

Afferent Aphasia Motor: Similarity and Difference Between Luria's Aphasia and a Case Study

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Luria discusses the relationship between the symptoms observed and the various locations of injury. This work aims to analyze the similarities and differences between the language manifestations described by Luria in afferent aphasia motor as a case study of injury in the left temporoparietal area. The survey was conducted from the hospitalization of the participant, diagnosed with brain tumor. For the evaluation of linguistic manifestations of the individual, a recording of a spontaneous speech section between the researcher and the participant was made. After evaluating, some language changes described in the literature as possible classification of the type of aphasia were found; among them are oral apraxia and articulatory confusion between similar sounds, but different linguistic manifestations of the classification described by Luria were also found. Throughout this paper, we can see that there are many conflicts in regard to the classification of aphasia, both with regard to location issues such as the direct and expected relationship for their linguistic manifestations. Thus, this research aimed to demonstrate the importance of careful evaluation regarding, first, the subject and its linguistic manifestations, demonstrating that these productions are not always compatible with the injured area.

Keywords: afferent aphasia motor, temporoparietal injury, Luria

Introduction

For many centuries, there were several attempts to understand the human mind. For philosophers and naturalists, the mental abilities could be located in three brain ventricles, but it was only in the early 19th century that the anatomist Gall described the existence of two brain chemicals: the gray and the white. This finding was considered a great contribution to the topographic advances of the time; however, according to Taub (2006), the phrenological maps of Gall fell into disrepute for lacking scientific evidence. These models

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and proposals, marked by the desire to find the language, are criticized and reworded from time to times. But it is clear that the weight of tradition by the terminology used by these neurologists of the 19th century (precursors of localizationists studies) is present, to the present day, even with several limitations.

During the 19th century, according to Glossman, Luria and Vygotsky tried to contrast the localizationists ideas through experiments in patients with brain injuries. However, they arranged them in units and processes in the brain, to obtain the product in an interaction of neuronal pathways and psychological organizational system. These functional systems are defined by participation of brain groups operating in concert and having, each, their participation in that system. But at the same time that Luria (1981) tried to understand this system, he paradoxically sought to relate and describe the linguistic manifestations in certain brain injuries (Novaes-Pinto, 2009).

The aphasic disorders classification is a controversial issue that although there are some significant differences between the literary descriptions and individuals, there is a considerable overlap between the various classificatory schemes (Kagan, 1997). According to Luria (1973), many areas of the brain operate in concert with each having their participation in these systems to form the functional language system that when one of them is injured, it affects the functional system extension.

The questions that guide this research revolve around the analysis of the classifications of aphasia, if they are tight to each injured area of the brain, and its possible linguistic manifestations. Some works support a negative hypothesis. In contrast, this study seeks to relate the injured area with neurological spontaneous speech presented the research participant, describing his brain injury along with some spontaneous speech excerpts. In this way, this study aimed to analyze the similarities and differences between the languages of events described by Luria in afferent motor aphasia with a case study of injury in the left temporoparietal area.

Methodology

Regarding the risk by Resolution 466/12, considering the respect for human dignity and discomfort, the procedures presented alternatives to these risks during the search and only started after the approval of the Ethics Committee, as envisaged in the same resolution. The research participant and/or caregivers were informed about the purpose and methodology of the study and asked to give consent for their participation by signing the Informed Consent form (ICF) in which their freedom was laid to leave search whenever you want as long as no damage is assigned.

The research participant is FN who was diagnosed with a brain tumor located in the temporoparietal area in the left hemisphere in December 2013. FN is 36 years old; he completed the secondary school, served as the conductor of the SAMU 192 in Itapetinga/BA, and died due to brain cancer. According to his wife, FN's routine, before the emergence of the disease, was very dynamic. Besides acting in responding to emergency calls and driving the vehicle, he had knowledge of the rules of Traffic Basic Law, defensive driving and municipal area in which he worked. After the diagnosis, his routine was related to the treatment of the condition, and it was at this point that the FN data were collected (12/11/2014).

The survey was conducted from the participant's admission in his hospital bed, in Vitória da Conquista, due to its pathological condition diagnosed with brain tumor. For the evaluation of the language manifestations of the individual, it was made a recording of a spontaneous speech section between the researcher and the participant.

After evaluating, some language changes to possible classification of the type of aphasia were identified, being relevant to observe the damaged area of the subject, age, gender, educational level, severity, and psychosocial level.

All data collected were kept strictly confidential and were used only for scientific purposes, without any participant identification. In addition to the medical records, information by the caregiver on the participant ID and his life history were collected.

