveratory: 2C Of uncertain aetiology: 2V + 1C	15 Anticipatory: 0 Perseveratory: 1V + 4C Of uncertain aetiology: 3V + 7C	6 Anticipatory: 0 Perseveratory: 1V + 1C Of uncertain aetiology: 4C
	Additions	4 = 2V + 2C	1V	7 = 2V + 4C + 1SV	2 = 1C + 1V
	Omissions	17 = 7C + 9V + 1SV	16 = 6V + 10C	10 = 4V + 6C	5 = 2V + 3C
	Sound distortions	2	0	2	2
	Neologisms	1	0	0	0
	Total	**37**	**26**	**34**	**13**
Metrical level	Word stress pattern	3	5	7	3
	Number of syllables	8 = 2I+6D	8 = 1I+7D	5 = 2I+3D	3 = 1I+2D
	CV structure	3	6	3	4
	Total	**14**	**19**	**15**	**10**
Additional error types	Phonological approximations	72	52	71	38
	Perseverations	21	32	41	23
	Semantic paraphasias	4	4	11	5
	Circumlocutions	0	0	3	0
	Intra-word breaks	0	0	0	0
	False starts	7	7	12	3
	Self-corrections	3	7	12	3
	Word search	12	7	27	8
	No-response errors	0	0	0	0
	Ascertaining output correctness	3	2	3	0
	Total	**122**	**111**	**180**	**80**
Total amount of errors made on all levels		**173**	**156**	**229**	**103**

Information on Participant 13	
Age	52
Gender	Male
Hand	Left
Education	Vocational secondary
Languages	Russian, Belarusian
Place of residence	Lida (city), Hrodna region, Belarus
Aetiology and lesion site	CVA leading to the disorder of cerebral circulation in the rostral portion of the inferior frontal gyrus of the left hemisphere
Post onset time	5 years
Type and severity of aphasia	Mild efferent motor aphasia Elements of amnestic aphasia
Therapy	Inpatient treatment in the neurological department for stroke patients of the Lida Central District Hospital from 03/17/2016 to 03/30/2016 Rehabilitation treatment (including speech therapy sessions) at the health facility Astroulya Regional Psychiatric and Neurological Hospital (the village of Astroulya, Lida district) from 04/15/2016 to 05/05/2016 and from 07/30/2021 to 08/20/2021
General linguistic behaviour	Perceptible impression of fluency; high speech rate within a tone group; short tone groups which at times consist of just one lexical unit; frequent, strongly pronounced pausation and, hence, tonal division of utterances; prevalence of nominal sentences; relative rarity of verb employment; sporadic extension of the nominal phrase to three-four elements, with complex vocabulary items being added among others; abundant use of demonstratives; scarcity of personal pronouns; occasionally observed parallel syntactic construction of utterances; frequent use of one and the same verb several times in the description of one picture plot.

Error category	Error type	Cause and effect task	Problem and solution task	Narration / description task	Comparison and contrast task
Segmental level	Sequential errors	0	0	0	1
	Environment errors	0	0	0	0
	Substitutions	14 Anticipatory: 1C Perseveratory: 0 Of uncertain aetiology: 2V + 11C	12 Anticipatory: 0 Perseveratory: 1V Of uncertain aetiology: 2V + 9C	13 Anticipatory: 0 Perseveratory: 3V + 1C Of uncertain aetiology: 2V + 7C	7 Anticipatory: 1C Perseveratory: 1V + 1C Of uncertain aetiology: 4C
	Additions	4 = 2V + 2C	6 = 3C + 3SV	9 = 4V + 4C + 1SV	2 = 1V + 1C
	Omissions	18 = 3V + 14C + 1SV	29 = 4V + 25C	15 = 4V + 11C	24 = 6V + 16C + 2SV
	Sound distortions	6	9	3	8
	Neologisms	4	10	14	6
	Total	**46**	**66**	**54**	**48**
Metrical level	Word stress pattern	1	0	1	1
	Number of syllables	5 = 3D+2I	4D	8 = 4D+4I	7 = 6D+1I
	CV structure	19	24	14	18
	Total	**25**	**28**	**23**	**26**
Additional error types	Phonological approximations	0	6	6	1
	Perseverations	1	2	6	2
	Semantic paraphasias	7	5	1	1
	Circumlocutions	1	0	1	1
	Intra-word breaks	2	2	2	1
	False starts	1	3	2	3
	Self-corrections	0	1	2	1
	Word search	7	12	1	4
	No-response errors	2	1	0	0
	Ascertaining output correctness	1	1	0	0
	Total	**22**	**33**	**21**	**14**
Total amount of errors made on all levels		**93**	**127**	**98**	**88**

Information on Participant 14	
Age	56
Gender	Male
Hand	Right
Education	Vocational secondary
Languages	Russian, Belarusian
Place of residence	Lida (city), Hrodna region, Belarus
Aetiology and lesion site	CVA leading to the disorder of cerebral circulation in the left-hemisphere pre-parietal area 5 of Brodmann occupying the superior parietal lobule
Post onset time	1 month
Type and severity of aphasia	Severe afferent motor aphasia
Therapy	Inpatient treatment in the neurological department for stroke patients of the Lida Central District Hospital from 06/30/2021 to 07/14/2021 Rehabilitation treatment (including speech therapy sessions) at the health facility Astroulya Regional Psychiatric and Neurological Hospital (the village of Astroulya, Lida district) from 07/15/2021 to 08/14/2021
General linguistic behaviour	Modestly preserved fluency; frequently made pauses; mumbling; rather short tone groups; lack of well-defined intonation contours and stress accentuation of the most semantically significant units; entrenched speech emboli; seeming meaningfulness of the produced neologistic paraphasias for the PWA himself; perceived utility of phonological cuing; spared repetition skill; rare expletives occurring to mark the PWA's deep feelings of frustration and dissatisfaction with his own performance on the task.

Error category	Error type	Cause and effect task	Problem and solution task	Narration / description task	Comparison and contrast task
Segmental level	Sequential errors	0	0	0	0
	Environment errors	0	0	0	0
	Substitutions	5 Anticipatory: 1C Perseveratory: 1V Of uncertain aetiology: 1V + 2C	11 Anticipatory: 1V + 1C Perseveratory: 2V Of uncertain aetiology: 7C	21 Anticipatory: 2V + 4C Perseveratory: 3V Of uncertain aetiology: 8V + 4C	8 Anticipatory: 1V + 1C Perseveratory: 3C Of uncertain aetiology: 3C
	Additions	2 = 1V + 1C	1V + 3C	7C	2C
	Omissions	9 = 2V + 7C	52 = 28V + 24C	17 = 7V + 10C	87 = 38V + 46C + 3SV
	Sound distortions	3	1	9	9
	Neologisms	22	43	106	53
	Total	**41**	**111**	**160**	**159**
Metrical level	Word stress pattern	0	7	3	3
	Number of syllables	3 = 2D+1I	29 = 28D+1I	7D	38D
	CV structure	8	7	14	17
	Total	**11**	**43**	**24**	**58**
Additional error types	Phonological approximations	0	11	25	12
	Perseverations	3	21	20	8
	Semantic paraphasias	7	20	31	14
	Circumlocutions	0	0	0	0
	Intra-word breaks	1	8	10	2
	False starts	0	7	6	0
	Self-corrections	0	3	0	0
	Word search	0	0	11	2
	No-response errors	0	0	3	0
	Ascertaining output correctness	0	0	0	0
	Total	**11**	**70**	**106**	**38**
Total amount of errors made on all levels		**63**	**224**	**290**	**255**

Information on Participant 15	
Age	69
Gender	Female
Hand	Right
Education	Secondary
Languages	Russian, Belarusian, German (limited passive knowledge)
Place of residence	Navahrudak (town), Hrodna region, Belarus
Aetiology and lesion site	Recurrent (2nd) CVA leading to the disorder of cerebral circulation in the left carotid system
Post onset time	64 days 1st CVA was in December of 2019
Type and severity of aphasia	Mild efferent motor aphasia
Therapy	Inpatient treatment in the neurological department for stroke patients of the Navahrudak Central District Hospital from 05/28/2021 to 06/09/2021 Rehabilitation treatment (including 8 speech therapy sessions) at the health facility Astroulya Regional Psychiatric and Neurological Hospital (the village of Astroulya, Lida district) from 06/10/2021 to 06/25/2021
General linguistic behaviour	Minor impairment of oral-articulatory praxis, occasional difficulties in switching from one articulatory posture to another; preserved spontaneous speech of a perceptible telegraphic character, with multiple disruptions of general speech flow by pausation; very short tone groups often ending abruptly; relatively spared intonation patterns; utterances frequently having identical beginnings or endings used as a method of speech compensation; repetitive usage of the same lexical units in describing a situation, again in a bid to make up for rather slow pace of speech and gain some time while recollecting a target word; tip of the tongue phenomenon; mild agrammatism in speech, in particular, when it comes to pronoun gender; agrammatical reading and writing; fully preserved speech comprehension; silent intentional word searches serving to hinder erroneous productions; self-conscious commentaries about the experienced speech impairment and the difficulties associated with it, e.g., “I can’t say the word, it won’t come”; decent vocabulary; manifest, uncontrolled bilingualism; laughing and positive attitude.

