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VARIABILITY IN THE PRODUCTION OF SYLLABLES AND WORDS IN PATIENTS WITH APHASIA AND IN PATIENTS WITH DYSARTHRIA

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SUMMARY

Background:

The aim of the study was to answer whether variability/invariability in the production of language elements could be one of the criteria for differentiating aphasia from dysarthria. (By production variability the authors understand the production of language elements: syllables, words (uttered spontaneously, repeated, or read aloud), by the same person differently, i.e., correctly/incorrectly or incorrectly in various ways).

Material/ Methods:

Two groups of patients were studied: 8 persons with post-stroke aphasia (5 with motor aphasia, 3 with anomic aphasia) and 8 persons with acquired dysarthria (5 with mixed spastic-ataxic dysarthria, 3 – with other etiologies). Patients had to repeat after the researcher and read aloud 50 syllables and 54 words. Each was examined four times. Clinical observation was used.

Results:

It was found that variability occurred in patients with aphasia and dysarthria in all the areas studied (syllables/words, repetition/reading); variability increase was less in patients with dysarthria than in patients with aphasia; variability increase (in reading when compared to repetition) in dysarthria patients and variability decrease (reading syllables and words) in aphasia patients were statistically significant. Seven types of production of the language material were distinguished which were common to the two groups but which occurred with different intensity.

Conclusions:

Variability in the production of language elements is not a reliable criterion for differentiating dysarthria from aphasia. A variability reducing factor in the production of syllables/words on the part of patients with aphasia is reading aloud. **Reading aloud may increase variability in the production of language elements in patients with dysarthria.**

Key words: speech diagnosis, speech therapy, repetition, reading, speech disorder differentiating

BACKGROUND

In the older literature on aphasia (Łuria, 1976; Maruszewski (1966, 1970; Mierzejewska 1971, 1977; Goodglass & Kaplan 1983), 'variability' is an unambiguous term, and the phenomenon it denotes is considered as one of the basic characteristics of aphasic speech disorders. In their work on variability in attempts to name objects, Maruszewski and Gamska (1973) stated that one of the basic features that mark the symptoms of brain damage in the behavioural sphere is their significant variability. In most cases, one can observe substantial differences in repeat performances of the same tasks even after a short time interval or in changed conditions. In other words, if an activity is disturbed it does not mean as a rule that the patient cannot do this activity or always performs it equally badly. Most frequently, the same activity is sometimes performed well/ better, and sometimes badly/worse. Such circumstances had already been reported on many years previously in research into aphasia (see also: Pačalska 1999)."

In the newer literature the term 'variability' is used in a number of senses (Pačalska 1999; 2005; 2007; 2008; Herzyk 2005; Prigatano 2009). Pačalska (2005:759) states that:

'In aphasia, the variability of symptoms in a given patient in different periods is the only constant.'

Pačalska (2005: 759) differentiated three aspects of variability:

1. Firstly, variability connected with the intensity/severity of a given type of aphasia: 'Variability in the clinical picture of aphasia results mainly from the fact that aphasia has a different course and symptomatology depending on its severity. Thus there is mild aphasia, moderate aphasia and severe aphasia.'
2. Secondly, variability connected with the patient's general physical and mental state at the given day: 'Every patient can have good and bad days.'
3. Thirdly, variability connected with the evolution of an aphasia type: 'In time, a given patient's aphasia evolves not only from a more severe to a milder form, but also from one type to another.'

To allow the term to be unambiguous, we can talk about 'production variability,' and so our study concerns only 'production variability,' and the term 'variability' is used exclusively in this sense (Maruszewski 1966; Mierzejewska 1977; Herzyk 2005). Production variability may be changed according to the symptom formation on the basis of the principles of Microgenetic Theory (Pačalska 1999, 2007, 2012).

