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Articles

A problematization of Neuroscience-based activities for literacy

Uma problematização das atividades das Neurociências para a alfabetização

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Abstract

This study aims to analyze what is presented as novel in intervention practices for early writing within the theoretical-methodological framework of Neurosciences. The methodological approach adopted is Content Analysis, and considerations regarding the activities were developed based on Discursive Neurolinguistics and the Discursive Perspective of Literacy. The material selected for analysis consists of an early writing intervention manual intended for educational psychologists, neuropsychopedagogues, and teachers. This manual is representative of the contemporary trend of associating Neurosciences with Education and closely resembles other materials designed for the same purpose. The analyses suggest that the activities proposed to intervene in writing are not significantly different from those traditionally found in literacy primers familiar to Brazilian teachers for more than a century. Thus, we problematize the vanguardist character claimed by Neurosciences and demonstrate how the practices it proposes distance themselves from written language as it is effectively used.

Keywords: discursive neurolinguistic; literacy; discourse; neurosciences; literacy books.

Resumo

Este trabalho tem como objetivo analisar o que se apresenta como novidade para as práticas de intervenção na escrita inicial no âmbito do referencial teórico-metodológico das Neurociências. A metodologia de análise utilizada é a Análise de Conteúdo e foram tecidas considerações sobre as atividades a partir da Neurolinguística Discursiva e da Perspectiva Discursiva de Alfabetização. O material selecionado para análise é um manual de intervenção na escrita inicial, voltado a psicopedagogos, a neuropsicopedagogos e a professores. Este manual é representativo da tendência contemporânea em se associar as Neurociências e a Educação e é muito parecido com outros que tem o mesmo propósito. As análises sugerem que tais atividades elaboradas para intervir na escrita não são muito diferentes das atividades frequentemente contidas nas cartilhas de alfabetização já conhecidas pelos professores brasileiros há mais de um século. Problematizamos, assim, o caráter vanguardista que as Neurociências tem reivindicado para si e mostramos como as práticas que sugere se afastam da linguagem escrita efetivamente em uso.

Palavras-chave: neurolinguística discursiva; alfabetização; discurso; neurociências; cartilhas.

INTRODUCTION

Research in discursive-oriented Neurolinguistics (henceforth DN) has been dedicated to analyzing the most recent theoretical trends in the field of Education involving the evaluation and intervention in school difficulties related to learning reading and writing (Moutinho, 2019, 2022; Moutinho; Coudry, 2021). The movement identified by research in the area, especially since the 2000s, is the approximation between Neurosciences and Education and, with it, the return to cognitive sciences to guide evaluation and intervention in school difficulties.

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American scientists began to call the 1990s the "decade of the brain", since advances in the characterization of some degenerative diseases were possible due to available technological progress. According to Guerra (2011), neuroimaging and electrophysiology techniques enabled the study of brain areas involved in specific cognitive functions and clarified aspects of the functioning of the central nervous system. In this context, a clearer definition of Neurosciences and its object began to circulate and gain prominence: Neurosciences study the molecules that constitute neurons, the organs of the nervous system with their specific functions, and the human behavior resulting from the activity of these structures (Guerra, 2011).

In this scenario outlined by Guerra, in which Neurosciences gain prominence through the use of technology that promised to explain everything possible regarding human behavior, it is natural that teaching and learning processes also became objects of neuroscientists, and the brain, an object of study for pedagogues. This trend persists and is increasingly clear today. A search conducted with the Google Scholar engine, which gathers a large portion of academic publications, is an example of this. Using the advanced search tool to look for the terms "neuroscience + education" in articles published between 1900 and 2000, 343 works on the subject are found. In the period from 2001 to 2010, there are 6,950, and in the period from 2011 to 2024, 15,900 published works address this topic. An analysis of the publishing market also confirms this trend.[1] It is also important to emphasize that the trend of adopting Neurosciences and cognitive psychology studies for education can be observed in national literacy guidelines. In the presidential decree of April 11, 2019, which dealt with the new National Literacy Policy, President Jair Bolsonaro determined that the phonic methodology be adopted for literacy, with the justification that its efficiency is scientifically proven by cognitive sciences (Moutinho, 2019).

Having identified this new theoretical path within Neurosciences and, above all, the fact that part of the theorization relating Neurosciences and Education is aimed at teachers, with strategies that directly interfere in the evaluation and intervention of reading and writing, it is of interest to DN and the Discursive Perspective of Literacy to investigate these proposals (Moutinho; Coudry, 2021). To this end, an analysis is presented of the intervention exercises that comprise the book *Neuroaprendizagem (vol. 2): estratégias para a alfabetização* [Neurolearning (vol. 2): strategies for literacy], authored by Roberta Claro – it is one of the best-selling books on the publisher's website, and its physical version costs R$ 90.00. As analyzed below, the activities proposed in this manual do not bring innovations compared to the activities that already circulate in children's daily school life and closely resemble, in fact, the literacy primers that have permeated the acquisition of writing in Brazil for over a century (Mortatti, 2000).

In view of the tentacular expansion of Neurosciences into various areas that culminates in a certain "neuromania" (Lledo, 2017), the inevitable diffusion of "neuromyths" (Lledo, 2017), and the guiding and vanguard character that Neurosciences claim for themselves (Moutinho, 2022), this work aims to investigate what is effectively new in a manual of activities to intervene in literacy, based on Neurosciences. The material was chosen based on three criteria: it is strongly recommended in the only Neuropsychopedagogy course in Brazil that allows clinical practice, it contains the prefix "neuro" in its title, and it is among the best-sellers in the Neuroeducation category, both at the publisher and on the Amazon portal.

This text presents: the theoretical framework of this work, which articulates the discursive perspective of literacy and Discursive Neurolinguistics; the description and analysis of the chosen manual from a qualitative data analysis approach, guided by Content Analysis; and, finally, in the final considerations, the radical separation between the neuroscience proposal and the proposals of the discursive perspective of literacy and DN is highlighted, especially regarding the concepts of brain, subject, and language, which impact the activities selected for literacy.

[1] On the Amazon portal, among the 100 best-selling books in the Education category, 23 relate Neurosciences to education and have as their theme teacher training in this area as a teaching enhancer. Following this trend, one can also identify the emergence of new postgraduate courses and new professional qualifications based on Neurosciences, such as Neuroeducation, Neuropsychopedagogy, Neuropsychology, and Neuro-speech-language pathology.

