

The influence of familial environment, parental perception and economic level on the receptive vocabulary of children

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ABSTRACT

Purpose: to examine the influence of familial environment, parental perception, and socioeconomic conditions on the receptive vocabulary of elementary school children.

Methods: an analytical cross-sectional observational study. The students were selected by stratified proportional sampling, using the Receptive Vocabulary Test. Those responsible for the children answered the anamnesis and the inventory of family environmental resources. Initially, a bivariate analysis was performed using the chi-square test, considering $p < 0.20$. In the multivariate analysis of binary logistic regression, $p < 0.05$ was considered, and the quality of the model was evaluated through the Hosmer-Lemeshow method.

Results: out of the 263 students, 131 were males, 142 were in the third grade and were on average 7.6 years old (± 0.57), and 111 had a low receptive vocabulary. In the bivariate analysis, there was a relationship between parental perception about learning to read and write, school failure, and the outcome ($p < 0.05$). The variables environment, resources, and stability of family life were also used for multivariate analysis ($p < 0.20$).

Conclusion: Parental perception of difficulty in reading and writing and a lack of family stability were factors associated with poor receptive vocabulary.

Keywords: Vocabulary; Child; Home Environment; Schools

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INTRODUCTION

In interpersonal interactions, words are the epitome of communication, since the magnitude and size of vocabulary are decisive for establishing expression and understanding among people. Vocabulary refinement is essential for language development, which is gradually built and developed in the midst of different ways of presenting words and their meanings^{1,2}.

Mastering new words improves schemes and, in childhood, enables a child to learn other words, and progress in vocabulary, which can be seen as a system in constant transformation that improves access to information, in addition to being a strong predictor in the development of reading²⁻⁵. Vocabulary matches the words that are part of a person's lexicon and can be segmented into expressive and receptive vocabulary. Expressive vocabulary is related to the ability to speak and communicate orally, and receptive vocabulary involves understanding what is heard³.

Among school-aged children aged from 8 to 10 years of age, it is found that vocabulary is a predictor of reading, and research points to a relationship between vocabulary and reading comprehension as grades progress^{1,5}. Discussions about the receptive vocabulary of elementary school children reveal that its assessment is very significant for the prognosis of reading and writing performance because it directly reflects on the development of expressive vocabulary^{6,7}, in addition to being greatly influenced by the quality of the environment⁸.

Studies show that receptive vocabulary is broader than expressive vocabulary, since the number of words understood is twice as great as the number of words emitted⁹. Well before the onset of speech, a child is encouraged, motivated, and led to use looks, gestures, and facial expressions⁹ and, gradually, develops the ability to discern speech sounds to establish communication with those around them⁶.

The acquisition of vocabulary is not just by speaking, it goes far beyond that, as children will make use of their mnemonic and cognitive abilities to understand received words, encode them, and contextualize them in their world⁹. Proof of this is that receptive vocabulary is the foundation for the development of expressive vocabulary that will be reflected in the ability to make inferences through the understanding of spoken, written, and signaled words³. Receptive vocabulary becomes an element of great importance in the communication process because it helps children develop skills around the perception of the sound

system of the language, which is linked to the performance of conversation and other behaviors and results in an improved understanding of words^{6,8}.

The breadth of a child's vocabulary can suffer interference from external factors such as the quality of language stimulation, familial environment, and socioeconomic level, which heighten drivers of new learning and experiences, factors associated with the development of specific brain areas^{8,10,11}. A 14-year cohort showed a correlation between children's long-term vocabulary development, socioeconomic status, and duration of reading exposure and left hemisphere brain development¹⁰.

The familial environment has decisive influences and crossings in the development of children that influences their involvement with educational practices¹². The behavior of parents and children (parenting behavior) has been the subject of a lot of studies and research and has highlighted parenting practices as being important predictors for children's development and for the acquisition and development of vocabulary^{13,14}. The opposite is also true, and a poor quality familial environment with a low income, low educational level of the parents with a high number of children are considered dominant risk factors for delay in the development of children's language and in the acquisition and development of vocabulary^{11,13}. Studies attest that the familial environment is responsible for ensuring the child's well-being and safety, by ensuring their adaptation to the environment, in addition to offering stimulation and an environment of socioemotional support^{8,13}.

