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

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\(^1\).

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\(^1,2\).

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\(^3\), in the Statute of the Child and Adolescent (ECA) from 1990\(^4\), 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\(^5\). 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\(^6-8\).

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\(^9,10\). Assessment of child behavior aspects is crucial for the establishment of language disorder diagnosis\(^11\). 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\(^13\) and international\(^14\) 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\(^15,16\), 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\(^{(17)}\).

**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
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\textsuperscript{(18)}. The same occurred with the aspects of behavior; only one survey aimed to verify the relationship between children’s behavior and language development\textsuperscript{(19)}.

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\textsuperscript{(20)}. With respect to study type, there was predominance of publications with higher level of evidence: one randomized clinical trial\textsuperscript{(18)} and seven longitudinal studies\textsuperscript{(19,21-26)}. The others were three cross-sectional studies\textsuperscript{(27-29)} and two literature reviews: one narrative\textsuperscript{(30)} and one integrative\textsuperscript{(31)}.

Regarding study sample, the smallest sample was composed of 12 children, in a qualitative research\textsuperscript{(20)}, whereas the largest sample comprised 1623 children, in a cohort study\textsuperscript{(19)}.

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\textsuperscript{(18)}, three cross-sectional studies\textsuperscript{(27-29)}, and one qualitative descriptive survey\textsuperscript{(20)}.

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\textsuperscript{(22,25,26)}. 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\textsuperscript{(22)}.

In this thematic axis, three articles showed the relationship between family environment and language development, with emphasis on the semantic/lexical subsystem of language\textsuperscript{(22,25,26)}.
Table 1. Longitudinal studies included in the search

<table>
<thead>
<tr>
<th>Study</th>
<th>Country of origin</th>
<th>Sample</th>
<th>Instruments</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cartmill et al. (22)</td>
<td>USA</td>
<td>50 parent-child dyads. Children aged 14 to 58 months with typical language development.</td>
<td>Monitoring of parent-child interaction, every four months from 14 to 58 months of age.</td>
<td>Quality of interaction: wide variation in the contextual cues offered to children by their parents.</td>
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<td>27 males, 23 females.</td>
<td>Peabody Picture Vocabulary Test (PPVT) applied at 54 months of age.</td>
<td>The monitoring of children showed correlation between interaction quality and language skills in children at 54 months of age.</td>
</tr>
<tr>
<td>Rowe et al. (23)</td>
<td>USA</td>
<td>62 main caregiver-child dyads. Children aged 14 to 46.</td>
<td>Child monitoring in the home environment, every four months from 14 to 46 month for assessment of vocabulary expansion</td>
<td>Vocabulary assessment at 30 months proved to be a predictor of lexical development.</td>
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<tr>
<td></td>
<td></td>
<td>27 males, 23 females.</td>
<td>Assessment of receptive vocabulary at 54 months of age.</td>
<td>No correlation was found between gender and speed in vocabulary expansion.</td>
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<tr>
<td>Bornstein and Putnick (24)</td>
<td>USA</td>
<td>192 children aged 20 to 48 months: 87 females and 105 males.</td>
<td>Child monitoring on spontaneous speech in the interaction with the mother.</td>
<td>Wide individual variation was found at the 20 to 48-month age range.</td>
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<td>Maternal report: Vineland Adaptive Behavior Scales and Early Language Inventory.</td>
<td>Stability in language development was maintained between independent assessments of socioeconomic factors, medical history, maternal intelligence and gender.</td>
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<td>Whitehouse et al. (25)</td>
<td>Australia</td>
<td>1623 children distributed in two groups: with expressive language delay aged 2 years or less (n=142) and with typical language development (n=1245).</td>
<td>Language Development Survey The Child Behavior Checklist</td>
<td>Delay in expressive vocabulary at 2 years of age proved to be a low efficiency predictor of behavioral and emotional disorders.</td>
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<tr>
<td>Pruden et al. (26)</td>
<td>USA</td>
<td>52 parent-child dyads. Children aged 14 to 46 months with typical language development 26 males and 26 females.</td>
<td>Spatial transformation task. Subtest with blocks of the Primary Scale of Intelligence.</td>
<td>Statistically significant differences between genders in the spatial transformation task.</td>
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<td></td>
<td>Spatial Analogy Test. Peabody Picture Vocabulary Test (PPVT).</td>
<td>Positive correlation between the spatial tasks: children who performed well on one task tended to perform well on the other tasks too.</td>
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<td>Monitoring of dyad interaction in daily routines.</td>
<td>Positive correlation between the use of words with spatial meaning by parents and children.</td>
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<tr>
<td>Razza et al. (21)</td>
<td>USA</td>
<td>1046 children aged 3 to 5 years.</td>
<td>Family environment evaluation: HOME protocol and socioeconomic level.</td>
<td>Statistically significant correlation between sustained attention, receptive vocabulary, and environmental aspects (socioeconomic status and family environment).</td>
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<td>Maternal mental health rating.</td>
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<td>Child Rating:</td>
<td>Children with higher scores in the family environment evaluation performed better in the receptive vocabulary assessment.</td>
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</table>
Table 1. Continued...

