

# Oral and written language in Infant Education: relation with environmental Variables

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## Abstract

The study investigated the relationship between environmental variables (socioeconomic level, family environment and attendance at preschool) with pre-school vocabulary and post-reading reading performance. Participants included 68 children (mean age = 4.4 years) from a public school of Early Childhood Education and their respective families. The Auditory Vocabulary Test used; parents answered an identification questionnaire and the ABEP scale. The HOME inventory used to collect information about the family environment. Six months later, the Reading and Writing Test applied. There was better performance in vocabulary and reading / writing with school progression and moderate relation between these variables. Maternal education related to the vocabulary and the time of attendance to the preschool with the writing. Specific aspects of the family environment, such as the styles of interaction and variety of stimulation, were associated with receptive vocabulary. The study supports the investigation of how environmental variables can be associated with children's linguistic development.

**Keywords:** Human development; assessment; cognition.

## *Linguagem oral e escrita na Educação Infantil: relação com variáveis ambientais*

### Resumo

O estudo investigou a relação de variáveis ambientais (nível socioeconômico, ambiente familiar e frequência à pré-escola) com vocabulário em pré-escolares e desempenho posterior em leitura/escrita. Participaram 68 crianças (Idade média = 4,4 anos) de uma escola pública de Educação Infantil e suas respectivas famílias. Utilizou-se o Teste de Vocabulário Auditivo; pais responderam a um questionário de identificação e à escala ABEP. O inventário HOME foi utilizado para a coleta de informação sobre o ambiente familiar. Seis meses depois, o Teste de Leitura e Escrita foi aplicado. Houve melhor desempenho em vocabulário e em leitura/escrita com a progressão escolar e relação moderada entre essas variáveis. Escolaridade materna relacionou-se ao vocabulário e o tempo de frequência à pré-escola com a escrita. Aspectos específicos do ambiente familiar, como os estilos de interação e variedade de estimulação, associaram-se com vocabulário receptivo. O estudo colabora com a investigação sobre como variáveis do meio podem associar-se ao desenvolvimento linguístico infantil.

**Palavras-chave:** Desenvolvimento humano; avaliação; cognição.

## *Lenguaje oral y escrita en la educación infantil: relación con variables ambientales*

### Resumen

En el estudio se investigó la relación de variables ambientales (nivel socioeconómico, ambiente familiar y frecuencia al jardín de infancia) con vocabulario en pre-escolares y rendimiento posterior en lectura/escritura. Participaron 68 niños (Promedio de edad =4,4 años) de una escuela pública de Educación Infantil y sus respectivas familias. Se utilizó el Test de Vocabulario Auditivo; padres contestaron a un cuestionario de identificación a la escala ABEP. El inventario HOME fue utilizado para recolecta de información sobre el ambiente familiar. Seis meses después, el Test de Lectura y Escritura fue aplicado. Hubo mejor rendimiento en vocabulario y en lectura/escritura con la progresión escolar y relación moderada entre esas variables. Escolaridad materna se relacionó al vocabulario y el tiempo de frecuencia al jardín de infancia con la escritura. Aspectos específicos del ambiente familiar, como los estilos de interacción y variedad de estimulación, se asociaron con vocabulario receptivo. El estudio colabora a la investigación de como variables del medio pueden asociarse al rendimiento lingüístico infantil.

**Palabras clave:** Desarrollo humano; evaluación; cognición.

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## Introduction

The role of oral language (OL) skills about future reading competence is well established in the literature (Melby-Lervåg, Lyster, & Hulme, 2012; Pazeto, 2016; Seabra & Dias, 2012; Song et al., 2015). Other studies also suggest that emerging reading and writing (RW) abilities figure as relevant predictors for subsequent reading competence (Costa et al., 2013; Pazeto, 2016). For example, a recent national study has shown that OL and emerging RW skills assessed in preschool children can predict reading, writing, and even math performance two years later (Pazeto, 2016). Thus, understanding the importance of these predictive abilities, mapping variables that may be associated with them can be a profitable area of research, with the potential to provide knowledge that guides future research about variables that can be object of intervention aimed at expanding child development, besides contributing with programs targeted to attending preschoolers and school and family orientation.

