Human Development

Child naming skills and the quality of environments

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Abstract

The objective was to relate the quality of family, school, and neighborhood environments to the naming skills of children in early childhood education. Sixty-four (64) children from 24 to 60 months of age and one family member for each child participated. The Child Naming Test, the Family Poverty Index, the Home Environment Resources Scale, and the Neighborhood Quality Instrument were applied to measure the quality of the environments, and the ECERS-R Scale was applied to measure the school environment. It was identified that 45.3% of the children obtained a high score in the Child Naming Test. Thus, the relationship between the variables pointed out that family members' income and education and joint activities between adults and children were the factors most associated with the outcome of language, which highlights the importance of monitoring language skills and the quality factors of the environments.

Keywords: child development; language; environment; oral communication; expressive vocabulary.

HABILIDADES DE NOMEAÇÃO INFANTIL E A QUALIDADE DOS AMBIENTES

Resumo

Este estudo teve como objetivo relacionar a qualidade dos ambientes familiar, escolar e de vizinhança às habilidades de nomeação de crianças na educação infantil. Participaram 64 crianças de 24 a 60 meses de idade e um familiar de cada uma. Foi aplicado o Teste Infantil de Nomeação, e, para mensurar a qualidade dos ambientes, adotaram-se o Índice de Pobreza da Família, o Inventário de Recursos do Ambiente Familiar, o Instrumento de Qualidade da Vizinhança e a escala ECERS-R para o ambiente escolar. Foi identificado que 45,3% das crianças obtiveram escore alto no Teste Infantil de Nomeação. Desse modo, a relação entre as variáveis apontou que a renda e a escolaridade dos familiares, assim como as atividades conjuntas entre adultos e crianças, foram os fatores mais associados ao desfecho da linguagem, o que realça a importância de monitorar as habilidades de nomeação e os fatores de qualidade dos ambientes.

Palavras-chave: desenvolvimento infantil; linguagem; ambiente; comunicação oral; vocabulário expressivo.

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HABILIDADES DE DENOMINACIÓN INFANTIL Y LA CALIDAD DE LOS AMBIENTES

Resumen

El objetivo fue relacionar la calidad del entorno familiar, escolar y comunitario con las habilidades de denominación de los niños en la educación infantil. Participaron 64 niños de 24 a 60 meses y un familiar de cada uno. Para evaluar el lenguaje, se aplicó la Prueba de Denominación Infantil. Para medir la calidad de los entornos, se aplicaron el Índice de Pobreza Familiar, el Inventario de Recursos del Entorno Familiar, el Instrumento de Calidad Comunitaria y la escala ECERS-R. La mayoría de los niños (45,3%) se ajustan a la puntuación más alta en la Prueba de Denominación Infantil. Así, la relación entre las variables señaló que el ingreso familiar y la educación, así como las actividades conjuntas entre adultos y niños fueron los factores más asociados al resultado del lenguaje, lo que resalta la importancia de monitorear las habilidades de denominación y los facto-res de calidad de los entornos.

Palabras clave: desarrollo infantil; lenguaje; ambiente; comunicación oral; vocabulario expresivo.

1. Introduction

Oral language is a system of principles and rules, which enables the encoding and decoding of sounds and symbols to convert concepts or ideas and produce orality. Language development depends on the complex interaction between individual and environmental factors (Alves et al., 2017; Horst & Torkildsen, 2019). Thus, it is expected that stimulating and good quality environments are more conducive to neurological maturation and the acquisition of skills appropriate to the child's chronological age.

Among the oral language skills, the expressive vocabulary stands out, which corresponds to the lexicons issued by the child, based on the semantic capacity and phonological awareness, and can be assessed by the number of words that he/she is capable of producing and by the naming of words (Horst & Torkildsen, 2019). In this sense, child naming tests assess the child's ability to identify information or a visual symbol, access content in the lexical-semantic field, and articulate it verbally.

As children grow and are inserted into new environments, the tendency is for this skill to be improved. In addition, this ability is related to the process of acquisition of reading, writing, and socialization, being an important indicator of language disorders (Horst & Torkildsen, 2019). Therefore, it is essential to evaluate

the appointment, especially in early childhood education, to identify changes in language development previously, risk factors for the environment, and enable early intervention.

In view of this, Bronfenbrenner's Bioecological Theory of Human Development (2011) stands out, which allows understanding development through four interrelated theoretical cores: the process (P), the person (P), the context (C), and the time (T). Thus, it is possible to analyze the characteristics of the person, who is involved in proximal processes guided by interactions between organism and environment, along with temporal dimensions. In this theory, the proximal process is highlighted as the primary driver of development. They are particular forms of interaction between person and environment, which manifest themselves gradually and vary according to the complexity of the interpersonal interactions and activities carried out, acting on the enhancement of the genetic and biological capacities of human beings.