Familial behavior is responsible for another factor that can affect a child's vocabulary development, as parents show interest in their children's school activities and content^{15,16}. It is of paramount importance that parents tell stories, read books together, sing lullabies, and have moments of quality time together with their children. A study of 664 children from preschool to high school found that the presence of language-based bedtime routines (57%) enhances cognitive and academic skills, with a beneficial effect on the child's vocabulary in early childhood and a positive association with academic performance in the 9th grade¹⁵.

There is strong evidence that a lack of familial support through simple mechanisms such as reading to children, listening to them and sharing moments of relaxation and conversation, in addition to accompanying school development in daily activities as required by the school, has a negative impact on the personal

and academic development of the child, specifically those with reading and writing difficulties, which can result in school failure¹⁷.

Economic factors are also highlighted, with low socioeconomic status reflecting negatively on vocabulary performance in childhood^{18,13,18}. Although there are studies that verify the relationship between familial environment variables and the performance of receptive vocabulary^{11,18}, there is still one that does not assert this relationship¹³. Furthermore, it appears that the vast majority of studies focus on the influence of these variables on vocabulary acquisition in early childhood, with school age being an essential period for understanding risk factors and/or protection for the acquisition and expansion of receptive vocabulary, given its strong connection with academic success^{11,19} and better reading comprehension²⁰.

Further research that confirms a better understanding of the crossing of these variables in the receptive vocabulary of children of school age is paramount. Therefore, the aim of this study is to verify the influence of familial environment, parental perception, and socioeconomic conditions on the receptive vocabulary of elementary school students.

METHODS

Design

This is an analytic and cross-sectional observational study, approved by the Institutional Research Ethics Committee (COEP) of the Federal University of Minas Gerais, Brazil, number CAAE-48129215.1.0000.5149. The study was carried out from October 2015 to November 2016 with elementary school students from a public school network of Ribeirão das Neves in the metropolitan region of Belo Horizonte. All the participants were informed about the voluntary aspects of participating in the program, its benefits, and repercussions.

Scenario, Population and Sample

The municipality where the research was carried out had at that time three macro-regions, districts A, B and C and 38 municipal schools that taught the initial grades of elementary school²¹. In this city, 39% of children enrolled in the 2nd and 3rd years of elementary municipal schools were located in district A, 23% were in district B and 38% in district C. According to the work of Santos²¹, among the 38 schools in the municipal education network 24 taught 2nd and 3rd year

of elementary school, nine schools only taught up to the 1st year, and five up to the 2nd year. Among the 24 schools, six were located in district B, 10 in district A, and 10 in district C. Adhering to proportional enrollments by region, a draw was carried out with random numbers of six schools that offered 2nd and 3rd grades, two of which were from region B, two from A and two from region C. The Human Development Index (HDI) of the municipality was 0.684, in 2010, which places this municipality in the average human development range (HDI between 0.600 and 0.699).

The Sample

Children enrolled in the initial grades of elementary school (2nd and 3rd grades) who had signed a Assent Consent Form (ACF) and their parents or guardians who had signed a Informed Consent Form (ICF) participated in the study. Children with sensory alterations (visual and hearing impairments) that could interfere with school performance and those who refused to participate were excluded from the study.

The children were selected by probabilistic cluster sampling at two levels according to region, district and educational institution, according to the following sample calculation Population size = 3357 children, estimated prevalence of below-average receptive vocabulary = 17.4%²⁰. The required precision rate (acceptable error margin) was $\pm 5\%$, confidence level = 99% and test power was 90%. This gave a total sample of 205 students, according to the study by Colombo and Cárnio²⁰. 25% of losses were added to this figure, totaling 256 participants.