THEORETICAL FRAMEWORK

Literacy in a discursive perspective

Amidst numerous studies on literacy that emerged between the 1970s and 1980s — based on Linguistics (Cagliari, 1989; Abaurre, 1986), Psycholinguistics (Ferreiro; Teberosky, 1985), Sociolinguistics (Soares, 1985), and the Philosophy of Education (Freire, 1987), among other fields — the work of an enunciative/discursive and socio-interactionist nature developed by Franchi (1977) and João Wanderley Geraldi (2002) stood out by distancing language from a conception that related it to a code or instrument, with a sense given *a priori* and removed from the socio-historical conditions of production. These studies emphasized the need to understand language as a historical activity, loaded with meanings from practical reality. Language is considered a symbolic construction that emerges in the context of interactions and power relations between people, and, above all, as constitutive of subjects.

In this context, the conception of language adopted in the discursive perspective of literacy (and also in DN) is the one formulated by Franchi (1977, p. 12), who defines it as the "work by which, historically, socially, and culturally, man organizes and gives shape to his experiences. In it is produced (...) the dialectical process between what results from interaction and what results from the subject's activity in the constitution of linguistic systems". For the author, the phenomenon of language cannot be understood outside of social interactions, which are, according to him, a condition for the development of language and a space that enables the subject's appropriation of the linguistic system, "insofar as he constitutes himself as a speaker and others as interlocutors". Therefore, "this activity of the subject is not only an activity that reproduces or activates previous schemes: it is, at every moment, a work of reconstruction" (Franchi, 1977, p. 12).

In the conception of language as a constitutive activity of subjects, there is, therefore, no room for a definition of the subject that disregards their socio-historical determination, uniqueness, and historicity; thus, the average, standard subject – often considered in clinical protocols – is rejected. This perspective is based both on the works of Luria (1979) and Vigotski (2001), as well as on the concept of interlocution, developed within linguistics and central to the works of Franchi and Geraldi. For these authors, interlocution is a privileged place for the constitution of subjects and the production of language – which only presents itself as meaningful in the singularity of the moment in which it is inserted and enunciated. According to Geraldi (2002, p. 6), "subjects constitute themselves as such as they interact with others; their awareness and knowledge of the world result as a 'product' of this very process".

The author continues by stating the need for the subject to be viewed as a social being, as he considers that language is not the work of an artisan; rather, like Franchi, he defines it as a historical and social work of a constitutive nature. Thus, he points to the impossibility of considering the existence of a given, ready-made subject, but rather a subject who, through interaction, completes and builds himself with each speech. Finally, Geraldi emphasizes the fact that interactions always occur in a broader historical and social context and are, therefore, singular events, circumscribed within the limits of social formations and subject to their interferences, controls, and selections.

In the deepening of these concepts, studies in the field of Discourse Analysis (DA) also stand out, articulated by Smolka (2012) based on the theory of enunciation by Mikhail Bakhtin (from the work *Marxism and the Philosophy of Language*) and French discourse analysis by Michel Pêcheux and Michel Foucault. On these bases, Smolka (2012) analyzes the process of writing acquisition in situations of discursive interactions that are part of the first stages of literacy. For the author, literacy implies a pedagogical action in which reading and writing are conducted through discursive practices and interlocution. In this context, Bakhtin's theory of enunciation reveals the social phenomenon of verbal interaction, whether in orality or writing, in situations of effective language use.

The author states, based on Orlandi (1983) and Pêcheux (1969), that it is possible to identify concrete clues to analyze and characterize enunciation in a school context, which involves, first of all, discourse – a concept with which DA goes beyond the analysis of the language/speech dichotomy. Discourse is an object of history, unpredictable, manifested in linguistic materiality and discursivity, which is not restricted to transmitting a message between interlocutors but reveals itself as an effect of meaning in which language, ideology, and history are articulated.

In this perspective, language ceases to be a phenomenon of langue (a transparent, predictable code) and becomes situated within the scope of discursivity and specific materiality, where discourse is the specific materiality of ideology and language is the specific materiality of discourse. Like ideology, historical conditions of production, the social and historical web, memory, and exteriority play a central role in understanding the discursivity immanent in texts.

According to Pêcheux (1969), the understanding of the conditions of production of the meanings of a discourse must involve the imaginary formations projected throughout the enunciation, incorporating the analysis of the power relations they represent and that configure the social roles that the interlocutors attribute not only to the other, but to themselves. Such representations anticipate the images of the interlocutors, constitute the interplay of images of the discourse, and establish the ultimate conditions of discursive production, so that discourse occurs within the limits imposed by imaginary formations.

In this context, Smolka (2012) presents a proposal for analyzing teaching relations, in which she develops guiding questions for pedagogical reflection: "Now, who is this child I am speaking to? Who do I think they are, from the point of view of the teacher I am? What image do they have of each other, teacher and student?" (Smolka, 2012, p. 37). In the same sense, the author points to questions that trigger reflections on the place of the child and the teacher in pedagogical practice: "What is the teacher's place in the school? And what is the place of the child, the student? What places do they occupy and what positions do they assume? What place is attributed to them in the system of social representations (in the school institution)?" (Smolka, 2012, p. 37). In pedagogical work guided by such questioning, social interactions, anchored in writing and orality, are carried out in concrete life, in a complex process of socio-historical elaboration and transformation, in which the dimension of alterity reveals and strengthens itself. The constitutive singularity of the subjects is the starting point of teaching relations in which reading and writing teaching practices emerge, situated in the social, historical, pedagogical, and cultural specificities that support literacy.

With these theoretical premises, Smolka characterizes, in the 1988 book *A criança na fase inicial da escrita* [The child in the initial phase of writing], literacy as a discursive process. The author shows how the exchange of texts in the classroom is an opportunity to generate discussions about orthographic and graphic aspects of writing, as well as various interpretations, (re)formulations, and negotiations of meaning. This is made possible by the different forms of organization and interaction of children and by the diversity of resources for textual production, which generate new ways of reading and writing, including the teacher in the role of scribe. Thus, the child assumes various roles: interlocutor, writer, author, reader, mediator, and proofreader; they assume the role of suggesting, rewriting, changing the end of a story, etc.

According to Goulart and Santos (2017, p. 107), "in the dynamics of interaction and interlocution, children talk, exchange information, laugh, argue, fight, and speak about matters relevant to them". These issues become raw material in the literacy process, as they allow the teacher to see how everyday discourse reveals not only the work with writing that is being inaugurated but also marks of the sociocultural reality and the groups with which the children interact.