It is emphasized that two types of evolutionary results come from the proximal processes: 1. the effect of competence through the acquisition or improvement of skills and abilities; and 2. the dysfunction effect, in which there are difficulties in maintaining the regulation of behaviors in the different domains of development, especially language. Both results depend on the mutual interaction between person and the environment. Thus, it is expected that stable environments will be more conducive to the manifestation of the competence effect. In contrast, dysfunction can manifest more frequently in disorganized or lower-quality environments (Bronfenbrenner, 2011).

In this perspective, according to Bronfenbrenner (2011), as the child develops, he/she starts to interact in different ecological environments. This behavior is understood as an organization of concentric structures, subsystems that interact with each other and with the person in development. They are called micro, meso, exo, and macrosystem. The first is the immediate environment, where the child establishes activities, roles, and interpersonal relationships, such as the family, school, and neighborhood microsystems.

In these terms, the family microsystem is generally the first environment where the child is inserted, and its quality refers to the types of care and stimuli provided by the family, emphasizing social support and resources. The support refers to the care and support directed to the child, in addition to the organization of the

routine and the supervision or monitoring offered in daily activities. The resources correspond to the materials made available in this environment, such as furniture, objects, and toys (Law, Rush, King, Westrupp, & Reilly, 2018; Marturano, 1999).

Another microsystem in which the child is inserted in early childhood is the neighborhood environment. Its quality can be determined by the conditions of residents' access to public and private services, such as infrastructure, leisure and accessibility opportunities, low exposure to pollution and violence, and relational aspects such as cohesion and social interaction between neighbors. From the perspective of human development bioecology, the situation of social vulnerability has macro systemic characteristics that directly influence the quality of family, school, and neighborhood environments and impact the developmental processes that occur in these microsystems. Thus, studies have considered that the low quality of these environments is linked to the interference of multiple risk factors, including poverty (Iruka et al., 2018; Morais, 2013, Tran, Luchters, & Fisher, 2017).

Poverty is a multifactorial and multidimensional phenomenon expressed asymmetrically in different populations and regions of Brazil. Particularly in the North region, in the Amazon, which stands out negatively for the high rate of children under six who belong to families in a situation of poverty and live in neighborhoods with precarious resources (Barros, Carvalho, & Franco, 2006; Costa, Cavalcante, & Dell'Aglio, 2015).

However, it is expected that the school environment, such as early childhood education institutions, where children have entered earlier and earlier, may contribute to the stimulation of development, especially in this critical period of neurological maturation (Alves et al., 2017; Pianta, Downer, & Hamre, 2016). However, the infrastructure of these spaces and the pedagogical proposals do not always have an adequate quality standard. The quality of this environment is the result of seven dimensions, namely, space, and furniture; personal care routines; language and reasoning; activities; interaction; program structure; and the relationship between parents and professionals (Campos, Esposito, Bhering, Gimenes, & Abuchaim, 2011). Such dimensions generally depend on the resources available or received by these institutions.

Evidence from current studies (Alves et al., 2017; Gatt, Baldacchino, & Dodd, 2020; Law et al., 2018) points out that environmental factors influence language performance. However, few studies have assessed the association between oral

language skills and the quality of environments, particularly in the Amazon region. Despite this, the research by Costa et al. (2015), which investigated the language development of 319 children enrolled in public Early Childhood Education Units in Belém, stands out. The results showed that 77.7% showed development with questionable scores, using the Denver II test, with family poverty being the main associated variable. However, it is still necessary to clarify how the environments in which children in poverty are inserted are interrelated and their influence on oral language skills.

Therefore, this study continued the investigations by Costa et al. (2015) to deepen the analysis of the relationship between children and their family, school, and neighborhood microsystems, focusing on the characteristics that indicate the quality of these environments, allowing to learn about the bioecological conditions in which the skills related to the semantic level and lexical capacity, in particular the appointment is established. Thus, the objective of this study was to relate the quality of family, school, and neighborhood environments to the children naming skills in early childhood education. The established hypothesis is that the better the quality of the environments, the better the children's performance in this oral language skill.

2. Method

2.1 Design

This is a cross-sectional, correlational study with a quantitative approach to the data. The Ethics Committee of the Nucleus of Tropical Medicine of the Federal University of Pará (UFPA) approved the research, according to the opinion 1.846.658 / 2016, in addition to following the norms of Resolution No. 466/12 of the National Health Council that governs research involving human beings.

This study was carried out in a public Child Education Unit (UEI), located in the central region of the municipality of Belém. This UEI annually receives about 70 children, divided into three classes, namely, Maternal I (2 to 3 years old), Maternal II (3 to 4 years old), and Kindergarten I (4 to 5 years old). The service takes place full time (7:30 am to 5:30 pm), and the children are accompanied by ten teachers, two per shift, in the nursery classes and one per shift in the kindergarten class. The selection criteria for this Unit was by a non-probabilistic sampling of the intentional

or judgment type. In this case, the choice of the institution was justified because this UEI was the one where the children performed worse in the language area in the Denver II test, according to the research by Costa et al. (2015), thus allowing for deepening the study.