Instruments

For evaluation of "receptive vocabulary", the instrument vocabulary test by figures USP – Tvfusp-92o²² was used. The TVfusp evaluates the auditory receptive vocabulary or, in other words, the ability to understand words heard. The abbreviated version of TVfusp - TVfusp92o was used, which contains four training items and 92 test items, ordered by increasing difficulty, each with four drawings. The task consists in selecting a figure from the alternatives that best matches what was said by the examiner. The test features 92 items across 14 sets of items, with percentages of difficulty ranging from 1% to 90%, with a maximum score being 92 hits. The vocabulary test by pictures, in its abbreviated version of 92 items (TVfusp-92o), is standardized and validated for children aged from 7 to 10 years old,

and the results were described in three categories, according to the instrument's manual, low, medium, and high²³.

The inventory of resources of the family environment, the RAF, was used to evaluate the resources of the familial environment, as proposed by Marturano¹⁶. This is an instrument that, according to studies, presents evidence of satisfactory reliability and validity. The RAF is made up of 14 topics, grouped into three domains. The first concerns resources that promote proximal processes that include practices of experiences that stimulate development, such as outings, material that stimulates reflection, availability of toys and books, newspapers, and magazines, use of free time, and access to programmed learning activities. They assess predictable activities that signal some degree of stability in familial life and parenting practices that promote a good family-school relationship. The second domain signals some degree of stability in familial life, routines and regular family meetings, and children's cooperation in household activities. The last domain is that of parenting practices that encourage family-school correlation, encompassing indicators of the direct involvement of parents in school life, such as meetings and monitoring grades¹⁶.

For analysis, the total number of points was considered-the raw values, that is. In order to evaluate the variable "socioeconomic level", the study used the criteria for economic classification in Brazil (CCEB²⁴ protocol) to economically classify the studied population, without intending to categorize the population into social strata, since the classification is based on ownership of assets rather than family income. The classes defined by the CCEB are A1, A2, B1, B2, C, D and E. The cutoffs of the Brazilian criteria were used to understand these classes: A1 42-46 points; A2 35-41 points; B1 29-34 points; B2 23 to 28 points; C1 18-22 points; C2 14-17 points; D 8-13 points; and E 0-7 points²⁴.

Procedures

A meeting was held with the parents and guardians who had previously signed the consent form, and in this meeting, they answered questions of a brief anamnesis to gather information about the following, neuropsychomotor and oral language development of the child, auditory and/or visual conditions, if the child was having or had speech therapy, the perception of difficulties with reading and writing, in addition to any history of school failure. The parents answered the anamnesis,

the CCEB questionnaire and the RAF at home because they were sent to the parents/guardians homes by the school, and those who had difficulty received help from the school. The application of the vocabulary test by pictures TVfusp took place collectively, on a previously scheduled date and in a room reserved by the school.

Data analysis

The data collected were initially transferred to the Statistical Package for the Social Sciences (SPSS) version 19.0, after which an analysis of the database and descriptive analyzes of the participants and study variables were performed. As a dependent variable, the "receptive vocabulary" test was considered, and the results were grouped into three categories according to the instrument's manual, low, medium, and high. For the purpose of analysis, the "medium and high" categories were grouped together, after which the children were allocated only into two groups, namely a group with below average performance in receptive vocabulary and a group with average or higher performance in receptive vocabulary. The independent variables were gender, economic level, maternal education, school grade plus repetition, parental perception of difficulty in reading and writing, and inventory of family resources - total scale and separate domains of the RAF.

For the bivariate analysis, the economic level was classified into two categories: "A, B and C1" and "C2, D and E". The maternal schooling variable was categorized into the following, up to complete elementary school and high school or higher, students who belonged to the 2nd and 3rd grades who may or may not have had a history of school failure. As for parental perception, parents answered yes or no to the following questions, Does your child have difficulty reading? Does your child have difficulty writing?

To analyze the quality of the familial environment, each of the three RAF blocks were considered. The first one about "Proximal Processes", the second portrays "Stability in familial life" and the third "Correlation of family and school". The Shapiro-Wilk Test was used to analyze the normal distribution of familial environment variables (RAF blocks) and data is presented in median, 1st and 3rd quartiles.

In the bi-variate analysis, the sample characterization variables were compared between the groups with below-average receptive vocabulary and medium or higher receptive vocabulary using the Mann-Whitney test. Comparison of the distribution of categorical variables between groups was performed using the

chi-square test and presented as absolute numbers and relative frequencies.