For Smolka (2012), it is in this sense that the text in literacy cannot be seen as a mere reproduction of the collective text, but a new moment of interlocution, given its incompleteness, based on what is more or less relevant to each child. In this process, children assume various roles, begin to write their sentences, even if short ones, and take risks in writing, incorporating and articulating the speech of others, as they cease to occupy the place of "students who do not (yet) know, but those who can be readers, authors, writers" (Smolka, 2012, p. 102). Thus, writing, which is initially the representation of internal discourse (Vigotski, 2001), begins to require certain developments (graphic, orthographic, syntactic, semantic, and textual), because the other, the reader, is involved in the discursive game of imaginary formations that guides the writing. According to Smolka (2012), this movement incorporates writing as a discursive practice, in which initial marks are transformed, omissions and agglunitation decrease, and doubts appear regarding spelling and segmentation, always bathed in meaning and negotiations over the text.

In this way, based on the considerations of Smolka (2012) in the discursive perspective of literacy, the relationship between writing with meaning and the legibility of writing is central to understanding what types of activities and pedagogical procedures favor the child's path toward conventional writing: that which is guided by meaning, situated in a discursive practice that implies more than letters and their relationship with sounds, or decontextualized words and phrases. Literacy cannot dispense with processes of meaning constitution and their modes of production, always guided by the central questions developed by Smolka and based on DA: what are we going to write, why, for whom? What are we going to read, for whom, and why? When these questions are used to analyze literacy activities and it is not possible to find answers to them; or, when it is answered that such activities are ends in themselves or serve as reading and writing training, we find ourselves facing a perspective opposite to the discursive one, as children find themselves deprived of reflection on linguistic-discursive aspects that the relationship with the other, in interlocution and discursive practices, can provide.

Speech, reading, and writing from the perspective of Discursive Neurolinguistics

DN began in the 1980s at the Institute of Language Studies of the State University of Campinas (Unicamp). Initially focused on language assessment in aphasias, the research shifted toward tools for assessing children's speech, reading, and writing. In these more than four decades, researchers dedicated to the study of reading and writing acquisition have identified an excess of reports with diagnoses of learning-related pathologies, such as Dyslexia, Attention Deficit Hyperactivity Disorder (ADHD), and Specific Learning Disorder, among others (Moutinho, 2019). To conduct a broader investigation of this phenomenon -- and also to intervene in the school difficulties of children who received a diagnosis of learning pathology –, Professor Maria Irma Hadler Coudry created, in 2004, the Language Coexistence Center (CCazinho).[2]

In addition to the problem of the inadequacy of certain instruments that evaluate reading and writing, DN research identified other issues that constituted impediments to learning – affective, social, cultural, political, and pedagogical issues that were obscured by the clinical report (Coudry, 2023). This obliteration of problems from other spheres under the label of pathology is called, in DN, the pathologization of normal learning difficulties and medicalization, following several other authors who examine the issue, such as Maria Aparecida Affonso Moysés and Cecília Azevedo Lima Collares (Moysés; Collares, 2011). It is because of this scenario[3] that much of DN research is dedicated to understanding and critiquing the historical and contemporary apparatuses (Agamben, 2009) that configure the basis of this pathologization[4].

DN distances itself from and rejects approaches that consider learning capacity as the exclusive result of the presence or absence of biological aptitudes and which, therefore, tend to justify school difficulties through pathologies (Coudry, 2007). These perspectives disregard or sub-theorize the cultural and social complexity underlying literacy and do not properly recognize the social, cultural, pedagogical, political, and economic factors that influence how children are taught to read and write in schools, nor the consequent singularity of this process.

[2] The work developed within DN regarding the excess of pathologies related to reading and writing stems from data collected at CCazinho. The center promotes the coexistence of children with reading and writing difficulties in verbal and non-verbal discursive practices that are meaningful to them and involve reading and writing. The goal of CCazinho is to invest in the children's entry into the world of letters—that is, in their literacy process—despite the supposed pathology they present.

[3] This process is not led solely by doctors, but also by other professionals in the clinical area who evaluate and intervene in school difficulties, such as psychopedagogues, neuro-psychopedagogues, and speech-language pathologists. Teachers also play a role in it: the experience of CCazinho shows that many raise a diagnostic hypothesis for a child with difficulties and suggest a clinical evaluation to confirm it.

[4] In addition to this critique, DN presents a counter-discourse to this trend, mobilizing cultural-historical psychology and the heuristic analysis of children's writing hypotheses, articulating various areas of Linguistics and Education. That which medical literature and clinical protocols reduce to omission, addition, inversion, and exchange of letters of a potentially pathological nature, in DN analysis, are evidences of the child's linguistic-cognitive work when dealing with, for example, the differences between orality and writing, the representation of the complex syllable and consonants, voiced and voiceless sounds, phonological variatio4s, and linguistic varieties (Moutinho, 2014, 2019; Coudry, 2007, 2023).

To understand the singular process of learning to read and write, three concepts are crucial to DN: brain, subject, and language. The brain is understood in its historicity, plasticity, and complex, integrated functioning, following the studies of Vigotski (2001), Luria (1979), and Freud (1973). Vigotski (2001) emphasizes the functional variation of the brain as a characteristic of humanity: the brain is a biological heritage common to all, but its neurological functioning and organization vary depending on the experiences that promote (or do not promote) development. This variation is determined by different historical, social, and cultural relations that constitute subjects, mediated by language.

Language, in turn, is constitutive of subjects: a collective, historical, and social construction that confers upon it a character of semantic and syntactic indeterminacy and requires context to be interpreted (Franchi, 1977). In the same vein, the conception of the subject that aligns with such conceptualizations of brain and language radically distances itself from the conception of a "standard" and "quantitatively average" subject underlying medical literature. The subject is constituted in and through language (Franchi, 1977) in a singular process of socio-historical determination; being singular, the subject is indeterminate and escapes idealizations. Language therefore assumes the function of regulating psychic processes and specializing higher psychological functions (beyond language itself), such as attention, memory, the body (praxis), intellectual reasoning, perception, imagination, and will. In short, the development of these functions is understood in its social genesis, this being one of the central premises that distance DN from medical literature.

In this perspective, based on cultural-historical psychology, DN understands that the conditions for learning to read and write occur long before the day the child is introduced to the alphabet at school and involves much more than pedagogical practice predicts. For Luria (2017), it is in the period of the "prehistory of written language" that representations of reading and writing are constructed and that the child experiences a series of processes with reading and writing. This period is decisive for literacy because these experiences can make learning to read and write a less tortuous process. It is during this period that the child must recognize much of the social function that writing and reading have in society, through the meanings that the "other" gives to these practices. All symbolic-cognitive experiences with drawing, play, books, and technological devices "are constitutive factors of the child's literacy process and prepare them for systematic school work with the alphabet and written verbal language" (Faraco, 2016, p. 64). Based on this substrate, DN problematizes the standardized and decontextualized activities that are usually prioritized in school and clinical environments, identified both in books intended for clinical professionals for evaluation and intervention and in the notebooks of children who attend CCazinho.[5] The manual analyzed here is an example of an activity that has been systematically problematized by the field and also by other researchers in linguistics and education, as explained in the following sections.

