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Review articles

Linguistic profile of children with language and speech disorders and family participation in the therapeutic process: an integrative literature review

Tatiana Bagetti[1]
Viviane Santos do Nascimento[2]
Gisele Gouvea da Silva[1]
Renato Sampaio Lima[1]

[1] Universidade Federal Fluminense - UFF, Departamento de Formação Específica em Fonoaudiologia - ISNF, Curso de graduação em Fonoaudiologia, Nova Friburgo, Rio de Janeiro, Brasil.

[2] Espaço CEL - Corpo e Linguagem, Niterói, Rio de Janeiro, Brasil.

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Corresponding author:
Tatiana Bagetti
Universidade Federal Fluminense.
Instituto de Saúde de Nova Friburgo
Rua Silvio Henrique Braune, 22
CEP: 28625-650 - Nova Friburgo,
Rio de janeiro, Brasil
E-mail: tatianabagetti@id.uff.br

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ABSTRACT

Purpose: to investigate the linguistic profile (linguistic symptoms and risk factors) of children with communication, language, and speech disorders and verify their family's participation in the therapeutic process.

Methods: an integrative literature review including studies on linguistic symptoms of children with developmental language disorder (DLD), autism spectrum disorder (ASD), and phonological disorders (PD), published in Portuguese in the last 10 years (2012 to 2022) in the PubMed, SciELO, and VHL databases.

Literature Review: 24 studies were included, according to the eligibility criteria, the children having different linguistic symptoms. In PD, there were more phonological processes, slower speech, and difficulties in auditory perception and morphosyntactic and semantic development. In DLD, there were changes in nominal morphology, morphosyntactic comprehension, greater use of intransitive verbs, omission of verb objects, and difficulties in solving conflicts. In ASD, there were difficulties in social interaction, imitation, prosodic changes, and decreased responsiveness. The main risk factor was prematurity, and the family was considered crucial as a support network in the therapeutic process. The family's attitudes were facilitators or barriers to the patients' improvement, depending on how they responded to the therapists' instructions.

Conclusion: the linguistic profile depends on the various language/speech disorders. Each child's singularities must be considered, and the family's participation is crucial to the therapeutic process.

Keywords: Child Language; Signs and Symptoms; Speech Therapy; Family

INTRODUCTION

Children acquire language by interacting with their surroundings, home experiences, and the influence of stimuli they receive. Through their cognitive skills and social interactions, they acquire and develop the language of their linguistic community. Thus, language development depends on environmental and interactional factors and is influenced by genetic factors[1].

Hence, language acquisition is a complex gradual process that involves countless skills, such as word choices, correct linguistic formation, correct speech motor control, and other details involved in the process. Fluent speech, in turn, depends on activating semantic, phonological, and syntactic information, influenced by contextual information[2]. Given such an extensive factor network, it is not surprising that some children cannot acquire language as their peers, possibly having changes in the process.

There are various child language and communication disorders. DSM-V[3] classifies them as neurodevelopmental disorders, which include communication disorders that subdivide into language disorders, speech disorders, childhood-onset fluency disorders, social communication disorders, and unspecified social communication disorders. Neurodevelopmental disorders also include autism spectrum disorder (ASD). Knowing the main speech-language-hearing (SLH) and linguistic symptoms of developmental changes is essential to reach differential diagnoses and adequate SLH treatment.

Communication disorders include language disorders and speech disorders[3]. Language disorder, as defined in DSM-V, was previously named specific language impairment (SLI)[4] and is currently known by professionals and scholars in the area as developmental language disorder (DLD)[5]. Speech disorders include phonological deviation, currently known in the Brazilian literature as phonological disorder (PD). This study referred to them as DLD and PD because they are the currently most used terms in the area.

Some of these language and speech changes are rather common in childhood. A national study points out that PD prevalence is 9.17%, with a greater occurrence in 5-year-old children[6]. Some studies indicate that PD is one of the most common speech changes in children. In its turn, DLD affects approximately one in every 14 children[7]. This disorder may occur alone or be associated with some other change. The same epidemiological study indicates that 7.5% of children have DLD with no associated medical condition. As for ASD, data from the Centers for Disease Control and Prevention (CDC) indicate a prevalence of 1 in every 54 eight-year-old American children in 2016, affecting boys more often than girls in a ratio of 4 to 1[8].

PD is the disorganization or inadaptation of the child's speech sounds in relation to their linguistic community. These children's clinical characteristics mainly include difficulties, particularly with consonants, and the absence of neurological, hearing, or intellectual changes that could justify the disorder[9]. Mistakes may occur in phoneme production, use, representation, or organization, such as sound omissions or substitutions [3].

In the context of DSM-V[3], DLD is included among language disorders and refers to a persistent difficulty in acquiring and using language in various modalities, such as oral and/or written language, comprehension or production changes, shorter vocabulary, and changes in sentence and discourse structures. These changes are substantially below the expected for their age, resulting in impaired communication, interaction, and academic performance not due to neurological changes, intellectual disabilities, or global developmental delay. Language development in DLD is disproportionately poor in comparison with the same child's other cognitive skills, with no apparent reason – which means that the linguistic deficit does not result from an underlying pathology[10]. Thus, individuals with DLD have two or more impaired areas of language without any neurological, psychiatric, sensory, or intellectual deficit[5].

DSM-V[3] characterizes ASD with persistent changes in communication and social interaction, with dysfunctions in reciprocity and nonverbal behaviors used in social interactions. It also involves restrictive and repetitive interest, behavior, and activity patterns. Different language levels may be affected, especially pragmatic aspects[11].

