

Association between the performance in reading of words and the availability of home environment resources

Associação entre o desempenho em leitura de palavras e a disponibilidade de recursos no ambiente familiar

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ABSTRACT

Purpose: To investigate the association between word reading performance and the resources of the family environment of third-year elementary school children enrolled in a Belo Horizonte municipal school. **Methods:** This study involved a nonprobability sample comprising schoolchildren of both sexes aged between 9 and 11 years enrolled in a municipal school of Belo Horizonte. The status of the children's home environment resources was assessed using the inventory of the Home Environment Resources and their reading performance was measured through the Evaluation Tests of Reading Processes. **Results:** We found statistical significance in the relationship between the availability of material resources (ludic and linguistic) and social activities and the reading of words. Parental practices were positively correlated to the reading of infrequent words. Only the rubric "routines" was not significantly associated with the students' reading performance. **Conclusion:** It was observed a proportional association between the resources of the family environment and the reading and writing performance of the schoolchildren. These results demonstrate the need for actions to be developed with the families to assist them in coping with the adverse conditions and optimizing the home resources to enhance the children's development.

Keywords: Speech, language and hearing science; Language; Reading; Learning; Family; Students; Child

RESUMO

Objetivo: Investigar a associação do desempenho em leitura de palavras aos recursos do ambiente familiar de escolares do terceiro ano do primeiro ciclo de uma escola da rede pública municipal de ensino de Belo Horizonte. **Métodos:** Trata-se de um estudo com amostra não probabilística composta por escolares de ambos os sexos, com idades entre 9 e 11 anos, estudantes de uma escola da rede pública municipal de ensino de Belo Horizonte. Foram analisadas as configurações dos recursos do ambiente familiar de 41 escolares, por meio do Inventário de Recursos do Ambiente Familiar e seu desempenho em leitura, avaliado pelas Provas de Avaliação dos Processos de Leitura. **Resultados:** Foi encontrada significância estatística nas relações entre a disponibilidade de recursos materiais (lúdicos e linguísticos) e atividades sociais e a leitura de palavras. As práticas parentais se relacionaram positivamente à leitura de palavras não frequentes. Apenas o item "rotinas" não se associou significativamente ao desempenho de leitura dos escolares. **Conclusão:** Constatou-se associação proporcional dos recursos do ambiente familiar ao desempenho em leitura e escrita de escolares, evidenciando a necessidade de trabalhos junto às famílias no enfrentamento das adversidades e potencialização dos recursos familiares para o desenvolvimento infantil.

Descritores: Fonoaudiologia; Linguagem; Leitura; Aprendizagem; Família; Estudantes; Criança

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INTRODUCTION

Reading is a complex activity that occurs through word recognition, based on the dual-route model, which explores the phonological and lexical route⁽¹⁾. Initially, the word reading process takes place through the decoding of letter by letter and of the grouping of them (phonological route). Later, reading occurs through the understanding of the meaning of words, through lexical representation, without the need of letter identification (lexical route)⁽²⁾.

The understanding of the reading processes, because of its complexity, can not be achieved in its entirety without regarding the development of oral language and the factors related to it, since it is undeniable the interference of the oral language in the learning process, even before school age⁽³⁾. In this sense, it is necessary to analyze the environmental influences in which the child is inserted⁽⁴⁾.

The characteristics of the family environment are associated with the reading performance since the previous period to the school stage⁽⁵⁾, with the development of the pre-reading skills⁽⁶⁾ and, finally, with the textual comprehension⁽⁷⁾, in other words, the conscious interpretation of the written message, ultimate goal of the reading learning.

The greater the possibility of stimulating the child in the family environment, the greater the development of the cognitive ability, with better structuring of lexical representation, assisting the learning, even if the activities are not intentionally directed to this purpose^(2,8).

Problems on environmental resources can lead to losses in the language development and, consequently, in the literacy process. When the difficulty in reading already occurs in the early school years, it is very likely to persist in higher grades, especially in unfavorable environments⁽⁹⁾.

The Home Environment Resources Scale (HERS) is an instrument used to determine the environmental resources that can influence the child's language skills and, consequently, on school performance. Among the analyzed factors, one can mention the organization of the physical environment, the availability of educational materials, the activities performed by the child, parental involvement in the development process of children and educational family practices⁽¹⁰⁾. This instrument has been increasingly referenced in the areas of speech therapy, psychology and education for its high accuracy in the association with learning difficulties^(11,12,13).

The assessment of reading processes is a challenging activity, due to the complexity of this task. Among the standardized instruments, one can highlight the Evaluation Test of Reading Processes (PROLEC – *Prova de Avaliação dos Processos de Leitura*; originally in Spanish and adapted to Portuguese), for its ability to evaluate the different processes and sub-processes that interfere in the reading. Reading aloud is one of the procedures for analyzing the use of reading routes and the evaluation of the lexical route involves words of different frequencies⁽¹⁾.