METHOD

The research method that guided this work is the qualitative approach of Content Analysis (Bardin, 1977). In this approach, it is important to highlight the researcher's role:

> The analyst is like an archaeologist. They work with traces: [...]. But the traces are the manifestation of states, data, and phenomena. [...], the analyst takes advantage of the treatment of the messages they manipulate to infer (logically deduce) knowledge about the message's sender or their environment, for example. Just like a detective, the analyst works with clues carefully highlighted through more or less complex procedures (Bardin, 1977, p. 39).

[5] In group sessions, we read recipes and cook; we read signs, advertisements, and notices on campus; we read the menus of the Unicamp cafeterias and, above all, we read books. We read books and talk about them, allowing children to ask what they did not understand, and asking them to tell and retell the story, thus organizing the narrative axis. What we perceive, in the same direction as Goulart and Santos (2017, p. 33), is that "the alphabetic system is learned in an enunciative context; linguistic 'awareness' is not a pre-condition for reading and writing, but develops amidst meaningful activities"". In these discursive practices (Maingueneau, 2005), we see that children shift from the position of a "child with school difficulties" to that of a subject of language, a reader and writer in various practices where the social function of reading and writing becomes evident. Along this path, many of the difficulties pointed out by both the school and the clinic are overcome, as attested by Neurolinguistics research.

The use of Content Analysis is quite varied, as exemplified in the following citation, since it is compatible with the analysis of various types of corpora and can serve diversified objectives. According to Gomes (2007), in addition to the analysis of novelists' works, testimonials from television viewers watching a program, or newspaper readers' testimonials, it is possible to use Content Analysis to analyze textbooks to uncover underlying ideology (Gomes, 2007, p. 84).

Given that the objective proposed here is to find novelties in exercises with a supposed neuroscientific basis, a comparison between them and the activities already circulating in various pedagogical practices is inevitable. To this end, the first stage of the methodological process involved the systematic description and categorization of the activities presented in the neurolearning manual. This categorization was based on the children's linguistic-cognitive reasoning mobilized by the activities: syllabic separation; copying initial, medial, or final syllables; copying letters; marking syllables; comparing syllables; and circling figures according to a given syllable. After the description and categorization, the stage of comparing the already categorized activities with activities already known in the literacy cycle began. The selection of items for comparison was made through searches on digital portals, which pointed to some primers and activities inspired by them available on the internet for printing and classroom use.

Regarding the theoretical section of the Neurolearning manual, a systematic description identified the following analyzed categories: subject, brain, origin of the learning difficulty, reading and writing intervention, and the relationship between the activities and the presented theorization.

DESCRIÇÃO E DISCUSSÃO DOS DADOS

In this section, this study presents a description of the manual with all proposed activities and an example of a task. The first activity is spread across 4 pages of the manual and consists of 21 items. In each item, there are 3 or 4 images from which the child must analyze and indicate which ones end with the same sound. For instance, one item features images of a brick (*tijolo*), a roll (*rolo*), and a dinosaur (*dinossauro*), where the child is expected to circle the words *rolo* and *tijolo*[6].

Next, the letter "b" is presented in various fonts, followed by the words "*bola*, *bolo*, *boné*, *bota*, and *bode*" (ball, cake, cap, boot, and goat), with their respective images and the initial syllable underlined and in bold. On the facing page, the images are repeated, and children must copy the initial syllable of each into a square. This same format is repeated on other pages of the book for all other consonants of the alphabet. Subsequently, the same images appear alongside different images, and the child must again circle the figure whose name begins with the syllable "*bo*". For example, an image of a ball is placed next to a cap, a coconut, and a safe so that the child circles the cap (which, like *bola*, begins with the syllable "*bo*"). This type of activity comprises 43 of the 109 pages of the manual (Figure 1).

The following task, as shown in Figure 2, presents the same images from previous pages with three syllables below each, requiring the child to mark the initial syllable of each figure. This activity spans 4 pages of the manual and contains 24 items.

The next activity presents three figures per line for the child to paint the figures whose names share the same initial syllables. For example, given a snake (*cobra*), a strawberry (*morango*), and a coconut (*coco*), the child should paint the snake and the coconut, as both begin with the syllable "*co*". This activity is arranged over 3 pages and contains 15 items.

The exercise that follows comprises 28 of the 109 pages of the book. It provides two images and two squares for the child to fill in with the initial syllable of each image, as shown in Figure 3. There are words with two and three syllables, always with one missing syllable (initial, medial, or final) for the child to insert.

[6] A potential issue for children is highlighted here: in this item (and others), all three words end with the same sound, the semivowel [ʊ]. However, the activity assumes the child will choose the images of the brick and the roll, thinking of the syllable rather than the vowel. Thus, an imprecision in the prompt is observed, which may compromise the task's completion

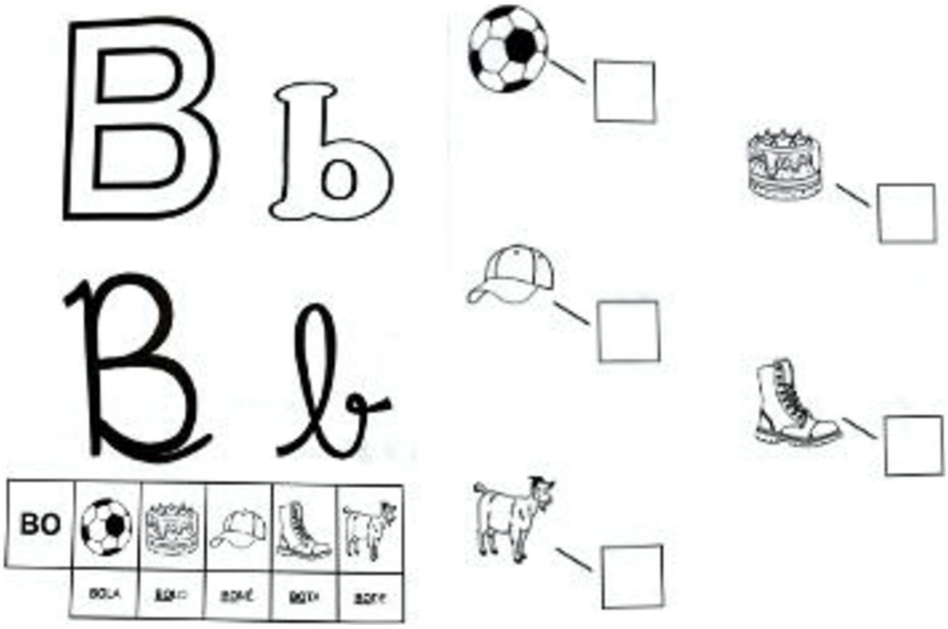

Figure 1. Manual activity.
Source: Claro, (2019, p. 30 – 31).