These impairments are highly prevalent in childhood and affect children's communication and interaction with their peers. Hence, updated knowledge of their main linguistic symptoms may contribute to the therapeutic focus and help clarify possible causes and factors that may lie beyond the symptoms.

As children belong to a family, which is considered the social unit that triggers its members' psychosocial development[12], it is crucial to verify how the family participates in the therapeutic process of children with communication, language, and speech changes.

Hence, this study conducted a bibliographical update to answer the following questions: "What is the current linguistic profile of children with speech, language, and communication disorders? What are the main SLH and linguistic symptoms that characterize these children's profiles? What are the main risk factors related to linguistic and communication changes in childhood? To what extent does the family's participation in the therapeutic process contribute to the child's communication and social development?". Thus, this study aimed to update these issues, help SLH therapists and other health and education professionals, and contribute to discussions on the engagement of families in therapeutic processes.

The general objectives of the study are to update the bibliography on the linguistic profile of children with communication, speech, and language disorders, more precisely children with DLD, PD, and ASD. The description of the linguistic profile considered SLH symptoms or linguistic manifestations of children with these disorders and the risk factors for language and communication changes. The family's perception of and participation in the SLH therapeutic process was likewise verified.

The study also had the following specific objectives:

- To describe SLH symptoms or linguistic manifestations of children with DLD, PD, and ASD.
- To identify risk factors for language, communication, and speech changes in childhood.
- To verify the family's participation in the SLH therapeutic process of children with communication, language, and speech disorders, reflecting and discussing the importance of their participation to the child's communication and social development.

METHODS

An integrative literature review was conducted, and its results were discussed to meet the study objectives.

As eligibility criteria, the review analyzed scientific articles published in Portuguese in the databases of PubMed, SciELO (Scientific Electronic Library Online), and VHL (Virtual Health Library), with the following health science descriptors: (signs and symptoms) AND (child language); (risk factors) AND (child language); and (therapy) AND (child language) AND (family). The titles of studies found in the search were initially read to filter the topics related to the research objectives and exclude duplicates. The following stage consisted of reading their abstracts to confirm the main topics of the articles that met the inclusion criteria and would advance from the second stage. Then, the selected articles were read in full text.

The articles were divided into two groups: 1) Signs, symptoms, and risk factors for language changes; and 2) Family's perception of and participation in the SLH treatment of children with communication and language changes.

The inclusion criteria were as follows:

- Articles whose main topic was the SLH signs and symptoms related to certain oral language and speech disorders, such as DLD and PD.
- Articles focused on SLH symptoms of children with ASD.
- Studies focused on risk factors for language changes and the family's perception of and participation in the SLH treatment.

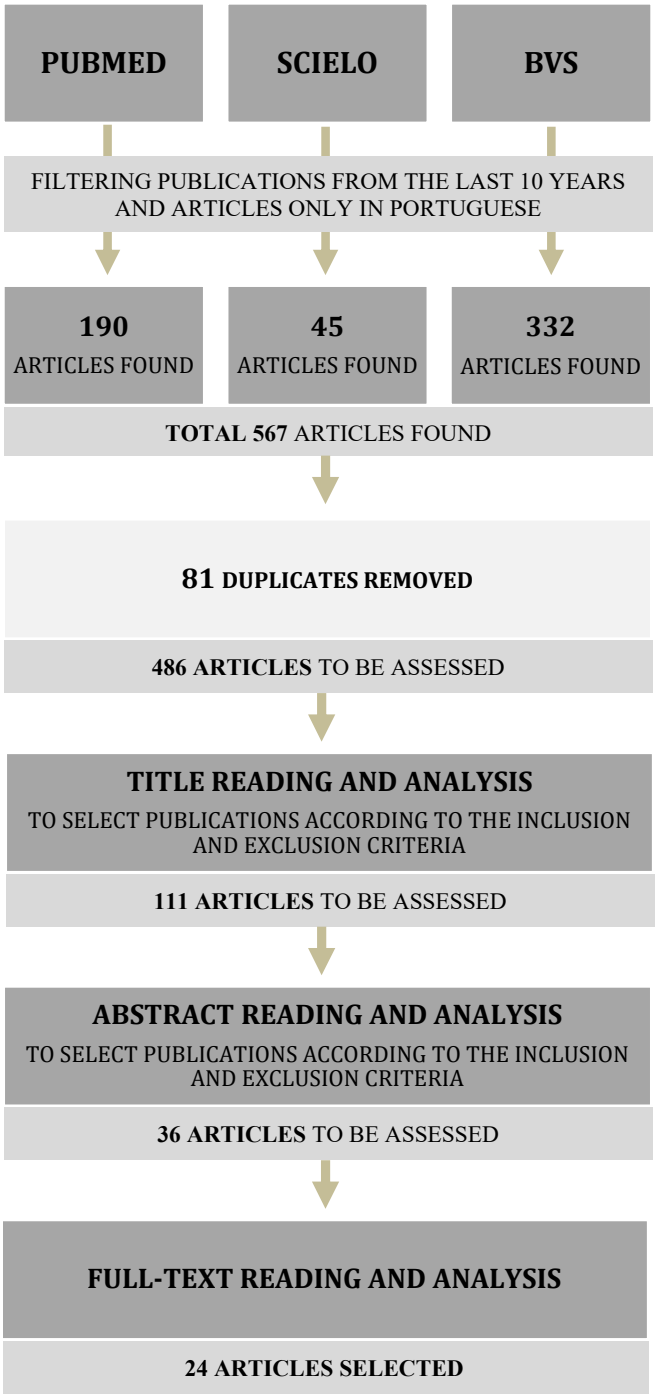
Also, it addressed studies published in the last 10 years, available in Portuguese (i.e., national literature), indexed in the PubMed, SciELO, and VHL databases.

