

Speech apraxia in childhood: beyond phonetic and phonological issues

Apraxia de fala na infância: para além das questões fonéticas e fonológicas

Apraxia de habla en la infancia: mas allá de las cuestiones fonéticas y fonológicas

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Abstract

This article proposes the analysis and discussion, based on the Discursive Neurolinguistics (ND), of the neurophysiological, psychic, cognitive, linguistic and social aspects pertinent to the process of language acquisition of hearing children with “Speech Apraxia”. Based on the bibliographical review of the area, covering the evaluation and speech therapy traditionally intended for those children, we expanded, based on a discursive approach of language, our reflections on the child with apraxia. Thus, in addition to the phonoarticulatory alterations, the child is involved in important issues related to his or her babbling period, the neurofunctional conformation of the articulatory gestures memory and the constitutive processes of dialogue as a matrix of signification.

Keywords: Speech, Language Pathology and Audiology; Apraxia; Child; Language.

Resumo

Este artigo propõe a análise e a discussão, com base na Neurolinguística Discursiva, dos aspectos neurofisiológicos, psíquicos, cognitivos, linguísticos e sociais pertinentes ao processo de aquisição de linguagem de crianças ouvintes com “Apraxia de Fala”. A partir da revisão bibliográfica da área, recobrando

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avaliação e tratamento fonoaudiológico tradicionalmente destinados àquelas crianças, ampliamos, com base em uma abordagem discursiva de língua e linguagem, nossas reflexões sobre a criança com apraxia. Observamos, assim, que, para além das alterações fonoarticulatórias, estão envolvidas na criança questões importantes, pertinentes e referentes ao seu período de balbucio, à conformação neurofuncional da memória dos gestos articulatórios e aos processos constitutivos do diálogo enquanto matriz de significação.

Palavras-chave: Fonoaudiologia; Apraxia; Criança; Língua; Linguagem.

Resumen

En este artículo se propone el análisis y la discusión, bajo la base de la Neurolingüística Discursiva, de los aspectos neurofisiológicos, psíquicos, cognitivos, lingüísticos y sociales pertinentes al proceso de adquisición del lenguaje de niños oyentes con “Apraxia del Habla”. A partir de la revisión bibliográfica del área sobre evaluación y tratamiento fonoaudiológico tradicionalmente destinados a aquellos niños, ampliamos, con base en un abordaje discursivo de la lengua y del lenguaje, nuestras reflexiones sobre el niño con apraxia. Observamos que, más allá de las alteraciones fonoarticulatorias, están involucradas en el niño cuestiones importantes, pertinentes y referentes a su período de balbuceo, a la conformación neurofuncional de la memoria de los gestos articulatorios ya los procesos constitutivos del diálogo como matriz de significación.

Palabras claves: Fonoaudiología; Apraxia; Niño; Lengua, Lenguaje.

Introduction

This article proposes the analysis and discussion, based on the Discursive Neurolinguistics¹ (ND), of the neurophysiological, psychic, cognitive, linguistic and social aspects pertinent to the process of language acquisition of hearing children with “Speech apraxia”. Also interferes in this analysis the literature review on speech-language pathology evaluation and treatment, and a brief report of the follow-up of a clinical case, whose objective is to demonstrate how the different theories found do not seem to contemplate the complexity and multiplicity of factors involved in childhood apraxia of speech.

The term *speech praxis* refers to the neuro-functional ability learned that the speaker has to program the speech-to-speech gestures involved in speech motor production. Speech requires the coarticulation of phonetic segments in the midst of a structure that recovers, in addition to the segmental aspects of speech (production of sounds), also the suprasegmental aspects, such as intonation and prosody².

Norberto Rodrigues, supported by the electromyography technique³, analyzes that the praxis of speech arises from the predominance of articulatory gestures, whose neurofunctional motor command is of the ballistic type, described physiologically as fast movements of small mass and with less inertia. In the case of chained speech production, ballistic movement imposes mechanical limitations that do not allow the position of the structures involved in the articulation of each sound to be zeroed after its emission. Thus, the chained speech eventually requires the spatial-temporal overlap of the motor commands, resulting in the coarticulation of the sounds. However, the motor commands that reach the phono articulatory organs for a given phoneme are dependent on the phonetic context, rhythm and speech intonation. This set of aspects makes each phonemic emission a singular phenomenon, making it impossible to predict a finite set of pre-established motor commands^{1e}.

The first description of “Speech apraxia” in adults was performed by Darley in 1969^{2c}. In gen-

1. The ND developed by Coudry within the Institute of Language Studies of the State University of Campinas (UNICAMP) is an area of Linguistics that studies the linguistic processes in the relation subject, brain, mind and body^{5e}.

2. The terms “intonation or intonation” and “prosody” appear in

this article from the studies consulted as suprasegmental aspects without distinction between them. However, Scarpa and Svartman differentiate the two terms: intonation refers to larger units such as sentences, and prosody refers to phonic aspects relating to the phonemes of the language within a syllable or vocabulary³.

3. Surface electromyography (EMG) records variations in muscle electrical activity during its contraction, contributing to the myofunctional diagnosis⁴

eral, it is defined for both adults and children as a disorder of the articulation characterized by the difficulty that the speaker presents in voluntarily programming the sequence of movements of the phono articulatory organs involved in the production of phonemes and words of the language. What makes this diagnosis deserve special attention is the consideration that these patients do not present muscle changes (slowness, weakness, incoordination), stomatognathic (breathing, chewing, swallowing), neurological⁴ or cognitive disorders^{1,2,3e,4e}.