Error category	Error type	Cause and effect task	Problem and solution task	Narration / description task	Comparison and contrast task
Segmental level	Sequential errors	0	0	1	0
	Environment errors	0	0	0	0
	Substitutions	3 Anticipatory: 1V Perseveratory: 1C Of uncertain aetiology: 1C	3 Anticipatory: 0 Perseveratory: 0 Of uncertain aetiology: 3C	3 Anticipatory: 0 Perseveratory: 1V + 1C Of uncertain aetiology: 1C	3 Anticipatory: 1V + 1C Perseveratory: 1V Of uncertain aetiology: 0
	Additions	2 = 1V + 1C	1C	1C	0
	Omissions	1C	1SV	0	1V
	Sound distortions	4	2	2	2
	Neologisms	1	0	2	0
	Total	**11**	**7**	**9**	**6**
Metrical level	Word stress pattern	0	0	1	1
	Number of syllables	1I	1D	0	1D
	CV structure	1	1	1	1
	Total	**2**	**2**	**2**	**3**
Additional error types	Phonological approximations	16	15	24	11
	Perseverations	5	3	10	3
	Semantic paraphasias	3	2	3	0
	Circumlocutions	1	0	0	0
	Intra-word breaks	0	1	1	1
	False starts	8	8	10	1
	Self-corrections	4	4	5	0
	Word search	17	27	27	13
	No-response errors	1	1	0	0
	Ascertaining output correctness	0	0	0	0
	Total	**55**	**61**	**80**	**29**
Total amount of errors made on all levels		**68**	**70**	**91**	**38**

Information on Participant 16	
Age	69
Gender	Male
Hand	Right
Education	Vocational secondary
Languages	Russian, Belarusian, German (limited passive knowledge)
Place of residence	Navahrudak (town), Hrodna region, Belarus
Aetiology and lesion site	Recurrent (2nd) CVA leading to the disorder of cerebral circulation in the left carotid arterial system
Post onset time	4 years
Type and severity of aphasia	Severe sensorimotor aphasia
Therapy	Inpatient treatment in the neurological department for stroke patients of the Navahrudak Central District Hospital from 10/17/2017 to 10/29/2017 and from 04/03/2019 to 04/16/2019 Rehabilitation treatment (including speech therapy sessions) at the health facility Astroulya Regional Psychiatric and Neurological Hospital (the village of Astroulya, Lida district) from 11/13/2017 to 12/03/2017
General linguistic behaviour	Non-fluent speech; perceived non-tenseness of speech efforts; relatively restored auditory comprehension skills; abundance of intra-word breaks which arise as a result of the PWA's attempting to arrive at a target phoneme relying on slow output rate; consequent absence of fully developed tone groups; extremely short tone groups; entrenched speech emboli; unwanted use of certain affixes on nouns; unintended repetitions of the same syllable giving rise to lengthy non-word phonemic sequences, which probably fulfils a compensatory function; welcoming of coupled and reflected uttering; preserved or restored skill of accurate repetition of mono- and disyllabic words (in their majority), though, inaccurate repetition of multisyllabic lexical units; highly positive attitude towards describing the plots; frequent laughing.

Error category	Error type	Cause and effect task	Problem and solution task	Narration / description task	Comparison and contrast task
Segmental level	Sequential errors	0	0	0	3
	Environment errors	0	0	0	0
	Substitutions	18 Anticipatory: 3V + 5C Perseveratory: 1V + 4C Of uncertain aetiology: 1V + 4C	30 Anticipatory: 1V + 3C Perseveratory: 3V + 3C Of uncertain aetiology: 3V + 17C	52 Anticipatory: 3V + 4C Perseveratory: 2V + 13C Of uncertain aetiology: 3V + 27C	32 Anticipatory: 3V + 10C Perseveratory: 1V + 3C Of uncertain aetiology: 1V + 14C
	Additions	4 = 1V + 3C	14 = 7V + 7C	31 = 9V + 19C + 3SV	17 = 7V + 10C
	Omissions	43 = 17V + 26C	28 = 7V + 21C	48 = 17V + 31C	66 = 18V + 42C + 6SV
	Sound distortions	14	10	9	7
	Neologisms	31	28	39	7
	Total	**110**	**110**	**179**	**129**
Metrical level	Word stress pattern	0	0	0	0
	Number of syllables	18 = 17D+1I	14 = 7D+7I	26 = 17D+9I	25 = 18D+7I
	CV structure	13	28	31	17
	Total	**31**	**42**	**57**	**42**
Additional error types	Phonological approximations	24	23	28	28
	Perseverations	34	32	48	12
	Semantic paraphasias	4	0	7	6
	Circumlocutions	0	0	0	0
	Intra-word breaks	36	39	52	69
	False starts	7	0	13	3
	Self-corrections	0	0	6	3
	Word search	1	7	8	7
	No-response errors	0	0	0	0
	Ascertaining output correctness	0	0	0	0
	Total	**106**	**101**	**162**	**128**
Total amount of errors made on all levels		**247**	**253**	**398**	**300**

Information on Participant 17	
Age	73
Gender	Male
Hand	Right
Education	Secondary technical, driver by occupation
Languages	Russian, Belarusian, German (limited passive knowledge)
Place of residence	Kharositsa (village), Hrodna region, Belarus
Aetiology and lesion site	Recurrent (2nd) CVA leading to the disorder of cerebral circulation in the superior division of the left middle cerebral artery
Post onset time	4 days
Type and severity of aphasia	Moderate efferent motor aphasia
Therapy	Inpatient treatment in the neurological department for stroke patients of the Navahrudak Central District Hospital from 08/18/2021 to 08/30/2021 Rehabilitation treatment following the first CVA (including speech therapy sessions) at the health facility Aksakaushchina Republican Clinical Hospital of Medical Rehabilitation (the village of Aksakaushchina, Minsk region) from 10/14/2019 to 11/04/2019
General linguistic behaviour	Preserved spontaneous speech of a rather pronounced telegraphic character, with multiple disruptions of general speech flow by pausation as well as prolonged vocalic and even consonantal elements presumably serving for filling the gaps when searching for a target word; moderate agrammatism; reports on high degree of complexity of the narration/description tasks; self-conscious commentaries about the experienced speech impairment and the difficulties associated with it; occasional pointing with finger to described objects in the picture, most probably in a bid to get linguistic assistance in finding target words; skilful use of culturally specific clichés; very short tone groups often ending abruptly; relatively spared intonation patterns; decent vocabulary; manifest, uncontrolled bilingualism; willingness to intersperse the task performance procedure with stories about life experiences relevant to the contents of the pictures being presented; frequent laughing and positive attitude.

Error category	Error type	Cause and effect task	Problem and solution task	Narration / description task	Comparison and contrast task
Segmental level	Sequential errors	0	0	1	0
	Environment errors	0	1	2	0
	Substitutions	16 Anticipatory: 1V + 5C Perseveratory: 2V Of uncertain aetiology: 1V + 7C	16 Anticipatory: 2V Perseveratory: 4V + 4C Of uncertain aetiology: 2V + 4C	9 Anticipatory: 1V + 2C Perseveratory: 3V Of uncertain aetiology: 2V + 1C	4 Anticipatory: 1C Perseveratory: 1V Of uncertain aetiology: 2C
	Additions	4 = 2V + 2C	5 = 2V + 2C + 1SV	5 = 3V + 1C + 1SV	2 = 1V + 1SV
	Omissions	4C	18 = 7V + 10C + 1SV	9 = 3V + 5C + 1SV	5 = 2V + 2C + 1SV
	Sound distortions	6	13	19	3
	Neologisms	4	4	3	0
	Total	**34**	**57**	**48**	**11**
Metrical level	Word stress pattern	3	3	0	1
	Number of syllables	1I	7 = 5D+2I	6 = 3I + 3D	3 = 2D + 1I
	CV structure	4	10	6	1
	Total	**8**	**20**	**12**	**5**
Additional error types	Phonological approximations	27	42	55	12
	Perseverations	16	10	27	5
	Semantic paraphasias	2	2	2	0
	Circumlocutions	0	0	0	0
	Intra-word breaks	2	3	2	2
	False starts	7	11	17	6
	Self-corrections	2	2	0	0
	Word search	9	13	26	3
	No-response errors	2	1	1	0
	Ascertaining output correctness	1	0	0	0
	Total	**68**	**84**	**130**	**28**
Total amount of errors made on all levels		**110**	**161**	**190**	**44**

Information on Participant 18	
Age	58
Gender	Female
Hand	Right
Education	Vocational secondary
Languages	Russian, Belarusian
Place of residence	Navahrudak (town), Hrodna region, Belarus
Aetiology and lesion site	Recurrent (2nd) CVA leading to the disorder of cerebral circulation in the supramarginal area 40 of Brodmann
Post onset time	14 days
Type and severity of aphasia	Severe afferent motor aphasia
Therapy	Inpatient treatment in the neurological department for stroke patients of the Navahrudak Central District Hospital from 03/12/2013 to 03/26/2013 and from 08/06/2021 to 08/26/2021
General linguistic behaviour	Absence of speech fluency; regular disruptions of the speech flow; frequent, pronounced placement of pauses; very short tone groups; properly set tone group boundaries; progressively disturbed tonal division with the accumulation of tiredness; lack of clearly defined intonation contours; noticeable rarity of personal pronouns; tendency to produce a bigger number of errors towards the end of a tonal group; perceptible influence of bilingualism; positive attitude towards task completion.

