

PHONOLOGICAL AND LEXICAL PROFILE: RELATIONSHIP WITH ENVIRONMENTAL FACTORS

Perfil fonológico e lexical: interrelação com fatores ambientais

Nathália de Jesus Silva Passaglio⁽¹⁾, Marina Alves de Souza⁽¹⁾,
Valquíria Conceição Souza⁽¹⁾, Ramilla Recla Scopel⁽¹⁾, Stela Maris Aguiar Lemos⁽¹⁾

ABSTRACT

Purpose: to association connect phonological profile and vocabulary of children between four and five years and 11 months, students from public and private schools in Belo Horizonte and analyze the influence of family and educational institution in child development. **Methods:** were evaluated 96 children, aged from four to five years and 11 months and coming from two public infantile schools and one private. The responsible signed the Free and Clear Term of Consent. Were excluded the absent participants in the educational institution, with inadequate conditions of evaluation, with neurogenic or cognitive problems or whose responsible responded less than 70% in Inventário de Recursos do Ambiente Familiar. Were used, as instruments, this questionnaire and phonology and vocabulary tests of Teste de Linguagem Infantil. **Results:** at all ages, participants showed better performance on phonology test. Male children showed worse results in vocabulary test. In relation with the family environment, the majority of participants presented adequate phonology and vocabulary. Children from the private institution showed lower performance on both tests. In all institutions, among the participants with appropriate vocabulary, the majority also presented appropriate phonology. Children with inadequate phonology showed 1,15 greater odds of presenting lexical problems. **Conclusion:** the connect between phonology and vocabulary of children aged four to five years and 11 months showed the influence of family environment in child development. The majority of children that presented a good vocabulary also showed adequate phonology. There wasn't evidence that the school and the parental educational level are determinants to child development.

KEYWORDS: Speech, Language and Hearing Science; Vocabulary; Language; Parent-Child Relations; Child Day Care Centers; Child Development

■ INTRODUCTION

Language is a human skill that is a “social tool” for communication. Thus, it should be considered a process and not just a simple product. It can be defined as a conventional system of arbitrary symbols that are combined in a systematic way and guided to understand and send information¹. Its development depends primarily on two factors: individual characteristics – organic and affective

conditions – and social and family aspects, such as family and school influence².

It is the interaction of the above factors that ensure the overall development of the individual – cognitive, linguistic, and emotional. Didactically, language can be divided into four levels: phonological, grammatical, semantic and pragmatic³. This paper highlights the phonological and semantic aspects.

The phonological system consists of the acquisition of contrastive phonemes and syllabic structure⁴, and is reached spontaneously in a sequence and common age for most children (four to six years)⁵.

In relation to vocabulary, its acquisition occurs between 22 and 36 months of age. This learning

⁽¹⁾ Universidade Federal de Minas Gerais, Belo Horizonte, MG, Brasil.

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involves words related to names of objects, people and refers to social relationships⁶.

Based on this information, this study seeks to demonstrate some factors that influence the language development. It is noteworthy that the literature^{2,5} indicates that parental education, maternal involvement, quality of intellectual and cultural stimuli, availability of toys and games, family income and stay in daycare as important factors for the development of language. The domain and the degree of knowledge of the linguistic aspects linked to phonology or to semantics, together with the environment in which the child is inserted, can be decisive in determining the type of intervention and, especially, to observe its evolution.

Thus, the purpose of this study was to assess the relationship between phonological and expressive vocabulary of children aged between four and five years and 11 months, from public and private schools in Belo Horizonte and to analyze the influence of family and educational institution on child development.

■ METHODS

This is an observational analytic cross-sectional study with non-probability sample based on typicality, conducted in three institutions of child education, in the northeastern region of the city of Belo Horizonte, Minas Gerais, being two institutions of public funding and a private institution. Ninety six children aged between four and five years and 11 months were assessed, being 42 about four years old and 54 about five years old.

This study was approved by the Research Ethics Committee of the Federal University of Minas Gerais, opinion no. ETIC288/10.

A letter requesting permission for the research was sent to the educational institutions. The inclusion criteria for this study were: signature of the Free and Cleared Term of Consent by the parents or guardians of the children, and age of the child in the range proposed by the research. On the other hand, the exclusion criteria were: less than 70% of the Inventory of Resources of the Family Environment – (RAF)⁷ answered by the parents or guardians of the child, absence in the school, inadequate conditions of assessment and the presence of possible neurogenic or cognitive changes.

For the evaluation, the Inventory of Resources of the Family Environment – RAF⁷ and the phonology and vocabulary tests of the ABFW – Test of Children's Language^{8,9} were used as tools.