The literature has already pointed out some variables associated with children's cognitive development and more specifically the development in oral or written language. Among these variables, we highlight the socioeconomic status (SES) (Engel de Abreu et al., 2015; Fernald, Marchman, & Weisleder, 2013; Piccolo et al., 2016), and there is even evidence of a NSE and structural measures such as cortical surface, especially in brain areas associated, among other abilities, with language (Noble et al., 2015). Smaller numbers of studies have focused on other variables, such as the family environment (in terms of structure / materials and the relationships that occur in this environment), quality or attendance at preschool (Pinto, Pessanha, & Aguiar, 2013; Scopel, Souza, & Lemos, 2012; van Druten-Frietman, Denessen, Gijssels, & Verhoeven, 2015). In this context, this study included environmental variables such as SES, family environment measure and attendance time at preschool (children's schooling time), as well as the preschoolers' performance in vocabulary and, six months later, in skills RW.

The vocabulary is associated with the semantic component of language. It refers to the individual's ability to understand (receptive vocabulary) and produce (expressive vocabulary) lexical items that are part of his linguistic system (Capovilla, Negrão, & Damásio, 2011). The initial or emerging abilities of RW refer, for example, to the knowledge of letters, writing the name itself or to the ability to encode and / or decode isolated words (Costa et al., 2013; Pazeto, Seabra, & Dias, 2014; Puranik & Lonigan, 2012). Some evidences suggest that language skills seem to develop rapidly in the pre-school years (Pazeto et al., 2014; Song et al., 2015). For example, Pazeto et al. (2014) found progression in RW vocabulary and initial skills, such as knowledge of letters and their sounds, codification and decoding of isolated words, in the course of Kindergarten I to Kindergarten II. In the same sample, the authors found consistent relationships between vocabulary measures and emerging RW skills.

For authors such as Scopel et al. (2012), language development depends not only on biological conditions, but

also has important influence on environmental factors, such as those associated with family and school. In fact, evidence indicates that factors associated with the family, among them the SES are predictors of the vocabulary extension of the child already at 2 years; however, vocabulary growth up to age 4 is also influenced by factors associated with preschool (such as teacher education level and pre-school quality). Findings like this suggest an interaction between family and preschool variables in language development (van Druten-Frietman et al., 2015).

As regards the aspects related to the family, it is responsible for ensuring the child's well-being and safety, promoting their adaptation, development and social integration, as well as offering stimulation and a socio-emotional support environment (Caldwell & Bradley, 2003). A study conducted in 2011 showed that low quality family environment (measured in terms of supply of stimuli, such as low, medium or high, in the Inventory Home \_ *Home Observation for Measurement of the Environment*), was associated with increased risk of developmental delays child, which included language. In addition to the quality of the family environment, the research also pointed to other environmental factors associated with the risk of developmental delays, including low family income, low parental schooling and large numbers of siblings (Lamy Filho, Medeiros, Lamy, & Moreira, 2011). Other evidence also pointed out that changes in the family environment (measured from subscales of the Home Inventory: Learning Materials, Language Stimulation, Academic Stimulation, and Variety of Experiences) occurring in the child's age range between 36 and 54 months can predict development of language in these children (Son & Morrison, 2010).

It is a fact that as early as 18 months, the classification of the family as SES is associated with the children's linguistic performance (Fernald et al. 2013). A national study on this subject, with children in the 1st and 2nd years, also showed that SES is strongly associated with language abilities (able to explain up to 50% of variance in language, considering expressive and receptive measures) (Engel de Abreu et al., 2015). In this study, SES verified from income data and from parental schooling.

Also considering the different environments in which the child has inserted, a longitudinal study, conducted in Portugal, showed that the family environment and the quality of the preschool were associated with performances in language and emerging skills of RW during the preschool years. Among these results, pre-school quality had a greater impact on emerging literacy skills than the family environment. Finally, the authors suggest cumulative effect and interaction of these two environments on the development of these child skills. These effects suggest that higher preschool quality could potentiate the positive impact of the family environment on language and emerging RW skills (Pinto et al., 2013).