Error category	Error type	Cause and effect task	Problem and solution task	Narration / description task	Comparison and contrast task
Segmental level	Sequential errors	2	0	1	2
	Environment errors	0	0	0	0
	Substitutions	33 Anticipatory: 2C Perseveratory: 3V + 5C Of uncertain aetiology: 2V + 21C	24 Anticipatory: 3C Perseveratory: 3V + 4C Of uncertain aetiology: 1V + 13C	28 Anticipatory: 0 Perseveratory: 8C Of uncertain aetiology: 2V + 18C	23 Anticipatory: 0 Perseveratory: 6C Of uncertain aetiology: 2V + 15C
	Additions	13 = 6V + 6C + 1SV	18 = 10V + 8C	10 = 4V + 6C	5V
	Omissions	40 = 10V + 29C + 1SV	51 = 7V + 44C	35 = 12V + 22C + 1SV	19 = 9V + 7C + 3SV
	Sound distortions	11	13	13	12
	Neologisms	21	18	23	5
	Total	**101**	**124**	**110**	**66**
Metrical level	Word stress pattern	1	0	3	2
	Number of syllables	16 = 10D+6I	17 = 7D+10I	14 = 10D+4I	8 = 6D+2I
	CV structure	32	46	23	13
	Total	**49**	**63**	**40**	**23**
Additional error types	Phonological approximations	0	1	0	2
	Perseverations	6	0	4	0
	Semantic paraphasias	2	2	5	0
	Circumlocutions	0	1	0	0
	Intra-word breaks	1	2	2	0
	False starts	0	0	1	0
	Self-corrections	1	4	3	3
	Word search	0	2	6	2
	No-response errors	0	0	0	0
	Ascertaining output correctness	1	0	0	0
	Total	**11**	**12**	**21**	**7**
Total amount of errors made on all levels		**161**	**199**	**171**	**96**

Appendix B. Key background information on the participants. M = male, F = female, R = right, L = left

Parti-cipant	Age	Gender	Hand	Education	Languages	Place of residence	Post onset time	Type and severity of aphasia
1	62	M	R	Higher	Russian, Belarusian, German	Navahrudak	18 days	Mild acoustic-gnostic
2	66	M	R	Secondary	Russian, Belarusian, Polish	Orkavichy	13 days	Moderate afferent motor
3	52	F	L	Vocational secondary	Russian, Belarusian	Shchorsy	28 years	Mild efferent motor
4	83	M	R	Lower secondary	Russian, Belarusian	Lauryshava	2 years	Mild efferent motor
5	53	M	R	Secondary	Russian, Belarusian	Shchorsy	1 year	Mild afferent motor
6	68	F	R	Higher	Russian, Belarusian	Vitebsk	1 year	Severe sensorimotor
7	21	M	L	Home-schooling	Russian, Latvian	Riga	18 years	Moderate efferent motor
8	69	F	R	Vocational secondary	Russian	Moscow	4 years 9 months	Moderate acoustic-mnestic with elements of efferent motor
9	69	M	R	Secondary	Russian, Belarusian	Minsk	1 year 7 months	Severe sensorimotor
10	53	M	R	Higher	Russian, Belarusian, English	Minsk	12 years 6 months	Moderate afferent motor
11	55	M	R	Vocational secondary	Russian, Belarusian	Lida	9 months	Severe efferent motor with elements of amnestic
12	71	F	R	Vocational secondary	Russian, Belarusian	Lida	24 days	Mild efferent motor with elements of acoustic-mnestic
13	52	M	L	Vocational secondary	Russian, Belarusian	Lida	5 years	Mild efferent motor with elements of amnestic
14	56	M	R	Vocational secondary	Russian, Belarusian	Lida	1 month	Severe afferent motor
15	69	F	R	Secondary	Russian, Belarusian, German	Navahrudak	1 year 8 months	Mild efferent motor
16	69	M	R	Vocational secondary	Russian, Belarusian, German	Navahrudak	4 years	Severe sensorimotor

Parti-cipant	Age	Gender	Hand	Education	Languages	Place of residence	Post onset time	Type and severity of aphasia
17	73	M	R	Vocational secondary	Russian, Belarusian, German	Kharositsa	4 days	Moderate efferent motor
18	58	F	R	Vocational secondary	Russian, Belarusian	Navahrudak	14 days	Severe afferent motor

Appendix C. Detailed descriptive information on the tasks performed by the study participants

Picture plot number	Cause-and-effect	Problem-and-solution	Narration / description	Contrast-and-comparison
1	“Withered plant”	“Sick child”	“Melting snowman”	“Strong and weak”
2	“Burnt pie”	“Pickpocket”	“Flower planting”	“Clean and dirty”
3	“Missing the bus”	“Losing a shoe in the puddle"	“Baking biscuits"	“Onion and strawberry”
4	“Slipping on the ice”	“Child and house fire”	“Sledding”	“Summer and winter”
5	“Tooth decay”	“Mom’s torn bead necklace”	“Bird feeding”	“Snow White and her Wicked Stepmother"
6	“Flunker”	“Hooked on a fence nail”	“Adopting a puppy”	“Village and town"
7	“Marine litter”	“Broken bicycle”	“Finding an egg in the bush"	“Family and loneliness"

Appendix D. Informed consent form and its translation from Russian into English

Форма информированного согласия пациента на участие в исследовании

Название исследования	*Кросс-жанровый аспект производства фонологических парафазий и неологизмов пациентами с афазией*
Ф.И.О. исследователя	*Колосовская Анастасия Александровна*
Место проведения исследования	*Республика Беларусь, г. Новогрудок, УЗ "Новогрудская центральная районная больница"*
Цель исследования	*Сбор и последующий анализ аутентичных данных, которые были бы полезны в изучении звуковых нарушений в афазийной речи пациентов при выполнении заданий разной жанровой принадлежности*
Роль исследования	*Пациент, принимающий участие в данном исследовании, вносит неоценимый вклад в дело изучения афазийных речевых расстройств, а также связанных с ними медицинских состояний, возникающих в результате повреждения функции головного мозга.*
Риски, связанные с данным исследованием	*Риски и неудобства, которые потенциально могли бы присутствовать в исследовании данного типа, исключены.*
Задача пациента	*Описать ряд картинок, предложенных исследователем*

1) Я был(-а) ознакомлена с целью и принципами данного исследования и имел(-а) возможность **задать любые** интересующие меня **вопросы**.

2) Я понимаю, что участвую в данном исследовании **исключительно на добровольной основе**.

3) Я знаю, что мой доктор был(-а) уведомлен(-а) о моем участии в данном исследовании. Я также **не возражаю** против того, чтобы исследователь получил **доступ к данным о моем медицинском состоянии**.

4) Я даю согласие на то, чтобы при выполнении задания моя речь была записана на **звукозаписывающее устройство**.

5) Я даю согласие на то, чтобы образцы моей речи были переведены из звуковой формы в графическую посредством **транскрибирования**.

6) Я могу устраивать **перерывы** в любое удобное для меня время и **не обязан(а) проходить исследование целиком** в течение одной сессии.

7) Я имею право **пропускать** те **части задания**, которые я нахожу неприемлемыми или слишком сложными для выполнения.

8) Я имею **право отказаться от участия** в исследовании **в любой момент**, как во время его проведения, так и после, без уточнения причин моего отказа. При этом исследователь будет обязан удалить все данные, которые я предоставил(-а).

9) Я понимаю, что вся предоставленная мной информация будет обрабатываться и храниться **в конфиденциальном режиме**. Только исследователь будет иметь право на ее использование. Исследователь обязуется не распространять и не использовать собранные данные где-либо, кроме научной работы.

10) Я был уведомлен(-а), что **мои фамилия, имя и отчество нигде не будут упомянуты**. Вместо этого мне будет присвоен личный числовой код.

11) Я понимаю, что могу в любой момент получить **доступ к собранной информации**, а также непосредственно **к**

результатам исследования.

12) Я получил(-а) **копию данной формы** информированного согласия в личное распоряжение.
13) В случае возникновения каких-либо вопросов, я могу **обратиться напрямую к исследователю**, связавшись с ним по телефону (моб. +375292653600 (МТС), +375445833747 (Velcom), дом. 80159749760)) или электронной почте (nastassia.kalasouskaya@gmail.com).

Настоящей подписью я, **участник исследования**, подтверждаю, что **согласен(-на)** со всеми вышеперечисленными пунктами формы:	Настоящей подписью я, **исследователь**, подтверждаю, что мною было **получено** добровольное **согласие** пациента на участие в исследовании:
_____	_____

Дата: _____

Translation:

1) I have been familiarised with the purpose and principles of the present study and have had the opportunity to **ask any questions** that are of interest to me.

2) I understand that I am participating in this study **on a purely voluntary basis**.

3) I know that my doctor has been informed of my participation in this study. I also **have no objection** to the researcher having **access to my medical records**.

4) I am giving consent to having my speech recorded on **a sound recording device** during the task completion.

5) I am giving consent to having my speech sample translated from auditory to graphic form by means of **transcription**.

6) I am at liberty to take **breaks** at any time I feel the need for it as well as **under no obligation to complete the entire study** in one session.

7) I have the right to **skip** those **parts of the task** that I find inappropriate or too difficult to complete.

8) I have **the right to refuse participation** in the study **at any point of time**, both during the session and after it, without specifying the reasons for my refusal. In this scenario, the researcher is obliged to delete all the data that I have provided.

9) I understand that all information I provide will be treated and kept **confidential**. Only the researcher will have access to it and the right to use it. The researcher undertakes not to distribute or employ the collected data anywhere else but for the purpose of scientific research.

10) I have been informed that **my last name, first name and patronymic will not be mentioned anywhere** in the research paper. Instead, I will be assigned a personal numeric code.

11) I understand that I can at any time have **access to the information collected** as well as **to the results of the study**.

12) I have received **a copy of this** informed consent **form** for my personal use.

13) If I have any questions, I am encouraged to **contact the researcher directly** by using her phone number (mobile phone numbers +375292653600 (MTC), +375445833747 (Velcom), home directory number 80159749760)) or email (nastassia.kalasouskaya@gmail.com).