2.2 Participants

The sample consisted of 64 children, aged between 24 and 60 months of age, with a mean age of 43.03 (SD = 9.58), with 38.6% (27) being female and 61.4% (43) being male. Of these, 19 were in Maternal I, 20 in Maternal II, and 25 in Kindergarten I. For inclusion criteria, the parents' authorization for the child's participation in the research was considered; and the reports of parents and teachers attesting to the fact that the child's development does not change, that is, children with typical development. It is noteworthy that two children were excluded for being under the age of 3 years old. In addition, one of the parents of each child participated in the research, 89.1% (57) being mothers and 10.9% (7) being fathers.

2.3 Instruments

The Child Naming Test (TIN) reduced version, proposed by Seabra, Montiel, Capovilla, and Macedo (2012), was applied to evaluate the language. The instrument assesses the expressive language and lexical-semantic skills, especially naming, in addition to accessing long-term memory. The instrument has 60 figures for naming, with 1 point being computed for each correct answer. The raw score is generated (0 to 60 points) to obtain the final score, and then the standard score is sought in the standardization table, which defines the following scores "very low" (<70 points), "low" (70 to 84), "medium" (85–114), "high" (115 to 129), and "very high" (≥130 points). The TIN has an internal consistency of 0.92 (Cronbach's alpha) and Spearman-Brown's coefficient of 0.90.

The Family Poverty Index – IPF (Barros et al., 2006) was applied to measure the quality of the family environment. It comprises 48 indicators and is divided into six dimensions: vulnerability, access to knowledge, access to work, availability of resources, child development, and family housing conditions. Each indicator must be answered with "yes" (1 point) or "no" (0 points). The instrument's gross score ranges from 0 to 48 points, but the weighted score ranges from 0 to 1.

To calculate the final score, the value of 1 (maximum value) was initially divided by 6 (number of dimensions), with a weight of 0.167 being attributed to each one. Soon after, for each dimension, 0.167 was divided by the number of existing indicators in each one. The final score was classified into quartiles, namely, Q1 (0-0.25) families with greater poverty, Q2 (0.26-0.50) and Q3 (0.51-0.75) families with average poverty, and Q4 (0.76-1) families with less poverty.

The Home Environment Resources Scale – HERS (Marturano, 1999) was used to investigate social support and family environment resources. It consists of three dimensions: supervision and organization of routines; opportunities for interaction with parents; and presence of resources in the physical environment. To score questions from one to seven, 1 point is added for each item marked. In question eight, the score for each item ranges from 0 to 3 points; in questions nine and ten, the score ranges from 0 to 2 points. The score in each question is the sum of the points obtained, divided by the number of items that make up that topic and multiplied by 10. The total score corresponds to the sum of the scores obtained in the 10 questions of the instrument (Marturano, 1999), and the higher the score, the better the quality of the family environment. The RAF has an internal consistency coefficient equal to 0.76 (Cronbach's alpha).

The Neighborhood Quality Instrument – *Instrumento de Qualidade da Vizinhança*, in Portuguese – IQV (Morais, 2013) was also applied to parents. It is structured in the following subscales: infrastructure; services and convenience; quality of services; institutional activities; interaction and trust; intervention and retaliation; assistance; neighborhood satisfaction; safety; mobility; and disorder. As for the IQV score, for the subscale's "infrastructure" and "services", each existing structure or service receives 1 point. If the family has not used the service in the last three months, it receives 2 points. In the subscale "quality of services", the score follows an ordinal scale of 5 points, ranging from bad to excellent. In the other subscales, the answers range from "never" (1 point), "sometimes" (2 points), and "always" (3 points). In the end, the score of each subscale is added, generating a raw score, with better quality being attributed, the higher the score. The IQV has an internal consistency coefficient equal to 0.78 (Cronbach's alpha).

To assess the quality of the school environment, the Early Childhood Environment Rating Scale, Revised Edition – ECERS-R, which assesses the quality of early childhood education environments for children between 2 and 5 years old,

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has been translated and adapted into Brazilian Portuguese (Campos et al., 2011). Its observation guide contains seven sub-scales (space and furniture; personal care routines; language and reasoning; activities; inter-action; program structure; and parents and staff) and has a total of 43 items and 470 indicators. The indicators are marked "yes", "no", or "not applicable", and each item will have a score ranging from 1 to 7 points. In the end, the average is generated for each subscale and then the general average, which also varies from 1 to 7 points, with the following scores: inadequate, for scores from 1 to 2.9; minimum/basic, for 3 to 4.9; good, for 5 to 6.9; and excellent for score 7 (Harms et al., 1998). The scale has internal consistency (Cronbach's alpha) of 0.92 and inter-observer fidelity of 71% regarding its psychometric qualities.