In the present study, although the quality of the preschool environment has not been considered, it is recognized that the school may have a relation with child performance and, given this, will be considered as given the child's

schooling time (measured in months), which refers to how many months the child has total enrollment, since his first enrollment in daycare. This data will be used in view of the possible impact of pre-school attendance on children's performance, as observed in previous studies (Pereira, Marturano, Gardinal-Pizato, & Fontaine, 2011; Shah et al., 2017). For example, Shah et al. (2017) found that children in the second year of elementary school who attended the pre-school for two years had better performances in terms of cognitive, academic (including vocabulary and reading) and adjustment. Taken together, these findings suggest an important role of Early Childhood Education in the development and preparation of children for later formal learning.

Finally, a review in the area (Scopel et al., 2012) presented findings that corroborate the relevance of stimulation in the family context and of SES variables, such as parental schooling, for children's linguistic development. The authors, however, highlighted the lack of studies that relate children's development to variables in the school environment. They also listed some limitations of the area, such as the lack of studies investigating the relationship of vocabulary with school and family variables and the still limited use of standardized protocols in evaluations. In order to minimize such difficulties, one of the skills investigated in this study is the vocabulary and, for all measures, standardized instruments with satisfactory psychometric properties obtained from surveys of Brazilian samples have used. In this context, this study investigated the relationship of family environment variables, including SES variables, and frequency of attendance to preschool with performance in language measures, specifically vocabulary (concurrent relationship) and initial reading and writing skills (six months later) in preschool children and in transition to Elementary School.

## Method

### Participants

The number of 68 children, aged three to 5 years at the start of the study, ( $M = 4.4$  years,  $SD = 0.65$ ), and their respective families participated in this study. The total sample, 36 (52.9%) of the children were girls. In the first year of the study (Year 1), 29 were students of Kindergarten I classes (mean age = 3.79,  $SD = 0.41$ ) and Kindergarten II 39 (mean age = 4.85,  $SD = 0.37$ ) of a public school of Early Childhood Education in a city in the metropolitan region of São Paulo. The school serves 110 children in Early Childhood Education in two periods. As exclusion criteria, we adopted an indicator of intellectual disability (measured by the Columbia Mental Health Maturity Scale), sensory or motor disabilities that hindered the evaluation and presence of syndromes or neurological / psychiatric disorders (from the Parent Identification Questionnaire). No child had these characteristics, so there was no excluded participant. Six months after completing the first phase of the study (Year

2), the second stage of the evaluation was the second stage of the evaluation, in the year following the start of the study: of the 68 initial participants, 45 children were reassessed, of which 22 were originally from Kg-I in this occasion, enrolled in Kg-II. As well as 23 originally from Kg-II, were in the first year of Elementary School at the same school.

### Instruments

*Parent Identification Questionnaire (PQ)*: contains questions about the child's health and development, parental education, and the child's own schooling time. Filling time is approximately 5 minutes.

ABEP scale (*Brazilian Association of Research Companies*) of socioeconomic status (ABEP, 2014): scale with questions about household items and schooling of the head of the family, for example. It based on Brazil's Economic Classification Criteria. The score obtained allows verification of the classification of familiar ESE (between A and D-E). Approximate fill in 5 minutes.-

*Home Observation for Measurement of the Environment-Early Childhood (Home; Caldwell & Bradley, 2003)*: standardized measure of family environment observation. It has different versions, the *Early Childhood (EC)* version intended for children between three and six years of age. The version used in this study translated and adapted to Brazilian Portuguese. Dias et al. (2017) reported good psychometric characteristics for this version in Brazilian children, including high inter-rater concordance ( $ICC = 0.94$ ) and satisfactory internal consistency (Cronbach's Alpha = 0.84) for the full scale. The analyzes also showed that the domains of HOME contemplate content relatively independent of the family context and provide evidence of validity to the inventory by correlation with other variables from associations with variables of ESE and performance of children in tasks of executive functions.

The Home EC version divided into eight subscales, with 55 items. Of these, 21 based on observation of the family environment, 10 in observation or interview and 24 in interview. The subscales include: 1) Learning Materials - dealing with children's availability of toys, books, games that facilitate their learning, for example, colors, sizes or shapes. 2) Stimulation of Language - reference to parents' attempts to encourage the development of children's language through conversation, modeling or direct teaching. 3) Physical Environment - describes the physical environment, considering the internal and external space, as well as its organization and security. 4) Responsiveness - refers to the emotional and verbal responsiveness of caregivers. For example, whether parents are attentive to their children's questions and how the interactions between adults and children occur. 5) Academic Stimulation - describes the direct involvement of the caregiver with the child's learning, for example by encouraging them to learn the numbers. 6) Modeling - refers to the modeling of parents of desirable and acceptable behaviors, thus communicating their expectations to children. 7) Varie-

ty - describes the family lifestyle that offers varied and rich experiences to the child. 8) Acceptance-refers to the ability of parents to accept the child's negative behavior, noting the occurrence of physical punishment and reprimand.