Appendix E. Example of the phonological error analysis in the narration/description generic plot "Melting snowman" elicited from Participant 12

Original in the transcription form	Literal translation into English
1 INTERVIEWER: … chetyri kartinki, (0.5)sastavit' v adin raskas. (0.5)shto praishodit. 2 PWA: (3)m:(5)°tak°(2)na ulice */ʂtu—/ (PA) /ʂ::/ (PA) /ʂtu:ʐ:əjə/ (1CPS,1SVA+1VA,INS2→3)* (0.5)stop(0.2) */ʂtu:ʐ:əjə/, (1SVA+1VA,INS2→3)* (0.1)°net° *(SC)* (0.1)na ulice↑—*(FS)* (.)net(.)ni to *(SC)* (3) */ʂtu:ʐ:ə/* (0.2)na ulice stuzha. *(AOC)* (4)fse ochen' raduyutsya(.)smotryat na(0.2)etogo(.) eta kak ona *(WS)* (.)baba °tak°(.)em:::((tongue clicking))m:: ((tongue clicking)) *(WS)* (2) */ʐʐ::/ (PA) /ʂʲɲʲɛʐ—/ (PA)* snezhnaya baba,(1.5)kakoe-to vremya(.) */pɾa—/ (FS)* (.) */ɲa—/ (PA)* nachala *(WSP)* (.)potihonechku(.)teplet'↑(.)stala bol'she solnyshka↑(1)uzhe_(1)baba:_(1) e::: *(WS)* oj (2) snezhnaya baba *(SC)* (0.2)prigoryunilas'(3)s kazhdym(0.5)>s kazhdym *(Persev)* razom solnyshka< eshchyo bol'she i bol'she(0.1)bol'she(.)>i bol'she< *(Persev)* (.)e::*(WS)* */ʂ::/* (.) ((tongue clicking)) *(PA)* SVETIT. (.)GREET.(2)BABA yaga *(SP)* (1)voobshche_—(0.3)>tak(.)tam prigoryunilas' byla<(.)°a shto sh ana zdes' zdelala° *(WS)* (1.5)°tut ej uzhe >ploha kaneshna<(.)>savsem ploha >no kak eta skazat'<<°(2)hhhh((tongue clicking))hhhh ((tongue clicking)) *(WS)* (3)A::↓(.)baba yaga *(SP)* (.)nachala *(WSP)* (0.2)slyozy, (0.2)£s:lyozy£ LIT'.(.)ne. *(SC)* (.)nachala *(WSP)* plakat' (1) */ʂi::::—/ (FS)* (3)°>tak tak tak tak tak<° *(WS)* (1)°baba yaga,° *(SP)* (2)° */ɲat͡ʲɛ—/ (PA)* >nachala nachala nachala<° *(3WSP,3Persev)* (2)stala */ plak—/ (PA)* pla:-kat'(3)>a cheres kakoe-to(.)vremya,(1) */ʂ:—/ (FS)* baba yaga *(SP)* (.)vaapshche(.)umerla. *(WSP)* (.)>oj ne umerla *(WSP)*<*(SC)* (2)°nu kak eta° *(WS)* (.)baba yaga, *(SP)* */ ɛ:::ɾ//ɛ:::ɾ//ɛ:m::/*°>tak tak tak tak<° *(WS)* (0.5)ni #razmyakla# *(SC)* (.)a */ɾaʂ:—/ (PA)* (1)RASTAYALA. (.)rastayala. *(AOC)*	1 INTERVIEWER: … four pictures,(0.5)to make into one story.(0.5)what is happening. 2 PWA: (3)uhm:(5)°well°(2)in the street */ʂtu—//ʂ:::/ʂtu:ʐ:əjə/* ((attempts at producing the noun "cold"))(0.5)stop(0.2) */ʂtu:ʐ:əjə/*,((mistargeted "cold")) (0.1)°no°(0.1)in the street↑—(.)no(.)not that(3) */ʂtu:ʐ:ə/* ((correctly produced target "cold"))(0.2)in the street cold.(4)all very are cheering (.)looking at(0.2)this ((masculine))(.) this ((feminine)) how she(.)woman °well°(.)uhm:::((tongue clicking))m:: ((tongue clicking))(2) */ʐʐ::// ʂʲɲʲɛʐ—/* ((attempts at producing the adjective "snow(y)"))snow woman,(1.5)some time(.) */pɾa—/* ((failed word production attempt))(.) */ɲa—/* ((aborted attempt at producing the verb "began" (feminine)))began(.)inchmeal(.)to warm up'↑(.)became more sun↑(1)yet(1)woman:_(1) e::: oops (2) snow woman(0.2)became sad'(3)with every(0.5)>with every time sun< yet more and more(0.1)more(.)>and more<(.)e:: */ʂ::/* ((attempt at producing the verb "shines"(third person, singular)))(.)((tongue clicking)) shines.(.)warms.(2)BABA yaga(1)altogether_—(0.3)>well(.)there became sad' was<(.)°and what she here' did°(1.5)°here to her((Dative case))yet >bad of course<(.)>really bad> but how this to say'<<°(2)hhhh((tongue clicking))hhhh ((tongue clicking))(3)A::↓(.)baba yaga(.)began(0.2)tears,(0.2)£tears£ TO SHED'. (.)no.(.)began crying'(1) */ʂi::::—/* ((failed word production attempt))(3)°>well well well well well<°(1)°baba yaga,°(2)° */ɲat͡ʲɛ—/* ((aborted attempt at producing the verb "began" (feminine)))>began began began<°(2)became */plak—/* ((failed attempt at producing the verb "to cry"))to cry'(3)>and over some(.)time,(1) */ʂ:—/* ((aborted word production attempt))baba yaga(.)altogether(.)died.(.)>oops not died<(2)°nu((an untranslatable discourse marker and filler word))how this°(.)baba yaga, */ɛ:::ɾ//ɛ:::ɾ//ɛm::/*°((attempts at producing the verb "melted (away)"(feminine)))>well well well well<°(0.5)not #softened#((feminine))(.)but */ ɾaʂ:—/* ((attempts at producing the verb "melted (away)"(feminine)))(1)MELTED AWAY. (.)melted away.

Appendix F. Tables employed in Results and Discussion

Table 1. *Quantitative pattern of phonological errors made by Participant 16 diagnosed with severe sensorimotor aphasia on the cause-and-effect generic tasks*

	"Withered plant"	"Burnt pie"	"Missing the bus"	"Slipping on the ice"	"Tooth decay"	"Flunker"	"Marine litter"
Segmental errors	11	6	6	30	26	17	14
Metrical errors	4	2	3	8	5	5	4
Other error categories	8	5	1	17	45	16	14
Total number	**23**	**13**	**10**	**55**	**76**	**38**	**32**

Table 2. *Quantitative pattern of phonological errors made by Participant 1 diagnosed with mild acoustic-gnostic aphasia on the problem-and-solution generic tasks*

	"Sick child"	"Pick-pocket"	"Losing a shoe in the puddle"	"Child and house fire"	"Mom's torn bead necklace"	"Hooked on a fence nail"	"Broken bicycle"
Segmental errors	5	4	14	11	19	4	7
Metrical errors	3	2	8	10	8	0	4
Other error categories	1	1	2	0	3	0	3
Total number	**9**	**7**	**24**	**21**	**30**	**4**	**14**

Table 3. *Quantitative pattern of phonological errors made by Participant 12 diagnosed with mild efferent motor aphasia with the elements of acoustic-mnestic one on the narration/ description generic tasks*

	"Melting snowman"	"Flower planting"	"Baking bisquits"	"Sledding"	"Bird feeding"	"Adopting a puppy"	"Finding an egg in the bush"
Segmental errors	1	5	14	1	0	3	9

	"Melting snowman"	"Flower planting"	"Baking bisquits"	"Sledding"	"Bird feeding"	"Adopting a puppy"	"Finding an egg in the bush"
Metrical errors	8	1	5	0	0	0	0
Other error categories	36	5	71	5	10	22	31
Total number	**45**	**11**	**90**	**6**	**10**	**25**	**40**

Table 4. *Quantitative pattern of phonological errors made by Participant 2 diagnosed with moderate afferent motor aphasia on the comparison-and-contrast generic tasks*

	"Strong and weak"	"Clean and dirty"	"Onion and strawberry"	"Summer and winter"	"Snow White and her Wicked Stepmother"	"Village and town"	"Family and loneliness"
Segmental errors	5	18	20	19	16	22	6
Metrical errors	0	6	6	5	1	1	1
Other error categories	0	18	8	11	30	5	5
Total number	**5**	**42**	**34**	**35**	**47**	**28**	**12**

Table 5. *Quantitative pattern of phonological errors made by Participant 8 diagnosed with moderate acoustic-mnestic aphasia with the elements of efferent motor one on the problem-and-solution generic tasks*

	"Sick child"	"Pick-pocket"	"Losing a shoe in the puddle"	"Child and house fire"	"Mom's torn bead necklace"	"Hooked on a fence nail"	"Broken bicycle"
Segmental errors	2	1	4	6	3	0	1
Metrical errors	1	1	1	4	1	0	0
Other error categories	8	31	54	25	21	15	8
Total number	**11**	**33**	**59**	**35**	**25**	**15**	**39**

***Table 6**. Qualitative pattern of phonological errors made by Participant 16 diagnosed with severe sensorimotor aphasia on the cause-and-effect generic tasks*

	"Withered plant"	"Burnt pie"	"Missing the bus"	"Slipping on the ice"	"Tooth decay"	"Flunker"	"Marine litter"
Segmental errors	1VAS 1CAS 2VO 3CO 1Neol	1CAS 1VO 1CO 2SD 1Neol	2VO 3CO 1Neol	2CAS 1VPS 1CPS 1VSUA 2CSUA 1CA 5VO 9CO 3SD 5Neol	1VAS 2CPS 1VA 1CA 1VO 1CO 5SD 14Neol	1VAS 1CAS 1VA 2VO 2CO 1SD 9Neol	1CAS 1CSUA 2VO 2CO 1SD 7Neol
Metrical errors	2DNS 1CV	1DNS 1CV	2DNS 1CV	5DNS 3CV	1INS 1DNS 3CV	1INS 2DNS 2CV	2DNS 2CV
Other error categories	3PA 4IWB 1FS	4PA 1Persev	1PA	1PA 4Persev 10IWB 2FS	8PA 19Persev 3SP 12IWB 2FS 1WS	2PA 5Persev 8IWB 1FS	1PA 6Persev 6IWB 1WS