Data from the assessments of the reading performance, the resources of the family environment and the association between these two variables, as proposed in this study, can assist and provide support for the planning and organization of assistance to the children in schools and in their homes. It is believed that the lack of toys, books and the lack or reduction of opportunities of interaction with the parents at home can harm the learning process, interfering in the development of subsystems of oral language, as well as in the performance of reading and writing.

Thus, the aim of this study was to investigate the association of the performance in reading of words that are frequent and infrequent to the resources of the family environment of the third-year students of a Belo Horizonte first-cycle public school unit.

METHODS

This is an observational, analytical, cross-sectional study, with non-probabilistic sample, accomplished with third-year students of the first cycle of a Belo Horizonte public school, located in an area with high social vulnerability index, reference for residents of neighborhoods and villages inhabited by poor population, with minimal living conditions. It is the region that has the largest number of housing estates promoted by the government⁽¹⁴⁾.

Forty-one children participated in the study, 17 females (41.5%) and 24 males (58.5%) with mean age of 9.3 years (Minimum: 8.00; Maximum: 11.00, SD: 0.69).

The project was approved by the Ethics Committee in Research of *Universidade Federal de Minas Gerais*, according to register n° 0686.0.203.000-11. The responsible people for the children were informed about the willingness in the research, its objectives, benefits, risks and repercussions, and signed the Informed Consent.

The adopted inclusion criteria were: children regularly enrolled in the third year of the first cycle of basic education and consent of the parents/responsible ones to participate in the research. The study exclusion criteria were: cognitive alterations; history of alterations in the neuropsychomotor development; non corrected visual problems; and failure to audiological evaluation.

For getting the exclusion criteria it was conducted an anamnesis with the parents/responsible ones with questions about the general health of the child, the neuropsychomotor, cognitive and oral language development, the hearing and visual conditions, among others.

The previous audiological assessment, by pure tone audiometry (PTA), was conducted by the authors of the work, in a properly calibrated acoustic booth⁽¹⁵⁾ allocated in the school library.

For data collection, it was used the inventory of the Home Environment Resources (HER)⁽¹⁰⁾, which aims to raise the

resources of the family environment that can contribute to the learning in the early years of elementary school.

HER Research and the anamnesis directed to the parents were conducted in partnership with the reference Health Basic Unit of the region, through home visits with the Community Health Agents.

It was decided in this study to investigate the resources of the family environment in five domains elaborated and adapted from the questions of the HER: social activities (questions 1, 2 and 3); parenting practices (questions 4, 8 and 10); routines (question 9); availability of ludic resources (question 5) and availability of linguistic resources (questions 6 and 7).

The domain “social activities” explores programs carried out by children outside the school environment, such as playing, watching TV, walking in parks, squares, travel, besides regular extracurricular activities, involving, for example, sports and language classes. The domain “parenting practices” covers issues that approach the interaction of parents with the children in activities such as playing, reading books, watching TV, besides the supervision of school situations of their children, such as the verification of school material, grades and homework. The domain “routines” verifies if the children have a right time to carry out daily activities such as lunch, bathing and sleeping. The domains “availability of ludic resources” and “availability of linguistic resources” are surveys of the types of toys and reading materials, such as newspapers, magazines and books, respectively, existing in the family environment of the children.

The inventory was given, as prescribed by its author⁽¹⁰⁾, in the form of semi-structured interview, wherein each topic is passed orally to the informant. The interviewer began asking the open question that introduces each issue, pointed out the items mentioned by the interviewed in his/her free answers and then presented the other items, one by one.

The data relating to the performance in reading of words of the participants were obtained through the conducting of

question 6 - exploring reading of frequent and infrequent words - of the Evaluation Tests of Reading Processes - PROLEC⁽¹⁾.

PROLEC test was individually given in specific classroom, in the period determined by the school’s coordinating body, by the authors and previously trained academic speech therapy professionals. The conducting of the test was recorded for later analysis.

For data analysis, the children were divided into two normative categories, according to the performance shown in the evaluation: Group 1 - Difficulty (if the student showed any degree of difficulty and if his/her score were between 1 and 2 points below the average); Group 2 - Normal (if the student normally executed the given tasks and if his/her result were higher than the equivalent cutoff grade). Then, according to the test standard, it was created a specific database for this study, in the SPSS 19.0 software.

The statistical analysis of the data included the verification of the normality in the distribution of the sample through the Shapiro-Wilk test and the application of the T test for inferential analysis, taking as reference values of $p < 0.05$.

