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## Impact of Screens on Comprehensive-Expressive Language in Children Aged 36-78 Months in Ecuador

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### Abstract

*In recent years, the use of screens in children is becoming more frequent, affecting their comprehensive development. This study investigated how the use of screens affects language development in Ecuadorian children aged 36 to 78 months. An empirical, descriptive and correlational quantitative approach was used. The sample included 935 participants, assessed with the Screen Use Impact Survey on Children's Language Development and the CUMANIN test. The results indicated that dependence on screen use significantly predicts expressive language ( $\beta=0.088$ ,  $p=0.012$ ), but not comprehensive language ( $\beta=0.065$ ,  $p=0.063$ ). Factors such as frequency of use and supervision did not show significance ( $p>0.05$ ). It is concluded that there was a moderately positive impact on the development of expressive and comprehensive language associated with the educational level, family income and visual content, highlighting the importance of early intervention and parental mediation.*

**Keywords:** Language Development, Child Cognition, Technology in Childhood, Use of Electronic Devices.

### Introduction

The use of electronic screens has generated controversy over its impact on language development in children and adolescents.(Stamati et al., 2022; Karani et al., 2022). During early childhood, crucial for cognitive and linguistic development, there is no solid consensus on the effects of screens.(Vanderloo et al., 2022).

In Ecuador, previous studies have not specifically addressed children aged 36 to 78 months or the processes of comprehensive and expressive language, limiting themselves to small samples and qualitative methodologies:(Gago-Galvagno et al., 2023;GomezRomero-Borquez et al., 2024).

Christakis and Zimmerman, (2006)They analyzed how media affects cognitive and emotional development in the early years, providing useful information for parents and caregivers. They found that educational screen time is positively related to vocabulary.(Madigan et al., 2020;McBee et al., 2021), while total screen time is negatively associated with working memory(Rai et al., 2023;Panjeti-Madan & Ranganathan, 2023;Gaya et al., 2023),

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Twenge and Martin, (2020) They explored how screen use influences children's well-being, learning and socialisation, highlighting the importance of the role of parents in regulating screen use. (Livingstone, 2018; Twenge & Spitzberg, 2020; Mignot, 2023; Fortuny, 2024).

The study of Swider-Cios et al., (2023), suggests that educational content and interactive use of screens can have positive effects on language development. Robles-Estrada et al., (2024) In Mexico, they observed that excessive screen use is associated with delays in motor and language development, while shared use with an adult has a positive impact. (Robles-Estrada et al., 2024). Massaroni et al., (2024) They pointed out that television negatively affects language development, especially in the early years of life. (Solovieva & Quintanar, 2020). Yang et al., (2024) In France, they highlight that the context of screen use has a weak association with child cognition (Morris et al., 2022).

In this context, the present study analyzed the relationship between the use of electronic screens and the processes of language comprehension and expression in children aged 36 to 78 months in Zone 5 of Ecuador.

## **Method**

### **Design**

This study used quantitative research of empirical modality, with a non-experimental, transversal, descriptive and correlational design. (Sampieri, 2018) It took place from May to November 2023 in Ecuador.

### **Participants**

A total of 935 children between 36 and 78 months of age in Ecuador participated. Inclusion criteria were residing in Ecuador and having access to electronic screens. Exclusion criteria were children under 36 months or over 78 months, those who did not reside in Ecuador, and those without access to screens. Elimination criteria included non-completion of questionnaires or lack of informed consent from parents. The non-probability sample included 56.3% girls (526) and 43.7% boys (409). The largest group was 67 to 78 months (50.8%), followed by the 55 to 60 months group (14.5%).

### **Tools**

The Screen Use Impact Survey on Child Language Development (EUPDLI) was designed with 45 questions in three categories: sociodemographic data, availability of devices, and screen use. An exploratory factor analysis confirmed adequate internal consistency (Cronbach's alpha 0.707). To measure language development, the CUMANIN test was used. (Portellano Perez, 2009), with a reliability of 0.731 and validation in content, construct and criterion.

### **Procedures**

Informed consents were obtained from parents, in accordance with the Declaration of Helsinki, ensuring the protection and well-being of participants. The questionnaire was administered online using Google Forms, including a sociodemographic survey and questions about screen use. The CUMANIN test was administered in person. Data were analyzed using SPSS.