The review excluded articles focused on hearing impairments underlying language changes, cerebral palsy, written language changes, fluency changes, and language disorders that were part of a syndrome.

The eligibility criteria considered all articles that met the inclusion criteria and whose methods were cross-sectional, observational, case studies, or clinical trials; literature reviews were disregarded. Two evaluators analyzed the selected articles, in concordance in study selection. If there were any divergences, a third evaluator would be contacted. After reading the selected articles in full text, they extracted information on the characterization of SLH symptoms, especially linguistic ones, in children with DLD, PD, and ASD and the risk factors for language disorders. From articles that approached the family's participation in the therapeutic process, they extracted information on the family's perception of and attitude toward the child's and/or adolescent's communication disorders and/or the family's perception after receiving instructions.

LITERATURE REVIEW

The search initially found 572 scientific articles. After applying the filters and exclusion criteria, 24 articles remained[13-36].



Source: Developed by the authors, 2023.

Figure 1. Flowchart of publications included in the study

Out of the total selected studies[13-36], 22[13-34] approached aspects related to linguistic symptoms and risk factors for language and speech changes, and two studies[35,36] focused on the family's participation in the therapeutic process. Few studies in Portuguese were found on this topic because the search encompassed publications of the last 10 years.

The studies[28-34] that addressed only risk factors for SLH changes did so comprehensively, not specifying risk factors associated with any given neurodevelopmental disorder. The analysis of linguistic symptoms verified that DLD was the most approached change, appearing in eight studies[13-20], followed by PD (four studies)[24-27] and ASD (three studies)[21-23]. It was also found that one study approached the symptoms of children with ASD and DLD. Most manuscripts were published in the Southeast Region of Brazil, with a total of 20 publications, followed by the Central-West and South, with two publications each. Typical and atypical language development is influenced by cultural factors and linguistic variants. Hence, it is essential to encourage and invest in such research in all regions of the country – thus, clinical approaches and health promotion and prevention initiatives can consider each patient's cultural issues and singularities.

Only two studies[35,36] were found that addressed the family's participation in the therapeutic process for language and speech changes, demonstrating a scarcity of such papers in Portuguese.

Chart 1 synthesizes the studies on SLH symptoms of children with DLD. It briefly presents the study objectives and main results.

As seen in Chart 1, children with DLD have changes in nominal number morphology, errors in morphosyntactic comprehension[18], and longer silent pauses in their narratives, indicating difficulties, fragilities, or overload in their linguistic processing[15]. A study[37] in 289 children aged 7 to 12 years that assessed syntactic processing verified that about 9% of the children had suspected DLD, with difficulties in passive, relative, and WH interrogative clauses, with greater difficulties in reversible passive and ramified object relative sentences. In the present study, children with this disorder also had difficulties in morphosyntactic comprehension and production.

Chart 1. Speech-language-hearing symptoms in children with developmental language disorder

