

## Systematic Review

### Revisão Sistemática

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# Language development and its relation to social behavior and family and school environments: a systematic review

## *Desenvolvimento da linguagem e sua relação com comportamento social, ambientes familiar e escolar: revisão sistemática*

#### ABSTRACT

**Purpose:** To conduct a systematic review of the literature on the relationship between language development, social behavior, and family and school environments in children aged 4 to 6 years. **Research strategy:** Papers published between March 2009 and March 2014 were searched in electronic databases. The first phase of the study consisted in preparing the guiding question. Subsequently, survey and selection of studies were conducted. To this end, descriptors were defined by groups of themes. **Selection criteria:** The following types of publications were included in the search: complete scientific articles available in full and freely and original research papers or literature reviews published in the past five years covering the 4 to 6-year age range. **Data analysis:** The analysis of the papers was conducted through critical reading and selection of the results that responded to the guiding question. **Results:** Fourteen articles were selected. Most of the studies used at least one standardized instrument. Research indicates that the family environment is related to language development, mainly regarding socioeconomic status and parental education; number of adults who live with the child; parental health; language motivation; and interaction between parents and children. Only one article showed association between quality of the school environment and language development, and none showed evidence of an association between social behavior and language development. **Conclusion:** Most of the studies analyzed focus on the relationship between family environment and language development. Very few studies with this approach are available in the specific literature.

#### RESUMO

**Objetivo:** Revisar sistematicamente na literatura as relações entre desenvolvimento da linguagem, comportamento social e ambientes familiar e escolar em crianças de 4 a 6 anos de idade. **Estratégia de pesquisa:** Foram pesquisados, em bases de dados eletrônicas, artigos publicados entre março de 2009 e março de 2014. A primeira etapa da pesquisa constou da elaboração da pergunta norteadora. Posteriormente, foram realizados levantamento e seleção dos estudos em base de dados. Para tal, foram definidos descritores por grupos de eixos temáticos. **Critérios de seleção:** Foram incluídos artigos científicos completos e disponíveis na íntegra gratuitamente; artigos de pesquisa original ou de revisão de literatura, publicados nos últimos cinco anos compreendendo a faixa etária entre 4 e 6 anos de idade. **Análise dos dados:** A análise dos artigos foi realizada por meio da leitura crítica e seleção dos resultados que respondem à pergunta norteadora. **Resultados:** 14 artigos foram selecionados. A maior parte dos estudos utilizou pelo menos um instrumento padronizado. As pesquisas apontam que o ambiente familiar tem relação com o desenvolvimento da linguagem, principalmente quanto aos níveis socioeconômicos e de escolaridade dos pais, número de adultos que coabitam com a criança, saúde dos pais, estimulação de linguagem e interação entre pais e filhos. Apenas um artigo demonstrou associação entre qualidade do ambiente escolar e desenvolvimento da linguagem e nenhum evidenciou associação entre comportamento social e desenvolvimento da linguagem. **Conclusão:** A maioria dos estudos teve como foco a relação entre ambiente familiar e desenvolvimento da linguagem. São escassos estudos com esse enfoque.

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## INTRODUCTION

The first years of a child's life are the most important for the development of language skills, which occurs in phases and it is associated with linguistic and situational contexts. Adults play a dominant role in this process because they provide tools for the development of communication<sup>(1)</sup>.

Language development in children presents individual differences not only with respect to acquisition, but also to speed and quality. This development is thus complex and dependent on a number of factors, which range from neuropsychological maturity, affection, and cognitive development to the contexts in which the child is inserted<sup>(1,2)</sup>.

The family is the first context in the life of a child, playing a fundamental role at all levels of development. Children need an enabling environment to fully develop their potentials.

