

Communicative profiles of children from multi-species families

Perfil comunicativo de crianças pertencentes a famílias multiespécie

Perfil comunicativo de niños pertenecientes a familias de múltiples especies

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Abstract

Introduction: Scientific research has shown the benefits of the human-animal relationship, which might have an impact on child development. **Objective:** To evaluate the communicative profile of children in multispecies families including a dog as the pet. **Methods:** This is an exploratory, cross-sectional study of a quantitative nature. Sample: 54 subjects of both genders, and aged between three months and four years and five months: 34 subjects from multispecies families (Study Group-SG) and 20 subjects who never belonged to multi-species families (Control Group-CG). Procedure: The study was carried out at the participants' homes and data were collected through observation and a 30-minute video recording of a situation of playful interaction, in routine family contexts, involving the presence of the dog (SG) and without any animals (CG). The analysis of the results was carried out using the Behavioral Observation Protocol (PROC). Then, data were submitted to statistical analysis, in which a descriptive level of 5% ($p < 0.05$) was adopted for statistical significance. **Results:** Although there were no statistically significant differences in scores in the study population, However, it was observed that the participants and their pet(s) were interactional partners and that the dog played the role of interlocutor during the interaction scenes. **Conclusion:** The hypothesis that the dog enhances the child's communication skills cannot be refuted. Thus, this study expands the discussion on the topic and recommends the conduct of further studies, since the presence of dogs is increasing in Brazilian homes.

Keywords: Language; Language development; Family; Dogs; Bonding, human-pet.

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Authors' contributions:

APSH: Methodology, data collection and study design and outline.

MCC: Critical review and guidance.

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Resumo

Introdução: Pesquisas científicas têm evidenciado os benefícios da relação homem-animal, repercutindo no desenvolvimento infantil. **Objetivo:** avaliar o perfil comunicativo de crianças pertencentes a famílias multiespécie, onde o cão é o animal de estimação. **Métodos:** estudo exploratório, transversal, de natureza quantitativa. Casuística: 54 sujeitos, de ambos os sexos, na faixa etária entre três meses e quatro anos e cinco meses: 34 sujeitos pertencentes a famílias multiespécie (Grupo Pesquisa - GP) e 20 sujeitos que nunca pertenceram a famílias multiespécie (Grupo Controle - GC). Procedimento: a pesquisa foi realizada na residência dos próprios sujeitos e os dados foram coletados por meio de observação e filmagem de uma situação de interação lúdica, nos contextos familiares rotineiros, durante 30 minutos, envolvendo a presença do cão (GP) e sem nenhum animal de estimação (GC). A análise dos resultados foi realizada a partir do Protocolo de Observação Comportamental (PROC). Em seguida, os dados foram submetidos à análise estatística, onde assumiu-se um nível descritivo de 5% ($p < 0,05$) para significância estatística. **Resultados:** na população estudada, não foram observadas diferenças estatisticamente significativas nos escores. Contudo, observou-se que os sujeitos e seu (s) animal (s) de estimação (s) foram parceiros interacionais e que o cão desempenhou papel de interlocutor durante as cenas de interação. **Conclusão:** a hipótese de o cão potencializar as habilidades comunicativas da criança não pode ser refutada. Este estudo abre a discussão sobre o tema, sendo de extrema importância pesquisas posteriores, visto que a presença dos cães é universal e crescente nos lares em todo o mundo.

Palavras-chave: Linguagem; Desenvolvimento da linguagem; Família; Cães; Vínculo homem-animal de estimação.