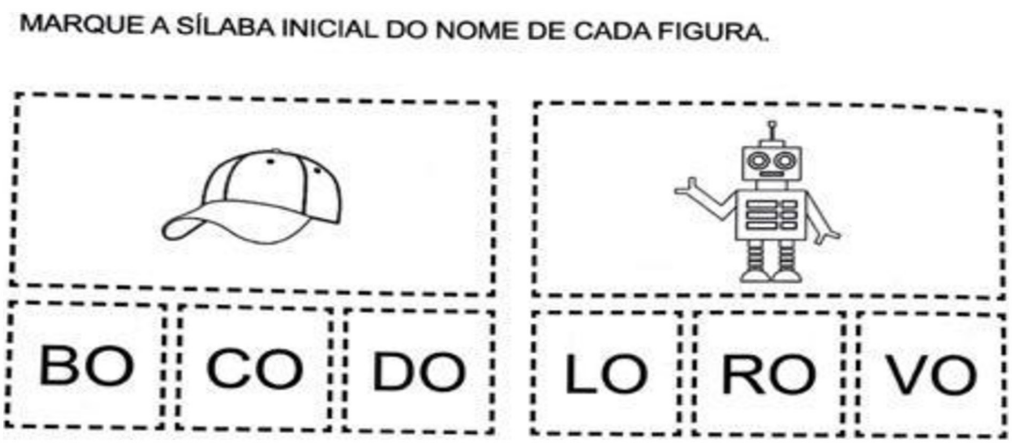

Figure 2. Manual activity.
Source: (Claro, 2019, p. 74).

Figure 3. Manual activity.
Source: Claro, (2019, p. 120).

Additional activities include matching words to their respective images (6 pages, 36 items). Over 26 pages of the manual, another task is found: the child must extract the first syllables from two images to form a new word. For example, from the words *bode* (goat) and *toco* (stump), the child forms the word *boto* (dolphin). Figure 4 shows an example.

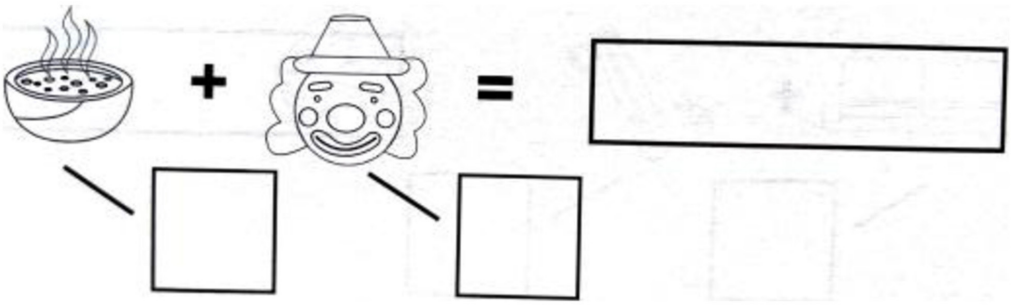

Figure 4. Manual activity.
Source: Claro, (2019, p. 102).

Across 3 pages, there are 15 items featuring two images from which the child is asked to write two different words. For instance, given images of a cake (*bolo*) and a wolf (*lobo*), the child should form two different words. However, the manual's answer key indicates the words *bolo* and *lobo*, rather than words different from the images themselves. Furthermore, 6 pages contain 36 images, each with an adjacent rectangle where the child must write the word representing the image.

Finally, the manual concludes with three crossword puzzles using images presented in all previous pages33. The activities shown are typical of syllabic literacy methods and can be found in literacy primers (ranging from R$20.00 to R$30.00) as well as on literacy websites that offer them in print-ready formats34. Consider some examples of primers that present the same activities or require the same type of linguistic-cognitive reasoning as seen in Figure 5, in Figure 6 and in Figure 7.

It becomes evident that the initial writing intervention manual is based on the syllabic method and employs the same activities as primers using this strategy.[7] However, in the introductory chapter to the activities, there is no mention of this method, nor of the authors of the primers inspired by it – such as Felisberto de Carvalho, author of *Seu primeiro livro de leitura*, published in 1892, Benedicta Sodré, author of *Cartilha Sodré*, published in 1947, or Branca Alves de Lima, author of Cartilha Caminho Suave, published in 1948. It must also be noted that, beyond the lack of mention of the syllabic method, the *Neuroaprendizagem* manual provides no neurological or neuropsychological justification for choosing the syllabic strategy. The author defines concepts such as phonological route, lexical route, phonological awareness, rhyme, alliteration, word awareness, syntactic awareness, syllabic awareness, and phonemic awareness, yet in none of these topics does she establish a direct correlation between the exercises she proposes and the theory she invokes. The author merely asserts that syllabic awareness is facilitated by activities requiring the child to count syllables, identify initial, medial, or final syllables, or subtract syllables to f[8]orm new words. Nevertheless, these activities are not textually linked to Neurosciences in the presented manual.

Unlike some primers – where authors still ventured to work with sentences and texts, albeit with many issue – the *Neuroaprendizagem* manual does not present even an attempt to lead the child toward reading and writing more complex constructions beyond the word level.

[7] According to the CEALE dictionary, the syllabic method "is characterized by the visual presentation of ready-made syllables, without forcing the articulation of consonants with vowels and without highlighting the parts that compose the syllable". The basic principle is that a consonant can only be emitted if supported by a vowel; therefore, only the syllable (not the letters) can serve as the linguistic unit for initial reading instruction. According to this same dictionary, concern for the syllable outweighs concern for the meaning of words and texts. In the manual analyzed here, we see that concern for meaning is non-existent, as there is no context for the words (only the image) and no texts.

[8] Discursive Neurolinguistics and the Discursive Perspective of Literacy mobilize various authors to construct a robust critique of literacy primers. Critiques focus primarily on: a) texts used as pretexts (Geraldi et al., 1999), essentially narrative with contextual impoverishment; b) the use of decontextualized words and phrases (Freire, 1987); and c) the linguistic errors that underpin such materials (Cagliari, 2009). Activities proposed in a methodology centered on the syllable and decontextualized words disregard the meaning of texts and discursive practices as central aspects that drive learning.

Figure 5. Manual activity.
Source: Peters (2022, p. 79).