Results and Discussion

Brain Injury and Language Expression

After the diagnosis, his current routine was about the treatment of the condition. Figure 1 shows the computerized image where it is possible to see the brain area where the tumor is located, in the temporoparietal region of the left hemisphere. The malignant tumor was diagnosed in December 2013.

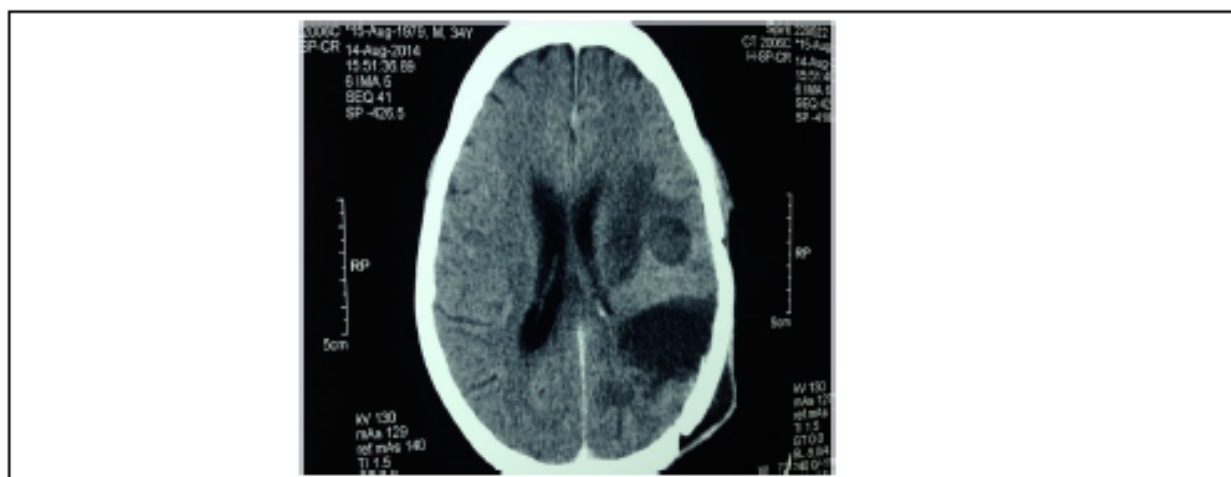


Figure 1. Computerized tomography.

It shows the completion of the medical report locating the lesion that covers a “wide hypoattenuation area affecting the temporoparietal left lobes associated with the hypo density area nodular”.

For a description of linguistic manifestations a dialogue between the researcher and FN was established. Table 1 shows the transcription of spontaneous speech of the participant (FN) with the author of the research (Pesq).

Table 1

Transcription of Spontaneous Speech of the Participant (FN) With the Author of the Research (Pesq) in English

	Graphematic transcription	Description of some important events during spontaneous speech
Pesq	—How old are you?	
FN	Iiiiiit’s...thi...thir...dir...dir...thi	Participant counted on the fingers until three
Pesq	Thirty?	
FN	Yeeees...thirty...one...two...three... four...five...six... Thirty-six	F. counts again the numbers on his finger to conclude his thinking and say “six”.
FN	—soc...soc...cer! Soccer!	During the conversation, the TV was on, and he heard the sentence “Brazilians are stars in Europe”, so the participant said “soccer” trying to show the Brazilian Team on TV.
FN	Bra...Bra...Brazil... Brasirian...Brazilian	After almost 15 minutes trying to say the word “Brazilian” and not being successful, the researcher gave the hint of L, so the participant could pronounce the word.
FN	—La...la	F. talks “la” trying to talk “na”.

The laborious production of FN and the difficulty in selecting the similar sounds have led us to classify your aphasia as motor afferent. Luria (1981) considers that this type of aphasia is caused by injury to the lower portion of the central post spin, secondary zone of sensory parietal cortex, and has the feature in its production of language difficulties in switching from one articulatory position to another. The author states that the greater the length of the word, such as polysyllable, the greater its difficulty in producing the utterance.

This feature became visible when FN tried to emulate the word—Brazilian. The changing of the lateral liquid [l] by tepe demonstrates the difficulty that the participant has to find the point, since a phoneme is distinguished from each other by only one feature (+/- lateral). This is also observed in—thirty, word found in row 2, wherein the participant in its production, alternated [d] by [T] in the syllable—thir, in this case the two phonemes are plosives, related to the aspect, and coronal related to the point (Yavas, 1990), distinguishing themselves only by being voiced or voiceless.

For Jakobson (2003), the difficulties presented by FN are related to the selection shaft, causing what the author calls Similarity disorder. Another situation compatible with this “disorder” is the difficulty in initiating dialogue, which is also shown on line 4, when the researcher gives the track the first word—thirty described on line 3, and the participant can create a strategy (by issuing the numbers to his desired age) continuing the conversation easier. According to Jakobson (2003), his language is reactive, context-dependent, and his difficulty in selecting is visible in the choice of phonemes.