Some researchers – in Poland – acknowledge variability (production) to be one of linguistic criteria for differentiating aphasia from dysarthria, based on the assumption that: the language responses of patients with aphasia are marked by the variability of their errors, and the language responses of patients with dysarthria are marked by the consistency of their errors (Tarkowski 1999). However, there are views in the literature that question the picture of dysarthric disorders as being consistent ones (Endelby, 1983 after: Tłokiński 2005; Pačalska 2005, 2005a; Murdoch, 2010; Jauer-Niworowska 2012). These authors observe that the intensity of variability is different in different types of dysarthria; never-

theless, variability itself does occur within this speech disorder. Also a study conducted by one of the authors of this article (Jauer- Niworowska – an unpublished doctoral dissertation) points to the occurrence of variability in patients with dysarthria.

Detailed research on aphasic variability with the use of Polish language materials is narrow in scope: Gamska and Maruszewski's article (1973) on variability in word finding, and Mierzejewska's papers (1971, 1977) devoted to phonetic and phonological errors in the Polish language within aphasia, in which she demonstrated the variability of responses within the studied scope and pointed to it as a characteristic feature of aphasic speech disorders.

Research on variability in dysarthria with the use of Polish language materials (ones limited in scope) has been conducted only by Kownacka (1978), who performed a linguistic analysis of the symptoms of this variability. In clinical work with patients with dysarthria, many manifestations of variability in their language behaviours are observed. **Hence the question as to whether variability/consistency of responses can be included among the criteria for differentiating aphasia from dysarthria.**¹ The study was conducted as part of the BST10/07-II.

The aim of the study was to answer whether variability/invariability in the production of language elements could be one of the criteria for differentiating aphasia from dysarthria. (By production variability the authors understand the production of a language element – a syllable, word (uttered spontaneously, repeated, or read aloud) by the same person differently, i.e. correctly/incorrectly or incorrectly in various ways).

MATERIAL AND METHODS

The study was non-experimental in nature.² For reasons beyond the authors' control (difficult access to patients, a lack of consent expressed by some patients to whom the authors provided speech therapy), they could only study a limited number of persons with a heterogeneous picture of both motor speech disorders and language disorders.

Clinical observation was the main research method.

Two groups of patients were examined:

1. a group of 8 patients with post-stroke aphasia: 5 patients with motor aphasia and 3 patients with anomic aphasia);
2. a group of 8 patients with acquired dysarthria: 5 patients with mixed spastic-ataxic dysarthria as a result of multiple sclerosis (MS), and 3 patients with dysarthria of various aetiologies.

The time that had elapsed since the onset of aphasia/ dysarthria was an important factor in the selection of participants for the study. It was assumed that at least one year should have passed from the onset of the disorder. The point was to be

¹ The study was conducted as part of the BST10/07-II.

² For reasons beyond the authors' control (difficult access to patients, a lack of consent expressed by some patients to whom the authors provided speech therapy), they could only study a limited number of persons with a heterogeneous picture of both motor speech disorders and language disorders.

sure that the observed variability had not resulted from speech improvement which had taken place (in many patients) in the first year after the onset of the disorder.

The authors used the following research tools in the study:

- Word and syllable charts,
- A digital recorder.

Procedure

Participants performed the following language tasks:

- they repeated 54 words after the researcher,
- they read the same 54 words,
- they repeated 50 syllables after the researcher,
- they read the same 50 syllables.

Each participant did the tasks four times. Sometimes several sessions were required to perform the tasks just once (due to patient fatigability)³. A list of the syllables and words used in the study is enclosed at the end of the article.

Data analysis methods

The authors recorded the participants' performance, and then carried out a qualitative and quantitative analysis of the recorded material.

1. The analysis included a total of:
 - a. 1,600 productions of syllable repetitions (50 syllables x 4 trials x 8 patients) in each group,
 - b. 1,600 productions of syllable reading (50 syllables x 4 trials x 8 patients) in each group,
 - c. 1728 productions of word repetitions (54 words x 4 trials x 8 patients) in each group,
 - d. 1728 productions of word reading (54 words x 4 trials x 8 patients) in each group.
2. The percentage ratio of variable productions to all productions (syllable and word repetition/reading) was calculated separately for each group.
3. The analysis took into consideration all the changes in the way the language material was produced by individual participants during each task.
4. The type and number of these changes were determined for each participant in each task.
5. The qualitative features of production variability registered in patients with dysarthria were compared with the features of variability registered in patients with aphasia.
6. It was investigated whether changing the language task (repetition, reading) involved a specific type of change in the way the material was produced by the participants.
7. The results were analyzed for statistically significant differences between patients with aphasia and patients with dysarthria in the level and types of variability registered in word/ syllable reading and repetition tasks.