<table>
<thead>
<tr>
<th>Study</th>
<th>Country of origin</th>
<th>Sample</th>
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<tbody>
<tr>
<td>Zimmerman et al. (26)</td>
<td>USA</td>
<td>275 families and their children aged 2 to 48 months (stage 1).</td>
<td>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.</td>
<td>On average, per day, the children heard 13,000 words spoken by adults and participated in 400 conversational turns.</td>
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<td>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.</td>
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</table>


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

<table>
<thead>
<tr>
<th>Study</th>
<th>Country of origin</th>
<th>Study design</th>
<th>Sample</th>
<th>Procedures</th>
<th>Results</th>
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<tbody>
<tr>
<td>Murta et al. (28)</td>
<td>Brazil</td>
<td>Cross-sectional</td>
<td>48 children aged 1 month to 6 years, 8 for each of the following age groups: 0-1 year, 1-2 years, 2-3 years, 3-4 years, 4-5 years, and 5-6 years.</td>
<td>Portage Inventory Nutritional assessment with anthropometric measurements. Socioeconomic questionnaire. .</td>
<td>Statistically significant correlation between language development and cognition. No statistically significant correlation between language development and the variables family environment, social behavior, and school environment</td>
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</tbody>
</table>

Pagliarin et al. (27) | 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) | 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. |
due to the small sample size, and the authors concluded that communicative functions showed greater variety in the home environment\(^{(20)}\).

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

Three publications were selected in the theme language, family and school environments, and social behavior\(^{(21,24,28)}\).

The survey conducted with 1046 children and their families\(^{(21)}\) 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\(^{(24,28)}\) no statistically significant correlation was found between social behavior and language development. One of these articles\(^{(18)}\) shows that the stability of language development was maintained between evaluations, regardless of socioeconomic factors, medical history, maternal intelligence, and gender. The other study\(^{(28)}\) 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.

### Table 2. Continued...

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<th>Study</th>
<th>Country of origin</th>
<th>Study design</th>
<th>Sample</th>
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<tr>
<td>Sheridan et al.(^{(24)})</td>
<td>USA</td>
<td>Clinical trail</td>
<td>217 children aged 35 to 52 months. (116 in the intervention group and 101 in the control group).</td>
<td>Intervention group: Protocol of intervention strategies and home visits.</td>
<td>Alterations in the performance of the intervention group with respect to use of spoken language, reading, and writing skills.</td>
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<td>Teachers: Intervention group: training for intervention application.</td>
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<td>Control group: training in child development.</td>
<td>Positive effects of the intervention in the expressive language of children at risk of development were demonstrated.</td>
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<td>Rating of groups: 211 parents (111 in the intervention group and 100 in the control group).</td>
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<td>The Teacher Rating of Oral Language and Literacy -teachers.</td>
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<tr>
<td>Oliveira et al.(^{(29)})</td>
<td>Brazil</td>
<td>Qualitative descriptive</td>
<td>12 children aged 5 to 6 years (6 selected for target analysis and 6 as interacting pairs). 6 mothers 6 teachers</td>
<td>Semi-structured interview with the mothers. Questionnaire applied to the teachers. Monitoring of children's communication in the school and home environments.</td>
<td>Communicative functions showed greater variety for home environment compared with school environment.</td>
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<tr>
<td>Araújo et al.(^{(28)})</td>
<td>Brazil</td>
<td>Cross-sectional</td>
<td>159 students aged 4 to 7 years.</td>
<td>Peabody Picture Vocabulary Test (PPVT).</td>
<td>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).</td>
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<td>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).</td>
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</table>

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\(^{(18)}\) Carvalho AJA, Lemos SMA, Goulart LMHF. CoDAS 2016;28(4):470-479
The two surveys\(^{(19,27)}\) found in the thematic axis language development, family environment, and social behavior reported no association between family environment, social behavior, and language development. It is worth highlighting that the researches did not address all the subsystems of language and involved different populations.

Still in this theme, one study\(^{(19)}\) was conducted with 1623 participants divided into two groups: children with expressive language delay up to 2 years of age and children with typical language development, monitored until 17 years old. The research shows that delay in expressive vocabulary, up to 2 years of age, is not a risk factor for subsequent behavioral and emotional disorders. It is worth stressing that, in this study, behavior was assessed by the Child Behavior Checklist at the following ages: 5, 8, 10, 14 and 17 years\(^{(19)}\).

A research\(^{(27)}\) conducted with 152 school children aged 4-8 years focused only on the phonological and lexical semantic subsystem. In this study, the behavioral aspect referred to psychological disorders presented by the parents. Association was found between the presence of emotional problems of parents and mild phonological disorders of children. No correlation was verified between level of phonological disorder and other family factors such as 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. Nevertheless, other works\(^{(32-34)}\) reported that family environment factors such as the presence of speech and language disorders in family, socioeconomic status, and educational level of parents are associated with the presence of phonological disorders.

Two systematic literature reviews were found in our search: one narrative and one integrative. In the narrative review, most publications refer to the thematic area of language, with predominance of three sub-themes: importance of working with the family for speech therapy, influence of family relationships in symptoms, and family involvement in rehabilitation. The studies placed greater emphasis on pathology compared with investigation of processes of language constitution\(^{(30)}\).

The narrative review presented studies that show the importance of parental education and stimulation in the family environment for the development of language in children\(^{(31)}\).

Figure 2 shows the word cloud generated based on the abstracts and conclusions of the review articles. The word cloud presents a synthetic view based on the abstracts and main conclusion of the 14 articles included in this systematic literature review. It shows that the most frequently used words were children, language development, parents,
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.

REFERENCES


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.