It is, therefore, a phono articulatory alteration that focuses particularly on the phonological system of the language. By *phonology*, a term coined by the linguists of the Linguistic Circle of Prague⁵, the description of the sounds interpreted within the phonological system of the language as constitutive elements of the words, from their values, functions, contextual and positional variants within a system linguistic. Thus, the patient with apraxia remains unable to say the intended word, due to not being able to perform the set of phono articulatory movements involved and required by the language system.

For the adult, two differential markers of this diagnosis are: 1. Better performance in the production of automatic speech (numbers, days of the week, etc.) than in the one performed voluntarily; 2. High variability of errors that do not always fall into the same position within the word, and in different attempts to correct it. Thus, as the pathology affects the segmental aspects of speech repercussion in its suprasegmental aspects^{6e}, apraxia is associated with a discursive extension. The speaker can then, as an effect of his articulatory inability, have his speech modified (altered as to meaning) in relation to the pattern of intonation and rhythm, such as: slowed speech, breakage of fluency (pause, hesitations, prolongations of syllables words, repetitions of attempts to speak the word)^{1,5,4e,7e,8e,9e}

From the studies on adult verbal apraxia derived the evaluation and treatment of children with apraxia. These procedures are recurrently focused on the issues of speech production and stomato-

gnathic functions⁶, often producing the erasure of the adult-child encounter, the singular and unique event of the interaction/interlocution in which speech and language emerge and apraxia is shown.

We recognize, however, that entering the field of children's speech also presupposes entering the field of Language Acquisition, covering neurophysiological, psychic, cognitive, linguistic and social aspects as the multiple dimensions of this future speaker of a given language.

The main complaint of parents of children with speech apraxia is usually that "She seems to understand what is told to her, but we cannot understand what she says." Identifying and signifying this complaint in the evaluation, and throughout the speech-language pathology, reminds us of the need to understand the linguistic pathway that the child undergoes in at least three aspects:

Based on Jakobson, in order to look for indications of his period of stammering on this course^{10e}. The objective with Jakobson is not to question the validity of his hypothesis of discontinuity between the period of babbling and the phonological system of a language, but to understand the proprioceptive path of that child who, by continuous and discontinuous paths, would arrive to the condition of a speaker, which did not happen. This analysis is complemented by the studies developed by Scarpa that emphasize prosody as a primordial entry into language and responsible for the processing, discrimination and segmentation of speech flow throughout the first and second years of the child's life^{6,7}.

Based on Freud's study of aphasia, we seek to understand how the child with apraxia constructs its course of repetition (or not repetition) of the language, in the midst of different interactions, with different interlocutors^{11e}. Freud in "Aphasias" approximates the adult in an aphasic state, that is, in the process of dissolution of speech and language, of the child in the process of acquisition of speech and language^{8,9,10}. To account for the study in which he discriminates the different types of aphasia, Freud idealizes the language apparatus as a memory apparatus (of association of sense and of different phono articulatory proprioceptions), since we learn to speak because we learn to repeat the language. In view of this, it is necessary to

4. As we will see, there is a strong reference to the presence of neurofunctional

5. The studies of the Linguistic Circle of Prague (from 1926 to 1939) prioritized the functions of language structure coupled with the flexibility of use (semantic and pragmatic), to the detriment of its formal nationalization.

6. Stomatognathic functions are breathing, sucking, chewing, swallowing, and speech.

ask how the children diagnosed with apraxia of speech enter the language, if the motor repetition that they realize seems insufficient. How does this experience register and modify itself neurologically, cognitively and mentally in the process of association/memory? Would apraxia involve a neurofunctional memory issue for the association of the constitutive movements of speech, converging towards the non-stabilization of these movements?

In the course of getting hold of the language and its use in community, the child is immersed in language, from the interaction with the other^{11,12,12e}. This experience leads her, almost intuitively, from listening, to a certain notion of language functioning. So, how do these children move in the process of language acquisition, since their speech often configures itself as a barrier to the meaning of the other? In order for it to mean what it listens to, by cutting out the words embedded in the language syntax in the continuous stream of speech, processing and discrimination of language functioning becomes necessary. So, how does she identify with her linguistic community?

Literature review

The proposal of this article refers to apraxia of speech in childhood, but, as mentioned before, the origin of this study is linked to the knowledge developed about adult apraxia of speech; therefore, we bring a brief clipping about this topic.

The terms “Acquired Speech Apraxia” or “Verbal Apraxia” distinguish the most common acquired form in adults as neurofunctional sequelae of a neurological injury or damage, more specifically involving the left hemisphere⁷ (speech motor cortex). Such an event impedes or modifies the motor planning of speech movements, even though the muscular system is totally preserved and may be associated with other frames of neurofunctional changes, such as aphasia⁸, and with it being confused.

7. According to Luria, the cerebral hemispheres act in complementarity, however, in the case of rightists, the left hemisphere (HE) is the dominant one^{13e}. Roughly, speech and language demand more the performance of HE, which performs different functions: processing of sound, of visual signals, of spatial relations, of motor speech performance, for example. We will return to this topic later.

8. According to Coudry, aphasia is caused by acquired cortical-cerebral lesion, being defined as a disturbance in the

The differentiation between speech apraxia and dysarthria is also relevant, both for children and adults. Apraxia is punctual, as we have seen, not associated with changes in orofacial and global muscle tone, and it affects the coarticulation of speech movements, and may be associated with some type of neurofunctional alteration¹³.

Dysarthria is a neurological (central or peripheral) condition and has a wide classification depending on the type and the point where the lesion occurred⁹, being associated with other syndromes or degenerative processes, with alterations in the motor function of speech, breathing, phonation, resonance, articulation, stomatognathic processes, intonation and prosody^{14e}.