³ A list of the syllables and words used in the study is enclosed at the end of the article.

RESULTS

The first stage of analysis aimed to distinguish consistent productions and variable productions.

Table 1 presents the results that represent the percentage of variability in the production of syllables and words by patients with aphasia/ dysarthria.

As can be seen, variability occurs in both groups, but its intensity measured in percentage terms is different (the percentage of variable productions is larger in patients with aphasia than in patients with dysarthria). A marked increase in variability is seen in reading when compared to repetition in patients with dysarthria.

A further stage of analysis made it possible to distinguish seven qualitatively different types of syllable/ word productions (including two types of consistent productions and five types of variable productions):

1. Consistency A – all productions are correct;
2. Consistency B – all productions are incorrect and the same;
3. Variability C – all productions are incorrect and each is different;
4. Variability D – all productions are incorrect, some productions are different and some are the same;
5. Variability E – correct and incorrect productions, all incorrect productions are the same;
6. Variability F – correct and incorrect productions, some incorrect productions are different and some are the same;
7. Variability G – correct and incorrect productions, each incorrect production is different.

Table 2 shows sample of variability in word production by patient with dysarthria.

In Table 3 the authors have included a sample of variability in word production by an aphasia patient.

A statistical analysis of the results was the next stage. A significance level of $p = 0.05$ was used. Tests for small samples were employed: The Mann-Whitney U test (a non-parametric equivalent of the Student's t- test) – to compare differences in the levels of production variability in a given task in the group of patients with dysarthria and the group of patients with aphasia. The Wilcoxon signed-rank test – to compare differences in the level of production variability depending on the task type (repetition versus reading) separately for patients with aphasia and patients with dysarthria.

Tables 4 and 5 illustrate the differences between patients with dysarthria and patients with aphasia in the intensity of the individual types of production vari-

Table 1. Percentage of variability in the production of syllables and words in patients with aphasia/ dysarthria

		Dysarthria	Aphasia
Syllables	repetition	30%	64%
	reading	59%	62%
Words	repetition	44.5%	70%
	reading	58.5%	42%

Table 2. Variability/ consistency in word production by patients with dysarthria

Patients WITH DYSARTHRIA					
Words produced Orthographic representation	Phonetic representation				Variability/consistency type
	Trial 1	Trial 2	Trial 3	Trial 4	
pajac	[paias]	[paias]	[paias]	[paias]	B
lizak	[līzak]	[lizāk]	[nnlizak]	[li-zak]	C
noc	[nōs]	[noc ^s]	[nos]	[nos]	D
niedola	[ñe ^{dt} ola]	[ñedola]	[ñedola]	[ñedola]	E (single error)
sok	[sok]	[so ^k]	[so ^k]	[sok]	E (repeated error)
lew	[l ^{ev} f]	[lev]	[lev]	[lef]	F
zab	[^s zomp]	[^{sv} zomp]	[^{som} zomp]	[zomp]	G

Table 3. Variability/ consistency in word production by patients with aphasia

Patients WITH APHASIA					
Words produced Orthographic representation	Phonetic representation				Variability/ consistency type
	Trial 1	Trial 2	Trial 3	Trial 4	
waliza	val'i-ska	val'i-ska	val'i-ska	val'i-ska	B
fizyka	fskole	f 'ińika	f 'ika	f 'ireka	C
pajac	stoi	parac	paca	paca	D
noc	noc	noc	ńic	noc	E (single error)
but	put	put	but	put	E (repeated error)
cud	kut	sut	sut	cut	F
lizak	ida	v 'izak	l'ilak	l'izak	G

