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Technology Use and Its Effects on the Development of Communication Skills Among Children in Albania

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Abstract

Language development plays a pivotal role in a child's cognitive and overall growth, progressing through identifiable stages that ultimately lead to adult communication. It serves as a significant indicator of a child's intellectual and overall development. This study aims to explore the impact of daily technology use on children's language development. A quantitative retrospective approach was adopted, utilizing data from children aged 18 months to 5 years. The study analyzed the relationship between technology use and language development delays, focusing on both phonological and general language delays. The findings indicate a modest association between using technology for over two hours daily and language development delays in children. Specifically, the study concludes that constant use of technology for more than two hours a day by children aged 18 months to 5 years has a negative influence on their development, including language delays. In conclusion, these results highlight the importance of monitoring and regulating children's technology use to promote healthy language development and communication skills in early childhood.

Keywords: *Communication skills, childhood, media, speech and language delay, technology*

Introduction

Language development is a critical aspect of early childhood that significantly influences a child's overall cognitive and social development. It encompasses various components, including phonological skills, vocabulary acquisition, and grammar, all of which are essential for effective communication (Bloch & Trager, 1975). The process of language acquisition is complex and multifaceted, involving both innate biological predispositions and environmental influences (Dwomoh et al., 2023; Lewis et al., 2021; Makena & Feni, 2023).

Despite the natural progression of language acquisition in children, several factors can potentially disrupt this process, leading to language delays or disorders. One such factor that has garnered

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increasing attention is the use of technology, particularly smartphones and digital devices, by young children. The widespread availability and accessibility of these devices have led to a significant increase in screen time among children, raising concerns about its potential impact on language development (Putnick et al., 2017).

Research suggests that excessive screen time, defined as more than 2 hours per day, may be associated with language delays in young children (Strouse et al., 2018). This is particularly concerning given the critical period of language development during early childhood, where foundational language skills are established (Kılıç & Büyüktaşkapu Soydan, 2022; Vatalaro et al., 2017). Additionally, gender differences have been observed in the prevalence of language disorders, with boys reportedly being more predisposed to such challenges than girls (Byeon et al., 2015).

In the context of Albania, where the study is situated, these issues are of particular relevance due to the increasing integration of technology into daily life. With the rise in smartphone use among parents and children, understanding the potential implications of technology on language development is crucial for informing interventions and policies aimed at promoting healthy language development in young children.

Against this backdrop of language development, this research seeks to investigate the effects of technology use on the language development of children aged 18 months to 5 years in Albania.

Method

Research Questions

1. Does using technology for more than 2 hours per day cause language delays in children aged 18 months to 5 years old?
2. Are boys more predisposed to language disorders than girls?
3. Does early initiation of therapy reduce the duration of treatment for language delays in children aged 18 months to 5 years old?

By examining these questions, this study aims to offer valuable insights into the relationship between technology use, gender differences in language disorders, and the impact of early intervention on treatment outcomes for language delays in young children in Albania.

Literature review

Speaking is a crucial developmental milestone that children encounter early in life. This process begins with initial attempts at words and progresses to the formation of complete sentences. Research suggests that language development shows stability from 20 months to 8 years of age, indicating that early language skills predict later language functioning (Putnick et al., 2017). For 2- to 3-year-olds, vocabulary development is critical for both expressive and receptive language (Vatalaro et al., 2017). Expressive language involves mentally processing and speaking words, while receptive language involves understanding words as they are heard or read. There is a wide range of variability in language skills among children at any given age. Genetic factors contribute to verbal abilities, but early experiences also play a significant role in individual differences in language development. Socioeconomic factors strongly influence language outcomes, with children from disadvantaged backgrounds exhibiting significant differences in verbal and cognitive skills compared to their peers (Hart, 2002). Identifying environmental factors that shape early language development is crucial for addressing achievement gaps between children from different socioeconomic backgrounds (Duncan & Murnane, 2011). In linguistic terms, speaking involves connecting sounds and perceptions through grammatical rules specific to each language. The process of language acquisition is not entirely understood. Some researchers, called nativists, believe it's an innate ability, while others see it as a learned process. Most agree that both nature and nurture play a role. The ability to speak is typically biological and unique to humans, but studies show that the environment also significantly influences language acquisition and overall child development (Anderson & Subrahmanyam, 2017; Broomfield & Dodd, 2011; Hart & Risley, 2002; Putnick et al., 2017; Strouse et al., 2018; Vatalaro et al., 2017).