Resumen

Introducción: La investigación científica ha demostrado los beneficios de la relación humano-animal, con repercusiones en el desarrollo infantil. **Objetivo:** evaluar el perfil comunicativo de los niños pertenecientes a familias de múltiples especies, donde el perro es la mascota. **Metodos:** estudio exploratorio, transversal, cuantitativo. Casuística: 54 sujetos, de ambos sexos, con edades comprendidas entre tres meses y cuatro años y cinco meses: 34 sujetos pertenecientes a familias multiespecies (Grupo de Investigación - GP) y 20 sujetos que nunca pertenecieron a familias multiespecies (Grupo Control - GC). Procedimiento: la investigación se realizó en la propia residencia de los sujetos y los datos se recolectaron mediante observación y filmación de una situación de interacción lúdica, en contextos familiares rutinarios, durante 30 minutos, con la presencia del perro (GP) y sin ningún animal (GC). Los resultados se analizaron utilizando el Protocolo de observación conductual (PROC). Luego, los datos se sometieron a análisis estadístico, donde se asumió un nivel descriptivo del 5% ($p < 0.05$) para la significación estadística. **Resultados:** en la población estudiada, no hubo diferencias estadísticamente significativas en las puntuaciones. Sin embargo, se observó que los sujetos y sus mascotas eran compañeros interactivos y que el perro desempeñaba el papel de interlocutor durante las escenas de interacción. **Conclusión:** la hipótesis de que el perro mejora las habilidades de comunicación del niño no puede ser refutada. Este estudio abre la discusión sobre el tema, y la investigación adicional es extremadamente importante, ya que la presencia de perros es universal y está creciendo en los hogares de todo el mundo.

Palabras clave: Lenguaje; Desarrollo del lenguaje; Familia; Perros; Vínculo ser humano-animal.

Introduction

Besides occupying a special place in people's lives, animals have also become members of their families. Thus, the presence of pets in the most diverse human environments is noticeable worldwide. This context has contributed to the growing interest of the scientific community in understanding this relationship, as well as its impact on the development of human beings¹.

Partly influenced by numerous social and cultural changes, the number of pets living in urban centers has grown significantly, and dogs and cats (mostly) have gained space in people's homes. Furthermore, the emotional bond between both species has intensified in recent decades.

The role that pets have been playing in human life has contributed to the growing number of scientific studies on this relationship. Researchers have found numerous benefits of living with animals, including measurable ones, such as increased well-being, reduced feelings of loneliness, assistance in patient recovery, among others².

At the same time, the multispecies family stands out as a new family composition, which is characterized by the presence of humans and their pets. The multispecies family is made up of individuals who recognize and legitimize their pets as members of the family³.

Multispecies families report different reasons for the acquisition of a pet, emphasizing affective and companion relationships, in particular. There are many variations of the role of pets in this context, according to the peculiarities of the family structure and the socio-emotional aspects of its members⁴.

For example, the inclusion of a dog in the family proves to be effective insofar as people recognize the animal's relevance not only from an individual perspective, but also from the effect on family dynamics⁵.

In fact, animals have achieved family member status for many people. Given this scenario, the impacts of this change on the human-animal relationship should be investigated, as well as the way that this new family arrangement impacts on child development, specifically on the language acquisition process⁶.

In this sense, a recent research found that the contact between babies and domestic animals reduces the risk of being overweight and suffering

from allergic diseases, as it changes the microbial capacity of the body. The interactions between children and animals enable them to meet typical physical childhood contact needs, in addition to providing important affective experiences, such as giving and receiving love, caring for each other, and dealing with birth and death⁷.

Although there are different species of animals in homes around the world, this study chose to include only multispecies families in which the dog is the pet. In addition to their universal presence, scientific evidence has already shown that dogs have sociocognitive skills that enable interaction with humans¹. Furthermore, although recent research correlating the presence of pets with child development has addressed different species in its methodology, dogs are the most researched. Their level of interaction and potential for reciprocity compared to other animals are the main motivating factors for the choice of canine species in research methodologies⁸.

Given that multispecies interaction contributes to child development, would such an interaction specifically impact the oral language acquisition process?

In this context, a recent study showed that the presence of a dog in the therapeutic speech-language pathology context intensified activity in dialog, gestures, and efficient communicative body movement, provided motivation to read and write, mobilized patients' affectivity and promoted a significant decrease in symptoms expressed in oral and/or graphic language⁹.

This study adopted the interactionist approach, based on the assumption that the subject is able to actively interact with the environment, modify it and also be impacted by it¹⁰. Therefore, language is understood as the first form of human socialization and, in this context, family interaction plays a fundamental role in the development process¹¹.

In this sense, recent studies also show that language development depends on a series of variables involving biological issues, but also demonstrate the relevance of emotional and social aspects in this acquisition process¹²⁻¹³.