Returning to apraxia, in addition to the listed criteria, others were identified for the understanding of the phenomenon in the adult, for example: possibility of success for the repetition of production of isolated phonemes and not for a sequence of phonemes; repetition of simple words with visible articulatory points, more susceptible to correctness than with auditory cues; difficulty in remembering how articulatory movements are made; (vowels, consonants, consonant groups), size of the word and its prosodic aspect^{10 1,14}.

In the case of children, this picture becomes even more complex. Unlike the adult, who has built up a stable process of speech and language destabilized as a result of a neurological injury, the child has been in this condition since the beginning of his speech and language acquisition process. The exception would be the child who, in later stages of this process, suffers brain damage that compromises their speech.

The set of explanations found for apraxia in childhood, as we shall see, seems to value the organicist view of the production of speech and

processes of signification with alteration in one of the linguistic levels with repercussion in others, compromising the discursive functioning^{5e}

9. The following are the most common classifications of dysarthria and an example of pathology associated with each: Flácida (Myasthenia Gravis); Spástica (Cerebral Palsy); Hipokinética (Parkinson Disease); Hiperkinética (Korea); Atáxica (cerebellar lesions); Mixed, i.e., different dysarthria at the same time (Multiple sclerosis). Suggested reading on the topic: Doctoral Thesis: Marina Martins Pereira Padovani, Speech Therapy, Federal University of São Paulo, orientation of Prof. Dr. Mara Suzana Behlau, 2011.

10. Because this population is not the focus of the present study, we will not extend into the relationships between verbal apraxia and the adult reading and writing processes.

language. Thus, apraxia is seen as a result of the neurological maturation of the child in the functional learning of the interaction with the speech production itself, as a consequence of the adaptive mechanism associated with the development of the organism^{15,15e}. Apraxia would then be the result of the failure of this adaptation, which interferes with the set of neuromotor systems and strategies that control the speech production, accuracy and variability of the articulatory movements observed in young children^{11, 16,17,18,16e}.

Other medical explanations associate childhood apraxia with known neurological etiologies (intrauterine, infections or trauma), complex neurobehavioral disorders (genetic or metabolic), or idiopathic neurogenic origin^{5,19,20}. The only incidence reference found for this condition is the indicator of one case for 100 children⁵.

Among the main descriptions of the table we highlight:

- “Childhood Apraxia of Speech” (CAS) identified by the American Speech-Language-Hearing Association⁵ as a disorder of neurological origin in which the accuracy of speech movements is impaired in the absence of neuromuscular deficits with segmental changes and suprasegmental speech and language, such as: articulation at the beginning of speech elocution; phoneme substitution errors characterized by metathesis¹²; frequent omissions of phonemes; inconsistent changes of phonemes in speech; high incidence of vowel errors; increase in the number of errors in larger units of speech; impaired voluntary oral movements; inconsistent accent achievement (tonic syllable); reduction of diadochokinetic¹³ abilities; change in prosody, vocal quality and

fluency; significant difficulties in imitating words and phrases and predominant use of simple syllabic forms; expressive language reduced in relation to the comprehension language^{4e,17e}. Such characteristics tend to persist in later stages of the child’s life, compared to those with other speech or language disorders¹⁴, corroborating the indication of early diagnosis.

- Developmental Apraxia of Speech (DAS) present since the beginning of the process of language acquisition, in a continuum of severity from a mild form to the impossibility of speech acquisition²¹. In this diagnostic category¹⁵, the observed speech changes are: reduced speech rate; reduction of words by non-coarticulation of syllable sequencing of words; intonational change; alteration in the phonological system; errors that resemble the errors of adults with acquired apraxia. This framework refers to the delay in the development of children’s language and, as a consequence, may have repercussions in other linguistic domains (semantic, pragmatic and especially in syntax), including written language¹⁴.

As to the speech-language evaluation, different protocols/instruments of evaluation, from the point of view of the psychometric criteria and the aspects they evaluate, were analyzed by Gubiani, Pagliarin and Keske-Soares, covering the period 2003 to 2014²². Among such protocols/instruments, the authors highlight the following:

- Verbal Motor Production Assessment for Children (VMPAC): For children between three and 12 years of age, search for speech disorders due to deficit in speech praxis, composed of 82 items (20 of global motor control, 46 of oromotor control and 16 sequencing skills). The items of global motor control evaluate postural tone and stability for respiration, phonation and artificial system; oromotor reflexes and vegetative functions. The oromotor control items evaluate the integrity of verbal and nonverbal movements of the mandible, lips and tongue. Sequencing items evaluate

11. The movements of the lips, tongue and mandible, fundamental for precision and articulatory coordination, are transformed throughout the development of children (from undifferentiated to refined). Contrary opinion is expressed by the American Speech-Language-Hearing Association (ASHA), which considers that such movements are not essential for the chaining of sounds in speech^{10e}.

12. Metathesis is the rearrangement of sounds within the same word, influenced by the facilitation of pronunciation in the language system, for example: lizard for lizard; shoelace for carding.

13. By diadochokinesia is meant the ability to perform rapid repetitions of simple speech segments. Its evaluation reflects the adequacy of maturation and neuromotor integration of the patient, offering an acoustic index of the articulatory movements’ velocity and the position of the articulators, being therefore considered tests of neurological ability^{18e}.

14. As, for example, in “Articulation Disorder”, where the same phonemes have their productions prevented by not updating one or more distinctive features^{19e}, generating their distortion, omission or their replacement by another; superficial impairment of the phonological system and the process of language acquisition; less time for speech therapy.