***Table 7**. Qualitative pattern of phonological errors made by Participant 1 diagnosed with mild acoustic-gnostic aphasia on the problem-and-solution generic tasks*

	"Sick child"	"Pick-pocket"	"Losing a shoe in the puddle"	"Child and house fire"	"Mom's torn bead necklace"	"Hooked on a fence nail"	"Broken bicycle"
Segmental errors	2VO 3CO	2CO 2Neol	1CAS 1VSUA 1CSUA 1VA 1CA 3VO 1CO 4SD 1Neol	1VA 1CA 1VO 5CO 1SD 2Neol	1CAS 3CSUA 1VA 4VO 5CO 4SD 1Neol	1CPS 2CSUA 1Neol	1CAS 1VSUA 1CSUA 1VO 3CO
Metrical errors	2DNS 1CV	2CV	1INS 3DNS 4CV	1INS 1DNS 8CV	3DNS 5CV	0	1DNS 3CV
Other error categories	1PA	1NR	1PA 1WS	0	1PA 1FS 1AOC	0	1FS 1SC 1WS

Table 8. *Qualitative pattern of phonological errors made by Participant 12 diagnosed with mild efferent motor aphasia with the elements of the acoustic-mnestic one on the narration/ description generic tasks*

	"Melting snowman"	"Flower planting"	"Baking bisquits"	"Sledding"	"Bird feeding"	"Adopting a puppy"	"Finding an egg in the bush"
Segmental errors	1VA	1CPS 2CSUA 1CO 1SD	1VPS 1CPS 2CSUA 1VA 1SVA 4VO 5CO	1SD	0	3CSUA	2CPS 3VSUA 4CA
Metrical errors	6WSP 1INS 1CV	1CV	1INS 3DNS 1CV	0	0	0	0
Other error categories	10PA 10Persev 3SP 2FS 6SC 5WS	5PA	24PA 20Persev 5SP 3Circum 4FS 3SC 10WS	1PA 2FS 1WS 1AOC	3PA 2Persev 1FS 1SC 3WS	6PA 8Persev 1SP 1FS 4WS 2AOC	22PA 1Persev 2FS 2SC 4WS

Table 9. *Qualitative pattern of phonological errors made by Participant 2 diagnosed with moderate afferent motor aphasia on the comparison-and-contrast generic tasks*

	"Strong and weak"	"Clean and dirty"	"Onion and strawberry"	"Summer and winter"	"Snow White and her Wicked Stepmother"	"Village and town"	"Family and loneliness"
Segmental errors	1SD 4Neol	1CA 2VO 4CO 1SVO 3SD 7Neol	1VAS 1CAS 3CSUA 2VA 1CA 1VO 1CO 1SD 9Neol	1CSUA 1CA 1SVA 2VO 14Neol	1VAS 1CAS 2CSUA 1VO 1SD 10Neol	1CO 1SD 20Neol	2CSUA 1VA 3Neol
Metrical errors	0	2DNS 4CV	2INS 1DNS 3CV	2DNS 3CV	1DNS	1CV	1INS

	"Strong and weak"	"Clean and dirty"	"Onion and strawberry"	"Summer and winter"	"Snow White and her Wicked Stepmother"	"Village and town"	"Family and loneliness"
Other error categories	0	5PA 5Persev 1SP 2Circum 1FS 4WS	1PA 3SP 1Circum 3WS	3PA 1SP 1Circum 4FS 2WS	14PA 6Persev 3SP 1Circum 1FS 1SC 4WS	1PA 1Persev 1Circum 2WS	4PA 1Persev

Table 10. *Qualitative pattern of phonological errors made by Participant 8 diagnosed with moderate acoustic-mnestic aphasia with the elements of the efferent motor one on the problem-and-solution generic tasks*

	"Sick child"	"Pick-pocket"	"Losing a shoe in the puddle"	"Child and house fire"	"Mom's torn bead necklace"	"Hooked on a fence nail"	"Broken bicycle"
Segmental errors	1VPS 1CO	1CO	1VA 1CA 2SD	2CSUA 1CA 1VO 2CO	1VPS 1CPS 1CO	0	1Neol
Metrical errors	1CV	1CV	1INS	1DNS 3CV	1CV	0	0
Other error categories	2PA 1Circum 1FS 3WS 1AOC	11PA 3Persev 5Circum 1FS 10WS 1AOC	23PA 10Persev 1SP 2Circum 6FS 3SC 9WS	9PA 5Persev 1Circum 1FS 3SC 5WS 1NR	9PA 1Persev 2SP 1Circum 5FS 3WS	6PA 2Persev 1SP 2FS 3WS 1AOC	7PA 5Persev 1SP 6Circum 5FS 2SC 10WS 2AOC

The system of abbreviations and clips outlined below applies to Tables 10–14:

VAS = vowel anticipatory substitution, CAS = consonant anticipatory substitution, VPS = vowel perseveratory substitution, CPS = consonant perseveratory substitution, VSUA = vowel substitution of uncertain aetiology, CSUA = consonant substitution of uncertain aetiology, VA = vowel addition, CA = consonant addition, SVA = semi-vowel addition, VO = vowel omission, CO = consonant omission, SVO = semi-vowel omission, SD = sound distortion, Neol = neologism, INS = increased number of syllables, DNS = decreased number of syllables, WSP = word-stress pattern error, CV = consonant-vowel structure error, PA = phonological approximation, Persev = perseveration, SP = semantic paraphasia, Circum = circumlocution, IWB = intra-word break, FS = false start, SC = self-correction, WS = word search, NR = no-response error, AOC = ascertaining output correctness.

Table 11. *Erroneous productions of Participant 6 ranked by occurrence frequency*

Most strongly affected	Error type	The largest number per generic task	The average number per generic task	Additional details
Participant 6 (severe sensorimotor aphasia)				
1. Additional error types 488 in total 122 on average	1. Intra-word breaks	78	51,25	
	2. Phonological approximations	52	24	
	3. False starts	24	16,25	
	4. Word search	31	15,25	
	5. Semantic paraphasias	21	13,25	
	6. Ascertaining output correctness	3	1,5	
	7. No-response errors	2	0,5	
2. Segmental level 212 in total 53 on average	1. Omissions	39	21,75	6SV + 17V + 64C
	2. Substitutions	28	13,5	8A, 10P, 36UA 15V + 39C
	3. Neologisms	13	9,5	
	4. Additions	14	7	21V + 7C
	5. Sound distortions	3	1,25	
3. Metrical level 93 in total 23,25 on average	1. CV structure	21	13,75	
	2. Number of syllables	18	9,5	21I + 17D

Table 12. *Erroneous productions of Participant 9 ranked by occurrence frequency*

Most strongly affected	Error type	The largest number per generic task	The average number per generic task	Additional details
Participant 9 (severe sensorimotor aphasia)				
1. Segmental level 209 in total 52,25 on	1. Neologisms	31	52,25	
	2. Substitutions	21	11,75	2A, 27P, 18UA 8V + 39C
	3. Sound distortions	10	6	

Most strongly affected	Error type	The largest number per generic task	The average number per generic task	Additional details
Participant 9 (severe sensorimotor aphasia)				
average	4. Omissions	7	4,25	1V + 16C
	5. Additions	3	2,75	10V + 1C
2. Additional error types 154 in total 38,5 on average	1. Word search	23	10	
	2. Perseverations	22	8	
	3. Phonological approximations	15	7,75	
	4. Semantic paraphasias	16	6,25	
	5. Intra-word breaks	6	2	
	6. No-response errors	2	1,5	
	7. False starts	3	1,25	
	8. Ascertaining output correctness	3	1	
	9. Self-corrections	3	0,75	
3. Metrical 35 in total 8,75 on average	1. CV structure	11	5,25	
	2. Number of syllables	3	2,75	10I + 1D
	3. Word stress pattern	3	0,75	

Table 13. *Erroneous productions of Participant 16 ranked by occurrence frequency*

Most strongly affected	Error type	The largest number per generic task	The average number per generic task	Additional details
Participant 16 (severe sensorimotor aphasia)				
1. Segmental level 529 in total 132,25 on average	1. Omissions	66	46,25	6SV + 59V + 120C
	2. Substitutions	52	33	32A, 30P, 70UA 25V + 107C
	3. Neologisms	39	26,5	
	4. Additions	31	16,5	3SV + 24V + 39C
	5. Sound distortions	14	10	

Most strongly affected	Error type	The largest number per generic task	The average number per generic task	Additional details
Participant 16 (severe sensorimotor aphasia)				
	6. Sequential errors	3	0,75	
2. Additional error types 497 in total 124,25 on average	1. Intra-word breaks	69	49	
	2. Perseverations	48	31,5	
	3. Phonological approximations	28	25,75	
	4. False starts + word search	13 + 8	5,75	
	5. Semantic paraphasias	7	4,25	
	6. Self-corrections	6	2,25	
3. Metrical level 172 in total 43 on average	1. CV structure	31	22,25	
	2. Number of syllables	26	20,75	24I + 59D

Table 14. *Erroneous productions of Participant 2 ranked by occurrence frequency*

Most strongly affected	Error type	The largest number per generic task	The average number per generic task	Additional details
Participant 2 (moderate afferent motor aphasia)				
1. Segmental level 707 in total 176,75 on average	1. Neologisms	149	112	
	2. Omissions	43	29	3SV + 46V + 67C
	3. Substitutions	35	21,25	9A, 18P, 58UA 16V + 69C
	4. Sound distortions	12	8,25	
	5. Additions	10	5,25	2SV + 9V + 10C
	6. Sequential errors	2	1	
	1. Phonological approximations	40	32,5	
	2. Perseverations	26	17,25	