In the hierarchical binary linear regression model, variables that had a $p < 0.20$ in the bivariate analysis were considered, and only those with $p < 0.05$ remained in the model. Interactions between variables in the final model were examined. Model quality was assessed using the Hosmer-Lemeshow method and the fit measure - 2 log likelihood (-2LL). Residue analysis, in the final model, was performed to detect significant outliers.

RESULTS

A total of 315 children were investigated in the study, of which 19 (6.03%) were excluded for having uncorrected sensory alterations – auditory and visual impairments, and 33 (10.47%) for not completing the tests or completing the tests incorrectly. The final sample consisted of 263 participants.

Of the 263 students, 132 (50.2%) were female and 131 (49.8%) were male; 121 (46.0%) children studied in the second grade and 142 (54.0%) in the third grade of elementary school. The average age of the children was 7.6 years old (± 0.57).

Regarding the economic level, it was found that there was a concentration of families in classes C, with 160 students corresponding to 60.8%, followed by classes D and E with 58 students (22%), in classes B with 40 students (15.2%) and Class A with 5 students (2%).

It was found that 41% of the mothers had an educational level up to the eighth grade ($n=108$), 44.9% had completed high school ($n=118$), which made up 226 mothers that were interviewed (85.9%); the remainder were distributed among 20 mothers who had primary education to the fourth grade (7.6%), 15 with higher education (5.7%), one who was illiterate and another with a postgraduate degree.

Regarding the results of TVFusp-92^o receptive vocabulary test. 111 students had low receptive vocabulary (42.2%), 141 students classified as medium receptive vocabulary (53.6%) and there were only 11 students with high receptive vocabulary. (4.2%). Table 1 describes the socioeconomic and parental perception characteristics of students' academic difficulties and their relationship with receptive vocabulary. There was a statistically significant relationship between parental perception of learning to read and write and school failure and the child's results in the vocabulary test.

Table 1. Behavior of receptive vocabulary with socioeconomic and parental perception variables

		Receptive vocabulary				Chi-square test	P Value
		Low (n=111)		Medium or High (n=152)			
		N	%	N	%		
Sex	Female	58	52.3%	74	48.7%	0.327	0.568
	Male	53	47.7%	78	51.3%		
Economic level**	A, B, C1	41	38.0%	73	48.0%	2.597	0.107
	C2, D, E	67	62.0%	79	52.0%		
Maternal education**	Basic education	60	58.8%	75	51%	1.477	0.224
	College education	42	41.2%	72	49%		
Child's education	Second year	48	43.2%	73	48%	0.591	0.442
	Third year	63	56.8%	79	52%		
School failure**	Yes	3	2.8%	0	0%	4.227	0.040*
	No	04	97.2%	149	100%		
Difficulty in reading**	Yes	60	55.6%	44	29.7%	17.265	<0.001*
	No	48	44.4%	104	70.3%		
Difficulty in writing**	Yes	44	41.1%	25	16.9%	18.472	<0.001*
	No	63	58.9%	123	83.1%		

Captions: n= number of participants, %= percentage.

Probability note. *Statistically Significant

** Variables of people responsible for answering the questionnaires that omitted information, and therefore the total number of answers differs from 263.

Table 2 shows the results of the inventory of familial environment resources for children according to receptive vocabulary.

Table 2. Results of the three domains of the children's familial environment, resource inventory according to receptive vocabulary

	Maximum allowed score	Receptive Vocabulary						Mann-Whitney Test P Valor
		Below average (n=111)			Medium or above (n=152)			
		Median	1 st Quartile	3 rd Quartile	Median	1 st Quartile	3 rd Quartile	
Inventory of Environmental Resources	93	56	48	73	61	50,2	71	0.350
Proximal Processes	57	26	16	37	29	19	38	0.140
Stability of familial life	28	21	19	24	20	18	23	0.088
Parental Practices	18	12	10	13	12	11	12	0.597

The results of the binary logistic regression can be seen in Table 3. In the hierarchical binary linear regression model the variables that had a $p < 0.20$ in the bivariate analysis were considered as follows, parental perception of reading difficulty, parental

perception of writing difficulty, school failure history, economic level, environmental resources and familial stability. In the final model, only those with $p < 0.05$ remained, parental perception of difficulty in reading and writing and familial stability.