The application made through a home visit, with an approximate duration of 1 hour. During the visit, the presence of the child and his/her main caregiver is necessary. Each item of the protocol is punctuated with zero (denoting a negative aspect, e.g. unsafe environment, absence of stimulation, occurrence of punishment) or one (denoting positive aspect, e.g. safe environment, presence of stimulation, absence of punishment) and, from sum of the items, we have the score in the eight subscales and total scale.

*Columbia Mental Maturity Scale* (CMMS; Alves & Duarte, 2001): evaluates the non-verbal rationale of children between 3 years and 6 months and 9 years and 11 months of age. There are boards with three to five drawings each, and the child's task is to choose which drawing is different from the others. There are data of precision and validity for the Brazilian population, with standards available in Alves and Duarte (2001). The measure was used for possible identification of children with intellectual disability indicatives (RPI <70). The estimated time of application is 20 minutes.

*Auditory Vocabulary Test USP - form A reordered of 33 items* (TVAud; Capovilla et al., 2011): evaluates the receptive vocabulary, i. é., the understanding of words heard, from the choice of figures. It consists of 33 items, each consisting of one word (pronounced by the examiner) and 5 figures as alternatives of choice. The task is to mark the figure that best represents the word pronounced by the examiner. The instrument has evidence of validity and normative data for children aged 18 months to 6 years (Capovilla et al., 2011). The total score used in TVAud. The application time is approximately 15 minutes.

*Reading and Writing Test* (RWT; Pazeto, 2016): evaluates initial abilities to read and write words in dictation. The test is divided into two parts: 1) Subtest Writing, consisting of 10 items, being eight words and 2 pseudo words; the applicator dictates 10 items for the child to write (each word can be repeated only once). Reading Subtest also composed of 10 items, being eight words and two pseudo words: the applicator presents the items individually for the child to read. The correction made considering the total of letters read and written correctly, converted in percentage, in each part of the test. Evidence of validity found in Pazeto et al. (2014). The application lasts approximately 20 minutes.

## Procedure

The project approved by the Research Ethics Committee (CAAE 41550315.0.0000.5435). Contact made to the participating school and requested permission to carry out the study. After authorization from the school management, in the first year of the study, contact made with those

responsible for the children signed the Free and Informed Consent Term. At the same time, there was filling of PQ and ABEP. TVAud applied in a collective session, approximately 15 minutes, with groups of five children. The CMMS applied in an individual session of 20 minutes. Both applied in a room available, in the school itself and in the regular period.

For HOME application, there was a telephone contact with the families and a home visit schedule. The family informed that if they wanted to schedule a visit and that this would last approximately 1 hour, necessitating the presence of the child and his main caretaker. Of the 68 participants, 62 visits were authorized by the families and, thus, carried out (there was 91.2% adherence). In 63.9% of visits, only the mother was present; in 18%, the couple was present in the house; in 14.8% of visits, only the father was present; and in 3.3% of the cases, the grandmother received the researcher. On all occasions, the children were present. The instrument completed during each visit.

In the second year of the study, six months after completing the evaluations of the first part of the study, the RWT applied to the children in an individual session of approximately 20 minutes, held in a reserved room of the school and during a regular period. Of the 68 children initially evaluated, 45 participated in this stage of the evaluation (retention of 66.18% of the sample). The loss is because in this new school year, many children transferred to other units by their parents and one did not attend classes during the month of RWT application.

## Data analysis

Descriptive statistics of SES variables were used (mean and standard deviation for variables of schooling of the mother and father and time of schooling of the child, frequency for socioeconomic category), as well as for scores on Home and performances in vocabulary, reading and writing. Student's t-test performed to verify grade level effect on scores in the Home and performances in vocabulary, reading and writing. The effect size of the differences investigated from Cohen's d. The relationship between vocabulary and reading and writing measures was verified using Pearson's correlation. To investigate the relationship between SES variables and children's performances in language measures, as well as the relationship between Home subscales and language measures, partial correlation analyzes were conducted, controlling the age (in months) of the children.