Most strongly affected	Error type	The largest number per generic task	The average number per generic task	Additional details
Participant 2 (moderate afferent motor aphasia)				
2. Additional error types 383 in total 95,75 on average	3. Semantic paraphasias + word search	21 + 15	14	
	4 .False starts	13	8,25	
	5. Intra-word breaks	7	4,25	
	6. Self-corrections	3	2,5	
	7. Circumlocutions	6	2	
	8. Ascertaining output correctness	2	0,75	
	9. No-response errors	1	0,25	
3. Metrical level 131 in total 32,75 on average	1. CV structure	30	18,25	
	2. Number of syllables	21	13,75	8I + 47D
	3. Word stress pattern	3	0,75	

Table 15. *Erroneous productions of Participant 5 ranked by occurrence frequency*

Most strongly affected	Error type	The largest number per generic task	The average number per generic task	Additional details
Participant 5 (mild afferent motor aphasia)				
1. Segmental level 108 in total 27 on average	1. Substitutions	14	8,5	7A, 13P, 14UA 15V + 19C
	2. Omissions	14	7,75	1SV + 7V + 23C
	3. Additions	7	4,75	2SV + 9V + 8C
	4. Sound distortions	6	4	
	5. Neologisms	5	2	
	6. Sequential errors	1	0,25	
2. Metrical level	1. CV structure	10	7,5	

Most strongly affected	Error type	The largest number per generic task	The average number per generic task	Additional details
Participant 5 (mild afferent motor aphasia)				
45 in total 11,25 on average	2. Number of syllables	7	3,75	8I + 7D
3. Additional error types 33 in total 8,25 on average	1. Phonological approximations	4	3	
	2. Word search	2	1,5	
	3. Semantic paraphasias + intra-word breaks	2 + 3	1,25	
	4. Circumlocutions	1	0,5	
	5. Perseverations + false starts + no-response errors	1	0,25	

Table 16. *Erroneous productions of Participant 10 ranked by occurrence frequency*

Most strongly affected	Error type	The largest number per generic task	The average number per generic task	Additional details
Participant 10 (moderate afferent motor aphasia)				
1. Segmental level 200 in total 50 on average	1. Omissions	43	27,75	3SV + 35V + 73C
	2. Substitutions	11	8,25	5A, 17P, 11UA 7V + 26C
	3. Sound distortions	8	6,25	
	4. Neologisms	8	4,25	
	5. Additions	6	3,5	6V + 8C
2. Metrical level 130 in total 32,5 on average	1. CV structure	28	21,75	
	2. Number of syllables	19	10,25	6I + 35D
	3. Word stress pattern	2	0,5	
	1. Phonological approximations	7	5	
	2. Word search	9	4,25	

Most strongly affected	Error type	The largest number per generic task	The average number per generic task	Additional details
Participant 10 (moderate afferent motor aphasia)				
3. Additional error types 70 in total 17,5 on average	3. Semantic paraphasias	4	2,25	
	4. False starts	3	1,75	
	5. Perseverations	4	1,25	
	6. Intra-word breaks + self-corrections	2	1	
	7. Ascertaining output correctness	1	0,75	
	8. No-response errors	1	0,25	

Table 17*. Erroneous productions of Participant 14 ranked by occurrence frequency*

Most strongly affected	Error type	The largest number per generic task	The average number per generic task	Additional details
Participant 14 (severe afferent motor aphasia)				
1. Segmental level 471 in total 117,75 on average	1. Neologisms	106	56	
	2. Omissions	87	41,25	3SV + 75V + 87C
	3. Substituions	21	11,25	11A, 9P, 25UA 18V + 25C
	4. Sound distortions	9	5,5	
	5. Additions	7	3	2V + 13C
2. Additional error types 225 in total 56,25 on average	1. Semantic paraphasias	31	18	
	2. Perseverations	21	13	
	3. Phonological approximations	25	12	
	4. Intra-word breaks	10	5,25	
	5. False starts + word search	7 + 11	3,25	
	6. Self-corrections + no-response errors	3	0,75	

Most strongly affected	Error type	The largest number per generic task	The average number per generic task	Additional details
Participant 14 (severe afferent motor aphasia)				
3. Metrical level 136 in total 34 on average	1. Number of syllables	38	19,25	2I + 75D
	2. CV structure	17	11,5	
	3. Word stress patterns	7	3,25	

Table 18. *Erroneous productions of Participant 18 ranked by occurrence frequency*

Most strongly affected	Error type	The largest number per generic task	The average number per generic task	Additional details
Participant 18 (severe afferent motor aphasia)				
1. Segmental level 401 in total 100,25 on average	1. Omissions	51	36,25	5SV + 38V + 102C
	2. Substitutions	33	27	5A, 29P, 74UA 13V + 95C
	3. Neologisms	23	16,75	
	4. Sound distortions	13	12,25	
	5. Additions	18	11,5	1SV + 20V + 20C
	6. Sequential errors	2	1,25	
2. Metrical level 175 in total 43,75 on average	1. CV structure	46	28,5	
	2. Number of syllables	17	13,75	22I + 33D
	3. Word stress patterns	3	1,5	
3. Additional error types 51 in total 12,75 on average	1. Self-corrections	4	2,75	
	2. Perseverations	6	2,5	
	3. Semantic paraphasias	5	2,25	
	4. Intra-word breaks	2	1,25	
	5. Phonological approximations	2	0,75	
	6. Circumlocutions + false starts + ascertaining output correctness	1	0,25	

Table 19. *Erroneous productions of Participant 3 ranked by occurrence frequency*

Most strongly affected	Error type	The largest number per generic task	The average number per generic task	Additional details
Participant 3 (mild efferent motor aphasia)				
1. Segmental level 239 in total 59,75 on average	1. Substitutions	48	19,25	9A, 27P, 40UA 1SV + 20V + 56C
	2. Omissions	39	17,5	1SV + 17V + 52C
	3. Sound distortions	24	12,75	
	4. Neologisms	11	5,25	
	5. Additions	12	5	2SV + 9V + 9C
	6. Sequential errors	1	0,5	
2. Additional error types 186 in total 46,5 on average	1. Word search	25	10,75	
	2. Perseverations + circumlocutions	18 + 12	6,5	
	3. False starts	17	6, 25	
	4. Phonological approximations	9	5,25	
	5. Semantic paraphasias	8	4	
	6. No-response errors	5	3	
	7. Self-corrections	7	2,5	
	8. Intra-word breaks	2	1,25	
	9. Ascertaining output correctness	2	0,5	
3. Metrical level 90 in total 22,5 on average	1. CV structure	35	15,5	
	2. Number of syllables	16	6,5	9I + 17D
	3. Word stress pattern	1	0,5	

Table 20. *Erroneous productions of Participant 4 ranked by occurrence frequency*

Most strongly affected	Error type	The largest number per generic task	The average number per generic task	Additional details
Participant 4 (mild efferent motor aphasia)				
	1. No-response errors	11	6,75	

Most strongly affected	Error type	The largest number per generic task	The average number per generic task	Additional details
Participant 4 (mild efferent motor aphasia)				
1. Additional error types 118 in total 29,5 on average	2. Word search	9	6	
	3. Phonological approximations	9	4	
	4. Perseverations + circumlocutions	6 + 5	3,25	
	5. False starts	5	2,75	
	6. Semantic paraphasias	4	1,75	
	7. Ascertaining output correctness	2	1	
	8. Self-corrections	1	0,75	
2. Segmental level 102 in total 25,5 on average	1. Omissions	14	11,75	1SV + 18V + 28C
	2. Substitutions	9	5,5	3A, 5P, 14UA 3V + 19C
	3. Neologisms	8	4,5	
	4. Sound distortions	4	3	
	5. Additions	2	0,75	2V + 1C
3. Metrical level 57 in total 14,25 on average	1. CV structure	10	8,5	
	2. Number of syllables	9	5,25	2I + 19D
	3. Word stress pattern	2	0,5	

Table 21. *Erroneous productions of Participant 7 ranked by occurrence frequency*

Most strongly affected	Error type	The largest number per generic task	The average number per generic task	Additional details
Participant 7 (moderate efferent motor aphasia)				
1. Segmental level 191 in total 47,75 on average	1. Substitutions	42	24,75	4A, 27P, 68UA 14V + 85C
	2. Omissions	18	9,75	19V + 20C
	3. Sound distortions	11	8	
	4. Neologisms	11	4	

Most strongly affected	Error type	The largest number per generic task	The average number per generic task	Additional details
Participant 7 (moderate efferent motor aphasia)				
	5. Additions	4	1,25	1SV + 4C
2. Additional error types 183 in total 45,75 on average	1. Word search	28	19	
	2. Phonological approximations	18	11,75	
	3. Semantic paraphasias	7	5	
	4. Ascertaining output correctness	7	3,25	
	5. False starts	4	2,25	
	6. Perseverations	3	1,5	
	7. Self-corrections	3	1,25	
	8. Intra-word breaks	2	0,75	
	9. Circumlocutions + no-response errors	2 + 1	0,5	
3. Metrical level 51 in total 12,75 on average	1. CV structure	14	7	
	2. Number of syllables	11	5,75	4I + 19D

Table 22. *Erroneous productions of Participant 11 ranked by occurrence frequency*

Most strongly affected	Error type	The largest number per generic task	The average number per generic task	Additional details
Participant 11 (severe efferent motor aphasia with elements of amnestic one)				
1. Segmental level 436 in total 109 on average	1. Omissions	65	50,5	3SV + 28V + 171C
	2. Neologisms	31	26,25	
	3. Substitutions	18	13,75	11A, 19P, 25UA 11V + 44C
	4. Sound distortions	23	13	
	5. Additions	7	5,5	10V + 12C