2.4 Data collection procedures

Data collection was held from July to December 2016. Initially, the researchers went through an adaptation period in the environment, which lasted seven days before the application of ECERS-R and 15 days before the application of the TIN, in order to enable familiarization with the environment and the participants and avoid false results. Thus, the classes were observed by two researchers mandatorily in the morning and afternoon periods. Six observations were made in each class. The level of agreement between the responses of the evaluators was 96.1%.

The TIN was applied individually with the children by the same evaluator, with the help of an intern. The situations of fatigue, illness, and other complications were respected. Parents were invited to participate in the research and authorize children's participation with the signing of the Free and Informed Consent Form. The collection of information from the IPF, RAF, and IQV instruments took place in the form of an interview when entering and/or leaving the Unit.

2.5 Data analysis procedures

Each instrument was organized, taking as a reference its thematic axes. For categorical variables, the Test used Chi-square and the Test G association. For the comparison of means, Analysis of Variance (ANOVA) was performed. Finally, the multiple binary Logistic Regression analysis was performed, using the method Stepwise Regression Forward not automatically selected. The inclusion of each variable in the model was verified based on the likelihood ratio test, the Akaike

Information Criterion (AIC), and the odds ratio (OR). A significance level of 5% was adopted for all analyses.

3. Results

3.1 Child Naming Test (TIN)

The average score in the Child Nomination Test was 109.47 points (SD = 23.7; MD = 109.0), with a score of 73 and a maximum of 176 points. 45.3% (N = 29) of the children fit the high score, followed by the low 28.1% (N = 18) and 26.6% (N = 17) scored average. For the statistical analysis between the dependent and independent variables, initially, the Kolmogorov–Smirnov and the Levene tests were performed, which pointed out that the sample had a normal and homogeneous distribution, respectively.

3.2 Quality of the Family Environment

Regarding the characteristics of the parents, the mothers of the children assessed had the following socioeconomic profile: 39.1% (25) were in the age group of 20 to 25 years old, 50% (32) had completed high school, and 35.9% (23) had a professional occupation as a small employee or in the worker category. Regarding the fathers, 57.8% (37) were over 30 years old, 37.5% (24) had completed high school, and 39.1% (25) had a professional occupation in the small employee or worker category.

Concerning the Family Poverty Index (IPF), most families whose children obtained a low score in the TIN fell into quartile Q2 (41.7%), which gathers the families with the worst poverty situation in the country. The average family per capita income was BRL $ 424.4 (SD = 319.7), with a minimum value of BRL $ 42.8 and a maximum of BRL $ 1700.00. In addition, the variables "absence of adults with complete secondary education", "absence of a worker with medium or high qualification", and "family per capita income lower than the extreme poverty line", showed a statistically significant association with the TIN. Children with low performance in the naming test belonged to families whose adult members had low education and professional qualifications, as shown in Figure 3.2.1. To compare the mean scores of the instruments, the Analysis of Variance (ANOVA) and the post-hoc test in Bonferroni (F) were used. According to Figure 3.2.2, the data allow

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us to infer that children with the highest score in the TIN also obtained averages of the highest scores in the IPF, mainly in the dimensions "Access to income" and "Access to knowledge", that is, members had more financial resources and a higher educational level.

Figure 3.2.1. Bivariate Analysis Between the TIN and Quality of Environments.

	Child Naming Test% (N)				
	Low	Medium	High	Test	*p*-value
Family Poverty Index					
First Quartile	10.7 (3)	28.6 (8)	60.7 (17)	8.05[a]	0.01
Second Quartile	41.7 (15)	25% (9)	33.3 (12)		
Presence of adult with complete high school					
No	22.8 (13)	28.1 (16)	49.1 (28)	34.0[b]	0.01
Yes	71.4 (5)	14.3 (1)	14.3 (1)		
Presence of worker with medium or high qualification					
No	11.8 (2)	17.6 (3)	70.6 (12)	35.9[b]	0.04
Yes	34 (16)	29.8 (4)	36.2 (17)		
Family per capita income lower than the extreme poverty line (BRL $ 140.00)					
No	19.6 (9)	26.1 (12)	54.3 (25)	49.7[b]	0.002
Yes	50 (9)	27.8 (5)	22.2 (4)		
Home Environment Resources Scale (HERS)					
Joint activities between parents and family					
Play					
No	38.9 (7)	44.4 (8)	16.7 (3)	8.58[a]	0.01
Yes	23.9 (11)	19.6 (9)	56.5 (26)		
Storytelling					
No	38.1 (16)	33.3 (14)	28.6 (12)	14.0[b]	0.001
Yes	9.1)2§	13.6 (3)	77.3 (17)		
Reading					
No	40:18.	33.3 (15)	26.7 (12)	26.2[B]	<0.001
Yes	0 (0)	10.5 (2)	89.5 (17)		
Chatting about the day at school					
No	56.3 (18)	31.3 (10)	12.4 (4)	42.4[b]	<0.001
Yes	0 (0)	21.9 (7)	78.1 (25)		

continue

Figure 3.2.1. Bivariate Analysis Between the TIN and Quality of Environments.