After signing the term, the parents answered a questionnaire proposed by the literature⁷, about the routine of the children and their family environment,

with open questions and multiple-choice items, totaling ten topics. The items were presented orally to the person responsible for the child, there was an open question for each topic and the mentioned items were marked by the respondent. The answer of the respondent, if not included in the list, was marked and described under "other". The raw score was the sum of the items marked in each topic, with the exception of those with specific score (eight, nine and ten). In the relative score, the formula $raw\ score / maximum\ score\ of\ the\ topic \times ten$ is suggested, in which the maximum score is the number of items.

The phonology and the lexicon of the children were analyzed in the rooms of the institutions, in two individual sessions, held in different days, with an approximate duration of 40 minutes.

For evaluation of the phonological skills, the phonology test of the ABFW was used, which consists in naming 34 figures and imitation of 39 words. If the child was not able to name the figure, the evaluator named it and then presented the same figure to the child after five subsequent figures. If in the second attempt the child failed to name the figure, the fact was recorded. In the imitation test, the words spoken by the evaluator should be repeated by the child. All responses were audio recorded for analysis and phonetically transcribed in the naming and imitation protocols, and in the analysis sheets of the phonological processes of the test. For the analysis, the phonological processes that occurred above 25% of its possibility were considered productive and less than 25% not productive.

Regarding the lexical evaluation, the vocabulary test of the ABFW⁹ was used. Its application consisted in naming 118 figures distributed in nine conceptual fields (in the following order: clothing, animals, food, means of transport, furniture and household appliances, professions, places, shapes and colors, toys and musical instruments). The evaluator presented the figures to the child and asked: "What is this?", to objects; "Which color is it?", to colors; "Which shape is it?", to shapes; and "Who is he/she?", to professions. When the child was not able to name the figure, the next one was presented and, at the end of this conceptual field, the one that was not named was presented again. The responses were recorded and transcribed in a protocol of records.

The analysis of the relationship between the variables was performed using the Chi-square and Fisher's Exact tests. The results with a significance level of 5% were considered statistically significant. For the data processing the Epi Info™ program, Version 3.4.3 was used.

■ RESULTS

In the present study, the sample mostly consisted of male children and the age of five years old. Regarding the type of research institution, most students (59.4%) were from public

institutions (schools A and B). It is also important to note that, regarding parental education, the majority had secondary education, followed by those who reported to have higher education and, finally, primary education (Table 1).

Table 1 – Characteristics of the sample regarding age, gender, parental education and school

Characteristic	N	%
Age		
4 years	42	43,8
5 years	54	56,3
Gender		
Female	44	45,8
Male	52	54,2
School		
A	30	31,3
B	27	28,1
C	39	40,6
Parental education		
Primary education	24	25
Secondary education-	44	45,8
Higher education	28	29,2

Legend: n = number

When relating phonology and vocabulary to the various characteristics evaluated, it is observed that regarding age, the participants of all ages presented better results in the phonology test compared to the results of the vocabulary test. Regarding gender, male children presented, more often, inappropriate results in the vocabulary test when compared to females; this fact showed a significant result. Regarding the relationship between family environment, investigated by the RAF questionnaire, and language aspects, it was observed that most participants showed appropriate phonology and vocabulary. However, the percentage of children with phonological adequacy was considerably higher than those with appropriate vocabulary. Regarding the relationship between parental education and the presence or absence of phonological alteration or appropriate vocabulary, there was no correlation with statistical significance (Table 2).

Finally, regarding the institution attended by the children, it is observed that the children from the institution C, of private funding, showed poorer results for both the adequacy of phonology as of vocabulary, a fact that demonstrated a significant result (Table 2).

By relating the vocabulary improvement in each assessed school with the phonology, it was observed that, in all the surveyed institutions, most of the children who presented appropriate vocabulary have also demonstrated the proper phonology (Table 3).

Regarding the odds ratio of a child with inappropriate vocabulary to also present phonological change, no significant result was observed; but children with inappropriate vocabulary had 1,15 times more chance to present phonological disorders (Table 4).

Table 2 – Relationship between adequacy of phonology and vocabulary and age, gender, family environment, parental education and child education institution

Characteristic	Phonology				p Value	Vocabulary				p Value
	Appropriate		Inappropriate			Appropriate		Inappropriate		
	n	%	n	%		n	%	n	%	
Age										
4 years	39	92,9	3	7,1	1,000	10	23,8	32	76,2	0,189
5 years	50	92,6	4	7,4		20	37,0	34	63,0	
Gênero										
Male	47	90,4	5	9,6	0,447	10	19,2	42	80,8	0,008
Female	42	95,5	2	4,5		20	45,5	24	54,5	
RAF	89	92,7	7	7,3	0,740	66	68,75	30	31,25	0,003*
Parental education										
Primary education	23	95,8	1	4,2	0,756	4	16,7	20	83,3	0,184
Secondary education	40	90,9	4	9,1		15	34,1	29	65,9	
High education	26	92,9	2	7,1		11	39,3	17	60,7	
School										
A	28	93,3	2	6,7	0,595	26	86,7	4	13,3	0,002*
B	26	96,3	1	3,7		21	77,8	6	22,2	
C	35	89,7	4	10,3		19	48,7	20	51,3	