### **Data Analysis**

Descriptive statistics were calculated for the main variables. Pearson correlations were performed to examine the relationships between language and socio-demographic and

contextual variables, and ANOVA was used to compare means between different groups. Linear regression models were applied to identify predictors of language development, evaluating the contribution of variables such as rules, frequency of screen use, supervision, and dependence on screen use.

## Ethical Aspects

The study was conducted according to the ethical principles of the Declaration of Helsinki, ensuring the validity of the study and the protection of the rights and well-being of the participants.(Esparcia et al., 2023).

## Result

### ANOVA Analysis

ANOVA was used to analyze the differences in the impact of screen use on expressive and comprehensive language development across different groups of sociodemographic and behavioral variables. The results showed that there were no significant differences in expressive language in relation to rule setting ( $F(17, 917) = 1.100, p = 0.348$ ), frequency of screen use ( $F(17, 917) = 1.220, p = 0.241$ ), and supervision ( $F(17, 917) = 0.624, p = 0.875$ ). However, screen dependence showed a trend toward significance ( $F(17, 917) = 1.460, p = 0.102$ ).

Regarding comprehensive language, the ANOVA results indicated that there were no significant differences in relation to rule setting ( $F(25, 909) = 1.031, p = 0.348$ ), frequency of screen use ( $F(25, 909) = 0.821, p = 0.241$ ), supervision ( $F(25, 909) = 1.035, p = 0.875$ ), and screen dependence ( $F(25, 909) = 0.844, p = 0.102$ ).

Variable	Categoría	Frecuencia	Porcentaje
Sexo	De 36 a 42 meses	70	7,5
	De 43 a 48 meses	89	9,5
	De 49 a 54 meses	69	7,4
	De 55 a 60 meses	136	14,5
	De 61 a 66 meses	96	10,3
	De 67 a 78 meses	475	50,8
	Total	935	100
Edad	Femenino	526	56,3
	Masculino	409	43,7
	Total	935	100
Nivel educativo	No está inserto en el sistema escolar formal	75	8,0
	Inicial (Sub-nivel 1)	102	10,9
	Inicial (Sub-nivel 2)	173	18,5
	Básica Preparatoria (Sub-nivel 1)	246	26,3
	Básica Elemental (Sub-nivel 2)	339	36,3
	Total	935	100,0
Zona de residencia	Rural	225	24,1
	Urbano	710	75,9
	Total	935	100,0

Table 1: Age, Sex, Educational Level and Area of Residence

Table 1 shows the sociodemographic data, revealing that the majority of participants (50.8%) are between 67 and 78 months old, with older children being the most likely. In addition, there is a slight majority of girls (56.3%) compared to boys (43.7%), and a varied distribution in terms of educational level, with Basic Preparatory (26.3%) and Basic Elementary (36.3%) standing out. The majority of participants reside in urban areas (75.9%), while 24.1% live in rural areas.

Variables	Categorías	Lenguaje Expresivo								Lenguaje Comprensivo							
		Bajo	%	Medio	%	Alto	%	Total	%	Bajo	%	Medio	%	Alto	%	Total	%
Contenido visualizado	Ninguno	1	0,5	5	0,9	2	1,1	8	0,9	1	0,6	6	1,2	1	0,4	8	0,9
	otros	0	0	3	0,6	1	0,5	4	0,4	0	0	1	0,2	3	1,2	4	0,4
	Dibujos Animados	207	95	486	91,5	169	90,9	862	92,2	156	92,9	480	92,5	226	91,1	862	92,2
	Juegos	1	0,5	11	2,1	3	1,6	15	1,6	1	0,6	9	1,7	5	2	15	1,6
	Programas Musicales	3	1,4	5	0,9	1	0,5	9	1	1	0,6	5	1	3	1,2	9	1
	Programas Culturales	2	0,9	3	0,6	1	0,5	6	0,6	1	0,6	4	0,8	1	0,4	6	0,6
	Programas Educativos	4	1,8	18	3,4	9	4,8	31	3,3	8	4,8	14	2,7	9	3,6	31	3,3
Dispositivos de pantallas más utilizados	Televisor	102	46,8	257	48,4	92	49,5	451	48,2	74	44,0	257	49,5	120	48,4	451	48,2
	Smartphone	77	35,3	161	30,3	69	37,1	307	32,8	58	34,5	165	31,8	84	33,9	307	32,8
	Tablet	24	11	65	12,2	16	8,6	105	11,2	26	15,5	55	10,6	24	9,7	105	11,2
	Consola de Juegos	1	0,5	5	0,9	0	0,0	6	0,6	0	0,0	4	0,8	2	0,8	6	0,6
	Computador	8	3,7	23	4,3	4	2,2	35	3,7	4	2,4	18	3,5	13	5,2	35	3,7
	Otros	1	0,5	2	0,4	0	0,0	3	0,3	0	0,0	3	0,6	0	0	3	0,3
	Ninguno	5	2,3	18	3,4	5	2,7	28	3,0	6	3,6	17	3,3	5	2	28	3
Total	218	100	531	100	186	100	935	100	168	100	519	100	248	100	935	100	