Currently, the environment and interaction in the acquisition process are commonly investigated in national research and studies on language. There is evidence that environmental aspects are determinant to the quality of language skills¹⁴⁻¹⁶.

In turn, other international studies also report social interaction as the basis for healthy development, not only of cognitive and motor skills, but also for language and socio-emotional development. The rise of the digital world has led to increased exposure time to screens, especially in children under two years of age, and has been the subject of studies¹⁷.

Relevant research enabled theories of language development, such as symbolic functioning, as the result of a relationship between children and their caregivers, who are already inserted in the language. Thus, language can only be understood when it is used socially and when facing a bond with an adult interlocutor¹⁸.

Given the above, its relevance to the production of knowledge and the search for scientific evidence, this study aimed to investigate the impacts of living with pets on child development, specifically in the language acquisition process.

Method

This study is in line with resolution No. 466/12 that defines the Guidelines and Regulatory Standards for Research involving Human Beings of the Brazilian National Health Council, of the Ministry of Health (CAAE - 91868218.5.0000.5482), and was approved by the Research Ethics Committee of the institution under the opinion no. 2.736.939 All study participants were authorized by their parents, by signing the Informed Consent Form (ICF).

Case study: The study included 54 children of both genders (28 females and 26 males), aged between 3 months and 4:5 years. The subjects were categorized into two groups:

- Study group (SG): 34 subjects from multispecies families.
- Inclusion criteria: children who interact with the same dog(s) since birth.
- Control group (CG): 20 subjects who never belonged to multispecies families.
- Inclusion criteria: children who do not have dogs (or other pets) in their homes.

The exclusion criterion for both groups was any family complaint or previous clinical diagnosis of cognitive, motor, sensory and/or psychological changes.

The subjects were selected by the convenience sampling.

Procedures

Preparation of questionnaires to characterize the sample

Two questionnaires were prepared in order to characterize the sample:

- Questionnaire for Characterization of Multispecies Family (*Questionário de Caracterização das Famílias Multiespécie*, QCFM), for families with dog(s) as pet(s).
- Questionnaire for Family Composition (*Questionário de Composição Familiar*, QCF) for families without pets.

The QCFM was submitted to a validation process through the bibliographic survey of instruments intended for the evaluation of multispecies families and the evaluation by three experts in working with this family configuration.

Promotion of the research on social networks

Due to their ability to promote content very quickly, social networks are now a powerful channel to disseminate information. Therefore, it was the tool chosen as a strategy to compose the study sample.

Selection of subjects

The selection of subjects for both groups was carried out through a prior contact, using a text messages or calling the guardians interested in participating in the research, who voluntarily responded to messages posted on social networks or were referred by others subjects already participating or fellow researchers.

The contact was always made with the children's mothers to check the selection criteria described above. On this occasion, the date and time for the data collection were also agreed.

Data collection

SG:

Phase 1: Data collection started with the application of the Questionnaire for Characterization of Multispecies Family (QCFM) (Appendix 1).

Phase 2: Then, a digital camera was used to video observation and recording of an interactive and playful routine time in the family context, which was chosen by the subjects and should involve the dog. The most common situations involved playing with balls or other toys with the dog; feeding or handling the animal (e.g. Brushing or offering medication) and expressions (verbal

and nonverbal) of affection towards the dog. The video included 30 uninterrupted minutes of images, maintaining a minimum distance of one meter between the camera and the subject and following the subjects in cases where they moved to other rooms in the house.

CG:

Phase 1: Data collection started with the application of the Questionnaire for Family Composition (QCF) (Appendix 2).

Phase 2: Then, a digital camera was used to video observation and recording of an interactive and playful routine time in the family context, which was chosen by the subjects. The situations preferred by the subjects involved playing with the presence of the mother and feeding. Similarly to the other group, the video included 30 uninterrupted minutes of images, maintaining a minimum distance of one meter between the camera and the subject and following the subjects in cases where they moved to other rooms.

Analysis of Results

Phase 1: The data obtained through the QCFM and QCF were entered in Microsoft Excel spreadsheets.