## Results

Descriptive statistics of socioeconomic variables, including years of schooling of the mother and father, children's schooling (in months) and frequency of each socioeconomic category of the participating families presented in Table 1. The averages obtained in each subscale and in the total of

**Table 1.** Socioeconomic variables of the participating families.

SES Variables	N	Min	Max	M	SD
Years of mother's study	63	6	16	10,81	1,740
Years of father's study	60	7	16	10,72	1,658
Time of schooling of the child (months)	65	3	60	23,29	15,805
Socioeconomic Status ABEP	F	%			
No answer	3	4,4			
A	2	2,9			
B1	10	14,7			
B2	19	27,9			
C1	23	33,8			
C2	7	10,3			
D-E	4	5,9			
Total	68	100,0			

the Home listed in Table 2. There was no school level effect on the HOME scores (all comparisons with  $p > 0.05$ ).

Regarding the RW vocabulary and initial skills tests, there was a significant difference and large size of effect of the school level for all the measures, with increasing performance as the progression of the school level. These results summarized in Table 2. There was a positive, significant and moderately significant relationship between performance in vocabulary in Year 1 of the study and reading performance ( $r = 0.56$ ,  $p < 0.001$ ) and writing ( $r = 0.47$ ;  $p = 0.001$ ), both evaluated in year 2 of this investigation. Given the impact of the school / age level of children on their performance in language measures, we chose to control age (in months) in the analysis of the relationship between environmental variables and the results of the RW vocabulary tests. Table 3 presents these findings. There was a low but significant relationship between maternal schooling and child's performance in vocabulary, as well as between the child's schooling time and their subsequent performance in the writing task. Two non-significant trends observed one between maternal schooling and child's writing performance, and the other between ABEP scores and vocabulary performance.

Partial correlation analysis also conducted between scores on the HOME and children's performances on voca-

bulary and RW measures, controlling the children's age (in months). Table 3 summarizes the relationships found. Scores in HOME subscales only related to vocabulary measure. No association observed with RW measurements. Specifically, there was association of low, significant magnitude between performance in vocabulary and subscales of Modeling and Home Variety.

## Discussion

The study investigated the relationship between family environment variables, including NSE variables and child's schooling time, and preschool children's vocabulary performance and subsequent performance in LE emerging skills, assessed six months after the first part of the study. In general, some relationships found, showing that some of these environmental variables are associated with the performance of children in this schooling range.

Regarding the socioeconomic class, a greater number of families were concentrated in the classes B1 to C1, representing 76.4% of the participating families. It verified that the parents of the participating children had an average schooling time of 10 years, while the average schooling time



**Tabela 2.** Descriptive Statistics of Home Scores and Children's Performance in Vocabulary Tasks (Year 1) and Initial Reading and Writing Skills (Year 2), with *t* and *p* values.

Home Variables (year 1)	Nível escolar	N	M	SD	Home Variables (year 1)	Level	N	M	SD
Learning Materials	KG I	27	6,63	2,323	Modeling	KG I	27	3,00	0,784
	KG II	35	6,63	1,911		KG II	35	3,34	0,591
Language Stimulation	KG I	27	6,44	0,801	Variety	KG I	27	6,30	1,514
	KG II	35	6,31	0,832		KG II	35	5,91	1,463
Physical Environment	KG I	27	6,00	1,901	Acceptance	KG I	27	4,00	0,000
	KG II	35	5,14	1,927		KG II	35	3,94	0,236
Responsiveness	KG I	27	5,59	1,366	Total Home	KG I	27	42,56	6,314
	KG II	35	5,29	1,601		KG II	35	41,34	6,193
Academic Stimulation	KG I	27	4,59	0,888					
	KG II	35	4,77	0,547					
OL and RW performances	Nível escolar	N	M	DP	<i>t</i>	<i>p</i>	<i>d</i>		
TVAud (year 1)	KG I	29	27,31	2,977	-4,327	≤ 0,001	1,06		
	KG II	39	29,95	2,051					
RWT - Reading (year 2)	KG II	22	4,12	6,719	-5,970	< 0,001	1,74		
	1st year	23	54,43	39,82					
RWT - Writing (year 2)	KG II	22	12,15	7,27	-7,047	< 0,001	2,06		
	1st year	23	58,96	30,98					