Most strongly affected	Error type	The largest number per generic task	The average number per generic task	Additional details
Participant 11 (severe efferent motor aphasia with elements of amnestic one)				
2. Metrical level 189 in total 47,25 on average	1. CV structure	51	36,75	
	2. Number of syllables	7	9,5	10I + 28D
	3. Word stress pattern	2	1	
3. Additional error types 104 in total 26 on average	1. Word search	12	7,25	
	2. Perseverations	12	6	
	3. Semantic paraphasias + phonological approximations	10 + 5	3,5	
	4. False starts	4	2	
	5. Self-corrections	3	1,25	
	6. No-response errors	1	1	
	7. Intra-word breaks	2	0,75	

Table 23. *Erroneous productions of Participant 12 ranked by occurrence frequency*

Most strongly affected	Error type	The largest number per generic task	The average number per generic task	Additional details
Participant 12 (mild efferent motor aphasia with elements of acoustic-mnestic one)				
1. Additional error types 493 in total 123,25 on average	1. Phonological approximations	72	58,25	
	2. Perseverations	41	29,25	
	3. Word search	27	13,5	
	4. False starts	12	7,25	
	5. Self-corrections	12	6,25	
	6. Semantic paraphasias	11	6	
	7. Ascertaining output correctness	3	2	
	8. Circumlocutions	3	0,75	
	1. Omissions	17	12	1SV + 21V + 26C

Most strongly affected	Error type	The largest number per generic task	The average number per generic task	Additional details
Participant 12 (mild efferent motor aphasia with elements of acoustic-mnestic one)				
2. Segmental level 110 in total 27,5 on average	2. Substitutions	15	10,5	7A, 15P, 20UA 11V + 31C
	3. Additions	7	3,5	1SV + 6V + 7C
	4. Sound distortions	2	1,5	
	5. Neologisms + sequential errors	1	0,25	
3. Metrical level 58 in total 14,5 on average	1. Number of syllables	8	6	6I + 18D
	2. Word stress patterns	7	4,5	
	3. CV structure	6	4	

Table 24. *Erroneous productions of Participant 13 ranked by occurrence frequency*

Most strongly affected	Error type	The largest number per generic task	The average number per generic task	Additional details
Participant 13 (mild efferent motor aphasia with elements of amnestic one)				
1. Segmental level 214 in total 53,5 on average	1. Omissions	29	21,5	3SV + 17V + 66C
	2. Substitutions	14	11,5	2A, 7P, 37UA 11V + 35C
	3. Neologisms	14	8,5	
	4. Sound distortions	9	6,5	
	5. Additions	9	5,25	4SV + 7V + 10C
	6. Sequential errors	1	0,25	
2. Metrical level 102 in total 25,5 on average	1. CV structure	24	18,75	
	2. Number of syllables	8	6	7I + 17D
	3. Word stress pattern	1	0,75	
	1. Word search	12	6	
	2. Semantic paraphasias	7	3,5	
	3. Phonological approximations	6	3,25	

Most strongly affected	Error type	The largest number per generic task	The average number per generic task	Additional details
Participant 13 (mild efferent motor aphasia with elements of amnestic one)				
3. Additional error types 90 in total 22,5 on average	4. Perseverations	6	2,75	
	5. False starts	3	2,25	
	6. Intra-word breaks	2	1,75	
	7. Self-corrections	2	1	
	8. Circumlocutions + no-response errors	1 + 2	0,75	
	9. Ascertaining output correctness	1	0,5	

Table 25. *Erroneous productions of Participant 15 ranked by occurrence frequency*

Most strongly affected	Error type	The largest number per generic task	The average number per generic task	Additional details
Participant 15 (mild efferent motor aphasia)				
1. Additional error types 225 in total 56,25 on average	1. Word search	27	21	
	2. Phonological approximations	24	16,5	
	3. False starts	10	6,75	
	4. Perseverations	10	5,25	
	5. Self-corrections	5	3,25	
	6. Semantic paraphasias	3	2	
	7. Intra-word breaks	1	0,75	
	8. No-response errors	1	0,5	
	9. Circumlocutions	1	0,25	
2. Segmental level 33 in total 8,25 on average	1. Substitutions	3	3	3A, 4P, 5UA 3V + 8C
	2. Sound distortions	4	2,5	
	3. Additions	2	1	1V + 3C
	4. Omissions + neologisms	1 + 2	0,75	1SV + 1V + 1C
	5. Sequential errors	1	0,25	
	1. CV structure	1	1	

Most strongly affected	Error type	The largest number per generic task	The average number per generic task	Additional details
Participant 15 (mild efferent motor aphasia)				
3. Metrical level 9 in total 2,25 on average	2. Number of syllables	1	0,75	1I + 2D
	3. Word stress pattern	1	0,5	

Table 26. *Erroneous productions of Participant 17 ranked by occurrence frequency*

Most strongly affected	Error type	The largest number per generic task	The average number per generic task	Additional details
Participant 17 (moderate efferent motor aphasia)				
1. Additional error types 310 in total 77,5 on average	1. Phonological approximations	55	34	
	2. Perseverations	27	14,5	
	3. Word search	26	12,75	
	4. False starts	17	10,25	
	5. Intra-word breaks	3	2,25	
	6. Semantic paraphasias	2	1,5	
	7. Self-corrections	2	1	
	8. Ascertaining output correctness	1	0,25	
2. Segmental level 150 in total 37,5 on average	1. Substitutions	16	11,25	12A, 14P, 19UA 19V + 26C
	2. Sound distortions	19	10,25	
	3. Omissions	18	9	3SV + 12V + 21C
	4. Additions	5	4	3SV + 8V + 5C
	5. Neologisms	4	2,75	
	6. Environmental errors	2	0,75	
	7. Sequential errors	1	0,25	
3. Metrical level 45 in total	1. CV structure	10	5,25	
	2. Number of syllables	7	4,25	7I + 10D

Most strongly affected	Error type	The largest number per generic task	The average number per generic task	Additional details
Participant 17 (moderate efferent motor aphasia)				
11,25 on average	3. Word stress pattern	3	1,75	

***Table 27**. Erroneous productions of Participant 1 ranked by occurrence frequency*

Most strongly affected	Error type	The largest number per generic task	The average number per generic task	Additional details
Participant 1 (mild acoustic-gnostic aphasia)				
1. Segmental level 264 in total 66 on average	1. Omissions	47	30,75	1SV + 33V + 89C
	2. Substitutions	28	17,5	17A, 18P, 35UA 15V + 55C
	3. Neologisms	9	7,5	
	4. Sound distortions	9	6	
	5. Additions	7	4	6V + 10C
	6. Environment errors	1	0,25	
2. Metrical level 140 in total 35 on average	1. CV structure	39	25,25	
	2. Number of syllables	12	9,5	5I + 33D
	3. Word stress pattern	1	0,25	
3. Additional error types 40 in total 10 on average	1. Word search	6	3,25	
	2. Phonological approximations	6	2,25	
	3. False starts	2	1,25	
	4. Semantic paraphasias + intra-word breaks + self-corrections	1 + 2 + 1	0,75	
	5. No-response errors + ascertaining output correctness	1	0,5	

Table 28. *Erroneous productions of Participant 8 ranked by occurrence frequency*

Most strongly affected	Error type	The largest number per generic task	The average number per generic task	Additional details
Participant 8 (moderate acoustic-mnestic aphasia with elements of efferent motor one)				
1. Additional error types 648 in total 162 on average	1. Word search	98	50,75	
	2. Phonological approximations	67	45,25	
	3. False starts	21	15	
	4. Perseverations	26	14	
	5. Ascertaining output correctness	28	11,25	
	6. Semantic paraphasias + circumlocutions	16	8	
	7. Self-corrections	14	6,25	
	8. No-response errors	7	3	
	9. Intra-word breaks	7	1,75	
2. Segmental level 72 in total 18 on average	1. Substitutions	18	7,25	6A, 10P, 13UA 11V + 18C
	2. Omissions	11	5,5	11V + 11C
	3. Additions	7	2,5	1V + 9C
	4. Neologisms	3	2	
	5. Sound distortions	2	0,75	
3. Metrical level 35 in total 8,75 on average	1. CV structure	14	5,75	
	2. Number of syllables	7	3	1I + 11D

Table 29. *Comparative picture of the shares of omissions and additions in the samples of the fluent PWAs*

Type of aphasia	Participant	The average number of omissions per task	The average number of additions per task
	2	29	5,25

Type of aphasia	Participant	The average number of omissions per task	The average number of additions per task
Afferent motor aphasia	5	7,75	4,75
	10	27,75	3,5
	14	41,25	3
	18	36,25	11,5
Acoustic-gnostic aphasia	1	30,75	4
Acoustic-mnestic aphasia	8	5,5	2,5

Table 30. *Kinds of substitution errors made by the PWAs*

Type of aphasia	Participant	The total number of anticipatory substitutions	The total number of perseveratory substitutions	The total number of substitutions having uncertain aetiology	Vowel vs semivowel vs consonant ratio
Sensori-motor	6	8	10	36	15V+39C
	9	2	27	18	8V+39C
	16	32	30	70	25V+107C
Afferent motor	2	9	18	58	16V+69C
	5	7	13	14	15V+19C
	10	5	17	11	7V+26C
	14	11	9	25	18V+25C
	18	5	29	74	13V+95C
Efferent motor	3	9	27	40	1SV+20V+56C
	4	3	5	14	3V+19C
	7	4	27	68	14V+85C
	11	11	19	25	11V+44C
	12	7	15	20	11V+31C
	13	2	7	37	11V+35C
	15	3	4	5	3V+8C
	17	12	14	19	19V+26C
Acoustic-gnostic	1	17	18	35	15V+55C
Acoustic-mnestic	8	6	10	13	11V+18C