Regarding aphasia classification and its convergence with the injured area, we can consider that, in the case of subject FN, there is compatibility in relation to the injury, to the classification and some linguistic findings (Aphasia Motor Afferent), but it is also important to mention the differences as the resolution capacity and compensation for the production of the phoneme and consequently of the word.

Location/Extent of Injury

According to Annunciato (2013), when brain damage occurs, various events occur in the injured sites and near it. FN was affected by tumor, and this damage can lead to necrosis of surrounding cells, because tumor lesions are often surrounded by halo of edema and often present infiltrative component that extend beyond the margins defined in neuroimaging.

This fact may explain some similarities and differences of language described in the literature in the participant. This effect explains why a particular injured area can change its surrounding regions. We can consider that, taking into account that FN suffered a tumor, in his surgical process, neighboring areas were also injured.

Thus, to analyze the extent of the injury, its location or whether the presence of bleeding is used computerized tomography (CT). But not always CT is reliable; it can help show small ischemia in the posterior fossa due to bone artifact as the cortical surface (Kasper, 2006). It may not have visible changes in TC, but with language change, so it is not possible to sum up the language to localizacionists issues, it is important to emphasize the subjective and social nature of brain function, because the brain is molded by external experiences that transform the cognitive functioning (Novaes-Pinto, 2012).

Interactional Context

The exhibition and the interaction of a subject to an interactional context directly influence the functional characteristics of the human brain. This organism-environment interaction experienced by an individual primarily determines an evolution in its responsive aspects where it is inserted. The different communication

situations will modify the cognitive linguistic possibilities of the subject. However, this stimulus has to be enjoyable and stimulating for the individual. The interactional context promotes sociocultural contribution which carries a certain world view in which it was/is experienced by aphasic (Novaes-Pinto, 2009).

The participant is considered by observations at home and reports of caregivers, a subject very encouraged by family and therefore has great developments in its linguistic aspects. The functionality of the brain is not only linked to the subcortical and cortical levels, but the relationship with the environment, the mediator, and the culture in which the aphasic is exposed. The second participant, FN, as already described, has a massive injury and even presenting difficulties to move from one articulation to another uses strategies to overcome this obstacle.

Difficulties for the Use of Standardized Tests

Caplan (1987, 1993), the neurolinguistic describes aphasia as portraits of language disorders. These symptoms are covered by the notion of aphasic syndrome, presenting stronger and weaker forms of the syndrome. The concepts of—strong are associated with a tendency to all deficits of individuals into well-defined categories; whereas the notion—weak refers to a set of symptoms which includes some variation, but still can be determined as syndrome.

The search for a standard that fits the individual is based on quantitative research methods. The most commonly used instrument is the standard test, called Boston Classification System, based on work of Geschwind and colleagues (1969), to seek to diagnose language changes. Coudry (1988) shows that often when a person is subjected to the questions proposed in the standard tests, the answers are not satisfactory, since it was prepared in a decontextualized situation, like a game of questions and answers. Although during the informal conversation, method practiced by this study, the aphasic says the word according to the contextual issues. The scores that determine the classification of aphasia and its severity are generated from standard tests and this reduces significantly its effectiveness for the vast majority of aphasia, since each has a different historical-cultural environment (Novaes-Pinto, 2006).

Conclusion

For centuries, the brain theory was based on localizacionists ideas, in which the linguistic manifestations were understood as the scope of specific areas of the brain. This organ only came to be seen as a functional system, due to the principles of Luria (1981). During this work, we observed that there are several conflicts regarding the classification of aphasia, both regarding location issues such as the direct relationship (injury/symptoms) towards their linguistic manifestations. We have seen that the divergence of anatomical and clinical correspondence is old, as the work of Luria (1981) and Jakobson (2003) demonstrate.

Based on this research, it was also noted that the analyses carried out, supported in Lurianas theories are not sealed to classify the language changes of the individual, since Luria (1981) considers the functioning of the central nervous system as a complex functional system, operating in concert, that is, a change is not restricted to a specific area. Luria (1981), with regard to aphasia, takes into account the analyses of Jakobson (2003), thus distinguishing from other authors. However, the proper linguistic analysis, as can be seen in the evaluation of the subject, was refined by Jakobson (2003), which also sought to demonstrate a linguistic interpretation for this study.

During this study, we found linguistic similarities in aphasia motor afferent of Luria between literature review and case study mainly related to apráxicos aspects.

But it is also important to mention the differences as the resolution capacity and compensation for the production of the phoneme and consequently the word. This can be explained by the environment in which the aphasia is.