of the children was about 23 months. The study also described characteristics of the family environment of the sample, and no difference observed in this variable according to the children's age / schooling. There was an increase in the performance of vocabulary and initial RW skills measures with school progression, as expected (Capovilla et al., 2011, Pazeto et al., 2014, Pazeto, 2016, Song et al. 2015). In fact, vocabulary skills have an important development in the preschool years (Song et al. 2015) and the increase in RW scores with the progression of the school level expected because the most According to Pazeto (2016), unlike OL, the RW requires formal education, which mainly offered as of the first year.

In longitudinal terms, it evidenced that the vocabulary significantly related, with moderate magnitude, to the later performance in RW, evaluated six months later. In fact, vocabulary has proved to be an important predictor of reading,

including reading comprehension (Seabra & Dias, 2012; Song et al. 2015). Recent evidence, for example, has shown that, among other measures, pre-school vocabulary can predict reading, writing and even mathematics in the first year (Pazeto, 2016). These findings corroborate the importance of language in the pre- school, for the later development of school skills.

With control of the children's age, the study showed a relationship between years of study of the mother and vocabulary, as well as a non-significant trend between SES (total score in ABEP) and vocabulary. For writing, there was a relationship with the child's schooling time. These results suggest that children of mothers with higher education or those from families with higher SES tend to have a greater extension of vocabulary. In fact, the relationship between language and variables of SES, including here the parents' schooling, has already portrayed in the literature (Engel de

**Table 3.** Matrix of relations between the SES variables, Home and scores on vocabulary and reading and writing tests, with age control.

		TVAud	RWT-R	RWT-W
<b>SES Variables*</b>				
Years of mother's study	<i>r</i>	<b>0,29</b>	0,23	0,28
	<i>p</i>	<b>0,031</b>	0,173	0,090
Years of father's study	<i>r</i>	0,04	-0,11	-0,12
	<i>p</i>	0,791	0,530	0,494
Time of schooling of the child (months)	<i>r</i>	0,17	0,25	<b>0,38</b>
	<i>p</i>	0,221	0,129	<b>0,019</b>
Total Score ABEP (SES)	<i>r</i>	0,24	-0,01	0,10
	<i>p</i>	0,074	0,944	0,546
<b>Home Variables**</b>				
Learning Materials	<i>r</i>	-0,01	0,10	0,80
	<i>p</i>	0,988	0,524	0,611
Language stimulation	<i>r</i>	-0,06	0,08	0,12
	<i>p</i>	0,641	0,619	0,464
Physical Environment	<i>r</i>	0,11	-0,03	-0,08
	<i>p</i>	0,393	0,831	0,587
Responsiveness	<i>r</i>	0,16	0,06	0,10
	<i>p</i>	0,209	0,712	0,511
Academic Stimulation	<i>r</i>	0,03	0,02	0,11
	<i>p</i>	0,797	0,923	0,470
Modeling	<i>r</i>	<b>0,27</b>	0,15	0,09
	<i>p</i>	<b>0,037</b>	0,319	0,555
Variety	<i>r</i>	<b>0,30</b>	-0,05	-0,06
	<i>p</i>	<b>0,017</b>	0,753	0,686
Acceptance	<i>r</i>	0,11	-0,23	-0,25
	<i>p</i>	0,418	0,131	0,108
Total HOME	<i>r</i>	0,17	0,05	0,04
	<i>p</i>	0,179	0,760	0,783

\**gl* = 55 (TVAud); 36 (RWT)

\*\**gl* = 59 (TVAud); 42 (RWT)

Controlled variable: age in months.

Abreu et al., 2015; Fernald et al., 2013; Piccolo et al., 2016; Scopel et al., 2012). For Lamy Filho et al. (2011), low parental schooling, along with other NSE variables such as low family income, is one of the environmental factors that can most influence child development. This relationship may be due to the quality of the stimulation offered to the child. For example, mothers with higher levels of education may use, among other things, complex language, richer and more diversified vocabulary, having an impact on the development of this ability in their children.