Table 4. Differences between patients with dysarthria and patients with aphasia in the intensity of individual types of production variability in repetition tasks

Syllable and word repetition						
Variability/ consistency in syllable and word production	patients with aphasia N = 8		patients with dysarthria N = 8		U	p = 0.05
	Mean	Standard deviation SD	Mean	Standard deviation SD		
A– all productions correct	33.68	18.86	55.25	35.86	21	0.25
B– all productions incorrect, the same	0.38	1.06	9.63	14.09	14.5	0.03
C– all productions incorrect, each different	2.25	2.76	1.25	2.43	26	0.49
D– all productions incorrect, some the same, some different	4.38	4.41	14.5	22.45	30	0.83
E– correct and incorrect productions, incorrect productions the same	29.62	6.69	18.75	11.94	14	0.059
F– correct and incorrect productions, some incorrect productions the same, some different	13.5	9.15	1.5	1.85	4.5	0.003
G– correct and incorrect productions, each incorrect production different	20	10.85	3.13	3.52	4	0.003

ability. Table 4 shows intergroup differences in repetition tasks and Table 5 in reading tasks respectively.

Tables 6 and 7 show differences in variability intensity depending on the task type (repetition/ reading). Table 6 contains the results of patients with aphasia. Table 7 illustrates the results of persons with dysarthria.

Table 5. Differences between patients with dysarthria and patients with aphasia in the intensity of individual types of production variability in reading tasks.

Syllable and word reading						
Variability/ consistency in syllable and word production	patients with aphasia N = 8		patients with dysarthria N = 8		U	p = 0.05
	Mean	Standard deviation SD	Mean	Standard deviation SD		
A– all productions correct	36.5	29.38	31.5	21.02	30.5	0.87
B– all productions incorrect, the same	1.5	3.12	11.25	9.11	7.5	0.008
C – all productions incorrect, each is different	6.25	9.72	1.5	2.78	22	0.23
D – all productions incorrect, some the same, some different	2.75	4.68	23	23.44	7	0.008
E – correct and incorrect productions, incorrect productions the same	21.88	9.3	26.5	14.06	29	0.75
F– correct and incorrect productions, some incorrect productions the same, some different	11.63	6.58	3.5	3.66	9	0.015
G– correct and incorrect productions, each incorrect production different	23.5	16.34	6.75	4.13	11.5	0.03

Table 6. Differences in variability intensity depending on the task type (repetition/ reading) in patients with aphasia

Patients with aphasia N=8						
Variability/ consistency in syllable and word production	Syllable and word repetition		Syllable and word reading		Z	p = 0.05
	Mean	Standard deviation SD	Mean	Standard deviation SD		
A– all productions correct	2.38	1.92	3	2.98	-0.35	0.72
B– all productions incorrect, the same	0	0	0.13	0.35	-0.73	0.46
C– all productions incorrect, each different.	0.5	1.07	1.75	2.49	-1.21	0.22
D– all productions incorrect, some the same, some different	1.13	2.42	0.38	0.74	-0.77	0.44
E– correct and incorrect productions, incorrect productions the same	3	1.7	2.75	2.92	-1.97	0.049
F– correct and incorrect productions, some incorrect productions the same, some different	1.38	1.59	1.13	0.99	-0.56	0.57
G– correct and incorrect productions, each incorrect production different	3.63	2.56	2.88	2.17	-0.7	0.48

Table 7. Differences in variability intensity depending on the task type (repetition/ reading) in patients with dysarthria

Patients with dysarthria N = 8						
Variability/ consistency in syllable and word production	Syllable and word repetition		Syllable and word reading		Z	p = 0.05
	Mean	Standard deviation SD	Mean	Standard deviation SD		
A– all productions correct	55.25	35.86	31.5	21.02	-2.37	0.018
B– all productions incorrect, the same	9.63	14.09	11.25	9.11	-0.68	0.49
C– all productions incorrect, each different.	1.25	2.43	1.5	2.78	-0.37	0.72
D– all productions incorrect, some the same, some different	14.5	22.45	23	23.44	-2.53	0.012
E– correct and incorrect productions, incorrect productions the same	18.75	11.94	26.5	14.06	-0.77	0.44
F– correct and incorrect productions, some incorrect productions the same, some different	1.5	1.85	3.5	3.66	-1.58	0.11
G– correct and incorrect productions, each incorrect production different	3.13	3.52	6.75	4.13	-1.87	0.06