15. Hall, Jordan, Robin and Kumim relate the DAS to syndromes such as: Down, X-Fragile, Rett, Autism Spectrum Disorder / Autism and Epilepsy^{23,20e}.

non-verbal sequencing ability and duplicate and triplicate phonemes.

- *Dynamic Evaluation of Motor Speech Skill (DEMSS)*: For children between three years and six years and seven months of age with severe speech disorders, the evaluation consists of 9 subtests covering 66 items that evaluate the articulatory precision of vowels and words, the prosody and the consistency of utterance. It privileges the child's ability to imitate the examiner in two phases: (i) with and without an articulatory track, (ii) with an examiner's demonstration. The instrument was sensitive to the diagnosis of childhood apraxia of speech in the American population.
- *The Orofacial Praxis Test (TOPT)*: Assists, through verbal request and imitation of the examiner, the identification of motor coordination disorders at various levels, being aimed at children and adults. Composed of 36 tasks (12 referring to the praxis sonorized, 12 to the orofacial praxis, six to the sequence of movements and six to the parallel movements), it involves: sequencing movements of the orofacial musculature (for example: opening and closing the mouth) distinction between the type of gesture (oroverbal praxical movement, orofacial praxical movement, sequence of movements, parallel movements) and types of application (verbal request and imitation).
- *Kaufman Speech Praxis Test for children (KSPT)*: For children between two years and five years and 11 months of age, it helps, through the imitation of the examiner, in the identification and treatment of childhood speech apraxia. Composed of four parts with increasing difficulty levels: 1: wide oral movements; 2: simple movements (isolated vowels, simple consonants and combined vowels, 3: consonants / k, g, f, s /, complex disyllables and complex words 4: spontaneous speech. With a criterion and content validity index for the North American population, this instrument is widely used in international research with samples of children's speech.
- *Madison Speech Assessment Protocol (MSAP)*: Proposes to identify and classify diagnostic markers for eight subtypes of speech disorders of unknown origin (at different ages), among them apraxia. It consists of 25 tasks: Goldman Fristoe Test of Articulation; screening test; spontaneous speech sample; task of lexical accent; task with words, simple and complex sentences; repetition

of syllables and pseudo words¹⁶; chore and sibilant tasks; task of diadochokinesia; vowel and consonant (/ a / e / f /); orofacial exam; oral and written language scales and the Kaufman Brief Intelligence Test.

Gubiani, Pagliarin and Keske-Soares identified the following aspects in the research: all instruments assess oral structures and/or motor function of speech as the most involved areas in speech apraxia; only DEMSS and MSAP evaluate prosody in specific tasks; all the instruments help in the diagnosis of CAS, but only the DEMSS presented a valid and reliable study; only TOPT was used in Brazilian researches; none of the instruments have been adapted and standardized sufficiently for Brazilian socio-cultural reality or have psychometric properties for Brazilian Portuguese²².

After the presentation of the theoretical contribution on speech apraxia in childhood and its evaluation, we will give priority to speech therapy therapies, as follows:

- *System Points for the Restructuring of Phonetic and Oro-Muscular Objectives - PROMPT*: The method defines the speech impairments from multifactorial aspects: facial, skeletal and muscular structures; body tone and proprioception; cognitive-linguistic, social-emotional domain. The technique includes neuromotor principles, auditory and visual information, and somatosensory (kinesthetic and proprioceptive) to provide feedback to the speaker. It favors sensory integration (touch, pressure, specific locations, auditory and visual sensibility sensitive to time) and support, stabilization and postural facilitation (trunk, tone, head and neck control). The progress of the therapy seeks to refine the movements of the speech substructures (phonation, mandibular movement and orofacial complex), aiming at the independence between the structures until the integration of the whole stimulus for the functional communication is reached. The stages of therapy follow therapist-oriented patterns through predetermined PROMPT protocols, such as: Parameter; Complex and Surface^{21e}.
- *"Metodo de Dedinhos"*: It aims to promote/facilitate articulatory production and literacy of children and adolescents, especially those with the following diagnoses: Down Syndrome; Au-

16. Pseudo-words: terms that do not exist in the language but can be pronounced.

tism Spectrum Disorder; Specific Language Impairment and Literacy Difficulties. The resource used is multisensory/visual-auditory stimulation, through photos, illustrations and programs such as the *Boardmaker*¹⁷, prioritizing morphosyntactic elements present in the initial development of the child's oral language²⁴.

- Phono-visual-articulatory Method (Metodo de Boquinhas). Created at the confluence between Speech Therapy and Pedagogy, the method has as principle the theory of Phono articulatory Consciousness. From phonic (phoneme/sound), visual (grapheme/letter) and articulating strategies (articulema¹⁸/mouth moves), the students seek to read and write children and to mediate/rehabilitate reading and writing disorders. It also adopts the principles of Articulatory Phonology (FAR), which contemplates the phonetic-phonological unit and the articulatory gesture as the minimum unit of speech, favoring: materials that aid in the improvement of oral imitation skills; knowledge of the point and articulatory mode; recognition of the position of the phoneme in the syllable and in the word; tonic syllable recognition; prosody; association and analysis of the phoneme to the articulema; phono articulatory awareness associated with reading and writing skills^{22c}.
- *Supplementary and/or alternative communication*: This is special education aimed at developing facilitating means for people who present loss or delay in the development of spoken and/or written language to communicate with their interlocutors through: 1. Alternative Communication Supplementary (photographs, drawings, systems of graphic signs, figures); 2. Alternative Communication Supported through the use of computers that synthesize speech²⁵.