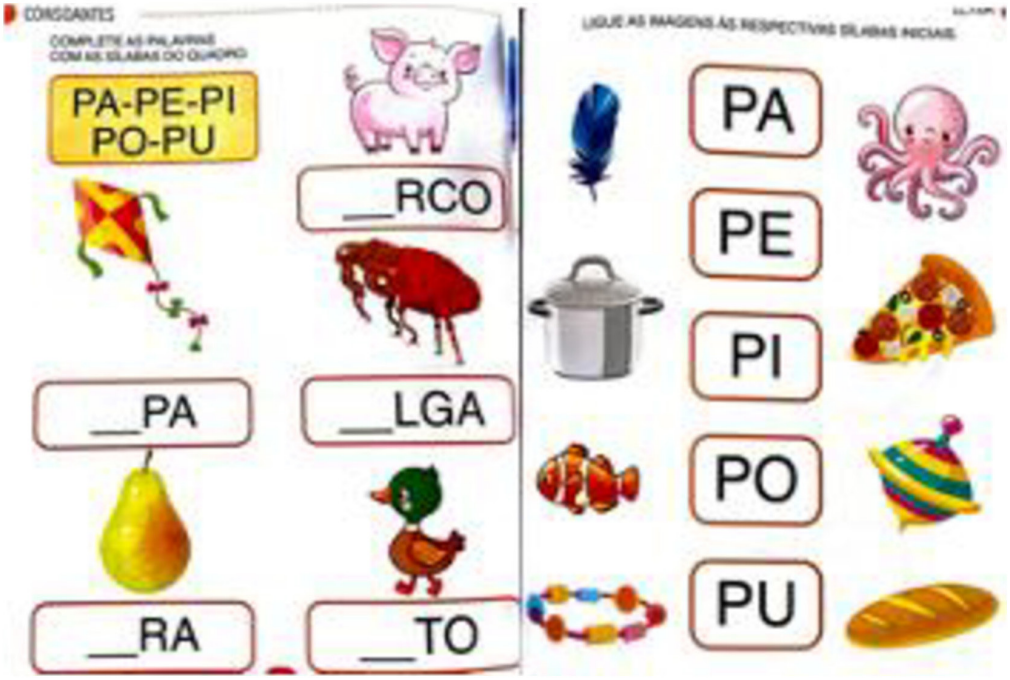

Figure 6. Manual activity.
Fonte: Buchweitz (2021, p. 74- 75)[9].

Figure 7. Manual activity.
Source: Lima, (2019, p. 59).

[9] A serious linguistic error is highlighted here, in which the authors of the *Cartilha Crescer Alfabeto* disregard the syllabic coda of the words *porco* (pig) and *pulga* (flea) as an integral part of the first syllable, transforming it into a canonical syllable. Syllabic complexity is an issue that generates various graphic and orthographic hypotheses for children in the literacy process, and errors like this can lead to misconceptions in the cognitive construction of syllabic representations.

This results in a *mutilating view of literacy* (Balduíno; Espadaro, 2023), focused on coding and decoding, which operates by suspending meaning. This leaves the child blocked from the process of complexifying linguistic-cognitive and discursive reasoning, which is otherwise made possible by the practice of writing authentic texts, as presented in the theoretical framework of this work.

Regarding the theoretical section of the material, the presentation of the theory of phonological and lexical routes is identified. Furthermore, the author presents a localizationist and modular view of the brain, in which each part is responsible for a single function. Such a view has long been outdated, especially since the neuropathological studies of Freud (1973) and Luria (1979).

Concerning the conception of the subject that underpins the manual, there is an identification with the concept of the "neural subject" proposed by Charlot (2020): reduced to the brain, with no mention of the social, pedagogical, cultural, and historical contexts that affect brain function according to cultural-historical psychology research (Vigotski, 2001). In this context, learning difficulties are explained solely through biological means, with extensive detailing of dyslexia, for example. Intervention in writing and reading, in these cases, is centered on writing isolated words: there is no mention of texts, meaning, genres, or discursive practices with language, either in the theoretical section or in the practical activities. In contrast to the discursive perspective of literacy, it is assumed that all children would learn in the same way, regardless of human singularity and the linguistic, cultural, and pedagogical complexity that sustains literacy. Furthermore, there is no mention of the impacts of different pedagogical strategies or the complex relationship between linguistic variation and the acquisition of conventional spelling. Consider the generalization presented: "Every child in the initial reading process starts by accessing the phonological route, in a process of phonological recoding that involves the application of a set of letter-to-sound conversion rules" (Claro, 2019, p. 12).

The types of activities presented in this material allow us to infer which conceptions of reading, writing, and their learning guide neuroscientific practice. In this approach, language is understood as a code that must be memorized and exhaustively practiced through repetitive activities that fragment words into smaller linguistic units to form new words. From this perspective, reading and writing are reduced to a mechanical process of encoding and decoding based on decontextualized words with no semantic relationship to one another.

The pedagogical practice based on these activities occurs at the interface of structuralist linguistic theory and behaviorist psychological assumptions, generating a mistaken and naive view of the process of written language appropriation that ignores the text and the social functions of reading and writing. In this conception, work on writing and the effective reading of texts would only occur after the appropriation and automatization of the linguistic code, in a movement where the meaning of reading and writing is suspended due to the exhaustive use of decontextualized words and sentences, often chosen based on a level of difficulty inherent to letters and syllables.

Such a didactic choice radically departs from a discursive perspective of literacy and the assumptions of DN presented in this work: tied to mechanical repetitions of syllables and words without context, children are blocked from the production of meaning that emerges in textual production, and are unable to occupy the positions of authors and reviewers of their own texts, or readers and commentators of other children's texts. The activities analyzed here, therefore based on behaviorist conceptions, appear detached from the constitutive heterogeneity of the children to whom the material is applied: the pedagogical practice that includes these activities relies on an average/standard subject, with children who exhibit the same brain functioning and relate to speech, reading, and writing in the same way.

While in a discursive perspective of literacy children focus on issues of graphic and orthographic representation out of the need to write and read texts that are effectively part of everyday discursive practices in a process of real interlocution with the "other" through reading and writing, in the neuroscientific perspective, children write to train and memorize orthographic conventions and account for such memorization to the teacher – the sole reader of decontextualized words and sentences – with the aim of evaluating writing acquisition.

This practice of teaching reading and writing in literacy has been systematically criticized in the fields of linguistics (Cagliari, 1989, 2009; Geraldi et al., 1999; Possenti, 2005; Kleiman, 2005) and education (Freire, 1987; Soares, 1985, 1988) for over 50 years. Concurrently, an alternative practice, grounded in literacy studies and a discursive perspective, had been consolidating itself – especially in official documents – since the *National Curriculum Parameters* and, to a certain extent, in the *National Common Curricular Base*. The activities analyzed here, however, move in the opposite direction, considering as scientific only the practice restricted to the exhaustive repetition of linguistic units outside of discursive practices.