AUTHORS (YEAR)	OBJECTIVES	METHODOLOGY	MAIN RESULTS
Befi-Lopes DM, Bacchin LB, Pedott PR, Cáceres-Assenço AM. (2013)[13]	To verify the mean length of silent pauses in narratives and the influence of the complexity of stories on the production of such pauses in the narratives of children with DLD and with TLD and compare both groups.	60 children aged 7 to 10 years – 20 with DLD and 40 with TLD. 15 increasingly complex stories were used to record the mean length of pauses produced in narratives.	Children with DLD made longer silent pauses in their narratives, regardless of story type than those with typically developing children. Longer pauses demonstrate fragile linguistic processing.
Paula EM, Befi-Lopes DM. (2013)[14]	To verify the conflict-solving skills of children with SLI and the correlation between the time of SLH therapy and their performance in conflict-solving tasks.	20 children with SLI and 40 with TLD, aged 7 years to 8 years and 11 months.	Children with DLD have greater difficulty solving conflicts, predominantly using physical and unilateral strategies, which are insufficient to solve many conflicts. No correlation was found between the time of therapy and performance in the conflict-solving task.
Befi-Lopes DM, Pedott PR, Bacchin LB, Cáceres AM. (2013)[15]	To investigate whether the parts of speech influence the mean length of silent pauses during narrative production by children with DLD and with TLD.	20 children with DLD and 40 with TLD, aged 7 to 10 years. The analysis approached the children's narratives, the nouns, adjectives, verbs, conjunctions, prepositions, and pronouns they used, and the pauses that preceded these elements.	Silent pauses were shorter when they preceded nouns and longer when they preceded conjunctions in both groups. The analysis demonstrated that the group with DLD made longer silent pauses in all parts of speech.
Befi-Lopes DM, Cáceres-Assenço AM, Marques SF, Vieira M. (2014)[16]	To compare disrupted speech in narrative production in students with DLD and their chronological peers.	60 children aged 7 to 10 years – 20 with DLD and 40 with TLD. Data collection used 15 stories represented by figures with four scenes each. The stories were transcribed, and speech disruptions were classified into various types.	Students with DLD have more stuttering and nonstuttering disruptions than their peers. Nonstuttering disruptions (interjections, reviewing/abandoning segments, and repeating sentences or multisyllables) were the most frequent in the DLD group. These disruptions are more associated with linguistic planning than speech-motor control.
Andrade CRF, Befi-Lopes DM, Juste FS, Cáceres-Assenço AM, Fortunato-Tavares TM (2014)[17]	To assess speech fluency regarding the types of disruptions and speech speed in children with suspected DLD.	50 children of both sexes, aged 3 to 7 years, without stuttering, divided into 2 groups: G1- 25 children with suspected DLD (diagnosis not confirmed, yet); G2- children with TLD.	Children aged 3 to 4 years with suspected DLD spoke slower than the typically developing ones, with no difference regarding the types of disruptions. No difference was found between the groups in the 5-to-7-year age range.
Puglisi ML, Befi-Lopes DM. (2016)[18]	To explore the effects of the school type and DLD on different language skills from the quantitative and qualitative perspectives.	204 Brazilian children aged 4 to 6 years divided into 3 groups: TDpriv, TDPub, and DLDpub. All children were assessed regarding expressive vocabulary, number morphology, and morphosyntactic comprehension skills.	Children with DLD performed worse in language skills than typically developing ones from both public and private schools. They mistook nominal number morphology and morphosyntactic comprehension. As they grew older, they moved to a systematic error pattern, suggesting they have not only a developmental delay but also idiosyncratic patterns.
Verreschi MQ, Cáceres-Assenço AM, Befi-Lopes DM. (2016)[19]	To verify the functional use of verbs and nouns by children with SLD, comparing it between them and children with TLD.	80 preschoolers – 20 with SLD, aged 3 to 6 years, and 60 with TLD, aged 2 to 4 years.	Children with SLD use verbs more than nouns in their productions, in comparison with children with TLD. Intransitive, linking, and direct transitive verbs were used more often, and children had difficulties using verbal arguments – they omitted verb objects, indicating difficulties with grammar structures.
Pedott PR, Cáceres-Assenço AM, Befi-Lopes DM. (2017)[20]	To identify and compare the performance of children with DLD and with TLD in alliteration and rhyme identification tasks and verify the influence of semantic and phonological distractors.	12 students with DLD and 48 with TLD, aged 7 years to 9 years and 11 months, submitted to rhyme and alliteration identification tasks.	Both groups performed worse in rhyme than in alliteration. Students with DLD performed worse than those with TLD in both tasks (alliteration and rhyme). Children with DLD also used more semantic distractors in alliteration tasks and more phonological distractors in rhyme tasks.

Source: Developed by the authors, 2023.

Captions: DLD: developmental language disorder. SLI: specific language impairment. TLD: typical language development. SLD: specific language disability. G1: group 1. G2: group 2. TDpriv: typically developing students from private schools. TDPub: typically developing students from public schools. DLDpub: public school students with developmental language disorders. SLH: speech-language-hearing

It was found that 3-to-4-year-old children with suspected DLD had slower speech than typically developing ones[17]; they also used more intransitive, linking, and direct transitive verbs[19]. These children omitted verb objects more often, indicating difficulties in sentence grammar structure. They were also found to have greater difficulties in phonological awareness skills such as rhyming and alliteration[20]. Another interesting result was the greater difficulty of 7-to-8-year-old children with DLD regarding conflict-solving and sociocognitive skills, as they would rather use physical unilateral strategies to cope with a conflict[14]. Linguistic and formal aspects may have interfered with their social communication and interaction with peers.

The assessment of children with suspected DLD must include syntactic aspects related to linguistic processing regarding both language comprehension and production, assessing morphosyntactic gender and number aspects, prosodic aspects, speech speed, and conflict-solving and social communication aspects. Thus, it is not enough to assess language generally and use exclusion diagnosis to identify DLD; instead, the assessment must include aspects of linguistic symptoms that may be affected in this population. Research must also be grounded on the symptoms of children with DLD according to their different languages worldwide, while also considering the particularities of Brazilian Portuguese. This diagnostic refinement may contribute to more effective interventions in these cases. Unfortunately, there are few such publications in Portuguese, which demonstrates the importance of investing in further national research in the area.

Chart 2 presents the studies on SLH and linguistic symptoms of children with ASD.

Chart 2. Speech-language-hearing symptoms of children with autism spectrum disorder

AUTHORS (YEAR)	OBJECTIVES	METHODOLOGY	MAIN RESULTS
Miilher LP, Fernandes FDM. (2013) [21]	To compare the pragmatic profile of communication initiatives and the bidimensional profile (initiative and responsiveness) in children diagnosed with ASD and analyze the most common response types.	The analysis addressed 30 SLH therapy recordings in which the therapist interacted with children with ASD of both sexes, with a mean age of 9:6. The interactions were analyzed by observing the actions and means of communication (gestural, vocal, and verbal) in the child's communication initiatives. The child's response in interactions was also analyzed.	Differences were found between the analyses (bidirectional and pragmatic profiles). In pragmatic analyses, it is important to consider the communication functions that analyze communication initiatives, but also consider the children's responsiveness – i.e., to what extent they participate in interactions.
Mazzega LC, Armonia AC, Pinto FC de A, Bevilacqua M, Nascimbeni RCD, et al. (2015)[22]	To compare children with ASD and with SLD regarding skills to imitate simple gesture schemes and sequential actions in family routines and analyze the relationship between the imitation index and verbal production of children with ASD.	36 children aged 6 years and 10 months, divided into 2 groups: ASD group: 24 children with ASD (22 boys and 2 girls) and SLD/DLD group: 12 children (11 boys and 1 girl). All children were undergoing direct and indirect interventions at a teaching clinic.	In the comparison of imitation skills of simple gesture schemes and sequences in family routines, the SLD/DLD group performed better than the ASD group. There was a significant direct relationship between imitation skills of family routine sequences and verbal production of words and sentences.
Olivati AG, Assumpção Junior FB, Misquiatti ARN. (2017)[23]	To examine the prosodic elements of speech segments in students with ASD and compare them with the control group with acoustic analysis.	19 patients with ASD and 19 typically developing participants, all males, aged 8 to 33 years.	Individuals with ASD have considerable differences in parameters of fundamental frequency, intensity, and duration. Changes were found in tessitura, the melodic amplitude of stressed vowels, the melodic amplitude of pretonic vowels, maximum intensity, minimum intensity, stressed vowel duration, pretonic vowel duration, and speech duration. Three individuals who attended therapy for more than 10 years had no prosodic differences from the other ones.