Dynamic Temporal and Tactile Cueing (DTTC): Through sensory cues (auditory, visual and tactile), it stimulates the child to imitate the therapist, aiming at the perception of the way and point of articulation of the phonemes. The use of sensory cues is proportional to the child's responses^{26,27}.

17. *Boardmaker* is software that offers more than 4,500 symbols of pictorial communication, used to facilitate human communication.

18. It is defined as articulema the movement of the mouth involved in the production of the phoneme or word.

Discussion

We analyze that these therapeutic proposals, to a greater or lesser degree, are based on predetermined programs and are based on strategies that require work in different degrees of complexity, covering different levels of apraxic commitment and, in general, prioritize: articulatory perception, improvement and training of the visual/auditory perception of the position of the phono articulatory organs, the stomatognathic functions and the control of feedback. Although they may interfere with the apraxic child's speech, they seem to give a superficial relevance to his constitution as a subject of language, to his role of interlocutor and to the role of interlocutor attributed by those around him (family and school, for example) – roles that we consider essential in the process of speech and language acquisition.

With the proposal of analyzing and discussing apraxia in childhood and, mainly, the path of this child in the process of language acquisition, we will return to the three issues listed initially. Our justification is that a better understanding of this change imbricated to the process of speech and language acquisition can interfere positively in the assessment and speech-language pathology accompanying them.

We are based on the studies of Jakobson^{10e,23e} and Scarpa^{6,7} to mark the importance of reflecting on the concomitant occurrence of babbling and prosody¹⁹ in the child's initial proprioceptive course, as well as on its implication in speech apraxia.

In the research we conducted in the area, references to this period are rare and very general; it is only inferred that these children were particularly silent babies^{5,28}. However, if there is a possibility of precocity in the follow-up of these children, this would occur from the observation and the more careful understanding of their period of babbling/prosody. However, we recognize that the perspective of language to which we link is particularly intrusive in such an approach.

The speech therapy models presented above seem to be based on a biomedical notion of language, since they do not complicate the importance

19. We have chosen didactically to separate babblings and prosody just because, in general, the production of sound rather than prosody is more valued in this period.

of the presence of the other and the language in the interaction. Thus, language is understood as the acquisition of a transparent communication code, dependent on neurological and cognitive development, at the service of thought. In a discursively oriented view, the child is a privileged interlocutor, from and before his birth, due to the priority of language, to the interaction, to the presence of the other and to the language, and to the effect of adult speech on the child's speech^{11,12}.

The difference between these two views is that the second one, based on Linguistics, privileges the consideration that language has multiple entrances in an interdependent relationship with neurophysiology²⁰. That is, before arriving at the word, the baby's gaze, his smile, his sounds, his different cries are arrays of signification, in different intonations in and by language. Jakobson and Scarpa's studies cover the first part of the child's life on the way to language, speech, and language and cooperate in the understanding that proprioceptive aspects (sensations and perceptions from the body, experimenting with joint movement, vocal resonances and sonority that comes from orality itself) affect the baby's body in the interaction with the other, as precursors and creators of his speech and language.

Jakobson's study privileges, among other aspects, the structural and universal analysis of the acquisition of language in the search for its general laws^{10e}. For the author, the chronological constancy of certain phonological oppositions universally acquired by children, finds familiar correspondence with the structural laws of the world's languages. He also acknowledged that, in the face of young children, adults modify their speech and language in a phonemic infantile pattern. Thus, in this initial space and time, the adult modifies his speech to a Child-directed Speech (FDC) or "Baby Talk"²⁹, simplifying it, reducing its phrasal extension, giving visibility to phono articulatory movements, exaggerating the intonation and intensifying the prosody of what it states with the aim of establishing with the child a possibility of encountering (affective, social, cognitive) senses in a given language. Subsequently, these "mechanisms" are

20. ND, based on the studies developed by Vygotsky, studies the brain as a biological organ of holistic, dynamic and plastic functioning that, in constant interaction with the environment, has its structures and functioning transformed according to the different needs that man (onto and phylogenetically) experimentation.

relativized because the child appropriates this proprioceptive, sonorous and motor process, full of meanings in the language/speech.

For Jakobson, the initial production of sounds by the child has an organic and physiological explanation. Suction of the breast or bottle calls for bilabial movements (breast/bottle seizure) and nasal resonance murmur (avoiding choking on alternation of breathing and swallowing). He also points out that when he is not nursing, the child continues to perform bilabial movements (with or without nasal resonance) plus vowel support, which would be the basic principle of the syllabic consonant - vowel structure. In a short time, she begins to associate this phonatory production with the presence or absence of food (representation), an experience that is sophisticated from organic and physiological to cognitive and psychic, sustained even by repetition (proprioceptive memory, as Freud will say).

Over time, the child begins to produce sounds with linguistic values marked mainly by contrast, opposition and reduplication, such as "mama and papa". At that moment, from the adult's response, the child advances to the border²¹ between babbling and the first words with meaning in the language (semantic and phonological entity), in this way, "mama" can initially refer to the presence of the food, later to assign the mother from an affective to a designative function.

Broadening this perspective, the studies developed by Scarpa favor prosody throughout the first and second years of the child's life as the initial bridge between the formal organization of speech and the significant and discursive potential of the language, *the first possibility of structuring linking the sound to the sense*^{6,7}. For the author, the child's path between the organization of the phonic form (first year of life) and the beginning of prosodic grammar (second year of life) is associated with the processing, discrimination and segmentation of the speech flow of the community language to which it belongs. Such an event is anchored in the fact that infants show processing capacity and discrimination of FDC prosody since intrauterine life^{25e}, unlike previous studies indicating this capacity only in infants with a few months to live.