	Child Naming Test% (N)				
	Low	Medium	High	Test	*p*-value
Child owns children's storybooks					
No	43.3 (13)	30 (9)	26.7 (8)	9.22[b]	0.01
Yes	14.7 (5)	23.5 (8)	61.8 (21)		
ECERS–R					
Use of Language to develop the child's reasoning					
Basic	37.8 (17)	31.1 (14)	31.1 (14)	29.9[b]	0.001
Excellent	5.3 (1)	15.8 (3)	78.9 (15)		
Adult–child interaction					
Basic	16–4	56 14%	28±7	18.2[a]	<0.001
Excellent	35.9 (14)	7.7 (3)	56.4 (22)		
Institutional Activities and Interaction and Trust					
Meet neighbors to solve neighborhood problems					
Never	35.7 (15)	35.7 (15)	28.6 (12)	15.2b	0.01
Rarely	0	14.3 (1)	85.7 (6)		
Sometimes	21.4 (3)	7.2)1§	71.4 (10)		
Always	0	0	100 (1)		
Chatting and visiting neighbors					
Always	12(3)	16/16	72 (18)	18.8[b]	0.001
Sometimes	31.3 (10)	40.6 (13)	28.1 (9)		
Never	71.4 (5)	0	28.6 (2)		
Satisfaction with the neighborhood and social disorder					
The neighborhood is a good place to live					
Always	13.3 (4)	16.7 (5)	70 (21)	19.6[b]	0.001
Sometimes	32.8%	44–11	24 (6)		
Never	66.7 (6)	11.1 (1)	22.2 (2)		
The neighborhood is good for raising children					
Always	7.7 (2)	30.8 (8)	61.5 (16)	10.5[b]	0.03
Sometimes	37.9 (11)	24.2 (7)	37.9 (11)		
Never	55.6 (5)	22.2 (2)	22.2 (2)		

Note: [a] = Test *Chi-square*; [b] = Test *G*

Figure 3.2.1 also explains the results of the Home Environment Resources Scale (HERS). It was noted that in the category "joint activities with parents or family members", children with lower scores on the TIN were less likely to perform these activities, such as "playing", "telling stories", "reading", and "Talk about how it was at school". Figure 3.2.2 shows that children with the highest TIN score also obtained higher averages in the RAF scores.

Figure 3.2.2. Association between the Average Quality of Environments and the TIN.

TIN	Low	Medium	High	F	p*
Neighborhood Quality Instrument M (SD)					
Institutional Activities	2.33 (1.97)	2.53 (2.10)	4.76 (1.98)	3.81	0.03
Interaction and Trust	3.11 (1.60)	3.53 (1.18)	4.90 (2.32)	10.1	<0.001[a]
Neighborhood satisfaction	1.72 (1.27)	2.59 (1.12)	3.14 (1.19)	11.8	<0.001[a]
Total IQV	38.2 (8.66)	44.8 (9.38)	56.9 (10.7)	23.6	<0.001a
Family Poverty Index (IPF)					
Access to income	0.06 (0.03)	0.03 (0.03)	0.02 (0.03)	5.63	0.006[a]
Access to knowledge	0.04 (0.02)	0.03 (0.01)	0.03 (0.02)	9.62	0.03
Family Environment Resources (RAF)					
Joint activities with parents and family	2.92 (2.12)	3.95 (1.50)	5.70 (2.13)	11.6.	<0.001[a]
Total RAF	27.1 (7.69)	32.6 (5.81)	39.6 (8.01)	16.3	<0.001[a]
ECERS					
Language and Reasoning	4.17 (0.64)	4.24 (0.35)	4.81 (0.74)	7.43	0.001
Interaction	5.09 (0.86)	6.37 (0.96)	6.41 (0.94)	12.1	<0.001

* Significant difference between low and high groups; THE NEW– *one – way / Bonferroni*.

3.3. Quality of the Neighborhood Environment

Figure 3.2.1 also shows the variables of the Neighborhood Quality Instrument (IQV). In general, the children with the worst performance in the naming test belonged to families that did not use to "talk and/or visit neighbors" or "meet with neighbors to solve problems in the neighborhood". Furthermore, ANOVA revealed that there was a statistically significant difference concerning the means of the

dimensions "institutional activities", "Interaction and trust", "Satisfaction with the neighborhood", and the overall score of the instrument. The children with the best performance on the test had higher scores on the IQV, indicating better quality in this environment.