* Statistically significant results ($p \leq 0.05$) – Fisher's Exact Test
 Legend: n = number

Table 3 – Relationship between adequacy of vocabulary and phonology according to the child education institution

			Vocabulary				Total		p Value
			Inappropriate		Appropriate		n	%	
			n	%	n	%			
A	Phonology	Inappropriate	1	3,8	1	25,0	2	6,7	0,253
		Appropriate	25	96,2	3	75,0	28	93,3	
B	Phonology	Inappropriate	1	4,8	0	0,0	1	3,7	1,000
		Appropriate	20	95,2	6	100,0	26	96,3	
C	Phonology	Inappropriate	3	15,8	1	5,0	4	10,3	0,342
		Appropriate	16	84,2	19	95,0	35	89,7	
Total	Phonology	Inappropriate	5	7,6	2	6,7	7	7,3	1,000
		Appropriate	61	92,4	28	93,3	89	92,7	

Fisher's Exact Test
 Legend: n = number

Table 4 – Relationship between adequacy of vocabulary and phonology, considering the odds ratio

	Vocabulary				p Value	OR	CI 95%
	Inappropriate		Appropriate				
	n	%	N	%			
Phonology							
Inappropriate	5	7,6	2	6,7	1,000	1,15	0,18-9,16
Appropriate	61	92,4	28	93,3		1,00	

Fisher's Exact Test

Legend: n = number; OR = odds ratio; CI = confidence interval

■ DISCUSSION

The present study was based on a sample consisting of 96 children aged between four and five years and 11 months, of both genders. The participants were mostly students from public institutions and most of the parents have completed the secondary school, a fact that does not corroborates the data of the Census 2010¹⁰. It demonstrates that there was a reduction in the percentage of people with no education or incomplete primary education, which still represent the majority. The Census is a Brazilian survey, but this data was not found in the municipality of the data collection.

When relating phonology to age, it is observed that the results do not corroborate the literature, because some studies show that with the increase of the age there are less phonological inadequacies, and the child's speech becomes similar to the speech of the adults with advancing age¹¹. In the present study, four years old children presented less phonological inadequacies; compared to five years old children. It is worth remembering that the literature¹¹ shows the probability of error, i.e., five years old children produce more due to better and larger language domain, therefore they can make more mistakes. However the data from this study cannot be used as a generalization due to the size and way the sample was selected. Therefore, it becomes necessary to further research in order to prove this finding.

The vocabulary was analyzed according to the age and, as in the researched literature¹²⁻¹⁴, the age influenced the performance in the lexical adequacy. The data showed that lexical errors decrease as the child reaches linguistic maturity¹²⁻¹⁴.

In addition, the male participants had poorer performance in the phonology and vocabulary tests, which suggests that the acquisition and development of language occur in different ways between genders. Studies^{11,15,16} show similar evidence and a relationship between genders and environment,

education, neurological factors and hormonal component^{11,15,16}.

In the analysis of the relationship between phonology, vocabulary and resources of the family environment, a relation between the performance on tests and the resources of the family environment was found. Thus, the importance of such characteristics is stated in the literature, as it presents an idea that the way of speaking of the parents, the family income, the number of residents and the parental encouragement are essential not only for the language acquisition and development but also for the overall development^{12,17,18}.

The data regarding parental education showed that children whose parents have lower educational level (primary education) presented better performance in the phonology test when compared to children whose parents have secondary and higher education. This finding does not corroborate the literature^{18,19} that shows that children whose parents have elementary education level are more vulnerable to a poorer language development. However, regarding the performance of the children in the vocabulary test, this paper corroborates the studies: children whose parents have primary education have a more inappropriate vocabulary^{18,19}. It is worth remembering that there was no statistically significant difference regarding parental education in the phonology and vocabulary performance of the participants. It should also be noted that most of the parents had secondary or higher education and the percentage of adequacy at all levels was greater than 90%.

The data show that the performance on phonology and vocabulary tests of students from the private institution was worse compared to public institutions. Such data do not corroborate the researched literature^{20,21} that shows that children from private institutions got better results^{20,21}. The results of this paper can be related to the educational practices used by teachers and to the infrastructure presented in each institution, once the private institution in question includes students from regions of middle

and lower-middle classes. It is worth noting that the population in this context prefers the public schools, remaining the private schools as an alternative in case of no vacancies in the first ones.