21. We disagree with Jakobson on the marking of a border between babbling and speech because we see this path as continuity.

We have to emphasize that prosody carries social and cultural aspects of the language that shape the speech melodically (intonation of question, of surprise, of contrariness, etc.).

Scarpa also points out that in the first year of life the child produces sounds as *prosodic fillers as signs of phonetic and grammatical sub specification in the process of structuring*⁷, thus pointing to the importance of prosodic aspects as a preferred path of the possibility of structuring the/in language. According to the author, there is a time for the prevalence of this event that extends mainly in the first and in part of the second year of life. At that time, *the phonic mass* is becoming differentiated because the child is making more and more *metric adjustments in longer sentences and dealing with prosodic boundaries within the intonational phrase*⁷, thus delimiting the precedence of intonation over grammar and lexicon in an interrelationship, in the mother tongue environment.

The process described here involves adult-baby interaction as space and time for the simultaneous occurrence, for the baby, of the proprioception of articulatory and auditory training of universal sounds (which is then pruned by language) and linguistic processing and discrimination of aspects prosodic present in the mother tongue. If this intense process - involving intonation, language, speech - is simultaneous, it would be reasonable to analyze that, unlike the expected, the apraxic child, because with coarticulatory and prosodic alterations, does not seem to enjoy this experience enough to become a speaker of a language.

We are therefore assuming that issues of apraxia are effects on the child's body of deprivation or the incomplete experience of his babbling/prosody period with repercussion on his ability to process, discriminate and segment the speech flow of the language community to which it belongs. For although the experiences of her in this period are not fully known, they have apparently proved to be insufficient to ensure the proprioceptive phono articulatory materiality necessary for speech of/in the language. Otherwise, even if such experiences ensure the production of isolated phoneme, they do not favor their entrance into phonology, in the language itself, as memory, inheritance of a community.

Thus, in the child, his proprioceptive experience - from prosodic cutouts, processing, discrimination and segmentation of the speech flow, present

in the process of language and speech acquisition - then leads us to the second question: everything becomes memory?

We return to Freud's 1891 study of aphasias, in which he idealizes the language/speech apparatus as an apparatus of memory and association. To understand what happens to the adult when affected by aphasia, Freud establishes a relationship between the process of dissolution of speech and language of the aphasic with the child in the process of acquisition^{8,9,10}. We imagine that the child who interests Freud is a little older than the baby who aroused the interest of Jakobson and Scarpa.

For the author, from the psychological point of view, the word is a functional and neuronal unit of language, a complex concept constituted by auditory, visual and kinesthetic proprioceptive elements (or images). Freud analyzes that we learn to speak always guided by the meaning that the word conveys. However, we speak the word by associating its impression of innervation or kinesthetic image in the body, that is, sensory/proprioceptive impressions coming from the organs of speech. For him, in the development of speech/language, these first associations are not identical to those heard, but their adjustments are always guided by the model that comes from the other, added to the child's effort to adapt his proprioceptive mechanisms to the sound production that the word demands. In this sense, we learn to speak because we learn to repeat the language²². The production of words therefore requires the recall in the body of the sound and kinesthetic images of each segment that compose them. Still for Freud, in this context, the loss or impossibility of the child or the aphasic to exercise the correcting *function of the sonic and kinesthetic image* explains peculiarities of physiological and pathological alterations²³.

Thus, for Freud, all learning requires in the subject's body a repetition of what comes from the other (of what is placed in the language/culture) that occurs in the concomitance between the psychological and the neurophysiological: all our experiences (proprioceptive, motor, linguistic, cognitive, psychic), from the most primitive and

22. The term "repeat" does not refer to mechanical repetitions of words, but to the repetition of contextualized experience in language and interaction.

23. Freud broadens his analysis for the relation of speech to writing and reading, however, because this is an extensive topic, it will not be addressed here.

rudimentary, continuously promote an inscription, a psychic and physiological record in the brain, that is, they consist of processes of memory. On the other hand, the more these experiences repeat themselves and become more complex, the more they re-enter psychically and neurophysiologically, and the more grooved these records become, which consequently are more accessible as a memory of the lived.

This associative and memory circuit, involving the experiences in the body and its neurofunctional registers, undergoes continual and interdependent reformulations, especially those involving the relation of speech and language and all that stems from it (mathematical learning, reading and writing processes, discourse production, etc.)^{8,26e,27e,28e}. Extending this understanding to its genuinely neurofunctional aspects, Barbizet & Duizabo explain that the memory circuit happens from short fragments of repeated experiences, *the repetition being the only one able to create and then maintain a new form of association between the neurons*.^{29e} For the authors, each new sensory-affective-motor experience lived repeatedly; leverage certain functional cohesion within the neuronal constellation, in a cycle that will require the interference of the same neurons involved. As to the learning/appropriation of different knowledge, they reinforce that: *The repetition that was indispensable to ensure their individualization will also ensure their perennially, extinction and physiological oblivion*.^{29e}

We then recognize that the apraxic child apparently appears in the midst of an altered/modified neuronal cycle (to varying degrees) by the non-motor repetition that the language requires. Such an event seems to reflect, in turn, processes of proprioceptive and sensorial memories fused to the production of the segmental and suprasegmental aspects of speech, in a vicious cycle. What we are saying is that apraxia reverberates at all linguistic levels - syntactic, semantic and pragmatic, and not just phonetic and phonological.