Phase 2: The oral language assessment of both groups (SG and CG) was performed based on the Behavioral Observation Protocol/PROC, specifically regarding the items related to Communication skills and Verbal Understanding¹⁹.

Phase 3: The same procedure described above was performed by a speech-language pathologist specialized in oral language acquisition, for the

purposes of external data validation. In order to assess the consistency between the two evaluators (researcher and speech-language pathologist), the reliability intraclass correlation test (r_{icc}) with the Two-Way Mixed-Effect Model for the model and consistency was applied to the scores of the PROC instrument.

Phase 4: Data were submitted to a descriptive statistical by means of absolute and relative frequencies, central tendency and scatter measurements. The Chi-squared test was used in the comparison between the groups, as well as the Fisher's exact test, when one variable had an expected value less than or equal to five. Since the variables did not have a normal distribution using the Kolmogorov-Smirnov test, the comparison between the quantitative variables and the scores of the PROC instrument, according to the group, was performed by the non-parametric Mann-Whitney U test. A 5% descriptive level ($p < 0.050$) was assumed for statistical significance. Data were introduced in Excel and analyzed in the SPSS v23.0, for Windows.

Results

The sample characterization of the SG and CG is shown in Table 1 below, which includes information about the gender and age group of the subjects. As noted, there is a similarity between the SG and the CG. It can be noted that the majority of participants are between 12 and 24 months of age in both groups. Given the methodology used to promote the study and selection of the subjects, it should be noted that this event was arbitrary.

Table 1. Sample characterization of SG and CG.

Variable	Category	N	%
Group	Study - SG	34	62.96
	Control - CG	20	37.04
Gender	Male	26	48.15
	Female	28	51.85
Age group	0-11 months	10	18.52
	12-24 months	22	40.74
	2.0-3.0 years	7	12.96
	3.1-4.0 years	8	14.81
	4.1-5.0 years	7	12.96
Total		54	100.00
Age (n=54)			Min-max (years) 0.25 - 4.5

Min-max = minimum and maximum

As shown in Table 2, there is a homogeneity between the two groups with regard to the family composition and school life of the children. In both groups, most subjects do not have siblings. Of those

who attend school, most have part-time classes and all attend private schools. In turn, only a minority participated in extracurricular activities.

Table 2. Number and percentage according to family configuration, educational level and extracurricular activities of the children.

Characteristics of children		Group				Total		P
		Study		Control		n	%	
		N	%	n	%			
Gender	Female	17	50.0	11	55.0	28	51.9	0.723
	Male	17	50.0	9	45.0	26	48.1	
Does the child have siblings?	No	25	73.5	13	65.0	38	70.4	0.507
	Yes	9	26.5	7	35.0	16	29.6	
Does the child go to school?	No	11	32.4	5	25.0	16	29.6	0.568
	Yes	23	67.8	15	75.0	38	70.4	
If so, what period?	Part-time	13	56.5	7	46.7	20	52.6	0.552
	Full-time	10	43.5	8	53.3	18	47.4	
Type of school	Private school	23	100.0	15	100.0	38	100.0	
Does the child do any extracurricular activities?	No	18	78.3	10	66.7	28	73.7	0.473
	Yes	5	21.7	5	33.3	10	26.3	
Does the child participate in any activity?	No	28	82.4	15	75.0	43	79.6	0.728
	Yes	6	17.6	5	25.0	11	20.4	
Who is the adult who takes care of the child (relationship)?	School	10	29.4	8	40.0	18	33.3	0.833
	Grandmother	3	8.8	2	10.0	5	9.3	
	Babysitter	1	2.9	1	5.0	2	3.7	
	Mother	19	55.9	9	45.0	28	51.9	
	Mother-in-law	1	2.9	0	0.0	1	1.9	
Total		34	100.0	20	100.0	54	100.0	

Tables 3 and 4 show the results of the PROC that did not have statistically significant differences in the following scores: Communication skills (0.713); Understanding of oral language (p=0.597); and Total PROC (p=0.693) in study and control groups.

Table 3. PROC results obtained in SG and CG.