Table 3. Hierarchical binary logistic regression for the dependent variable "receptive vocabulary"

Independent variables	b ± S.E	OR	CI (95%)a	P Value
Parental perception of difficulty in reading	0.785 ± 0.325	2.193	1.159 – 4.149	0.016*
Parental perception of difficulty in writing	0.833 ± 0.358	2.300	1.139 – 4.642	0.020*
Stability of familial life	-0.71 ± 0.35	0.930	0.870 – 0.997	0.041*
School repetition				0.208
Environmental Resources				0.265
Economic level				0.499

Probability score: Model quality according to Hosmer and Lemeshow= 0.48. *p= Significance level ≤ 0.05 . b= Regression coefficient. S.E=Margin of error. OR= Odds Ratio, CI= Confidence Interval

The independent variables, parental perception of difficulty in reading and writing and familial stability, were considered significant predictors for distinguishing between students with below and above average receptive vocabulary. It could be seen that those children whose parents perceived reading and writing difficulties were 2.19 and 2.30 times more likely, respectively, to have a poorer score in the receptive vocabulary test, as well as children whose families had greater stability were 93 % more likely to have better results in the vocabulary test.

DISCUSSION

The scope of this study was to analyze the prediction of students' receptive vocabulary, using the predictors, the familial environment, parental perception and economic conditions of children enrolled in the initial grades of an elementary school in the metropolitan area of Belo Horizonte, Minas Gerais. Through a descriptive cross-sectional design, the prediction of each outcome was estimated, based on the assumption of parental perception of reading, and writing difficulties, as well as repetition, presented more conclusive data about

factors that could compromise the development of children's receptive vocabulary. RAF variables were also estimated, although only environmental resources and stability of familial life were eligible.

Based on the assumption that parental perception revealed important variables through receptive vocabulary, difficulty reading and difficulty writing, both were predictors with greater statistical significance, confirming the impact on the acquisition of receptive vocabulary. Parental perception can predict children's vocabulary changes, considering that they are present in their daily lives. By regular observation, that is parental perception, it makes it possible to signal some impairment in the child's development and consequently trigger measures for the understanding and stimulation of this development^{18,25}.

In this study, the influence of child education and economic level on the students' receptive vocabulary was not looked at (Table 1), which can be explained by the homogeneity of the sample in relation to sociodemographic variables.

Concerning gender studies, these show that there is an influence of gender on vocabulary acquisition. Studies show the influence of gender on vocabulary acquisition, and females have a greater number of words at two years of age when compared to their peers of the opposite sex. A study demonstrated that receptive language in females is significantly greater when compared to receptive language in males⁸. As children get older their receptive vocabulary increases and this applies to both sexes^{6,26,27}, which confirms the findings of this study, in which there were no vocabulary differences between males and females. Furthermore, younger children have greater difficulties with regard to vocabulary, which are resolved with the progression through the schooling series, and concomitantly external influences arising from interpersonal relationships, family, school and friends^{5,28}. The importance of social skills on vocabulary performance is also emphasized, with possible codependency between interpersonal relationships, vocabulary performance and reading ability²⁹.

Bearing in mind that the development of social skills begins with the family, this study found that when analyzing the relationship between the familial environment and receptive vocabulary (Table 2) that the variables environment resources (proximal processes) and stability in familial life showed values of $p < 0.20$ in the bivariate analysis and therefore were also followed for the multivariate analysis. There is a

vast and consistent amount of information about the close relationship between environmental resources and receptive vocabulary, however, this relationship was not confirmed in our research, and economic level was not a significant predictor regarding superior performance in receptive vocabulary, contrary to some studies^{12,13,16,20}. The fact that all the children attended public schools and that the majority (83%) belong to classes C, D, and E can be a justification for such results, which made it difficult to adequately compare vocabulary between different economic classes.