3.4 Quality of the School Environment

The three classes evaluated by the ECERS-R obtained the following averages: 4.08 (Maternal I), 3.89 (Maternal II), and 3.18 (Kindergarten I). Such grades fell into the category of minimum or basic quality. The subscales with the highest averages were "interaction" 6.9 (MI), 6.9 (MII) and 4.7 (JI), and "language and reasoning" 5.25 (MI), 4.5 (M2), and 3.88 (JI). It is noteworthy that the JI class had a teacher-child ratio above that recommended by the Ministry of Education (MEC). This advises that there are six to eight students per teacher for children from 0 to 1 year old; 15 students per teacher for 2 to 3-year-olds; and 20 students per teacher for children aged 4 to 5. However, the classes had the following proportion: 10 (MI), 12.5 (MII), and 25 (JI).

The bivariate analyzes showed that the ECERS-R items, which showed a statistically significant association with the TIN score, were "use of language to develop reasoning" and "adult-child interaction". Most children with high scores in the TIN obtained "excellent" in both items. Likewise, by ANOVA, it was observed that the averages of the subscales "language and reasoning" and "interaction" were higher for children who obtained a high score on the language test.

The logistic regression data revealed that, according to Figure 3.4.1, the odds ratio of the probability that a child will have worse performance in the naming skill is 59% higher as there are fewer adults with complete high school in the family. It will be 1.94 times higher when family per capita income (BRL $ 140.00) is lower than the extreme poverty line. It will be up to 4.84 times higher when teachers use less oral language to develop the child's reasoning and up to 4.36 times higher the less the parents perform joint activities with the child.

Figure 3.4.1. Logistic regression model for performance on naming skill.

Variables	Parameter B (%)	Standard Error (SE)	Wald test	p-value	Chance Ratio (Exp B)
Absence of adults with completed high school	0.68	0.29	4.25	0.02	0.41
Per capita family income below the extreme poverty line (BRL $ 140.00)	0.61	0.27	4.31	0.03	1.94
Use of language to develop reasoning	1.53	0.69	4.13	0.03	4.84
Joint activities with parents and family	1.49	0.75	4.09	0.04	4.36

Note: $P = 0.04$; $x^2 = 6.168$; $R^2 = 0.36$

4. Discussion

In relation to the TIN, most children presented results appropriate to the age group. That is, they demonstrated good oral language skills related to semantic level and lexical ability. This result was contrary to that found in the previous study by Costa et al. (2015), in which the majority of children in the same UEI had a high percentage of suspected language delay. As an explanatory hypothesis, it is noteworthy that this study had a probabilistic sample, which included children enrolled in public UEIs across the municipality of Belém. However, as this is the only unit in the district, the sample size was only 2.19%. However, 97% of enrolled children participated in the current survey.

In addition, in the research by Costa et al. (2015), all children in the UEI in question belonged to families with a high poverty rate and were not residents of the neighborhood where the unit is located. In this study, even though most of the children with the worst TIN score were from families with the highest poverty rate in the sample, part of the children belonged to families from different socioeconomic strata and were residents of the noblest region of the city. With that, the current study was able to explore other aspects of developmental bioecology.

4.1 Quality of the family environment

In this study, children from the Amazon region belonging to families with the worst poverty rate also had the worst scores on the language test, a result

consistent with that of other studies (Costa et al., 2015; Prado et al., 2017). The literature points out (Cohen-Mimran, Reznik-Nevet, & Korona-Gaon, 2016; Horst & Torkildsen, 2019) that there are parents with lower social economical levels, who tend to talk less with their children and to have verbal expressions with a more directive language, characterized by limited vocabulary and simpler morphosyntactic structures, such as giving instructions. As a result, it has been estimated that, particularly at four years of age, children with lower social economical levels tend to hear about 30 million fewer words (Romeo et al., 2018) and to know half of the words that children from families with higher social economical levels know (Horst & Torkildsen, 2019).

On the other hand, children with higher social economical levels tend to hear about 11 thousand statements per day (Greenwood et al., 2017). In contrast, those with lower social economical levels listen to approximately 700 statements (Horst & Torkildsen, 2019; Romeo et al., 2018). It is also estimated that, chronologically, there is a difference of about six months in terms of the language skills of children of different social economical levels (Cohen-Mimran et al., 2016; Rindermann & Baumeister, 2015). This means that vocabulary learning is particularly sensitive to socioeconomic factors (Gatt et al., 2020).