Within the context of contemporary society, with easy access to information and women increasingly involved in the labor market, children are enrolled in educational institutions at earlier ages. Under the Brazilian legislation, early childhood education has received increased attention in recent decades, as observed in the Constitution of 1988<sup>(3)</sup>; in the Statute of the Child and Adolescent (ECA) from 1990<sup>(4)</sup>; and in the National Education Guidelines and Framework Law (LDB) passed in 1996, in which early childhood education is included as the first stage of basic education<sup>(5)</sup>. Therefore, determining the quality of the school environment in early childhood education is of paramount importance, and it can assist in the understanding of children's relationship with language acquisition. This theme has also attracted the attention of some researchers<sup>(6-8)</sup>.

In addition to the environmental factors, other points worth mentioning in the study of language development are the behavioral and emotional aspects. There are studies in the literature emphasizing that disorders in communication and emotional and behavioral impairments can act jointly in the course of child development<sup>(9-11)</sup>. Assessment of child behavior aspects is crucial for the establishment of language disorder diagnosis<sup>(12)</sup>. Therefore, relationship difficulties, hyperactivity, and emotional and conduct problems can interfere with child development and, consequently, with language.

Analysis of the knowledge produced on the theme so far described becomes relevant, given that language development can be influenced by several factors, such as family and school environments and social behavior.

## OBJECTIVE

The present study aims to conduct a systematic review of the literature on the relationship between language development, social behavior, and family and school environments in children aged 4 to 6 years.

## RESEARCH STRATEGY

This is a systematic literature review on the relationship between language development, social behavior, and family and school environments. The study design was based on national<sup>(13)</sup>

and international<sup>(14)</sup> recommendations for the preparation of systematic reviews. The first phase of this study included the formulation of the following guiding question: *What is the relationship between language development, social behavior, and family and school environments in children aged 4 to 6 years?*

Studies were selected through a literature search for texts published between March 2009 and March 2014 in the Virtual Health Library (VHL) and PubMed databases. Based on the guiding question, keywords were defined by theme groups, resulting in four search sets. The following thematic areas were created: language development, early childhood education, family relationships, and social behavior. The first set of descriptors - child language, language, language development, language studies, speech-language pathology, and language and hearing sciences - was selected to organize the thematic area of language development. The second set of keywords - child education, child care, and preschooler - was selected for the theme early childhood education. The third set - family relationships, parent-child relationships - was selected for the thematic axis family relationships. The fourth set - social behavior - for the theme social behavior. All keywords were used in Portuguese together with their correlates in Spanish and English. The first search strategy included the combination between the first or second and the third or fourth sets of descriptors. The second search strategy included the combination between the first and the second or third sets of keywords. In this strategy, the fourth set of descriptors - social behavior - was removed, because when this keyword was used, articles previously identified were found. It is worth mentioning that the whole process of preparation of keywords and strategies for search in the electronic databases was monitored by a librarian of the institution.

## SELECTION CRITERIA

Inclusion criteria for both search strategies were as follows: complete scientific articles available in full and freely and original research papers or literature reviews published in the past five years covering the 4 to 6-year age range.

Exclusion criteria included publications with lower level of evidence<sup>(15,16)</sup>, i.e., expert opinions, letters to the editor, and case reports, as well as articles in which the answer to the guiding question was not found after the complete reading.

## DATA ANALYSIS

Analysis of the articles was performed in three stages: First, the titles and abstracts were read and selected according to the inclusion criteria; after that, the articles were read in full in search of the answer to the guiding question and final selection; finally, the articles selected were critically analyzed.

Two speech therapists involved in the study revised the evaluation with regard to the inclusion of studies; disagreements were resolved by consensus among the researchers.

The articles were classified by thematic areas according to content to facilitate the analysis. Articles addressing the following themes were found:

- Language and family environment;
- Language and family and school environments;
- Language, family and school environments, and social behavior;
- Language, family environment, and social behavior.