Furthermore, a certain predominance of neurological terminology is identified: brain parts without illustrative images, neurotransmitters, synapses, and cell groups. It consists of a concise and encrypted text, representing strategies of accumulation and abusive technicism (Charlot, 2020). Such strategies aim to accumulate a vast list of technical terms situated in a field of knowledge that is not the field of the reader for whom the material is intended. Faced with the awareness of ignorance about that field, according to Charlot (2020), "when they admit they know nothing about these complicated neurological issues, the reader is psychologically ready to accept the pedagogical guidelines presented to them" (Charlot, 2020, p. 98). Consider an example from a passage in which the author describes the neuroscientific basis of the reading process:

> 1. Visual processing of reading in the occipital cortex; 2. Orthographic-lexical processing associated with phonological processing, in the frontal cortex and left parietal cortex (lower portion); 3. Phonological-lexical processing, in the perisylvian regions, posterior and superior temporal gyrus in the left insula of the lower frontal cortex; 4. Phonological-sublexical processing, involving various types of tasks, including visual and auditory representation in the occipitotemporal region and the lower medial temporal portion of the frontal lobe of the left hemisphere; 5. Semantic processing responsible for judgment and semantic generalization used in the written word. It occurs in the temporal and frontal regions (Claro, 2019, p. 17).

It was also possible to identify inconsistency with the activities presented: the theoretical part deals at length with phonemic awareness, emphasizing its centrality in the acquisition of reading and writing, which points toward a phonic methodology. However, the activities gathered by the author are part of the syllabic method, as previously presented. Finally, there is no relationship between the activities presented and the neuroscientific bases the author revisits: the dual-route theory does not explore syllabic aspects, and the neuroscientific bases presented deal with reading rather than writing, which is the focus of the manual's activities.

FINAL CONSIDERATIONS

Beyond the critiques presented regarding how these activities operate on only one facet of reading and writing learning (namely, the understanding of the syllable) and regarding the absence of utterances and texts, our points also involve the fact that such activities are supposedly grounded in Neurosciences. Firstly, as previously mentioned, the book's author does not explicit the supposed relationship between the proposed exercises and the theorizations regarding the brain. From the point of view presented here, it is, therefore, a way of taking advantage of the prefix "neuro" and the scientific shield it encompasses as a marketing strategy to sell a book with exercises that present almost nothing new and, on the contrary, have been circulating among Brazilian children for decades in the form of primers. Thus, it is important to pay attention to and problematize this type of Neuroscience activity, as it seems to have more marketing than innovative objectives by reclaiming widely used activities, renaming them, and selling them as a revolutionary scientific theoretical trend.

In this sense, the following question is inevitable: what contemporary elements contribute to this type of widely known activity being located within the scope of Neurosciences and sold at high prices without this fact being problematized? Furthermore, the discourse that defends that teachers study Neurosciences to revolutionize their pedagogical practice is

based on a supposed scientific proof of the success of these proposals. It is necessary to be alert to this because the meaning effect of this type of utterance circulates the assumption that everything published until then lacked scientific proof or was unscientific. In this web of meanings, all theorization produced within the Human Sciences and Language Sciences is disregarded in favor of Natural Sciences, with their promise of revolutionizing the educational scene because they would bring knowledge of the brain and, consequently, the solution for teachers dealing with children with difficulties. It is as if searching for explanations for school difficulties or foundations for pedagogical practices were only possible within the Natural Sciences.

This publication also identifies the neuro-anthropological reduction pointed out by Charlot (2020) of the concepts of language, subject, and brain (understood as merely biological), as well as the neuro-anthropological reduction of literacy – disregarded as a complex socio-cultural process (Moutinho, 2022) – a to repetition and mechanical training of linguistic units such as the syllable.

There is also the presence of neurological intimidation procedures listed by Charlot (2020): the accumulation of a series of lexical items related to the brain without contextualization in the learning process, abusive technicism, and advertising with a discourse that values neurology and clinical experience as superior to pedagogical experience. There is also an attempt to define the appropriate method based on brain functioning (even if it is not, in this case, consistent with the theorization presented) without considering the extra-cortical principle (Vigotski, 2001), thus assuming that brain functioning related to writing is the same in speakers of different languages and cultures.

Moreover, neuro-charlatanism (Charlot, 2020) stands out: the author does not even make reference to the syllabic method, known to Brazilian teachers for over a century through literacy primers. The author relies on a certain silence and complicity from literacy teachers, who are expected to accept new arguments for the same old exercises and pretend there is no dishonesty in renaming activities already known to all as neuroscientific. She also seems to count on a certain theoretical ignorance of literacy teachers, or to count on the fact that abusive technicism will prevent them from noticing that the presented neuroscientific theorization points in one direction – the phonic methodology – while the proposed activities offer another – the syllabic method.

Finally, the contributions of the argument presented here to the field are highlighted: the denunciation of a dishonest and unethical (neuroscientific) movement that, when it does not ignore national research on literacy from a discursive perspective, delegitimizes its scientific character, disrespectfully understanding work in the fields of linguistics and education that focus on literacy as guesswork. This denunciation aims to draw teachers' attention to the fact that this movement does not involve innovative practices, but the same activities already known to teachers, presented in the same way, yet with legitimacy linked to the prefix "neuro". Therefore, it is expected with this work that teachers develop a critical eye toward what is presented as a novelty carrying scientific evidence and which, in fact, is more of the same; in addition to a critical eye toward the theorization that composes initial and continuing teacher education curricula, always in dispute by different approaches that use different arguments to seek legitimacy. It is essential that literacy teachers be attentive to this debate, as the perspective adopted will directly impact literacy practices and their intellectual autonomy, which will either be mobilized for the performance of authorial work in a discursive perspective or discarded by neuroscientific approaches, which provide for the application of ready-made manuals, such as the one discussed here.

Returning to the question that titles this work: what is new in neuroscientific proposals for intervening in initial writing? Based on this analysis and others (Moutinho, 2019, 2022; Moutinho; Coudry, 2021; Charlot, 2020), the answer, for now, is: nothing. Given what has been presented here and the lack of novelties in the proposed plans, I call upon Education and Language professionals to take a more assertive role in the debate on reading and writing intervention, denouncing marketing movements and offering other solutions to the problems that mark literacy in Brazil.

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REFERENCES

Abaurre, M. B. M. Introduzindo a questão dos aspectos lingüísticos da alfabetização. **Revusta da ABRALIN**, [s.l.], v. 7, p. 29-36, 1986.