The bivariate analyzes and the logistic regression model pointed out as predictive variables the three main indicators that make up the socioeconomic level, which are family income, education, and professional occupation, which admits the findings of the studies highlighted above and reinforces the hypothesis of the influence of multidimensionality poverty on naming skills and not just income. This result is consistent with other studies, which revealed a trend towards better receptive and expressive lexical performance when the parents' education level increased (Gatt et al., 2020; Romeo et al., 2018). Given this, Rindermann and Baumeister (2015) suggest that the most important variable for stimulating children's cognitive and language skills is the educational one in this triad. In this study, even though the sample has not distinguished itself in terms of social economical levels, families in the worst situation of poverty were also the ones with the lowest level of education of adults, showing this variable associated with the lowest naming score.

In this research, it was found that children who performed more joint activities with parents and family were the ones who had the best performance in the naming

test. Similar results were found in other studies (Law et al., 2018; Rindermann & Baumeister, 2015). It should be noted that joint activities, such as symbolic play and reading, are important for the development of oral language skills, as they stimulate more verbal interaction than in activities of daily living, such as bathing, eating, and clothing, which involve more instructive communication (Cohen-Mimran et al., 2016; Law et al., 2018; Tamis-LeMonda, Custode, Kuchirko, Escobar, & Lo, 2018). These joint activities can be considered, according to Bronfenbrenner's Theory (2011), as promoters of proximal processes, which can inhibit or encourage the expression of linguistic competences, in the case of the participants of this study, abilities that involve the semantic and phonetic components − phonologicals are involved in the naming process (Romeo et al., 2018).

Among the joint activities investigated, the shared reading of books was one of those most associated with the high score in the naming test and the presence of reading materials at home. Thus, the discourse of parents during book sharing is structurally more complex, lexically diverse, high in questions, and low in regulatory or directive language, compared to dialogues in other activities, regardless of the NSE (Tamis-LeMonda et al., 2018). However, in the study by Horowitz-Kraus, Hutton, Phelan, and Holland (2018), it was identified that the reading activity between parents and children with lower social economical levels, had less dialogic emphasis, that is, they narrated instead of talking about the stories, and children assumed an audience role. In addition, less schooling can impair reading, thus maintaining the cycle of little verbal acquisition.

It is noteworthy that the lower social support between parents and child is also a consequence of the multidimensional nature of poverty. It can be hypothesized that, in addition to the shorter schooling time, the parents' workday also affects time and their availability to carry out joint activities with their children, such as reading and playing. Thus, according to Bronfenbrenner (2011), when the environment is not conducive to manifestations of the proximal processes that lead to competence, the effect may be that of developmental dysfunction, which the present study results can exemplify. That is, the multidimensional risk condition in the family environment of some of the children participating in this research, determined mainly by the situation of poverty, demonstrates the potential that this condition has for reducing joint activities and interfering with naming skills.

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4.2 Quality of the neighborhood environment

Children belonging to families living in neighborhoods considered to be of low quality had the lowest performance in the naming test. This effect can occur indirectly or distally in child development (Horst & Torkildsen, 2019; Morais, 2013; Vernon-Feagans et al., 2012). For example, residents of neighborhoods classified as of lower quality are more likely to be exposed to stressors, such as noise, insecurity, disorder (accumulation of garbage, graffiti, traffic, marginality, and crime), and low social cohesion (Morais, 2013; Horst & Torkildsen, 2019). These variables can indirectly interfere in the parents' mental health and parental care and directly impact the quality and stimuli of the family environment and, consequently, on the development of oral language.

The dimensions "institutional activities", "interaction and trust", and "satisfaction" of the IQV were related to the performance in the naming test, and children with a low score also obtained lower averages in these dimensions of the IQV. Thus, it can be assumed that in a bioecological perspective, affective and collaborative ties between neighbors and participation in activities (religious, commemorative, and organizational) can trigger proximal processes and expose children to a complex ecology, marked by linguistic stimuli conducive to the acquisition and improvement of oral language skills, such as dialogues and lexical content, in addition to promoting the feeling of belonging and well-being in the community.

4.3 Quality of the School Environment

The minimum or basic level of quality of the school environment, as measured by ECERS, was consistent with that of other studies (Alves et al., 2017), including that carried out in Belém (Campos et al., 2011). As for this research, the results showed that the inter-action subscale was the one with the highest quality score. In this regard, daily interactions between teachers and students in early childhood education are among the main variables that promote development.

However, not all children experience lasting and consistent interactions in this dyad. This is because, most of the time, teachers fulfill multiple tasks, but mainly because of the number of students per class (Mayer & Beckh, 2016; Pianta et al., 2016). In this study, it was found that children with more naming skills were those who were the most involved in long-term interactions with teachers.

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It is suggested that this difference has occurred since the JI class had a teacher-child ratio above that recommended by the Ministry of Education (*Ministério da Educação* – MEC). As a result, children were not always stimulated, and, in many instances, directive commands were prioritized rather than dialogues. Thus, it is assumed that the variables that predict the quality of the school environment, especially the lower frequency of activities that stimulate language and reasoning and interactions in the school environment, may have impaired the quality of the proximal processes established by the children, with an effect of dysfunction on on the naming skill.