A word cloud based on the abstracts and conclusions of articles was developed. It is worth mentioning that this is a form of linguistic data visualization which shows how frequently words appear in a given text. The words are displayed in different sizes directly proportional to the number of times they appear in the text, thus creating a prioritized list according to the number of occurrences<sup>(17)</sup>.

## RESULTS

### Results in electronic databases

Using the first strategy, the search identified 126 studies in the Virtual Health Library database and 1479 works in the PubMed database.

In the first evidence matrix, which consisted in the reading of titles and abstracts, two articles from VHL and 10 articles from PubMed were selected. In the second evidence matrix, after the complete reading of the texts, two articles were excluded, remaining 10 previously selected works which met the inclusion criteria and were considered important for the purpose of this study.

Using the second strategy, the search found 74 studies in the VHL database and 110 publications in the PubMed database. After the reading of titles and abstracts, six works from the first database and eight from the second database were included in the study. Ten articles were excluded in the second evidence matrix, remaining only four publications which met the objective of this research. Exclusion occurred because these articles had already been selected in the first strategy.

Thus the final selection identified 14 articles for analysis. Figure 1 shows the flowchart of the study selection process.

### Analysis of selected studies

Among the 14 researches, six were conducted in Brazil, seven in the United States, and one in Australia. Most of these surveys addressed the relationship between family environment