As we analyze with Freud, every experience of life demands a neuronal and psychic inscription in concomitance. Thus, we also consider that it is by speech in language, in the exercise and use of language that the word materializes as an arbitrary sign of two faces: meaning and signifier^{30e}. Therefore, if the apraxic child seems to have a neurofunctional question of memory for the association of the constitutive movements of speech, how can we ensure

the appropriation of the two faces of the linguistic sign, physical and psychological, in its course of acquisition and use of language? Reflection that brings us back to the third and last issue listed initially. Considering that it is in the interaction that the child is constituted as subject, what is the place that this child, in the process of acquisition, occupies in the relations of interlocution that is exposed in the social, cognitive and affective flow of language / language?

Among questions like these, we turn to the studies developed by De Lemos^{11,12} and Luria^{12e}. De Lemos analyzes that the process of language acquisition of the child is associated with what the adult presents to him in the interaction (or conjugated activity): *constitutive processes of dialogue as a matrix of signification*¹¹. There are three such processes: 1. Specularity: Before the child participates effectively in the dialogue, the mother (or adult) cuts out the behaviors of crying, looks, laughter, vocalizations, to which she gives meaning; 2. Complementarity: The child, depending on the statement of the adult, incorporates²⁴ part of this statement, a word, for example, that occupies a “semantic”, “syntactic” and “pragmatic” place; 3. Reciprocity: The child starts to occupy the roles of the respondent and initiates the interlocution shift, reversibly, in a dialogical situation.

De Lemos revises, in the early 2000s, under the scope of Psychoanalysis, the child's process of language acquisition, characterizing it as a *process of subjectivation in the recognition of the logical pastiness of language relative to a drive body that is by it captured and meaning*³⁰. For the author, the process of subjectivation in language is a structure that articulates the child, language and speech, in which the child occupies three positions. In the first position, the child is alienated from the speech of the other, from the actual presence of the other, from his body and voice, and especially from the interpretation of that other, upon which each child's statement depends. In the second position, there is the dominance of the language; the errors in the child's speech indicate that it is distant from the speech of the other, but under the dominance of an operation of metaphorical²⁵ nature. In the third

24. According to the said author, it is not pure imitation, but appropriation.

25. For Saussure, associative relations occur through memory and occur outside of discourse, that is, “relations in absence”, and the possibility of chaining terms in the chain of speech

position, the child speaks, listens, reformulates and corrects his own speech, recognizing the disparity between what he says and what he intends to say, even if he does not achieve the correct form intended.

Luria, on the other hand, studies from the point of view of Neuropsychology and based on the Jakobsonian studies, the acquisition of language and speech of the child classifying it as an intense, long and complex process^{12e}. For him, the main function of the word is the representation, substitution of the object without, however, indicating a single, fixed and insignificant reference, but multi-significant and polysemic. In the initial phase, the word would be intertwined with the situation, the gesture, the mime, the intonation, and only under these conditions would it acquire its object reference.

In such a way, for Luria, the word becomes the link of a network of images evoked by it^{12e}. When we speak, we inhibit a network of associations to select that word that mostly means the situation lived. Otherwise, the listener inhibits the entire network of images evoked by the word to select the one implicit in the situation. For the author, the whole event of this process throughout the child's life updates and specializes the neural circuits in different areas and neurofunctional hierarchies, continuously interrelating the child's language, learning and psyche. That is, behind every word spoken or heard, in a given interaction, in a given language, there are intense neurological, semantic and psychic processes that have as their origin the lived experiences.

From this theoretical explanation, we return to the different questions already mentioned: How do apraxic children constitute themselves as subjects of speech/language? What is your place in the different affective and social relationships you experience? How does she realize what she is listening to? How do you identify with your language community? How does the mother mean the child's speech?

happens in the "relation in presence"^{30e}. Jakobson retakes these relations as figures of language, namely, metaphor and metonymy^{31e}. The metaphorical process operates by similarity and involves the selection and substitution of one term for another (equivalent in one aspect and different in another). The metonymic process operates in the contiguity and covers the combination and the context (for simpler and / or complex units).

In order to account for these reflections, we have chosen to briefly present a case report²⁶. The research in question was carried out at the Center for Studies and Research in Rehabilitation Prof. Dr. Gabriel de Oliveira Porto (CEPRE) / UNICAMP, under the authorization of the Research Ethics Committee No 018/2017. It is a cut-off of longitudinal speech-language pathological follow-up between January 2016 and March 2017 (one year and three months), whose object is to study the clinical case of a male subject, five years and three months of age, with the diagnosis of apraxia of speech.

The longitudinal methodology allowed the observation of the trajectory of the subject being followed, allowing a deeper understanding of the relationships between the linguistic variables observed, in this case, apraxia of infantile speech. For the longitudinal analysis, information was retrieved from the patient's chart (Hospital das Clínicas/ UNICAMP), initial speech-language interview, speech-language assessment, speech-language reports, daily therapy records (written, voice and image recordings), audiometry and pedagogical report. It is worth noting that the use of the data was authorized by the family in the Informed Consent Form.

The child was enrolled in CEPRE's Speech and Language Program in January 2016, when the initial complaint referred to speech impairment, although the mother stated that she understood everything he said.

The initial school report of 2015 reported that, at four years of age, the child presented "with difficulty of communication and socialization; only babbles, not speaking words or phrases; his speech consists of the repetition of the consonant / b / followed by vowels; difficulty in participating in literacy activities, because he cannot speak the name of the letter; is agitated and nervous because no one understands his speech when he communicates with everyone in the room, situation that causes the teacher to intervene so that the other children understand it; makes use of indicative gestures avoiding speech".

The child is the second son, lives with the parents and the older sister and has not been in any kind of therapy before. However, when he was about four years old, his mother took him to the

26. Letter from the Ethics Committee: No 018/2017 (Annex 1).

speech and hearing service at a municipal health post. The speech-language guidance received was: "He has a speech delay, but this will not interfere with his development" (sic). At the insistence of the mother for an attention, the professional clarified that he would need speech therapy, but there was no vacancy.