Appendix G. Diagrams employed in Results and Discussion

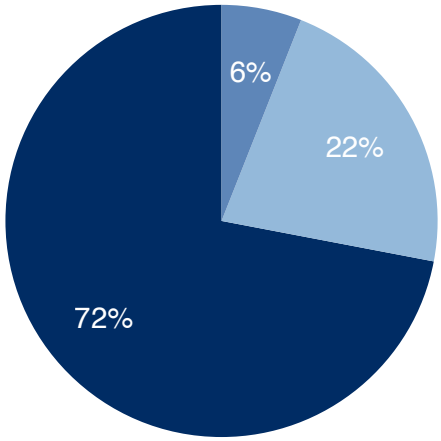

Diagram 1. *Proportions of the participants by the generic task types on which they have produced the biggest number of errors at all levels*

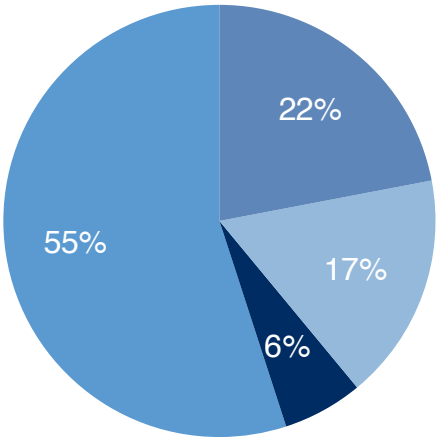

Diagram 2. *Proportions of the participants by the generic task types on which they have produced the smallest number of errors at all levels*

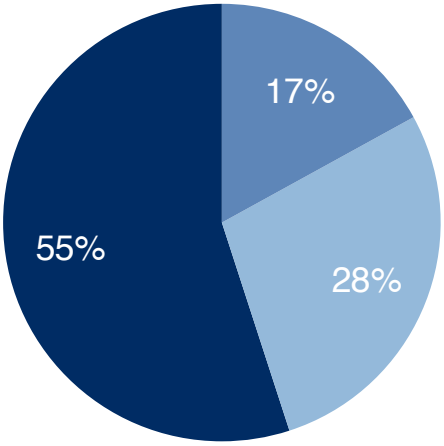

Diagram 3. *Proportions of the participants by the generic task types on which they have produced the biggest number of segmental errors*

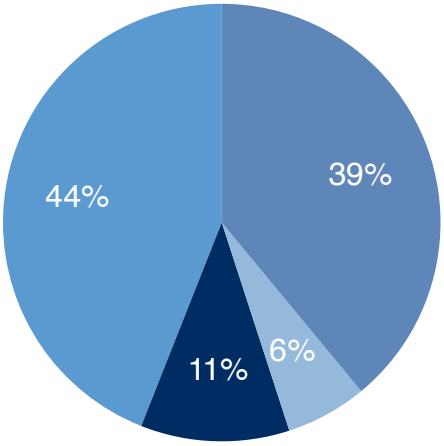

Diagram 4. *Proportions of the participants by the generic task types on which they have produced the smallest number of segmental errors*

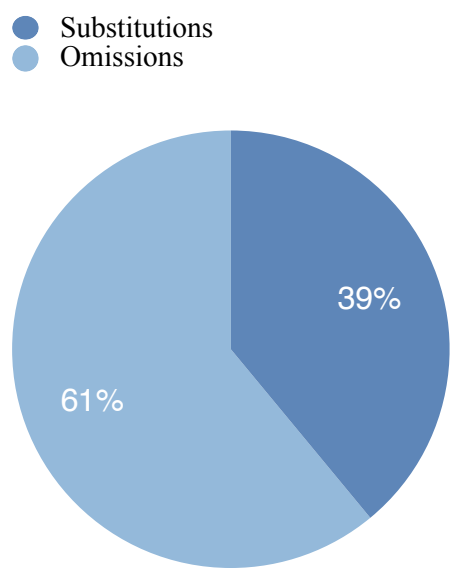

Diagram 5. *Proportions of the participants by the most numerous category of segmental errors*

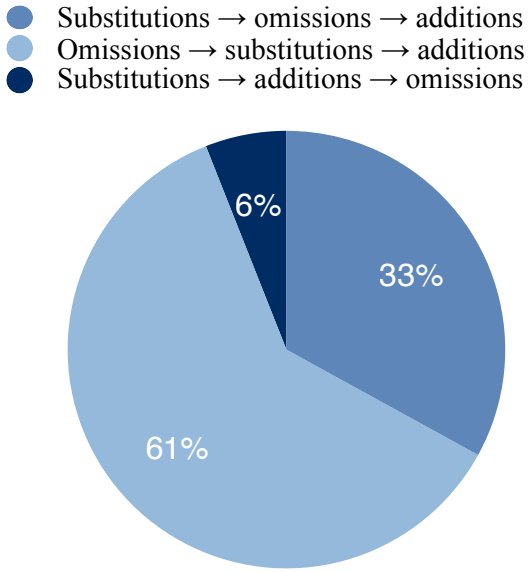

Diagram 6. *Proportions of the participants by the rank orderings of the monopositional errors*

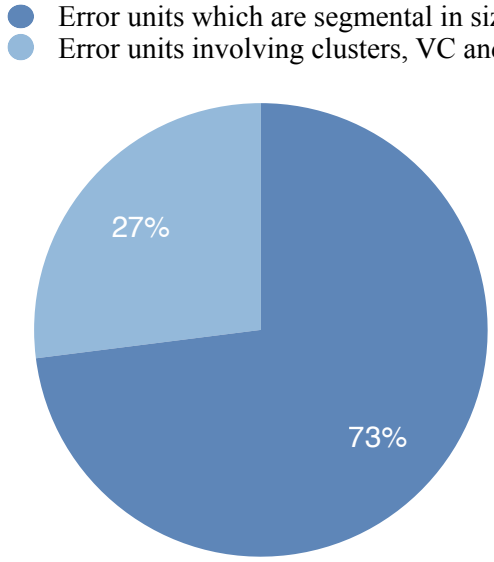

Diagram 7. *Proportions of segmental versus non-segmental errors in all the 18 samples calculated together*

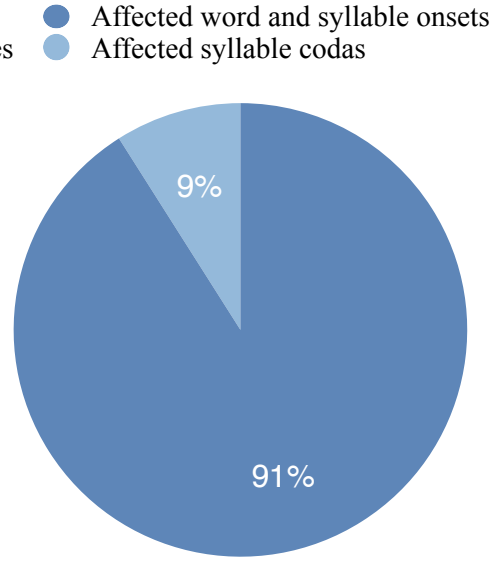

Diagram 8. *Proportions of errors made in the word and syllable onsets versus codas*

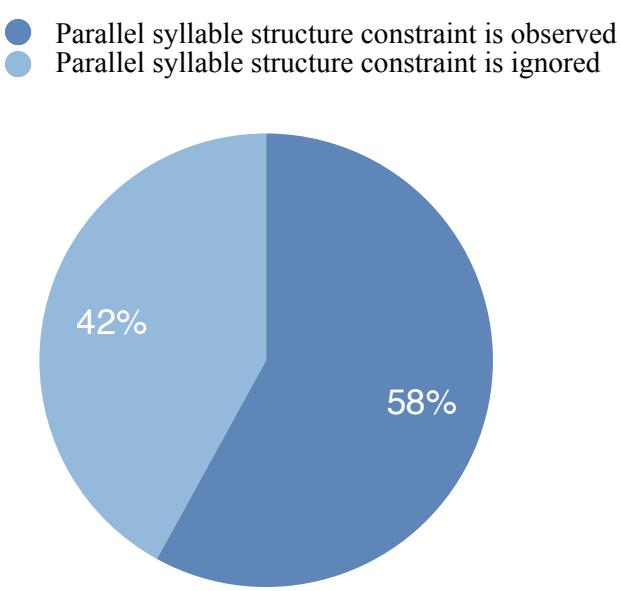

Diagram 9. *Proportions of errors involving the parallel syllable structure constraint versus those involving none*

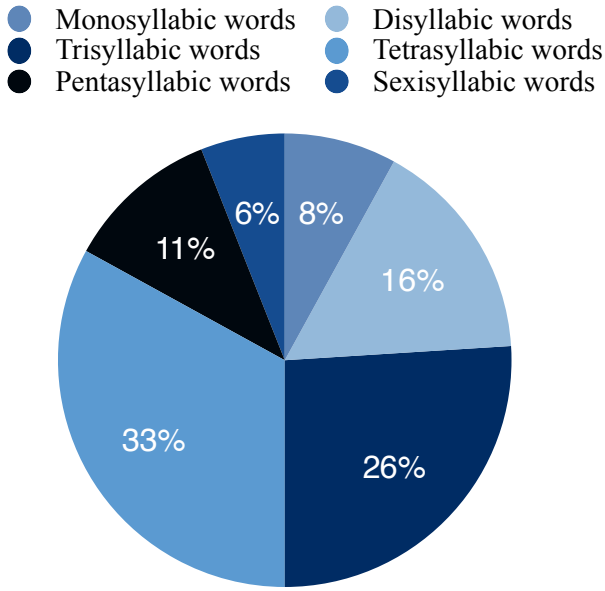

Diagram 10. *Proportions of erroneously produced words containing different numbers of syllables*