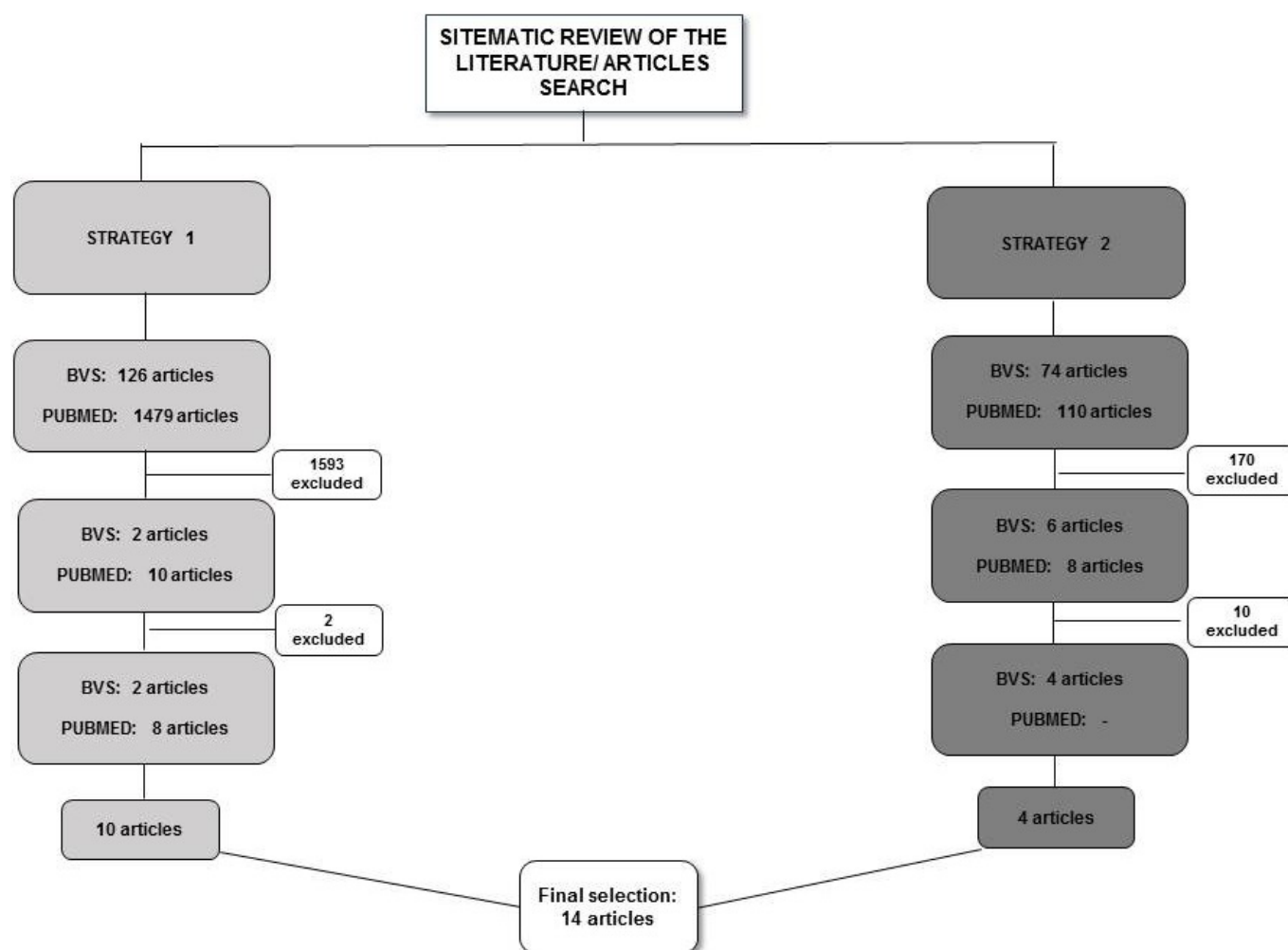


Figure 1. Selection process flowchart of the studies

and language development. Few studies addressing the aspects of school environment and social behavior were found. Some of those studied the physical environment of early childhood education, whereas the others addressed the importance of language skills for school readiness; but only one study considered the quality of the school environment and its relationship with child language<sup>(18)</sup>. The same occurred with the aspects of behavior; only one survey aimed to verify the relationship between children's behavior and language development<sup>(19)</sup>.

The majority of the surveys showed the use of at least one standardized instrument, which reinforces the validity of the studies analyzed. Regarding language assessment, the main standard instruments used in the studies were the Peabody Picture Vocabulary Test (PPVT), Preschool Language Scale, fourth edition (PLS-4) and the Children Phonological Assessment (CPA). Only one of the studies selected used a qualitative approach<sup>(20)</sup>. With respect to study type, there was predominance of publications with higher level of evidence: one randomized clinical trial<sup>(18)</sup> and seven longitudinal studies<sup>(19,21-26)</sup>. The others were three cross-sectional studies<sup>(27-29)</sup> and two literature reviews: one narrative<sup>(30)</sup> and one integrative<sup>(31)</sup>.

Regarding study sample, the smallest sample was composed of 12 children, in a qualitative research<sup>(20)</sup>, whereas the largest sample comprised 1623 children, in a cohort study<sup>(19)</sup>.

A summary of the articles is presented in two tables according to study design. The first table shows the longitudinal studies, whereas the second table shows the studies with other designs, except for the systematic reviews, which are described separately.

The longitudinal studies presented in Table 1 allowed evaluation from observation of the interaction between children and families or main caregivers over a period of time. Table 2 shows five researches: one clinical trial<sup>(18)</sup>, three cross-sectional studies<sup>(27-29)</sup>, and one qualitative descriptive survey<sup>(20)</sup>.

In the thematic area of language and family environment, three articles addressed the correlation between language development and stimulation of children's language by parents and parent-child interaction<sup>(22,25,26)</sup>. In these studies, language stimulation is characterized by the use of parental spatial language, which is defined by words and terms with spatial information and aspects; by the number of words used by them and the quality of such stimulus; and by the quality of the dialogues/conversations established between parents and children.

Acquisition of vocabulary between 14 and 58 months of age, socioeconomic status, and parent-child interaction was the topic discussed in one of these articles. The study demonstrated the positive influence of the quality (not quantity) of the stimulus generated in parent-child interaction on vocabulary acquisition. It also shows that families with higher socioeconomic level offer greater amount (not necessarily quality) of language input to their children. Quality of interaction was not associated with socioeconomic status<sup>(22)</sup>.