The research findings showed that, in all institutions, most of the children who had appropriate vocabulary have also demonstrated appropriate phonology. This fact corroborates the researched literature²², which describes that during the acquisition of language, lexicon and phonology are interconnected, regardless of individual variations²². Several studies showed that children with phonological disorders had poorer results in the vocabulary test compared to children with normal language development^{12,23,24}. This fact is justified by a language development scale in which the acquisition of word meanings, word production and their functional use occurs simultaneously²⁵. However, some researches were also found showing that the phonology disorders are only manifested in phonological level, without any effect on the lexical aspect²⁶.

Regarding the relationship between the vocabulary and phonology adequacy, considering the *odds ratio test*, the results confirm the influence of the lexical development on the phonological component, since children with inappropriate vocabulary have more chance to also present greater phonological changes. When comparing the results obtained in both tests, it was noted that the highest percentages of inadequacy occurred in the vocabulary test, proving therefore to be more effective in the assessment of alterations during the child's development. So, if only one of the two tests is required in hearing screenings, in the age range of the research, it is suggested to include the vocabulary test, although both tests are important and necessary tools in the Phonoaudiology as a health promoter.

Thus, it is important to discuss the phonological and lexical development of children aged between four and five years and 11 months, since this theme can contribute to advances in the field of Phonoaudiology and health promotion. The importance of the resources of the family environment

for a proper language development is highlighted, since this environment is essential for the overall development of the children. A private institution alone does not ensure a good performance in of the child development, and a public institution does not necessarily lead to a lower performance. Another fact worth mentioning is that the parental education, even without statistical significance in this study, is important and influences the language development of the children. It should also be emphasized that the phonology and vocabulary tests used are extremely important tools for the phonological assessment of the child development.

Despite the advances made by this study, some limitations were detected during its elaboration. Among them, it can be mentioned the size and design of the sample, since it only included two public institutions and one private institution. Therefore, this fact prevents the generalization of the findings. In addition, during the study, no activities fully involving the institutions were carried out, covering, for example, its teaching methodology. Thus, it is necessary to conduct further research covering population studies in order to obtain more consistent results to be incorporated into practice.

Finally, the findings of this research reinforce the role of the Speech Therapy in educational institutions as a health promotion area. In this context, the importance of actions in the area of speech therapy for the quality of life, education and health is highlighted, rather than just preventive activities directed to the disease.

■ CONCLUSION

This study revealed a relationship between phonology and the expressive vocabulary of children aged between four and five years and 11 months and that most of the children who performed well on the vocabulary test also showed adequacy regarding phonological aspects. It is noteworthy that in this study there was no evidence of association between educational institution, parental education and phonological and lexical development.

RESUMO

Objetivo: verificar a associação entre perfil fonológico e vocabulário de crianças de quatro a cinco anos e 11 meses, de escolas públicas e particulares de Belo Horizonte e analisar a influência da família e da instituição de ensino no desenvolvimento infantil. **Métodos:** foram avaliadas 96 crianças de quatro a cinco anos e 11 meses, provenientes de duas instituições públicas e uma privada. Os responsáveis assinaram o Termo de Consentimento Livre e Esclarecido. Excluíram-se os participantes ausentes na instituição, com condições inadequadas de avaliação, alterações neurogênica ou cognitiva ou cujos responsáveis responderam menos de 70% do Inventário de Recursos do Ambiente Familiar. Utilizaram-se como instrumentos este inventário e as provas de fonologia e vocabulário do Teste de Linguagem Infantil. **Resultados:** em todas as idades, os participantes mostraram melhor desempenho em fonologia. Crianças do gênero masculino apresentaram resultados piores na prova de vocabulário. Na relação com o ambiente familiar, a maioria dos participantes apresentou fonologia e vocabulário adequados. Crianças da instituição privada apresentaram desempenho inferior em ambas as provas. Em todas as instituições, dos participantes com vocabulário adequado, a maioria apresentou fonologia adequada. Crianças com fonologia alterada apresentaram 1,15 chances maiores de apresentarem alteração lexical. **Conclusão:** a associação entre fonologia e vocabulário de crianças de quatro a cinco anos e 11 meses mostrou influência do ambiente familiar no desenvolvimento infantil. A maior parte das crianças que apresentaram bom desempenho no vocabulário também demonstraram ter fonologia adequada. Não houve evidência de que instituição de ensino e escolaridade parental são determinantes para o desenvolvimento da criança.

DESCRIPTORIOS: Fonoaudiologia; Vocabulário; Linguagem; Relações Pais-Filho; Creches; Desenvolvimento Infantil

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Mailing address:

Stela Maris Aguiar Lemos
Av. Alfredo Balena, nº 190, Sala 251,
Bairro Santa Efigênia
Belo Horizonte – MG – Brasil
CEP: 30130-100
E-mail: lemos.stela@gmail.com