Source: Developed by the authors, 2023.
Captions: ASD: autism spectrum disorder. SLD: specific language disorder. DLD: developmental language disorder. SLH: speech-language-hearing

The search found studies on prosodic and pragmatic aspects of children with ASD, as well as skills to imitate simple gesture schemes and family action sequences. It was found that these individuals with ASD can have great prosody variations when communicating, in which one of the characteristics is an increase in fundamental frequency[23]. There was a great statistical difference in statement tessitura, melodic amplitude of the stressed and pretonic vowels, and melodic variation speed rate in the stressed and pretonic vowels between the groups – participants with ASD had higher values in all these variables. The study authors indicate that these results are contrary to those reported in the literature, which refer to monotonous speech, without melodic variations in individuals with ASD. It can be questioned whether "monotonous speech is a characteristic of people with ASD" and whether it is found in most cases. Although some symptoms may be present more often in certain disorders, many of them cannot be generalized, as each person's singularities and interactions must be primordially considered.

Vocal intensity variation was also found in individuals with ASD, especially regarding speech maximum and minimum intensity control[23]. These results suggest that both prosodic issues and vocal intensity variations must be addressed in the assessment of individuals with suspected ASD. The time of therapy of patients with ASD did not influence the research results – i.e., those who had been longer in therapy did not have significant prosody improvements in comparison with other ones who had been in therapy for less time. Besides the time of therapy, other aspects must be considered in the progress of the condition, such as the person's singularities, their bonding with the therapist, and the family's participation in the therapeutic process. Moreover, the sample of the study in question had few participants, with a wide age range (8 to 33 years), which hinders the generalization of results. However, most participants with ASD were up to 13 years old. These results call for a more careful and attentive look at the aspects related to prosodic issues in the speech of children with ASD, as well as further research with more participants in different age ranges.

Another study[21] analyzed the pragmatic profile of speech samples of children with ASD, comparing different analyses – especially one that considers the children's responsiveness in interactions. Since children with ASD have, to a greater or lesser degree, difficulties in communication initiatives and exchanges, assessments involving pragmatics should consider communicative functions linked to communication initiatives and especially their responses to interactions – since maintaining conversational turns requires not only beginning but also continuing the dialog. Hence, this study demonstrates the importance of observing these aspects when assessing children with ASD, supporting the inclusion of related aspects in language clinical practice.

A study [22] compared individuals with ASD and with DLD with the Assessment of Symbolic Maturity, which assesses the imitation of simple and sequential actions. It found that children with DLD performed better in sequential imitation tasks than in simple imitation tasks. On the other hand, children with ASD performed worse in sequential imitation tasks. According to the authors, the difficulty of children with ASD in integrating such information may be related to their short-term and long-term memory difficulties and the differences in information processing. The group comparison verified that the DLD group performed better than the ASD group in all imitation tasks analyzed (simple gesture schemes and sequential gesture schemes in family routines). This finding corroborates what has been described in the literature, that children with DLD tend not to have impaired social interaction and shared attention, thus performing imitation tasks more easily. On the other hand, ASD normally affects social interaction, which may explain their worse performance in such tasks. Analyzing these aspects related to ASD is greatly important because its diagnosis is complex and must involve the coordinated work of an interprofessional team. SLH therapists must look attentively and carefully at such issues, and further research is needed, especially national ones, also addressing aspects related to the interaction of children with ASD with their peers.

Research on the symptoms of children with ASD, DLD, or PD must also consider the pandemic and post-pandemic context. To what extent have emotional, behavioral, and interactional skills been impaired in this context, and to what extent have these impairments affected the children's communication and bonding? How has the prolonged screen time (which may have occurred in this context) affected and how will it affect these children's communication and language development? To what extent can many of these children have a language or learning delay due to issues related to the context they experienced, or have their previously diagnosed disorder aggravated? These

questions deserve to be approached in future research, contributing to language clinical practice.

Chart 3 presents the articles that approach the SLH symptoms of children with PD.