The following statistically significant differences were found between patients with dysarthria and patients with aphasia:

1. Correct syllable/word productions co-occurred with incorrect syllable/ word productions significantly more frequently in patients with aphasia than in patients with dysarthria. The higher frequency of the type F productions (correct and incorrect productions, some incorrect productions are different) and of the type G productions (correct and incorrect productions, each incorrect production is different) is statistically significant.
2. The type B productions (all productions of a given syllable/ word are incorrect in the same way) and the type D productions (all productions of a given syllable/ word are incorrect, some incorrect productions are the same) occurred significantly more frequently in patients with dysarthria than in patients with aphasia.
3. Reading brings about an increase in production variability – a statistically significant increase in some variability types – in patients with dysarthria. Of course the extent of production variability is different in individual patients with dysarthria.
4. Reading brings about a decline in production variability – which is statistically significant in some variability types – in patients with aphasia. Reading becomes then a stabilizing factor that increases the number of correct productions.

These conclusions concerning reading are important in terms of treatment– in treatment planning for both patients with aphasia and patients with dysarthria.

The third stage of analysis was of a qualitative nature and concerned the types of errors made in syllable and word repetition/ reading by patients with aphasia and patients with dysarthria. All types of errors known from clinical experience and described in the subject literature were found in the material analyzed. The results concerning the percentage of each type of production errors in patients with dysarthria and in patients with aphasia in syllable/ word repetition and reading attempts are shown in Tables 8, 9, 10, 11 (see: below).

Patients with dysarthria differed from patients with aphasia in terms of the frequency of the types of production errors. Some types of production errors made in syllable/ word repetition and reading by patients with dysarthria and patients with aphasia were the same and some were different.

Phone deformations and phonemic paraphasias occurred in syllable repetition attempts in both groups. Both patients with aphasia and patients with dysarthria produced verbal paraphasias of phonetic origin.⁴ For example, when the word NOC is produced as [nos], when this pronunciation results from difficulty in producing the [c] sound.

The dropping of a syllable's component, the lack of production of a syllable, perseverations, delayed responses, and ambiguous errors – labelled as 'other errors' in Table 8 – occurred only in patients with aphasia.

And the following errors occurred only in the group of patients with dysarthria: drawling, repetitions, and the adding of a sound element (such an additional sound element was not always a full phonic sound; it could be a result of disturbances in the motor production of a given syllable).

Phone deformations, phonemic paraphasias, verbal paraphasias of phonetic origin, and the lack of production of a syllable occurred in syllable reading at-

Table 8. Percentage of types of production errors in syllable repetition attempts of patients with aphasia and patients with dysarthria.

Task type	Error type	Proportional percentage of error types	
		Dysarthria (%)	Aphasia (%)
Syllable repetition	Deformations	55.56	11.9
	Drawling	17.46	0
	Repetitions	13.49	0
	An additional sound element appears	8.33	0
	Phonemic paraphasias ⁵	5.16	79.1
	Verbal paraphasias of phonetic origin	0	0.97
	A component of a syllable is omitted	0	0.38
	A syllable is not produced	0	4.48
	Perseverations	0	0.76
	Delayed response	0	1.52
	Other errors	0	0.97
	TOTAL	100.00	100.00

⁴ For example, when the word NOC is produced as [nos], when this pronunciation results from difficulty in producing the [c] sound.

⁵ The term 'phonemic paraphasia', which is used in the literature in English and by M. Pačalska in her works, is synonymous with the term 'sound paraphasia'.

tempts in both groups. The dropping of a syllable's component, perseverations, delayed responses, comments, and ambiguous errors – labelled as 'other errors' in Table 9 – occurred only in patients with aphasia. And drawling, repetitions, the adding of a sound element, and phone shortening occurred only in patients with dysarthria.