In this thematic axis, three articles showed the relationship between family environment and language development, with emphasis on the semantic/lexical subsystem of language<sup>(22,25,26)</sup>.

The importance of adult-child dialogue is highlighted. Reading, storytelling, sitting next to the child to watch television is not sufficient; interaction quality is needed for the acquisition of language skills and, consequently, for appropriate language development.

Five studies were found in the theme of language and family and school environments<sup>(18,20,23,29,31)</sup>.

A randomized clinical trial conducted in the United States<sup>(18)</sup> demonstrates the effectiveness of the intervention of teachers with children's parents to promote quality for the parent-child interactions and experiences and the consequent readiness regarding spoken language, reading, and writing skills. These interventions consisted of visits of teachers to the children's homes. The teachers were prepared in groups by a support team. These professionals supported and potentialized, in daily routines, the quality of interactions between parents and children and learning experiences. The purpose was to create shared responsibility between parents and teachers to foster the school readiness of children with respect to spoken language, reading, and writing. In addition, the study shows that higher level of parental education, greater number of people cohabiting with the child, and fewer health problems of parents favor the development of language. Thus the results of that study provide evidence that the interaction between school and family environments can enhance language development<sup>(18)</sup>.

Two articles<sup>(23,29)</sup> emphasize the lexical development of children in relation to receptive vocabulary. The first study<sup>(23)</sup> reveals that socioeconomic status and parental engagement are associated with the expansion of children's vocabulary. It demonstrates that the early increase in the speed of this vocabulary expansion for approximately 30 months provides vocabulary skill later in the child's life, after 54 months. The second research<sup>(29)</sup> shows no statistical significance in the analysis of the association between development of receptive vocabulary and the variables gender, mother's education, and mothers who work outside the home. The study reports that 61% of the children presented performance lower than the expected for their ages with regard to receptive vocabulary, especially the older children.

The only qualitative study found in this literature review<sup>(20)</sup> aimed to characterize the communicative behaviors of children whose entry in preschool occurred after the age of five. The observation of these behaviors occurred both in the school and home environments. The authors used a protocol with categorization of the means and functions of communication. Thus they considered the means of verbal or gestural communication and the levels of dialogue, which were divided into: begins, maintains, or extends the dialogue. As for the analysis of communicative functions, the following categories were specified: responses, requests, confirmations, vocatives, comments, and recognitions. This study found evidence that children who were enrolled in early childhood education after the age of five respond more often than initiate a conversation, and they benefit from contexts planned with family interlocutors. It was not possible to generalize the results