Concerning familial stability, this study found that children from more stable families had a 93% chance of obtaining better results in the vocabulary test. Stability in familial life¹⁶ is directly related to environmental resources (proximal processes) that cannot function effectively in environments that are unstable and unpredictable in space and time. Therefore, it is understood that instability and unpredictability arise both from an economic perspective, as well as how the family organizes itself as an institution that needs rules and norms for harmonious functioning among its members, from daily routines to the quality of interpersonal interactions. Stability of familial life and parenting routines based on language are clear predictors of receptive vocabulary^{11,15}.

One of the major components of this variable involves the familial routine, which includes activities as determined by the parents of the child, which require specific times for going to bed, waking up, meal times, cleaning, playing, and doing schoolwork, in addition to other daily activities, such as having breakfast, lunch, dinner, watching TV, and outdoor activities and access to books, magazines, and toys¹⁶. This means that the stability of familial life regulates other familial routines, since routines are an essential element for the individual to be able to plan and carry out their daily activities. Another important factor linked to routine is that the repetition of behavior and daily activities stimulates learning and, in a way, works directly on self-confidence and security and in the most appropriate direction for children³⁰.

Equally and not less important is familial interaction, which forms part of the stability in familial life. Simple habits that involve speaking with children about everyday life, such as listening to stories and subjects they bring up from their school days and exchanging everyday experiences, stimulate children's mode of expression and worldviews. Speaking and listening – expressive expression – certify and qualify

the development of the receptive vocabulary, since both reflect the gradual construction of interpersonal communication skills that will affect the quality of receptive vocabulary^{29,31,32}.

The cross-sectional design of this study should be highlighted as a limitation, which may have delimited the prediction models to a hypothetical plane, since it does not rule out the possibility of reciprocal effects or even feedback between the child's variables and the context. It is suggested that the homogeneity of the sample was a major factor limiting the study.

As a theoretical contribution, the study stands out for its focus on parental perception based on reading and writing difficulties, since it is necessary to understand under what conditions the familial environment can be a great ally in the process of acquisition and expansion of receptive vocabulary. Parents who perceive their children's reading and/or writing difficulties can reflect positively on the performance of receptive vocabulary, considering that attention, through the development process of children's learning, can be a possible motivational factor¹⁷. Furthermore, the positive or negative perception of parents in relation to their children's school performance plays a predominant role in the process of school development by revealing important and determinant indicators for school success³⁰. It is important to highlight the relevance of the parents' interest and commitment in the development of their children when they become aware of difficulties with the teaching-learning methods that are included in the school curricula^{12,30}.

Bringing the school closer to the family based on learning, the parents' perception can make numerous contributions to the students, and as the parents are guided by the school and have their specific problems solved, they become more capable of helping their children³⁰. We reiterate that familial interaction plays a crucial role in improving a child's vocabulary and academic performance through activities ranging from routine reading for children and/or shared reading as listeners, in addition to the monitoring of homework^{15,17,32}.

The highlight of the routine item is one of the aspects of great relevance in the study, as it involves the development of the child's autonomy, emotional and psychological development, in addition to stimulating the sense of learning and self-care, structuring of thought, and child independence, among others. Furthermore, an organized and collaborative environment fosters a more harmonious state among

its members. One hypothesis to be attributed to the impact on the development of receptive vocabulary is that a lack of routine does not allow the creation of a favorable environment for the development of children because it is essential to the learning process, since routines for carrying out chores and activities that are stimulating can be compromising.

These results highlight the importance of designing more incisive research in relation to this issue, in order to shed light on stability in familial life, which is seen as essential, so that problems with the learning process are minimized. A significant inference of this study in the praxis of the educational domain is the grounded perspective of providing clear and concise informative support to families to provide support to children in more regular routines and diversification of leisure at home.

CONCLUSION

Poor parental perception of difficulties in reading and writing and a lack of familial stability were factors associated with the worst cases of receptive vocabulary in elementary school students in the metropolitan region of Belo Horizonte, MG, Brazil.

The performance of receptive vocabulary, according to the TVFusp-92⁹ Test, revealed a significant percentage (42.20%) of students with a lowered receptive vocabulary. Therefore, it can be considered that environmental aspects (familial dynamics, environment, and lifestyle) are determining factors for the quality of language skills.

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