Chart 3. Speech-language-hearing symptoms of children with phonological disorder

AUTHORS (YEAR)	OBJECTIVES	METHODOLOGY	MAIN RESULTS
Wertzner HF, Pulga MJ, Pagan-Neves LO. (2014)[24]	To investigate the performance of children with PD in metaphonological skills assessed with the Lindamood Auditory Conceptualization Test (LAC-adapted for Brazilian Portuguese) and relate them to the age and severity of PD.	This study assessed 50 children with PD, aged 5 to 7:11. It verified the severity of PD, applied the LAC test, and assessed the auditory perception and comprehension of the number and order of sounds.	Children with PD have difficulties in more complex metaphonological skills – the more severe the PD, the greater the difficulty with auditory perception.
Novaes PM, Nicolielo-Carrilho AP, Lopes-Herrera AS. (2015)[25]	To verify and describe aspects related to speech speed and fluency in children with PD with and without SLH interventions.	30 children, 5 to 8 years old, of both sexes, divided into G1 (10 children with PD in intervention), G2 (10 children with PD, without intervention), and CG (10 typically developing children).	In comparison with the other groups, the PD group without intervention performed worse in the analysis of the number of words per minute and that of syllables per minute. The research verified that CG had the best performance, followed by G1 and then G2.
Freitas CR, Mezzomo CL, Vidor DCGM. (2015)[26]	To compare children with typical language development and with PD regarding phoneme discrimination and linguistic performance on language levels (morphological, syntactic, semantic, and perceptive and productive vocabulary).	36 children, aged 5 to 7:11, with TLD and with PD. They were assessed with the phoneme discrimination figures test, the sentence mean values test to assess morphosyntactic and semantic/lexical skills, and the expressive vocabulary test.	The analysis showed a significant difference between the TLD and PD groups – children with PD had greater difficulties in phoneme discrimination, which may be related to their difficulty distinguishing sounds and articulation points. Also, the greater the auditory discrimination, the better their performance on other linguistic levels.
Ceron MI, Gubiani MB, Oliveira CR, Gubiani MB, Keske-Soares M. (2017)[27]	To verify the phonological processes in typical and atypical phonology in different age ranges and indicate the occurrence of PD per age, sex, and school type.	866 children aged 3:0 to 8:11, attending public and private schools in Santa Maria, Brazil. A phonological assessment was used to verify phonological processes.	Children with PD were 15.2% of the sample. They had more phonological processes (PF) than those with typical phonological development, and the number of PF did not decrease with age. The most recurrent PFs in children with PD were consonant cluster reduction, onset lateral and non-lateral liquid substitution, non-lateral liquid deletion, onset fricative anteriorization, unstressed syllable deletion, non-lateral liquid semi-vocalization in the coda, and non-lateral liquid deletion in the coda.

Source: Developed by the authors, 2023.
Captions: PD: phonological disorder. TLD: typical language development. G1: group 1. G2: group 2. CG: control group.
LAC: Auditory Conceptualization Test. PP: phonological processing.

Chart 3 highlights some symptoms of SLH changes in PD. These include the greater occurrence of phonological processes in children aged 4 to 6 years, with lateral and non-lateral liquid substitutions, liquid deletion, fricative anteriorization, unstressed syllable deletion, and non-lateral liquid semi-vocalization and deletion in coda[27]. This study had a considerable sample of 866 children with PD from Rio Grande do Sul. It would be interesting to conduct such research in other regions of Brazil to verify whether the data are maintained.

Children with PD also had changes in speech speed, characterized by fluency changes related to slower pronunciation in the number of both words per minute and syllables per minute[25]. SLH intervention aimed at these issues helped these children perform better in linguistic aspects. It was verified[24] that children with PD also had difficulties with auditory perception and phoneme discrimination[26] – the more severe the disorder, the greater the difficulty. It was also found that these children can have changes in morphosyntactic and semantic/lexical development, as the more severe the PD, the greater the difficulty with auditory perception[26]. Other phonological skills were investigated in children with PD[38], such as phonological processing skills regarding phonological awareness and phonological memory in children aged 4 to 6:7 years. They were found to perform worse than typically

developing children. Also, those with more severe PD had greater difficulties with phonological awareness. Working memory skills were likewise more difficult in these children. These data raise other discussions, such as the possible relationships between PD and auditory processing and the different degrees of severity of the disorder. To what extent can these changes interfere with the child's process of learning to read and write, and to what extent were these symptoms worsened during the pandemic? Further research should be conducted to clarify these issues.

Chart 4 presents the articles that approach the risk factors related to language changes in childhood.