Table 2.

Cross-tabulation of the expressive language variables, comprehensiveness with the type of content displayed and most used devices.

The results in Table 2 indicate that children who watch cartoons and educational programs have higher levels of expressive language (90.9%) and comprehensive language (91.1%). Educational programs have a positive impact, with 4.8% of children achieving a high level of expressive language and 3.6% reaching a high level of comprehensive language. Other content, such as games and cultural programs, show a lower incidence in high levels of language development. Most children use television (48.2%) and smartphones (32.8%), which are associated with better levels of language development. Other devices, such as tablets, game consoles, and computers, are used less and do not show a clear relationship with language development.

Variable	Lenguaje expresivo	Lenguaje comprensivo	Sexo	Edad en meses	Nivel educativo	Zona	Orden de nacimiento
Lenguaje Expresivo	Correlación de Pearson 1	,313**	-,012	-,204**	-,106**	-,013	,030
	Sig. (bilateral)	,000	,709	,000	,001	,686	,354
Lenguaje Comprensivo	Correlación de Pearson	,313**	1	,000	-,042	-,013	-,075*
	Sig. (bilateral)	,000	,992	,203	,700	,651	,022
Sexo	Correlación de Pearson	-,012	,000	1	,031	,027	-,033
	Sig. (bilateral)	,709	,992	,344	,407	,311	,121
Edad en meses	Correlación de Pearson	-,204**	-,042	,031	1	,649**	-,021
	Sig. (bilateral)	,000	,203	,344	,000	,520	,858
Nivel educativo	Correlación de Pearson	-,106**	-,013	,027	,649**	1	-,020
	Sig. (bilateral)	,001	,700	,407	,000	,538	,232
Zona	Correlación de Pearson	-,013	,015	-,033	-,021	-,020	1
	Sig. (bilateral)	,686	,651	,311	,520	,538	,929
Orden de nacimiento	Correlación de Pearson	,030	-,075*	-,051	-,006	-,039	,003
	Sig. (bilateral)	,354	,022	,121	,858	,232	,929

\*\* La correlación es significativa en el nivel 0,01 (bilateral).  
\* La correlación es significativa en el nivel 0,05 (bilateral).

Table 3.

Correlation of sociodemographic variables and expressive and comprehensive language.

Table 3 shows a moderate positive correlation between expressive and comprehensive language ( $r = 0.313$ ,  $p < 0.001$ ), indicating that better expressive language skills are associated with better comprehensive language skills. Expressive language improves with age ( $r = -0.204$ ,  $p < 0.001$ ), whereas the relationship between comprehensive language and age is not significant ( $r = -0.042$ ,  $p = 0.203$ ). Educational level has a weak negative correlation with expressive language ( $r = -0.106$ ,  $p = 0.001$ ) and a non-significant correlation with comprehensive language ( $r = -0.013$ ,  $p = 0.700$ ). There is no significant correlation between expressive language and birth order, but firstborns have better comprehensive language skills ( $r = -0.075$ ,  $p = 0.022$ ).