This research aimed to demonstrate the importance of careful evaluation that considers, first, the subject and its linguistic manifestations, and that analyzes in detail both its difficulties, as their potential.

We observed that the language productions are not always compatible with the injured area, and furthermore, even when two individuals have the same lesion may have different manifestations, because each individual has a history of life, with very different performances, in relation to their language operation.

We must consider that, according Coudry (1988), an aphasic subject is not all the time in the same way as a normal subject is not all the time. We share a situation of incompleteness related to the language, at times of our lives. Thus, propose a classification, based primarily on quantification is not feasible. This occurs because the discourse operation and use of resources for the expression shows that the issues described in the literature—generalities, which in this case are aphasia—also have their specificities resulting from the history socio cultural subject (Coudry, 1988).

The main point that involves the acquisition of language and the study of aphasia is the aspect of construction and reconstruction of the linguistic system experienced by aphasic. This socio-interactionist vision aimed to justify that, despite obstacles, the subject sought to demonstrate control and express their wishes through discourse. And this speech, to be constructed and reconstructed needs formed brain connections through extrinsic stimulations such as dialogical game, the joint construction of meaning, the mediator and its acceptability in society inserted (Coudry, 1988).

The integration of aphasic with the environment enables new forms, either from the point of view to characterize the implications of aphasia in language and social interactions or to detect the difficulties experienced by aphasic individuals.

References

- Annunciato, N. (2013). *Influência da terapia sobre os processos do sistema nervosa* (Influence of therapy on the processes of the nervous system). São Paulo: Editora Neda-Brain.
- Caplan, D. (1987/1993). *Neurolinguistics and linguistic aphasiology*. Nova Iorque: Cambridge University Press.
- Coudry, M. I. H. (1988). *Diário de Narciso* (Daily Narciso). São Paulo: Martins Fontes.
- Jakobson, R. (2003). Dois aspectos da linguagem e dois tipos de afasia (Two aspects of language and two types of aphasia). In *Linguística e comunicação* (Language and communication) (22nd ed.). Tradução de Izidoro Blikstein e José Paulo Paes (Translation Izidoro Blikstein and José Paulo Paes). São Paulo: Cultrix.
- Kagan, A. (1997). *Uma introdução à afasiologia de Lúria: teoria Aplicação* (An introduction to aphasia Lúria: Application theory). Rio de Janeiro: Artes Medicas.
- Kasper, D., et al. (2006). *Harrison Medicina Interna* (Harrison internal medicine) (Vol. 2., 16a ed.). Rio de Janeiro: McGrawHill.
- Lúria, A. R. (1973). *Fundamentos de neuropsicologia* (Fundamentals of neuropsychology). São Paulo: EDUSP.
- Lúria, A. R. (1978). *Cerebro y lenguaje: la afasia traumática: síndromes, exploración y tratamiento* (Brain and language: Traumatic aphasia syndromes, screening and treatment). Fontanella.
- Novaes-Pinto, R. C. (2006). Uma reinterpretação do conceito de grau de severidade a partir de uma concepção enunciativa-discursiva de linguagem e dos relatos dos sujeitos afásicos sobre suas dificuldades (A reinterpretation of the concept of severity from a enunciative -discursive conception of language and the reports of aphasic subjects about their difficulties). In *Seminário do GEL - grupo de estudos linguísticos do estado de São Paulo* (GEL seminar - group of linguistic studies of São Paulo) (Vol. XXXV, pp. 1730-1735). São Carlos: SP.
- Novaes-Pinto, R. C. (2012). *Linguagem, subjetividade e ensino: reflexões a luz da neurolinguística discursiva* (Language, subjectivity and education: Reflections light neurolinguistic discursive). São Paulo: Editora Mercado de Letras.

- Novaes-Pinto, R. C., & Santana, P. A. (2009). Semiologia das afasias: uma discussão crítica (Semiology of aphasia: A critical discussion). *Psicol. Reflex. Crit.*, 22(3). Retrieved from http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0102-79722009000300012
- Taub, A., Zachi, C. E., Antunes, A. R., Faria, M. A. M., & Ventura, F. D. (2006). A aplicação da neuropsicologia na pesquisa experimental: o exemplo da intoxicação por vapor de mercúrio (The application of neuropsychology in experimental research: The case of poisoning by mercury vapor). *Psicologia USP*, 17(4), 287-300. Retrieved from <http://www.scielo.br/pdf/psp/v17n4/v17n4a15>
- Yavas, M. (1990). *Desvios fonológicos em crianças: teoria, pesquisa e tratamento* (Deviations phonological in children: Theory, research and treatment). Porto Alegre: Mercado Aberto.