**Table 1.** Longitudinal studies included in the search

Study	Country of origin	Sample	Instruments	Results
Cartmill et al. <sup>(22)</sup>	USA	50 parent-child dyads. Children aged 14 to 58 months with typical language development.	Monitoring of parent-child interaction, every four months from 14 to 58 months of age.	Quality of interaction: wide variation in the contextual cues offered to children by their parents.
		27 males, 23 females.	Peabody Picture Vocabulary Test (PPVT) applied at 54 months of age.	The monitoring of children showed correlation between interaction quality and language skills in children at 54 months of age.
Rowe et al. <sup>(23)</sup>	USA	62 main caregiver-child dyads. Children aged 14 to 46.	Child monitoring in the home environment, every four months from 14 to 46 month for assessment of vocabulary expansion	Socioeconomic status proved to be a positive predictor of vocabulary expansion.
			Assessment of receptive vocabulary at 54 months of age.	Vocabulary assessment at 30 months proved to be a predictor of lexical development. No correlation was found between gender and speed in vocabulary expansion.
Bornstein and Putnick <sup>(24)</sup>	USA	192 children aged 20 to 48 months: 87 females and 105 males.	Child monitoring on spontaneous speech in the interaction with the mother.	Wide individual variation was found at the 20 to 48-month age range.  Stability in language development was maintained between independent assessments of socioeconomic factors, medical history, maternal intelligence and gender.
			Maternal report: Vineland Adaptive Behavior Scales and Early Language Inventory.	
			Language assessment: Scales of Expressive Language Comprehension and Wechsler Preschool.	
Whitehouse et al. <sup>(19)</sup>	Australia	1623 children distributed in two groups: with expressive language delay aged 2 years or less (n=142) and with typical language development (n=1245).	Language Development Survey	Delay in expressive vocabulary at 2 years of age proved to be a low efficiency predictor of behavioral and emotional disorders.
			The Child Behavior Checklist	
Pruden et al. <sup>(25)</sup>	USA	52 parent-child dyads. Children aged 14 to 46 months with typical language development 26 males and 26 females.	Spatial transformation task. Subtest with blocks of the Primary Scale of Intelligence.	Statistically significant differences between genders in the spatial transformation task.
			Spatial Analogy Test. Peabody Picture Vocabulary Test (PPVT).	Positive correlation between the spatial tasks: children who performed well on one task tended to perform well on the other tasks too.
			Monitoring of dyad interaction in daily routines.	Positive correlation between the use of words with spatial meaning by parents and children.
Razza et al. <sup>(21)</sup>	USA	1046 children aged 3 to 5 years.	Family environment evaluation: HOME protocol and socioeconomic level.	Statistically significant correlation between sustained attention, receptive vocabulary, and environmental aspects (socioeconomic status and family environment).
			Maternal mental health rating.	
			Child Rating: Sustained Attention Scale, Spatial Analogy Test. Peabody Picture Vocabulary Test (PPVT) and school readiness.	Children with higher scores in the family environment evaluation performed better in the receptive vocabulary assessment.

**Table 1.** Continued...

Study	Country of origin	Sample	Instruments	Results
Zimmerman et al. <sup>(26)</sup>	USA	275 families and their children aged 2 to 48 months (stage 1).	12-hour period recording of children's word count in routine situations, one day a month for 6 months in the sample of stage 1 and for 18 months in the sample of stage 2.	On average, per day, the children heard 13,000 words spoken by adults and participated in 400 conversational turns.
		71 families and their children throughout 18 months (stage 2).	Analysis of passages during adult-child interaction and exposure to television.	Positive correlation was found between adult word count and child word count. Each 1000-word increase in the adult word count is associated with a 0.44 increase in the PLS-normed score.
		Preschool Language Scale, Fourth Edition (PLS-4).		

**Table 2.** Clinical trials and cross-sectional studies included in the search

Study	Country of origin	Study design	Sample	Procedures	Results
Murta et al. <sup>(26)</sup>	Brazil	Cross-sectional	48 children aged 1 month to 6 years, 8 for each of the following age groups:	Portage Inventory Nutritional assessment with anthropometric measurements. Socioeconomic questionnaire. .	Statistically significant correlation between language development and cognition.
			0-1 year, 1-2 years, 2-3 years, 3-4 years, 4-5 years, and 5-6 years.		No statistically significant correlation between language development and the variables family environment, social behavior, and school environment
Pagliarin et al. <sup>(27)</sup>	Brazil	Cross-sectional	152 children with phonological disorder aged 4 to 8 years.	Structured interview with parents or guardians on family factors. Children Phonological Assessment (CPA)  Narration and spontaneous conversation using a logical sequence of five facts the "birthday" theme.	No statistically significant correlation between level of phonological disorder and the family aspects investigated: unplanned pregnancy; addiction (of a parent and/or both) to alcohol and/or drugs; speech, language, and/or hearing disorders presented by parents and/or first-degree relatives; divorced parents; absent father; and loss of close relatives.

Table 2. Continued...