Phone deformations and phonemic paraphasias, scansion, the dropping of a word's component, the adding of an element to a word, and disturbances labelled as 'other errors' occurred in word repetition attempts in both groups. The

Table 9. Percentage of types of production errors in syllable reading attempts of patients with aphasia and patients with dysarthria

Task type	Error type	Percentage of error types	
		Dysarthria (%)	Aphasia (%)
Syllable reading	Deformations	36.59	5.87
	Drawling	29.04	0.00
	Phonemic paraphasias	15.94	72.00
	Repetitions	10.92	0.00
	An additional sound element appears added	4.59	0.00
	A component of a syllable is omitted	0.00	1.9
	A syllable is not produced	2.84	8.1
	Verbal paraphasias of phonetic origin	0.87	0.3
	Phone shortening	0.22	0.00
	Perseverations	0	2.78
	Delayed response	0	4.00
	Comment	0	0.3
	Other errors	0	4.63
TOTAL		100.00	100.00

Table 10. Percentage of types of production errors in word repetition attempts of patients with aphasia and patients with dysarthria

Task type	Error type	Percentage of individual error types	
		Dysarthria (%)	Aphasia (%)
Word repetition	Deformations	56.48	7.80
	Scansion	12.96	6.80
	Phonemic paraphasias	12.04	35.20
	Repetitions	9.26	0.00
	Drawling	4.94	0.00
	An element of a word (sound, syllable) longer segment) is omitted	1.54	16.20
	Voice growing weak	1.23	0.00
	An additional element (sound, syllable)	0.93	0.70
	Transpositions	0.00	2.70
	Verbal paraphasias	0.00	4.50
	Morphological paraphasias	0.00	2.00
	Jargon elements	0.00	2.80
	Circumlocutions	0.00	10.40
	A word is not produced	0.00	3.10
	Perseverations	0.00	0.60
	Delayed response	0.00	1.70
	Comment	0.00	3.50
	Other errors	0.62	2.00
TOTAL		100.00	100.00

following errors occurred only in patients with aphasia: transpositions (metatheses), verbal paraphasias, morphological paraphasias, jargon elements, circumlocutions, the lack of production of a word, perseverations, delayed responses, and comments. Repetitions, drawling, and voice weakening occurred only in patients with dysarthria. These results are presented in detail in Table 10.

Phone deformations, phonemic paraphasias, scansion, the dropping of a word's component, verbal paraphasias, delayed responses, and the lack of production of a word occurred in word reading attempts in both groups. The following errors occurred only in patients with aphasia: transpositions, jargon elements, perseverations, delayed responses and comments. Drawling, repetitions, the adding of a sound element, voice weakening, and phone shortening occurred only in patients with dysarthria. The authors show these results in Table 11.

The differences in error types (e.g. the lack of jargon elements in dysarthria or the lack of voice weakening in aphasia) result obviously from the separate pathomechanisms of these two speech and language disorders. The different nature of the pathomechanisms does not necessarily have to mean only differences in the types of production errors, something which is proved by the disturbances that occur in both groups.

In a further qualitative analysis of the language material, the authors centred on the error types that occurred in both groups, i.e. deformations and paraphasias, although the number of these disturbances was definitely different in each group.

Table 11. Percentage of types of production errors in word reading attempts of patients with aphasia and patients with dysarthria

Task type	Error type	Proportional percentage of error types	
		Dysarthria (%)	Aphasia (%)
Word reading	Deformations	48.84	5.90
	Scansion	12.79	14.00
	Phonemic paraphasias	11.63	39.6
	Drawling	10.00	0.00
	Repetitions	9.77	0.00
	An additional element (sound/syllable) word (sound, syllable)	2.09	0.00
	An element of a word (sound, syllable) is omitted	1.86	15.30
	Voice growing weak	1.16	0.00
	Verbal paraphasias	0.93	2.30
	Phone shortening	0.23	0.00
	Delayed response	0.23	2.70
	A word is not produced	0.23	3.70
	Morphological paraphasias	0.00	4.90
	Transpositions	0.00	1.29
	Jargon elements	0.00	7.50
	Perseverations	0.00	0.54
	Delayed response	0.00	2.70
	Delayed response	0.00	2.70
	Comment	0.00	0.37
	Other errors	0.23	0.00
	TOTAL	100.00	100.00

Table 12 illustrates the percentage of deformations in the production of syllables and words by patients with dysarthria/ aphasia.