Agamben, G. **O que é contemporâneo?** E outros ensaios. Chapecó: Argos, 2009.

Balduíno, A.; Espadaro, M. Contribuições e reflexões da teoria fonológica para uma alfabetização não mutiladora. **Revista Brasileira de Alfabetização**, Florianópolis, n. 21, p. 1-21, 2023.

Bardin, L. **Análise de conteúdo.** Lisboa: Edições 70, 1977.

Buchweitz, D. **Cartilha Crescer Alfabeto.** Jandira: Ciranda na Escola, 2021.

Cagliari, L. C. **Alfabetização e linguística**. São Paulo: Scipione, 1989.

Cagliari, L. C. **Alfabetizando sem o BA-BE-BI-BO-BU**. São Paulo: Scipione, 2009.

Charlot, B. **Educação ou barbárie?** Uma escolha para a sociedade contemporânea. São Paulo: Cortez Editora, 2020.

Claro, R. **Neuroaprendizagem**: intervenções para a alfabetização. Rio de Janeiro: Wak, 2019. v. II.

Coudry, M. I. H. O que fazer com as dificuldades de leitura e escrita? Analisar e intervir. **Estudos Linguísticos**, São Paulo, v. 51, n. 3, p. 1017-1034, 2023. https://doi.org/10.21165/el.v51i3.3263.

Coudry, M. I. H. Patologia estabelecida e vivências com o escrito: o que será que dá? *In*: 7º ENCONTRO NACIONAL SOBRE AQUISIÇÃO DA LINGUAGEM - ENAL. **Anais [...]**. Porto Alegre: CD-ROM, 2007.

Faraco, C. A. **Linguagem escrita e alfabetização**. São Paulo: Contexto, 2016.

Ferreiro, E.; Teberosky, A. **Psicogênese da língua escrita**. Porto Alegre: Artmed, 1985.

Franchi, C. Linguagem – atividade constitutiva. **Revista Almanaque**, São Paulo, v. 5, p. 9-25, 1977.

Freire, P. **Pedagogia do Oprimido**. 17. ed. Rio de Janeiro: Paz e Terra, 1987.

Freud, S. **La afasia**. Buenos Aires: Ediciones Nueva Visión, 1973.

Geraldi, J. W. *et al.* (org.). **O texto na sala de aula**. 3. ed. São Paulo: Ática, 1999.

Geraldi, J. W. **Portos de passagem**. 11. ed. São Paulo: Martins Fontes, 2002.

Gomes, R. Análise e interpretação de dados em pesquisa qualitativa. In: DESLANDES, S. F.; GOMES, R.; MINAYO, M. C. S. (org.). **Pesquisa Social: teoria, método e criatividade**. 25. ed. Petrópolis: Vozes, 2007. p. 79-108.

Goulart, C. M. A.; Santos, A. P. Estudos do discurso como referência para processos de alfabetização em perspectiva discursiva. In: GOULART, C. M. A.; GONTIJO, C. M. M.; FERREIRA, N. S. A. (org.) **Alfabetização como processo discursivo**: 30 Anos de A criança na fase inicial da escrita. São Paulo: Cortez, 2017.

Guerra, L. B. O diálogo entre a neurociência e a educação: da euforia aos desafios e possibilidades. **Revista Interlocução**, [s.l.], v. 4, n. 4, p. 3-12, 2011.

Kleiman, A. Ação e mudança na sala de aula: uma pesquisa sobre letramento e interação. In: ROJO, R. (org.). **Alfabetização e letramento**. Campinas: Mercado de Letras, 2005.

Lima, B. A. **Cartilha Caminho Suave**. São Paulo: Editora Caminho Suave, 2019.

Lledo, P.-M. **Le cerveau, la machine et l'humain**. Paris: Odile Jacob, 2017.

Luria, A. R. **El cerebro en acción**. Barcelona: Fontanela, 1979.

Luria, A. R. O desenvolvimento da escrita na criança. In: VIGOTSKII, L. S.; LURIA, A. R.; LEONTIEV, A. N. **Linguagem, desenvolvimento e aprendizagem**. 15. ed. São Paulo: Ícone, 2017.

Maingueneau, D. **Gênese dos discursos**. Curitiba: Criar Edições, 2005.

Mortatti, M. R. L. **Os sentidos da alfabetização**. São Paulo 1876-1994. São Paulo: Unesp; Brasília, DF: MEC/Inep/Comped, 2000.

Moutinho, I. C. N. À procura de um diagnóstico: uma análise neurolinguística. 2014. Dissertação (Mestrado em Linguística) – Instituto de Estudos da Linguagem, Universidade Estadual de Campinas, Campinas, 2014.

Moutinho, I. C. N. **Contribuições da Neurolinguística Discursiva para a formação de professores**. 2019. Tese (Doutorado em Linguística) – Instituto de Estudos da Linguagem, Universidade Estadual de Campinas, Campinas, 2019.

Moutinho, I. C. N. Neurociências e dificuldades de escrita: o contradiscurso da Neurolinguística Discursiva. **Estudos Linguísticos**, São Paulo, v. 51, n. 2, p. 710-731, 2022. https://doi.org/10.21165/el.v51i2.3216.

Moutinho, I. C. N.; Coudry, M. I. H. Neuroeducação e dificuldades de leitura e escrita. **Estudos Linguísticos**, São Paulo, v. 50, n. 3, p. 710-731, 2021. https://doi.org/10.21165/el.v50i3.2904.

Moysés, M. A.; Collares, C. A. O lado escuro da dislexia e do TDAH. In: FACCI, M. *et al.* (org.). **A exclusão dos incluídos**. São Paulo: Casa do Psicólogo, 2011.

Orlandi, E. **A linguagem e seu funcionamento**. São Paulo: Brasiliense, 1983.

Pêcheux, M. **Analyse Automatique du Discours**. Paris: Dunod, 1969.

Peters, C. M. **Cartilha Caminhos da alfabetização**. Barueri, São Paulo: Pé da Letra, 2022.

Possenti, S. **Aprender a escrever (re)escrevendo**. São Paulo: Cefiel/IEL/Unicamp e MEC, 2005.

Smolka, A. L. B. **A criança na fase inicial da escrita**. São Paulo: Cortez, 2012.

Soares, M. B. Alfabetização: a (des)aprendizagem das funções da escrita. **Educação em Revista**, Belo Horizonte, v. 1, n. 8, p. 3-11, 1988.

Soares, M. B. As muitas facetas da alfabetização. **Cadernos de Pesquisas (Fundação Carlos Chagas)**, São Paulo, n. 52, p. 19-24, 1985.

Vigotski, L. S. **A construção do pensamento e da linguagem**. São Paulo: Martins Fontes, 2001.

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