Study	Country of origin	Study design	Sample	Procedures	Results
Sheridan et al. <sup>(18)</sup>	USA	Clinical trial	217 children aged 35 to 52 months. (116 in the intervention group and 101 in the control group).	Intervention group: Protocol of intervention strategies and home visits. Teachers: Intervention group: training for intervention application.	Alterations in the performance of the intervention group with respect to use of spoken language, reading, and writing skills.
			211 parents (111 in the intervention group and 100 in the control group).	Control group: training in child development.	Positive effects of the intervention in the expressive language of children at risk of development were demonstrated.
			29 teachers (in the intervention group and 16 in the control group).	Rating of groups: The Teacher Rating of Oral Language and Literacy -teachers. Preschool Language Scale – Fourth Edition – children.	
Oliveira et al. <sup>(20)</sup>	Brazil	Qualitative descriptive	12 children aged 5 to 6 years (6 selected for target analysis and 6 as interacting pairs). 6 mothers 6 teachers	Semi-structured interview with the mothers. Questionnaire applied to the teachers. Monitoring of children's communication in the school and home environments.	Communicative functions showed greater variety for home environment compared with school environment.
Araújo et al. <sup>(29)</sup>	Brazil	Cross-sectional	159 students aged 4 to 7 years.	Peabody Picture Vocabulary Test (PPVT).	61% of the children aged 4-5 years presented performance lower than the expected for their ages. . No statistically significant correlation was found between genders (p=0.94). No statistical significance was found in the analysis of the variables mother's education (p=0.42); and mothers who work outside the home (p=0.99).

due to the small sample size, and the authors concluded that communicative functions showed greater variety in the home environment<sup>(20)</sup>.

Still in the theme language and family and school environments, three studies addressed the importance of language skills for school readiness<sup>(18,23,29)</sup>. Only one study showed correlation between the school environment and language development<sup>(18)</sup>.

Three publications were selected in the theme language, family and school environments, and social behavior<sup>(21,24,28)</sup>.

The survey conducted with 1046 children and their families<sup>(21)</sup> showed statistically significant correlation between sustained attention, receptive vocabulary, and environmental aspects. In this study, the authors observed that sustained attention to a particular activity was associated with better performance in receptive vocabulary for both low socioeconomic groups (low income and very low income). In the low-income group,

inadequacy of tasks involving sustained attention and increased impulsivity, related to the fact that children were unable to sit still during the test, were associated with poor performance on receptive vocabulary and increased externalization behavior. It is worth noting that in two studies<sup>(24,28)</sup> no statistically significant correlation was found between social behavior and language development. One of these articles<sup>(18)</sup> shows that the stability of language development was maintained between evaluations, regardless of socioeconomic factors, medical history, maternal intelligence, and gender. The other study<sup>(28)</sup> used the Portage Inventory to assess child development in the cognitive, motor, self-care, language and socialization areas. However, no correlation was observed between language and social behavior, but between language, cognitive aspects, and nutritional status.





vocabulary, family, and school. These findings allow us to infer that the search strategies used for the selection of articles were appropriate and consistent with the results obtained.

## CONCLUSIONS

The study results showed wide variation. Part of the surveys revealed an association between language development and family and school environments. With regard to family environment, the following aspects presented a relationship with language development: quality of parental stimulation, socioeconomic status, parental education, number of people cohabiting with the child, and health problems of parents. It can also be noted that the qualification of teachers to guide the parents regarding interaction with the children proved to be effective in promoting language development.

Association between social behavior and language development was addressed in only one study, but showed no statistical significance.

This literature review shows that there is a lack of studies addressing the relationship between language development, family and school environments, and social behavior. This study indicates the need for further research in this area, which could help future interventions not only with respect to the promotion and prevention aspects related to language, but also to the development of public policies focused on child health and education.

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### Author contributions

*AJAC was responsible for the study design, collection and analysis of data, and writing of the manuscript; SMAL and LMHFG were the advisers of the project, responsible for the monitoring of all its execution phases, data analysis, and writing of the manuscript.*