RESULTS

The results were analyzed in relation to the frequency distribution of the performance in the reading test of frequent and infrequent words (Table 1).

It was observed that a considerable number of children, approximately half of the sample, showed difficulty in reading infrequent words.

The results of the investigation of home environment resources can be seen in Table 2.

Regarding the resources of the family environment for the domains “social activities”, “parenting practices”, “routines” and “ludic and linguistic resources,” it was verified that the obtained means had large oscillation between the minimum and

Table 1. Performance of the children in PROLEC tests

	Normal		Altered	
	n	%	n	%
Test 6: Reading of frequent words	29	70,7	12	29.2
Test 6: Reading of infrequent words	23	56,0	18	43.9

Subtitle: PROLEC = *Prova de avaliação dos processos de leitura* (Evaluation Test of Reading Processes)

Table 2. Results obtained after conducting an inventory of the Home Environment Resources

	Mean	SD	Median	Minimum	Maximum	Upper limit
Social activities	11.80	3.38	12	7	20	34
Parenting practices	25.24	6.04	26	11	36	49
Routines	10.29	4.42	11	0	16	16
Ludic resources	11.27	4.00	12	3	18	18
Linguistic resources	9.02	3.40	9	3	16	20

Subtitle: SD = Standard Deviation

the maximum possible score. The categories “social activities”, “parenting practices” and “linguistic resources” showed a great difference between the median and the maximum instrument score.

The HER values were related to the results of PROLEC test, through the Student t test (Tables 3 and 4).

Children with appropriate result in PROLEC⁽¹⁾ test were the ones who showed the best mean score in the items “social activities” and “parenting practices”.

Social activities interfered significantly in the reading performance of frequent and infrequent words. The parenting practices showed a significant relationship only with the test of reading of infrequent words (Table 3).

It was noted also, in general, the best performance in reading was for children with better obtained mean in the research of ludic and linguistic resource availability (Table 4).

DISCUSSION

This study investigated the association of psychosocial factors related to parenting practices, social activities, availability of material resources and routines to the performance in reading frequent and infrequent words, in an attempt to better

understand the etiology of reading difficulties in children of 9 years, since the theme is current and relevant.

In this research, a considerable number of children - around 40% of the sample - had difficulty in the reading of infrequent words, in accordance with a previous study, which points lower reading performance of words and pseudo words (“poor readers”) in children of public school (82%) and private school (61%), through the evaluation of reading tests of the School Performance Test (*Teste de Desempenho Escolar – TDE*) in children of the same city of this study⁽¹⁶⁾.

Regarding the researched items, the availability of material resources (ludic and linguistic) was the most significant item related to the reading of frequent and infrequent words. That is, the presence of these resources at home and the contact of the child with pedagogical toys involving letters, numbers, animal names, games of make-believe, of construction and of rules, make home environment favorable to literacy, as they expose the child to symbols, rules and signs of the Portuguese language. This finding confirms the literature, which verified that children who demonstrate readiness and school performance above average show statistically significant differences in relation to children with readiness and school performance below average, in relation to the availability of both ludic and

Table 3. Relations between children’s performance in the reading and the items social activities, parenting practices and routines

		Social activities		Parenting practices		Routines	
		Mean	SD	Mean	SD	Mean	SD
Test 6 Reading of frequent words	Adequate (n=29)	12.4	3.2	25.5	5.4	10.3	4.3
	Altered (n=12)	10.1	3.3	24.4	7.5	10.1	4.8
	Test T	2.0		0.5		0.1	
	p-value	0.04*		0.57		0.90	
Test 6 Reading of infrequent words	Adequate (n=23)	12.7	3.3	26.8	5.0	9.7	3.7
	Altered (n=18)	10.6	3.1	23.1	6.6	11.0	5.1
	Test T	1.9		2.0		0.9	
	p-value	0.05*		0.05*		0.37	

* Significant values (p<0.05) – Test T

Subtitle: SD = Standard Deviation

Table 4. Relationship between children’s performance in the reading assignments and the availability of ludic and linguistic resources in the home environment

		Availability of ludic resources		Availability of linguistic resources	
		Mean	SD	Mean	SD
Test 6 Reading of frequent words	Normal (n=29)	12.0	3.6	9.6	3,4
	Altered (n=12)	9.3	4.35	7.5	3,0
	Test T	2.0		1.9	
	p-value	0.04*		0.06	
Test 6 Reading of infrequent words	Normal (n=23)	12.3	3.6	10.1	3,2
	Altered (n=18)	9.8	4.0	7.5	3,1
	Test T	2.1		2.6	
	p-value	0.04*		0.01*	

* Significant values (p<0.05) – Teste T

Subtitle: SD = Standard Deviation

linguistic resources^(6,17). In general, the data resulting from research in this area suggest that the availability of books, newspapers, magazines and promoter-of-development toys can favor the learning of reading^(5,7) and a stimulating home environment is associated with the lexical expansion in children⁽¹⁸⁾. The literature points out that the presence of a good lexicon contributes significantly to the student's reading. It is believed that, from the moment the child is able to understand the written language, it is consolidated a reciprocal relationship between reading and vocabulary⁽¹⁹⁾.