From the findings in the three environments investigated, according to the premise of Bronfenbrenner (2011), it can be reflected that the developmental results and the person's characteristics do not manifest in isolation; one must consider the interaction factors established in the immediate contexts and remote from the bioecological system. The children from the Amazon region participating in this research frequented various environments, and this means that, while one of them was able to act positively, strengthening certain proximal processes and personal attributes, the others were able to lead to his/her weakening. However, the result of the development will always be a result of the function of these interactions (Bronfenbrenner, 2011; Romeo et al., 2018).

Thus, it is considered that the driving factors for the development of oral language, which occurred in an environment, may have fostered proximal processes that remained active in the others, especially in children with better performance in naming and with better quality of environments. For example, such processes may have been driven by joint and interactive activities with adults and exposure to reading in the family environment. At school, in adult-child interaction, and in language stimulation, during pedagogical and care activities. Finally, in the neighborhood environment, participation in institutional activities and good interaction between neighbors.

Among the limitations and recommendations for future research, we highlight the increase in sample size and heterogeneity, the type of sampling, and the temporal design of the study. In addition, the fact that the classes evaluated by ECERS-R are in the same institution could have hindered the association between subscales and items and the outcomes of the TIN. Even so, from the appreciation of the results, it was possible to come to some considerations. First, the prevalence

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of children with poor performance on the language test was lower than in the previous research by Costa et al. (2015). It is suggested that this drop occurred due to the increase in the number of children assessed at the same UEI, the use of a specific language instrument, in addition to investigating the quality of other environments.

Even though the participants constituted a homogeneous sample, mostly with characteristics of poverty, it was possible to visualize that, in the same socioeconomic stratum, there are families less affected by risk factors; that is, they did not present the worst result in all indicators. This means that it is indisputable that the condition of poverty does not influence everyone in the same way; that is, there are risk and protection variables.

In this way, characteristics such as education, professional occupation, and income revealed themselves as mediators of the risk to language development. Thus, it is argued that financial insecurity caused by informal employment and a low academic degree can limit the quality of the family environment in terms of material and psychosocial investment and decrease the consistency of good parenting practices, such as joint activities, symbolic play, and shared reading. Consequently, this situation results in less stimulation or acquisition of the child's naming skills.

Concerning the quality of the neighborhood environment, it was identified that the deprivation of interactions with neighbors might imply a lack of stimuli for the vocabulary. The community's low social participation and family interaction can be associated with several factors measured by the IQV. These multiple factors can cause a feeling of insecurity, which generates fear for parents to allow their child to interact in this environment, thus reducing the family's social support network.

With regard to the quality of the school environment, the classes evaluated by the ECERS-R obtained a score considered basic or minimum, reflecting the reality of many Brazilian public daycare centers. Even so, the scale showed that variables such as adequate use of language and adult-child interaction were related to performance on the naming test, which makes it possible to assume that this environment can function as a protective factor and favor language, especially because children stay about 10 hours a day in the unit.

Therefore, it is believed that the results of this study agreed with the hypothesis that there would be an association between the variables that describe

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the quality of the environments and the naming skills of the children. In other words, the lower condition of poverty and the better resources and support of the family, together with the better quality of the school and the neighborhood, result in the best semantic and lexical development.

The TIN proved to be a good tool for screening this ability and at an early stage, so that interventions can be better planned and executed, since the lexical-semantic skills are related and can contribute to the literacy process, especially in reading and writing, in addition to the child's sociability and engagement in increasingly complex activities.

Based on the analyses carried out and the reflections raised, it is hoped that this research may generate repercussions for improving the bioecological conditions of children in the Amazon region and their families. In this sense, as implications for practice, the importance of the Bioecological Theory is emphasized to guide the analysis of oral language development systemically, that is, to investigate how children perceive and deal with the adversities of contexts throughout the study. Furthermore, our results highlight the importance of partners for carrying out joint activities such as playing and reading, not only for the parents, but also for teachers and neighbors, in order to trigger proximal processes and, who knows, to reduce the strength of the risk factors in the family environment.

It is known that the Amazon has negative indicators related to child health. Therefore, policies and investments must be thought with equity to identify children at risk of language delay and carry out interventions in a timely manner. In addition to improvements in the school environment, since it is where many children are able to supply the lack of stimuli that the family and neighborhood do not adequately provide. In this way, the potential of reading activities for the acquisition of expressive vocabulary is highlighted. In this perspective, the Brazilian Society of Pediatrics has invested in the campaign "Prescribe a Book" in order to mobilize health and education professionals and especially parents to stimulate reading to children from zero to six years old as a way to promote integral child development, especially in conditions of social vulnerability.

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