Table 13 shows the percentage of paraphasias in the production of syllables and words in both groups.

Deformations predominate in the productions of patients with dysarthria (although paraphasias do occur as well), and paraphasias predominate in the productions of patients with aphasia (although deformations do occur as well).

The authors did not perform a more detailed analysis of the types of paraphasias and deformations in the patients with dysarthria and the patients with aphasia⁶. The authors are aware of the fact that they touch upon the contentious issue of deformations in aphasia and paraphasias in dysarthria by finding the occurrence of both deformations and paraphasias in the two groups in the study, (Tłokiński 2003, Mierzejewska 1971, Zarębina 1973, Kania 1971).

The morphological and lexical plane of words is not impaired in dysarthria, which is a result of the nature of dysarthria itself, therefore there can be no comparisons with aphasia as far as variability is concerned. The prosodic plane – clearly impaired in the group of patients with dysarthria – was not impaired in the group of patients with aphasia.

Also, a fourth plane of analysis is worth pointing out which we called ‘disturbances in task performance.’ The following phenomena were noted here:

- a) Delayed responses, i.e. the occurrence of correct or incorrect word productions after a longer pause;
- b) No response;
- c) Patient’s comment on a given task (these comments were different in form and occurred instead of the target words or as task performance appraisal: ‘I know,’ ‘I know, but I can’t,’ ‘I don’t know,’ ‘no,’ or ‘wrong’);

Table 12. Percentage of deformations in the production of syllables and words by patients with dysarthria/ aphasia

Syllables		Dysarthria (%)	Aphasia (%)
		56	12
Words	repetition	36	6
	reading	57	8
	repetition	49	6
	reading		

Table 13. Percentage of phonemic paraphasias in the production of syllables and words by patients with dysarthria/aphasia

Syllables		Dysarthria (%)	Aphasia (%)
		5	79
Words	repetition	15	72
	reading	12	35
	repetition	12	40
	reading		

⁶ The authors are aware of the fact that they touch upon the contentious issue of deformations in aphasia and paraphasias in dysarthria by finding the occurrence of both deformations and paraphasias in the two groups in the study, (Tłokiński 2003, Mierzejewska 1971, Zarębina 1973, Kania 1971).

d) Dynamic responses, i.e. the patient produces a number of pronunciations of a given language element one after the other (within one utterance) to find its correct repetition/ reading form. The patient is trying to find a correct production (effective or ineffective), which means that he or she achieves the correct production of the word or not.

Such responses occur very frequently in patients with aphasia (and show very clearly the nature of aphasia as a condition of language disintegration/ instability, and production variability as a phenomenon that results from this condition).

Dynamic responses – syllable repetition:

– **ra**: [la, fa], **na**: [ma, da], **sa**: [vu, wa], **pa**: [pu, po, pa].

Dynamic responses - word repetition:

– **rak**: [rek, rok, ryk, né], **wóz**: [voda, rolńistfo, no], **zab**: [komp, fomp, somp], **lew**: [fy-, flep, lef].

Dynamic responses - syllable reading:

– **po**: [mo, fo], **nia**: [ri, ro, ia], **le**: [ly, le].

Dynamic responses - word reading:

– **kimono**: [kinon, ki-, kinowo, kimono], **waliza**: [falista, faliza, waliza], **pajac**: [paionc, pańonc, paiaç],

Among all the incorrect responses, dynamic responses constituted:

- 13.8 % in word repetition tasks, and they occurred in all the patients with aphasia, although their number was different in different patients;
- % in syllable repetition tasks, and they occurred in 5 patients with aphasia, i.e. those who had difficulty in repeating syllables;
- 32.5 % in word reading tasks, and they occurred in all the patients with aphasia;
- 8 % in syllable reading tasks, and they occurred in all the patients with aphasia.