To learn to read, children need to be exposed to writing and to the explicit instruction of how it works, besides the need to have opportunities to practice the reading⁽²⁰⁾. It can only be offered by the availability of these resources in the children's daily life. However, the presence of resources is not enough condition to ensure the learning of reading. There is the need to interact with this material^(5,8), which can be confirmed in the results obtained in this research for parenting practices. The literature review points out the family as a source of stimulation for the acquisition of new knowledge, promoting the development of skills needed for the learning of reading^(7,18).

Besides the material resources available, this study showed that the social activities were the second aspect of greater representativity in the analysis of reading of frequent and infrequent words. When the child interacts socially, he/she learns and develops new ways of seeing and acting in the world, he/she influences and suffers constant influence of the environment^(21,22). The experience and exploration of several environments, such as going to clubs, circuses, malls, trips and planned activities as, for example, dance classes, sports, foreign language and catechism, favor lexical expansion, which, in turn, favors, consequently, reading performance⁽¹⁹⁾. Children who grow up in an unfavorable family environment, with few resources and few opportunities for interaction, have reading difficulties related to the acquisition of vocabulary, because they receive less verbal *inputs*^(23,24).

Several studies found significant relationships between home literacy context and the development of language skills^(3,5,6,7,8,18,25). Regarding the phonology and the vocabulary, important aspects of reading and writing development, it was observed the association between the performance on tests of such aspects and the scores of the home environment resources, strengthening the influence not only to the acquisition and language development, but also for the overall development of the child^(12, 26).

Furthermore, the frequency of extracurricular activities and life experiences contribute to the presence or absence of stress in children, manifesting itself in school difficulties. In general, the percentage of stressed children is usually higher in the groups with poor school performance⁽²⁷⁾. Students reporting more number of practices of social activities obtained, in this research, better performance than others in the reading of frequent words. It is found, therefore, statistical relationship between

the occurrence of extracurricular activities and academic performance in reading. In addition, the children who perform social activities routinely have better academic performance⁽⁵⁾.

Parenting practices were significantly associated to the performance in reading infrequent words. The storytelling of parents to children, conversations about news, movies, television programs and other matters brought by the children are attitudes that show the family living together and enable them to expand knowledge⁽⁷⁾. It is known that the motivation for school learning may have personal, social and especially family influence, both on the positive aspects and the negative ones⁽²⁸⁾. It is found, in the literature, statistically significant relationship between the interaction with the parents and better scores on reading tests^(6,7). The interaction with parents and the support to school routines are important bases that contribute to the better performance of the child in relation to the learning of reading⁽⁷⁾. Longitudinal study with 59 children from 2nd to 5th year of elementary school found a significant negative correlation between the number of family members who resided with the child and the total score of reading of real and regular words. The authors observed that the more numerous the family, the lower the score in the reading of the children, that is, the more people living in the same environment, the less time the mother can devote to child⁽²⁹⁾, which reinforces the importance of the family support in the learning of reading.

In this research, the domain "routines" was not significantly associated to the student's reading performance. However, in other studies of the area, it was found that the poor school performance is negatively associated with the organization of family routines⁽³⁰⁾.

The results of this study showed that family support and environmental support aid in the formation of a literacy environment at home and, consequently, in the better ability of the children to read words. Talk about the day of the child and his/her activities encourage the reading of stories and comic books. To experience tours and extracurricular activities in family, as well as to provide time to spend with the children, are positive parenting practices that contribute to the expansion of the knowledge of the child and therefore for his/her better academic success.

It should be considered that, despite what is pointed in the literature^(5,6,7,8), the obtained results are applicable to the study population, i.e., students in a single school year, a school of the municipal public net of teaching, and therefore they are not likely of generalizations to other realities. Another limitation of the study was the non comparison of the findings with those of children from other socioeconomic realities. We can not point to a direct causal relationship between the lack of home environment resources and poor school performance of the evaluated children, as other factors may also be related to this, as the literacy method and the quality of education offered.

Therefore, it's suggested the expansion of the study of the association between the family environment and the reading

performance of students to other scenarios and socioeconomic realities, to a better understanding of the possible influence on the results found in this study.

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CONCLUSION

It was found the proportional association of the resources of the home environment to the performance in reading school words, highlighting the need to work with families, in an attempt to overcome existing environmental adversities to the children's full academic development.

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