Chart 4. Risk factors related to language changes

AUTHORS (YEAR)	OBJECTIVES	METHODOLOGY	MAIN RESULTS
Mendes JCP, Pandolfi MM, Carabetta Júnior V, Novo NF, Colombo-Souza P. (2012)[28]	To distinguish factors associated with language changes among preschoolers' social and nutritional variables.	126 children aged 6 months to 6 years from the South Zone of the municipality of São Paulo were assessed with Denver II. They were divided into 2 groups, with and without anemia.	Those at greater risk for language acquisition and development were the anemic children, oldest siblings, and those with fewer than four siblings. The children's performances were not different regarding nutritional status, maternal educational attainment, and the children's sexes.
Silva GMD, Couto MIV, Molini-Avejonas DR. (2013)[29]	To distinguish the main risk factors associated with SLH changes related to the children and their parents.	170 children and their parents were followed up at a teaching clinic between March 2010 and July 2012.	Being an only child and having a family history were the risk factors ascribed to family influence. Prematurity, long hospital stays, and deleterious oral habits were those ascribed to the children with language changes.
Caldas CSO, Takano OA, Mello PRB, Souza SC, Zavala AAZ. (2014)[30]	To verify language development skills in premature and low-weight children and associated risk factors.	Denver II (Denver Developmental Screening Test) and ELM (Early Language Milestone Scale) were applied to 77 children aged 2 to 3 years.	Low-weight premature children were delayed in the assessed linguistic skills, with greater impairment in expressive auditory function. Socioeconomic and historical risk factors were also identified.
Monteiro-Luperi TI, Befi-Lopes DM, Diniz EMA, Krebs VL, Carvalho WB. (2016)[31]	To assess the linguistic performance of premature children 2 years old, considering chronological and corrected ages.	23 premature children with a mean age of 2 to 2:11 had their linguistic skills assessed with the Test of Early Language Development (TELD-3).	Premature children's assessment results were abnormal, suggesting that prematurity is a risk factor for language changes. The analysis based on chronological and corrected ages did not find differences in performance. The group of 2-year-old premature children was at risk of language changes that cannot be compensated for with age correction.
Pereira JF, Formiga CKMR, Vieira MEB, Linhares MBM. (2017)[32]	To characterize socioeconomic and psychosocial variables in children that attended public day care centers and assess the influence of these factors on their neuropsychomotor development.	61 children of both sexes, aged 4 to 6 years, who attended public day care centers in Goiânia. Their development was assessed with Denver II, while questionnaires were administered to the parents to obtain socioeconomic data and the children's biological and clinical data.	It was verified that 77% of the sample children were at risk in the global Denver II classification, though typical in the psychosocial, fine motor, broad motor, and language areas. The analysis of factor influence revealed that family income (up to R$ 2,000.00) was associated with a higher percentage of risk for language development (64%). The other factors had no statistically significant differences.
Ribeiro CC, Pachelli MRO, Amaral NCO, Lamônica DAC. (2017)[33]	To verify how 1-to-3-year-old children born prematurely with low or very low weight in comparison with full-term children respond to child development in the gross motor, adaptive fine motor, personal-social, and language domains.	150 premature (experimental group) and full-term children (comparison group), divided into eight groups according to weight (low weight: below 2,500 grams, and very low weight: below 1,500 grams) and age (12 to 24 and 25 to 36 months).	The results demonstrated that premature babies performed worse than full-term ones in gross motor, adaptive fine motor, personal-social, and language.
Soares ACC, Silva K, Zuanetti PA. (2017)[34]	To examine different variables related to prematurity, identifying the risk factors for linguistic development changes.	98 records of preterm children aged 1 to 6 years. They were divided into 2 groups: G1 (at risk of linguistic changes) and G2 (no such risk.	This study concluded that prematurity alone is not a risk factor for linguistic changes, but rather, peri-intraventricular hemorrhage and birthweight below 1,000 grams. Bronchopulmonary dysplasia, long hospital stays, and maternal age under 18 were also identified as risk factors.

Source: Developed by the authors, 2023.
Captions: G1: group 1. G2: group 2. ELM: Early Language Milestone Scale, TELD: Test of Early Language Development. SLH: speech-language-hearing.

Prematurity was the main risk factor for language changes. These results were also found in another study[39] that verified that prematurity and low birthweight are risk factors for language and speech changes in children 3 to 4 years old. There are indications that the risk is not posed by the prematurity itself but by its complications[34].

The studies pointed out other risk factors for language and speech changes, namely: the child's long hospital stays, birthweight below 1,000 grams, peri-intraventricular hemorrhage and bronchopulmonary dysplasia at birth, previous family history of language disorders, being an only child, deleterious oral habits, and maternal age below 18 years.

An integrative literature review conducted in 2019[40] investigated risk and protective factors for oral language development delay in the last 5 years in national and international databases. It was verified that most studies investigated static risk factors – i.e., associated with biological issues or the child's life history. The most recurrent protective factor was the social support provided to the child. There are still few publications on the risk and protective factors for language delays, especially in Portuguese, which suggests the need for more national and international studies.

Chart 5 synthesizes the articles that approach the family's participation in the therapeutic process.

Chart 5. Family's participation in the therapeutic process

AUTHORS (YEAR)	OBJECTIVES	METHODOLOGY	MAIN RESULTS
Ostroschi DT, Zanolli ML, Chun RYS. (2017)[35]	To verify the family's perception of the linguistic conditions and social participation of children and adolescents with speech/language disorders, using the International Functioning Classification for Children and Youth (ICF-CY).	The study surveyed the records of 24 children and adolescents aged 6 to 13 years undergoing SLH follow-up due to stuttering, language delay, phonetic-phonological deviation, and language changes for neurological causes. The family also participated in family group sessions. They were interviewed and their profiles were descriptively analyzed with ICF-CY.	It was initially observed that the families classified language changes as an organic problem, categorized under "Functions" and "Body Structures". The "Activities and Participation and Environmental Factors" results showed that families acquired a more comprehensive perspective of language changes, beyond the organic dimension. Participants reported environmental factors, such as the family's attitude, as facilitators in the children's lives. Environmental factors, such as the family's attitudes and social attitudes, were also considered barriers – e.g., not following the therapist's instructions.
Balestro JI, Fernandes FDM. (2019)[36]	To analyze the perception of caregivers of children with ASD regarding the functional profile of their children's communication.	Caregivers of 62 children diagnosed with ASD, were divided into three intervention groups.	In the questionnaire, parents reported increased use of gestural, vocal, and verbal communication in all groups to express interpersonal communication functions – except for G2 (whose caregivers received the same instructions as in the program, but individually, and their children had individual therapy). In non-interpersonal communication functions, gestures decreased, and verbal communication increased, with no statistical difference between the groups. There was no difference in vocal communication over time.