Variable	Lenguaje expresivo	Lenguaje comprensivo	Sexo	Edad en meses	Nivel educativo	Zona	Orden de nacimiento
Lenguaje Expresivo	Correlación de Pearson 1	,313**	-,012	-,204**	-,106**	-,013	,030
	Sig. (bilateral)	,000	,709	,000	,001	,686	,354
Lenguaje Comprensivo	Correlación de Pearson	,313**	1	,000	-,042	-,013	-,075*
	Sig. (bilateral)	,000	,992	,203	,700	,651	,022
Sexo	Correlación de Pearson	-,012	,000	1	,031	,027	-,033
	Sig. (bilateral)	,709	,992	,344	,407	,311	,121
Edad en meses	Correlación de Pearson	-,204**	-,042	,031	1	,649**	-,021
	Sig. (bilateral)	,000	,203	,344	,000	,520	,858
Nivel educativo	Correlación de Pearson	-,106**	-,013	,027	,649**	1	-,020
	Sig. (bilateral)	,001	,700	,407	,000	,538	,232
Zona	Correlación de Pearson	-,013	,015	-,033	-,021	-,020	1
	Sig. (bilateral)	,686	,651	,311	,520	,538	,929
Orden de nacimiento	Correlación de Pearson	,030	-,075*	-,051	-,006	-,039	,003
	Sig. (bilateral)	,354	,022	,121	,858	,232	,929

\*\* La correlación es significativa en el nivel 0,01 (bilateral).  
\* La correlación es significativa en el nivel 0,05 (bilateral).

Table 4.

Correlations between the categories expressed in the Impact of Screen Use on Children's Language Development (EUPDLI) survey and the development of expressive and comprehensive language.

Table 4 shows correlations between screen use and language development in children aged 36–78 months. There is a weak but significant positive relationship between expressive and

comprehensive language ( $r = 0.228$ ,  $p < 0.01$ ). Expressive language also correlates weakly with rule-setting ( $r = 0.071$ ,  $p < 0.05$ ) and screen-use dependence ( $r = 0.097$ ,  $p < 0.01$ ). Comprehensive language only shows a weak correlation with screen-use dependence ( $r = 0.074$ ,  $p < 0.05$ ). In addition, there are significant correlations between rule-setting and screen-use frequency ( $r = 0.141$ ,  $p < 0.01$ ), and between family supervision and screen-use frequency ( $r = 0.248$ ,  $p < 0.01$ ). Screen dependence is moderately correlated with frequency of use ( $r = 0.334$ ,  $p < 0.01$ ).

Variable	Lenguaje Expresivo				Lenguaje Comprensivo							
	Coefficientes no estandarizados	Desv. Error	Coefficientes estandarizados	Beta	t	Sig.	Coefficientes no estandarizados	Desv. Error	Coefficientes estandarizados	Beta	t	Sig.
Modelo	B	Desv. Error	Beta				B	Desv. Error	Beta			
(Constante)	1,509	0,159			9,505	0,000	1,845	0,16			11,511	0
Establecimiento de Reglas	0,111	0,063	0,059		1,759	0,079	0,082	0,064	0,043		1,286	0,199
Frecuencia de Uso de Pantallas Supervisión	-0,028	0,047	-0,021		-	0,548	0,03	0,047	0,023		0,645	0,519
Dependencia de uso de pantalla	0,101	0,040	0,088		2,505	0,012	0,076	0,047	-0,047		-1,403	0,161
								0,041	0,065		1,865	0,063

Table 5. Linear Regression Results for Expressive and Comprehensive Language

Table 5 shows that for expressive language, the constant is significant ( $p < 0.001$ ), with a positive effect of screen dependence ( $p = 0.012$ ). Screen frequency is not significant ( $p = 0.548$ ). For comprehensive language, the constant is significant ( $p < 0.001$ ), but none of the variables (rule setting, screen frequency, family supervision) is significant, although screen dependence has a positive trend ( $p = 0.063$ ).

## Discussion

The correlations between sex and language development indicate that there are no significant differences in expressive language levels between boys and girls, with the majority at the medium level and a notable proportion at the low level. This finding is consistent with previous studies suggesting that gender alone does not strongly determine language development. (Lovas, 2011) However, there is a slight tendency towards a higher percentage of children in the low level. (Twenge & Martin, 2020), which could reflect subtle differences in the acquisition of certain aspects of language (Twenge & Farley, 2020) Both boys and girls show a similar distribution in the levels of comprehensive language, with a slight variation towards a lower level in girls, which is consistent with previous studies. (Sansavini et al., 2010).