The analysis also showed that children who had higher attendance at preschool had better emerging writing ability. This result suggests the role of Early Childhood Edu-

cation in the stimulation and preparation of children for the later learning of LE skills (Pereira et al., 2011; Shah et al., 2017).

The associations observed between family environment variables and children's vocabulary performance suggest that the interaction models that parents maintain with the child (Modeling), as well as the opportunities of stimulation offered to them (Variety) seem to be related to the development language component. In fact, previous studies have already suggested an association between quality of the family environment and child development (Lamy Filho et al., 2011; Scopel et al., 2012). Still, Son and Morrison (2010) pointed out that positive changes in the family environment

can contribute to the development of language. The specificity of our study was to demonstrate which specific aspects (to the detriment of the generic term 'quality of the family environment') are more associated with children's performance.

In this sense, the study showed that positive family environments in terms of a variety of experiences, such as the fact that the child has a musical instrument, even a toy, an opportunity to go sightseeing, visits to places such as museums. On the other hand, with the family, encouragement for the child to take responsibility for the organization of their things, such as their toys, to participate or be able to make their own choices, for example, what they want to eat or to buy in the market. Put their drawings on the walls of the house and style of interaction, parent's reaction when the child expresses negative feelings or acts aggressively toward them; the 'visitor' to the child when collecting research data, stimulating it to social interaction. All these things are associated with the children's vocabulary.

No relationships found between HOME variables and RW scores, suggesting that other variables, such as those associated with schooling, may be more relevant to RW performance in children at this school level. In fact, as already discussed, a relationship has been observed between the time of schooling of the child, in terms of attendance at the preschool, and its performance in writing months later. However, the fact that there was no relationship between variables in the family environment or SES and in children's RW scores does not necessarily indicate that such variables have no impact on academic performance. One hypothesis is that this association is indirect, that is, the mother's schooling or family environment would be related to more basic skills, such as OL, and this, in turn, may be associated with RW acquisition (this would be expected from According to Pazeto, 2016, Seabra & Dias, 2012, Song et al., 2015). Thus, although there was no direct relationship between SES variables and the family environment with the RW performances, it is possible that there is an indirect impact through the stimulation of vocabulary skills. New research designs may test this hypothesis.

Evidence has pointed out that factors associated with the family environment and pre-school environment are associated with the children's linguistic performance (van Druten-Frietman et al. 2015). Pinto et al. (2013), for example, found that, in association with pre-school quality, the family environment related to language development and early literacy. With close findings, this study suggests that the family environment, including SES variables, is associated with language performance, specifically vocabulary, and the time attendance at preschool (schooling time), the child's emerging writing ability.

This study has a well-delimited clipping, as is characteristic of the scientific method, but together with the evidences of the area can subsidize new investigations and actions with practical / social implications. For example, parental guidance programs could highlight the importance of the variety of stimulation, as the same as to offer children opportunities for choice and stimulate their organization, and modes of interaction, including acceptance of negative feelings (foste-

ring), encouragement for the establishment and use of rules, such as the judicious use of TV, and encouragement of social interaction.

We expected to find in this study other relationships between family environment variables, SES and performance in vocabulary, reading and writing, which has not confirmed. Future studies should extend this sample, contemplating private and public schools and different locations, in an attempt to confirm, clarify or even expand these findings. It is also possible that stronger relationships between family environment and vocabulary could be found in a sample of younger children, since between 4 and 5 years other environmental influences, e.g. the peers that cannot easily be controlled. Likewise, considering initial LE skills, it is also possible that robust relationships with the family environment could be found in older children who would have better developed RW.

## Final considerations

In general, it was observed that there are relationships between SES variables, especially years of mother's study, and specific aspects of the family environment (such as Modeling and Variety) and children's vocabulary. Mother's educational level and socioeconomic level seem to be variables that are relevant to performance in receptive vocabulary. Yet, the way parents interact with their children and the variety of learning stimuli and opportunities related to children's vocabulary. The time the child attended Early Childhood Education was associated more specifically with future writing performance. The study contributes to the investigation of how environmental variables can be associated with the development of language skills and provide information that may support future research that focuses on, for example, parenting.

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