Age group	Study group				Control group				
	n	Communication skills	Understanding of oral language	Total	n	Communication skills	Understanding of oral language	Total	
0-12 months	Mean	18.17	16.67	34.83		18.50	20.00	38.50	
	Standard deviation	6.49	5.16	10.87		7.33	8.16	14.15	
	Median	6	18.50	20.00	38.00	4	20.50	20.00	43.00
	Minimum value		8.00	10.00	18.00		8.00	10.00	18.00
	Maximum value		26.00	20.00	46.00		20.00	30.00	50.00
12-24 months	Mean	39.94	37.50	77.44		39.00	38.33	77.33	
	Standard deviation	8.00	7.75	13.05		6.42	4.08	7.87	
	Median	16	39.50	40.00	80.00	6	39.00	40.00	77.00
	Minimum value		21.00	20.00	41.00		30.00	30.00	68.00
	Maximum value		60.00	50.00	100.00		46.00	40.00	86.00
2.1-3.0 years	Mean	59.75	47.50	107.25		56.33	46.67	103.00	
	Standard deviation	7.14	5.00	11.30		4.51	5.77	7.55	
	Median	4	59.50	50.00	109.50	3	56.00	50.00	102.00
	Minimum value		52.00	40.00	92.00		52.00	40.00	92.00
	Maximum value		68.00	50.00	118.00		61.00	50.00	111.00
3.1-4.0 years	Mean	60.25	47.50	107.75		62.75	50.00	112.75	
	Standard deviation	3.30	9.57	12.55		5.38	0.00	5.38	
	Median	4	60.50	45.00	105.50	4	63.50	50.00	113.50
	Minimum value		56.00	40.00	96.00		56.00	50.00	106.00
	Maximum value		64.00	60.00	124.00		68.00	50.00	118.00
4.1-5.0 years	Mean	66,25	57,50	123,75		62,67	50,00	112,67	
	Standard deviation	3,59	5,00	5,12		5,77	0,00	5,77	
	Median	4	67,50	60,00	124,00	3	66,00	50,00	116,00
	Minimum value		61,00	50,00	118,00		56,00	50,00	106,00
	Maximum value		69,00	60,00	129,00		66,00	50,00	116,00

Table 4. Analysis of PROC scores according to group.

Characteristics of the instrument	Group										p
	Study					Control					
	Mean	SD	Median	Minimum	Maximum	Mean	SD	Median	Minimum	Maximum	
Communication skills	43.91	17.14	41.50	8.00	69.00	45.80	18.00	49.00	8.00	68.00	0.713
Understanding of oral language	38.53	13.96	40.00	10.00	60.00	40.00	12.14	40.00	10.00	50.00	0.597
Total PROC	82.44	30.12	83.50	18.00	129.00	85.80	29.49	91.00	18.00	118.00	0.693

Discussion

When comparing the PROC results in both groups, no statistically significant differences were found between groups in the scores of communication and expressive skills, as well as understanding of oral language.

Although the results do not show such differences, it is worth noting that both show values compatible with the reference (for children aged two and three years) reported in a previous study using the PROC²⁰.

Even though PROC reference values for other age groups have not been found in the literature, studies report that typical child development follows its natural chronological order²¹.

The homogeneity of the groups shown through the sample characterization sample (Tables 1, 2 and 3) may have contributed to this result. Specifically in relation to maternal education, both in the SG and in the CG, higher education and specialization prevailed. This finding is in line with studies that report a correlation between parental educational level and the development of children's language²²⁻²³.

In this sense, it is also noteworthy that most children in both groups attend school, which is a private school in all cases. When comparing verbal shifts and narrative function between children attending public and private institutions, a recent study concluded that there is a higher occurrence in the language sample of subjects who attend private schools²⁴.

In addition, previous studies that correlated socioeconomic profile and language development concluded that a high socioeconomic index may provide access to better opportunities and variety of stimulation, which certainly impacts on child development. In turn, family dynamics and style of the environment are decisive in the quality of language skills¹⁵⁻¹⁶.

The main indicators when analyzing scientific productions that correlate family and school environment in language acquisition are the presence of siblings; working mothers who live with their partners; and the educational level of the educators¹⁶. The homogeneity between the groups is again highlighted, with regard to the marital status of the subjects' parents, the presence of siblings and the educational level of the guardian of the child when the child does not attend school nor has part-time classes (Table 3).