Source: Developed by the authors, 2023.
Captions: ICF: International Functioning Classification, Disability, and Health for Children and Youth (ICF-CY). ASD: autism spectrum disorder. G2: group 2. SLH: speech-language-hearing.

Only two studies were found that approached the family's participation in the therapeutic process. One of the studies used the International Classification of Functioning (ICF-CY)[35], proposed by the World Health Organization (WHO) with parameters related to the person's functioning. Its conception focuses on a biopsychosocial approach to health, unlike the traditional purely biomedical approach that focuses on the pathology and its deficits. The usual health model considers the family as having the practical knowledge of care and health professionals as having the technical knowledge, with no interaction between the two. The analysis of the statements of the families of children and adolescents with language disorders and their relationship with ICF-CY demonstrated that, initially, relatives observed the patients' speech problems as changes with greater organic difficulties – i.e., the speech change and the possibility of improving it were purely related to the fact that the organism had the disorder. The family's attitudes were considered

facilitators or barriers to improving the patient's process, depending on how they responded to the therapist's instructions. According to the report, this happens because some families follow the therapist's instructions and do the best they can for the patient to improve and benefit from the therapy. The attitudes of other families, however, may pose barriers, such as when the therapist indicates a procedure and/or instrument but the family does not adhere to the instruction. Thus, the patient suffers loss, and the attitude becomes a barrier in the improvement process. According to the family, social attitudes (i.e., involving other people who interact with the patients) can be categorized as barriers to their communication, as certain situations may press them, impairing or hindering their communication with the other person. Thus, the family must participate in the therapeutic process, as their presence, participation, and co-responsibility may positively help the patient improve. ICF-CY is a quite adequate classification to provide a broader health approach, as it considers not only the pathology but also the person's functioning[35].

The second study[36] presents the family perception of the communication profile of the patient with ASD before and after the instruction program. The family is considered the child's first social group. From this standpoint, it is apt to reflect on the child's communication and interaction with their surroundings. This study used an instrument called the Functional Communication Profile – Checklist (PFC-C), whose questionnaire analyzes interpersonal and non-interpersonal aspects of communication. The patients and their families were divided into three groups: G1, in which caregivers received group instructions, and the children received individual therapy; G2, in which caregivers received individual instruction, and the children received individual therapy; and G3, in which only caregivers received group instruction, whereas the children were in the waiting list for SLH care. PFC-C was administered at the beginning of the research, after 5 months, and after 8 months. The instructions consisted of relevant topics pointed out by the researchers and included printed material and verbal instructions. The topics encompassed various issues on the importance of the context to the development of socio-communication skills and competencies and the importance of aspects of shared attention, spontaneous actions, and following the child's interests to have active engagement. The research results show how important instructing the family is to the progress of the SLH treatment, as the children in the three groups had more effective communication from the parents' perspective, even though those in the third group had not had SLH therapy. In that group, only the family received instructions and could reflect on and analyze their children's communication. Hence, the clinical environment potentializes changes regarding the family's needs and the patients' progress. Different knowledge must interact and dialog, involving the health team, the family, and caregivers. It is important to consider and listen to the family, sharing the responsibility with all those involved and avoiding that instruction be merely prescriptive. Thus, dialog, listening, and care are necessary and should be constant processes that permeate the therapeutic follow-up.

The analysis of these studies showed that few approached the family's participation in and engagement in the therapeutic process of children with speech and language changes, especially in those with ASD, PD, and DLD. The search found publications that addressed the family's participation regarding the care of various SLH complaints, such as hearing loss, cerebral palsy, syndromes, and so on. It is necessary to broaden the bibliographic review including other languages.

The results of the present study raise the question, "How do children with different oral communication difficulties and their families cope with suffering? To what extent can the family and the environment have facilitating or barrier attitudes to these processes?".

What often stands out in the traditional biomedical treatment model, widespread in SLH practice, is the person's "pathology" and its limitations – unlike the more comprehensive model, which focuses on the person's potentialities. There is also an important discussion regarding the weight of "labels" imposed by pathologizing. The importance of diagnosis should never be overlooked, but it is important to broaden the perspective and value the person's achievements and potentialities.

Furthermore, there is a need for studies on the pandemic and its effects on children's cognitive-linguistic development. How were their interactions in this context? How did remote teaching impact their learning to read and write and their overall education? Was the linguistic profile of children with language and speech disorders impacted by the COVID-19 pandemic? How will families participate after the pandemic period? Therefore, further research is needed to address these aspects.

CONCLUSIONS

This study focused on the linguistic profile of children with language, speech, and communication changes over the last 10 years. It found different linguistic symptoms depending on the neurodevelopmental disorder (PD, DLD, or ASD). It also verified general risk factor characteristics for language and speech changes, among which prematurity stood out. The family's participation is crucial to the therapeutic process, being either facilitators or barriers to the child's communication progress. Listening to the family, considering them, and sharing with them the responsibility for the therapeutic process increase the possibilities of greater child communication progress. Despite the need for outlining the linguistic and communication profile that characterizes the condition and aids the suspected diagnosis, each child's singularities must always be considered in assessments and throughout the therapeutic process. The number of studies included in this review highlights the need for further research and studies on these topics, especially in the Brazilian national literature, approaching more regions in the country to encompass its cultural characteristics and linguistic variants.

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TB: conceptualization, development, analysis of results, writing, review, and approval;

VSN: conceptualization, development, analysis of results, writing;

GGS: development, review, and approval;

RSL: review and approval.