As can be seen from the examples given above, some dynamic responses ended in finding the correct form of the elicited word, therefore they were effective. They constituted approximately a half or more than a half of all the dynamic responses in each of the four tasks (syllable repetition, word repetition, syllable reading, and word reading). Dynamic responses prove that the aphasic productions of language elements are a process with a variable course that is unpredictable in advance.

Such responses occurred only one time in a patient with dysarthria (while reading the syllables: **cia** [æe; æã]; **ta** [te; tã]).

SUMMARY

Due to the small number of patients in the study, we relate the conclusions from the study to those groups of patients first of all. However, we think that based on this material, we can draw attention to certain more general tendencies.

Production variability occurred both in patients with aphasia and in patients with dysarthria. Seven types of consistency/variability in the production of the language material were distinguished, which were common to patients with aphasia and patients with dysarthria, though they occurred with a different in-

tensity in these groups. Increase in variability was smaller in patients with dysarthria than in patients with aphasia. Statistical analysis showed differences in the intensity of production variability depending on the task type (reading/ repetition). An increase in production variability was registered in patients with dysarthria in their reading attempts when compared to their repetition attempts, while in patients with aphasia – a decline in variability, but the results were not always statistically significant. Therefore, it is necessary to be careful in a broader interpretation of the findings on account of the small sample and also in view of the influence of cerebellar damage on the way of reading (patients with spastic- ataxic dysarthria caused by MS predominated in the group of patients with dysarthria).

The qualitative analysis showed the complexity of the variability phenomenon. Variability manifested in:

1. The co-occurrence of correct and incorrect productions of the same syllable/ word in the same patient;
2. Incorrect, qualitatively different productions of the same language element within the same error type in the same patient;
3. Incorrect productions of the same syllable/ word that were different in terms of the error type in the same participant.

The complexity of the production variability phenomenon occurred both in patients with dysarthria and in patients with aphasia.

The authors answer the question posed as the goal of the study (with all the reservations resulting from the small number of participants) that variability is not a reliable criterion for differentiating aphasia from dysarthria.

CONCLUSIONS

Variability in the production of language elements is not a reliable criterion for differentiating dysarthria from aphasia. A variability reducing factor in the production of syllables/words by patients with aphasia is reading aloud. **Reading aloud may increase variability in the production of language elements in patients with dysarthria.**

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Annexes

List of syllables

pa, ba, ma, fa, wa, sa, za, sza, ʒa, sia zia, ca, dza,
cia, dzia, cza, dʒa, la, ra, ta, da, na, nia, ka, ga, cha,
po, mo, wo, so, szo, lo, ro, to, do, no, nio, ko,
pe, me, we, se, sze, le, re, te, de, ne, nie, ke.

List of words

but (shoe), cud (miracle), cis (yew), czyn (act), dom (house),
dzik (boar), fan (fan), gęś (goose), hak (hook), jar (ravine),
kot (cat), kit (putty), lew (lion), lis (fox), łoś (moose), mak
(poppy), miś (teddy), noc (night), nić (thread), pas (belt),
pies (dog), rak (crayfish), sok (juice), sień (entrance hall),
szum (swoosh/hum), ul (hive), wóz (cart), wir (whirlpool), ząb
(tooth), żar (heat);

derka (blanket), kino (cinema), lizak (lollipop), masło
(butter), nosze (stretcher), niebo (sky), pajac (clown), regał
(bookshelf), sanki (sledge), szuba (fur-lined overcoat), toga
(gown), waza (vase);

dyrygent (conductor), korona (crown), lekarstwo (medicine),
magazyn (storehouse), nożyce (scissors), niedola (misery),
pomidor (tomato), rowery (bicycles), sandały (sandals), szuwary
(rushes), tabaka (snuff), waliza (suitcase).