It is also worth mentioning that the research participants were considered to have typical language development. Although there was no previous investigation or application of another instrument in order to obtain reference values, all values were selected based on the absence of maternal or school complaints related to oral language, which is essential for the evaluation procedure and the composition of the study sample²⁰.

In addition, it should be noted that the data collection methodology was the observation of a spontaneous and transversal situation. Although the study assessed the child's spontaneous language, assuming that aspects not presented were not scored in the PROC, these aspects are not necessarily absent in the subjects. In this way, the child's language performance was assessed, approaching the descriptive model, in order to specify their linguistic behaviors.²⁵

Finally, although no statistically significant differences have been found in the PROC results between the research and control groups, it cannot be ignored that children and dogs were interactional partners.

Conclusion

The results found no statistically significant differences in scores between the study and control groups. However, positive aspects related to the acquisition of oral language were especially shown in multispecies interactions.

Thus, the hypothesis that the dog enhances the child's communicative skills in the process of language acquisition in a multispecies family cannot be refuted. Thus, this study expands the discussion on the topic and recommends the conduct of further studies, since the presence of dogs is increasing in Brazilian homes.

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Appendix*Appendix 1***QUESTIONNAIRE FOR CHARACTERIZATION OF MULTISPECIES FAMILY**

Name (in full) of person responsible for completing the questionnaire:				
How many people live in your house?				
For each of your family members, please describe below:				
Initials	Date of birth	Degree of kinship	Educational level	Occupation
With respect to the child who will participate in the research, please answer:				
What is the marital status of the child's parents? () Single () Married or stable union () Divorced () Widow(er)				
Does the child go to school? () Yes. Since what age? _____ () No				
If so , please answer: () Part-time () Full-time Type of school: () Public school () Private school In addition to school, does the child participate in any extracurricular activities? () Yes. Please specify: _____ () No				
If not , please answer: Does the child participate in any activity? () Yes. Please specify: _____ () No Who is the adult responsible for the child's daily care? _____ Regarding the adult responsible for this care, please answer: Age: _____ Kinship with the child: _____ Educational level: _____				
How many and which pets live in your home?				
Pets		Number		
() Dog		()		
() Cat		()		
() Other(s)		()		



About your dog, please answer:					
Name of dog:		Age of dog:		Breed	
How long has the dog (or each of them) been in the family?					
What are the behavioral characteristics of your dog (or each of them)?					
Who is responsible for feeding the dog(s)?					
Does your dog go to the vet?					
() Yes () No					
If so, how often?					
() Every six months () Annually () Only when necessary					
Which rooms in the house does your dog have free access to?					
() Access to all rooms of the house					
() Access to some rooms of the house					
() Access only to the outdoor of the house					
In which room of the house does the dog (s) sleep?					
Does your dog participate in family activities? If so, please specify					
Did any changes occur in the family interaction after the arrival of the dog? If so, please name the main changes.					
Do you celebrate your dog's birthday? (Mark your answer with an X)					
() Yes, always () Sometimes () Never					
Why did the family decide to have a pet?					
Has the family avoided any activity due to the dog(s)?					
Do you consider your dog a member of your family? (Mark your answer with an X)					
() Yes () No					
Was there any change in the relationship with the dog after the child's arrival in the family?					

Appendix 2

QUESTIONNAIRE FOR FAMILY COMPOSITION

Name (in full) of person responsible for completing the questionnaire:				
How many people live in your house?				
For each of your family members, please describe below:				
Initials	Date of birth	Degree of kinship	Educational level	Occupation
With respect to the child who will participate in the research, please answer:				
What is the marital status of the child's parents? () Single () Married or stable union () Divorced () Widow(er)				
Does the child go to school? () Yes. Since what age? _____ () No				
If so , please answer: () Part-time () Full-time Type of school: () Public school () Private school In addition to school, does the child participate in any extracurricular activities? () Yes. Please specify: _____ () No				
If not , please answer: Does the child participate in any activity? () Yes. Please specify: _____ () No Who is the adult responsible for the child's daily care? _____ Regarding the adult responsible for this care, please answer: Age: _____ Kinship with the child: _____ Educational level: _____				