Age shows significant variations in expressive language levels, with younger children at higher levels and a transition to middle levels as age increases. This pattern could be crucial for designing early interventions that take advantage of critical windows of linguistic development, supporting the proposal of Vygotsky, (1978) on the importance of the zone of proximal development in educational contexts (Vygotsky, 2021). Age significantly influences the level of comprehensive language (Duch et al., 2013), improving as children grow older. This fluctuation reflects the complexity of language development throughout childhood. (Xie et al., 2024).

The significant relationship between educational level and expressive language development highlights the influence of the educational environment on children's language development. This result is consistent with the theory of Bronfenbrenner (1979), which emphasizes the

importance of microsystemic environments in the development of cognitive and linguistic skills. Insertion in the formal educational system is associated with better performance in comprehensive language, supporting the idea that the educational context provides opportunities and stimuli that favor language development.(Mustonen et al., 2022;Orrego & Alvear, 2020).

No significant differences were found between children living in rural and urban areas in terms of expressive language, but urban children show a slight advantage in the high level of comprehensive language, suggesting that the urban environment could offer more resources or stimuli that favor language development:(Arnott, 2016;Rakesh et al., 2024).

The positive relationship between family income and language development underscores socioeconomic disparities in access to language development opportunities. This finding supports research highlighting the impact of family and economic environment on children's vocabulary development and communication skills.(Rakesh et al., 2024)There is a clear association between higher family income and a higher level of comprehensive language.(Thanaraju et al., 2024).

The influence of the primary caregiver is reflected in the children's level of comprehensive language, underlining the importance of attachment and early interactions in language development.(Chakranon et al., 2024)The age of the primary caregiver also influences language development, with younger caregivers showing a distribution towards the middle level and older caregivers having more children in the middle and high levels.(Song et al., 2014).

The association between the number of siblings and expressive language development points to the influence of family dynamics on opportunities for language practice and learning. Children with fewer siblings tend to perform better, possibly due to more individualized attention and less dispersed family resources.(Symeonides et al., 2021).

The prevalence of TV and smartphone use among 3- to 6-year-olds may be influenced by availability, ease of use, and the amount of content specifically targeted at this age group. Previous studies suggest that television remains one of the primary sources of entertainment for young children.(Kabali et al., 2015;Hu et al., 2023)Smartphones are becoming more accessible and offer a variety of educational apps and videos, while the reduced use of tablets, gaming consoles and computers may be related to their cost, complexity and parents' perception of their suitability for young children.

The positive and significant relationship between expressive and comprehensive language supports previous studies that highlight the interrelation of different linguistic skills in language development.(Vanderloo et al., 2022)Multiple linear regression analysis shows that screen dependence is significantly associated with expressive language, but not with comprehensive language.(Robles-Estrada et al., 2024).

Finally, limiting screen time is not enough to influence children's language development. It is essential to pay attention to the quality of the content and the way children interact with screens.(Hu et al., 2023)Family mediation and supervision, as well as opportunities for verbal interaction and play, are essential for healthy language development in childhood.(Aziz et al., 2023). Individual and contextual differences, such as families' socioeconomic and educational levels, must be considered to fully understand the impact of screen use on language development.(Binet et al., 2024)

## Conclusions

The present study has shown that screen use has a differentiated impact on the development of expressive and comprehensive language in children aged 36 to 78 months in Ecuador, highlighting the importance of considering sociodemographic and contextual variables in parenting practices. First, it was found that sociodemographic variables such as sex and age play a significant role in language development, with the educational level of parents being a determining factor in children's linguistic stimulation. Furthermore, parenting practices, specifically mediation and supervision of screen use, although showing a positive correlation with expressive language, do not seem to have a significant impact on comprehensive language. This suggests that the quality of interactions and the content viewed are more influential than the mere amount of screen time.

Socioeconomic status also emerges as a crucial factor, with families of higher socioeconomic status providing more educational and cultural resources, which favors the development of both comprehensive and expressive language.

The primary caregiver's relationship with the child, including age and type of relationship, correlates significantly with language development, highlighting the importance of a close and quality relationship. Furthermore, the quality and interactivity of the content displayed on screens considerably impacts language development, with educational and interactive content being the most beneficial. To foster healthy language development, it is essential not only to limit screen time, but also to enrich the quality of the content and interactions with caregivers and the environment. Public policies and intervention strategies should focus on educating parents and caregivers about the appropriate use of screens and the importance of an environment rich in linguistic and cultural stimuli, adapted to the sociodemographic characteristics of each family.

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