In the speech-language evaluation performed at CEPRE, when the child was five years and three months old, there was a severe picture of speech apraxia. In addition, other dialogic aspects have caught the attention of the speech therapist: 1 - He does not seem to realize that his speech / language does not demand meaning from his interlocutor, he does not show any strangeness in the fact that the speech therapist does not understand anything of what he speaks; 2. It is difficult to say that he understands everything that is said to him, especially when the speech of the other implies an extensive phrase; 3. The fact that the mother systematically 'translates' everything he speaks.

The work carried out by the speech therapist (which is maintained) is guided by two axes: 1°. In relation to the child, it aims to enter the language, the production of speech, the expansion of language use (cognition) and interlocution, in short, its subjectivation in speech/language; 2°. In relation to the mother, there should be a concern and suspension of the role of privileged translator that she exercises with the son, because her excess of action seems to have reverberated in the overvaluation of the son's movement to erase the language. This condition seems to have generated a fusion between the one who does not speak and the one who translates these sounds as an expression of speech, the meaning prevailing towards the other (interlocutor who hears) and not towards the child, a situation that collaborates, in addition to apraxia, with the dissolution of the child's place as interlocutor, of his possibilities of subjectivation in speech / language / language.

In general, the speech-language work with the child privileges the listening of the own speech in a dialogical situation with the speech-language pathologist; intonation and prosody in the context of language; the proprioception of phono articulatory production present in the period of babbling that materializes in the language; the use of corporal gestures by the speech therapist and the child, associated to the production of sounds, syllables and consequent word formation, with support in

the PROMPT²⁷ system; intense work focused on phono articulation; proposal of solving simple problems in language command; encouraging the use of language (pragmatic and discursive function) from the interests and life history of the child

The evolutionary process of the boy in speech therapy reveals that there are particularities in his constitution as subject, since what he speaks, affected by apraxia and by the posture of the mother, does not put him in relation with the other. The child occupies the place of those who have a demand for speech that, in the great majority of cases, falls into the void and does not feed the senses of the language. In this condition, he does not "listen" to his linguistic community to try to adjust his speech, although it is affected by apraxia. This is one of the objectives of speech therapy, and the boy is beginning to perceive/listen to his own speech and that of the other, portraying the aforementioned Complementarity process.

However, if he does another action while speaking, when, for example, he tries to tell a story from a book and some illustration catches his attention and starts talking about it, he loses speech monitoring, which becomes unintelligible. Thus, while there is a certain movement of the child in the language, there is also a return to the more facilitated, more repeated, neural and psychic functions throughout his life (memory). The child has not yet systematized the perception of the distance between the speaker and the listener, yet he does not fully understand the lack of effect of his speech on the other, but he is toward it, while showing some comfort / satisfaction to stay in this place with his mother.

Speech therapy with the mother focuses on her possibilities of listening to the child's real speech, re-dimensioning the idea of transparency in which she sits to translate this speech to others. That is, to shake the certainty that she maintains about the univocal relation between what the child speaks and its interpretation. However, the mother, in the midst of weekly meetings with the speech therapist, was resistant to listen to her son's speech in the language. Although the translations were amicably questioned, her stance, for a long time, was to reaffirm that she realizes that other people do not understand what he speaks, but she understands / knows everything he says.

27. The speech therapist is in training in the Prompt Method.

Observing the behavior of the mother when translating the child's speech, it has been found that it is recurrently based on the context of the situation or on recent events shared between them. To quell this demand, one of the proposals of the speech-language therapist was to arrange with her that she would send voice recordings, sent by the application WhatsApp, in which the child would report the therapeutic activities performed.

In this last situation, the mother reported difficulties in understanding what he was trying to say, showing visible discomfort with this observation. The speech-language therapist then suggested that the mother record the child's voice message and send it to the therapist. In the only message she sent to the speech-language therapist, the mother justified that she had edited the son's message, arguing the long time of the recording. It is worth mentioning that the speech-language therapist made four recordings and the mother, only one. Even in the face of the delicacy of the situation, the mother began to change her behavior, reporting that she passed, without her presence, to leave the child more time with the father, a fact that had not happened before.

In view of this analysis, we observe that apraxia is not only a speech pathology, but it interferes in the child in its constitution as a subject of language, in its subjectivation, repercussions on all linguistic, cognitive and psychic levels. We notice in the relationship between mother and child that two questions gain relevance: 1. Translating the speech from the child to the other is not the same as meaning the speech from the child to the child; 2. What language do they speak?

These questions clarify, in addition to apraxia, the fact that the child has difficulty monitoring his or her own speech, in the constant movement of resumption of what is said to be able to move towards the new, always triggered by intention or desire (demand) to different interlocutors, in different interactions.

Conclusion

Our conclusions indicate that the process of speech and language acquisition, based on neurological, neurolinguistic and discursive studies, is minutely intense and complex. In it, Apraxia of Children's Speech (DAS or CAS) cannot be considered a punctual event, but the consequence

of a neurophysiological proprioceptive process involving sounds / babbling, prosody, articulation, processing and sound discrimination that occurs in the child's body especially during all the first and second years of life, in the midst of interactions with others. This apraxia does not also end in the difficulty of coarticulation of sounds in time and space, but it seems to affect the neurophysiological process of the memory of the speech movements involved. We also emphasize the importance of children being seen in their process of subjectivation in speech / language from their different interactions (Family, School, speech-language therapist) and, not exclusively, their speech production, being only a possible of a much broader process.

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