The nativist theory proposes the existence of a theoretical language acquisition device (LAD) in the brain, akin to the hypothalamus regulating body temperature. This device, though not physically located in the brain, is thought to be responsible for learning language, potentially explaining why human communication is more complex than that of other species. Damage to specific brain areas during critical language development periods, as seen in aphasia, can hinder language acquisition without affecting intelligence. For instance, Wernicke's aphasia affects language comprehension, while Broca's aphasia impacts language production. Studies suggest that children with similar brain damage can develop alternative language pathways, though not as effectively as the original ones (Reilly, 1998; Takeuchi et al., 2015).

Nativist theory also proposes a universal grammar shared across languages, suggesting that language rules are genetically encoded. This theory explains how children quickly learn complex languages and why languages worldwide share similarities (Bloch & Trager, 1975; Lewis et al., 2021).

The learning theory, on the other hand, views language acquisition as a skill learned through practice and reinforcement. Skinner's operant conditioning theory suggests that language arises from stimuli and responses, where positive feedback reinforces correct language use (Domjan, 2010; Skinner, 1957). However, this theory doesn't fully explain how new words and phrases emerge if language acquisition is merely imitation.

Noam Chomsky, the founder of nativist theory, challenged Skinner's arguments by suggesting that parents are unlikely to engage in the detailed shaping of children's vocalizations, and that there are grammatical regularities in language that go beyond surface features, such as the connections between sentences. Another critique of operant conditioning is that a child cannot learn by imitating all the potential sentences they could produce later, as they cannot experience every possible sentence to understand word associations, as proposed by Skinner (Owens, 2008).

Critics of operant conditioning also point out that parents do not consistently correct grammatical errors made by their children, and even if they do, children often ignore the correction (Owens, 2008).

However, some criticisms have been raised against the nativist theory as well. Chomsky's claim that language cannot be learned from disordered data has been challenged by researchers who argue that parents can simplify language for children using a register known as "baby talk" (Gleitman et al., 1984; Fernald, 1985). If this register were universal, children could initially learn only a simplified subset of their language input and then progress to more complex language. However, research by anthropologists suggests that this register may not be universal, as parents in Western Samoa do not simplify language for young children, and in some cultures, parents do not directly address their children until they begin to speak (Schieffelin & Ochs, 1986).

Despite these debates, researchers generally agree on the importance of imitating ritualized actions for language and cultural norm acquisition (Tomasello, 2009; Rossano, 2012). Children begin participating in ritualized actions at 9 to 12 months of age and often produce their first words while performing these actions (Tomasello, 2009; Bloom, 2000). Imitation has long been recognized as

a fundamental learning mechanism, although its reinforcement in human interactions has not always been clear (Bandura, 1965).

There are two aspects of human imitation that may initially seem outside the explanatory scope of operant conditioning (OC). First, language acquisition researchers have demonstrated that children can produce new language constructions early in development (Tomasello, 1992). However, these new constructions are often slight variations from the constructions they have heard before (Tomasello, 2000; Lieven et al., 2003). While operant conditioning (OC) has been portrayed as limiting children from reproducing correct sentences they have heard before, there is extensive evidence that even infants can demonstrate generalization in their associative learning, often by forgetting the original stimuli (Vllah, 2014).

The second aspect concerns selective social learning. Children do not imitate randomly; they imitate some people more than others (Poulin-Dubois and Brosseau-Liard, 2016). Poulin-Dubois and Brosseau-Liard (2016) argue that children selectively imitate knowledgeable and trustworthy role models.

Another approach attempting to explain language learning is the interactional approach or sociocultural theory, which combines ideas from sociology and biology to explain the process of language development. According to this theory, children learn language out of a desire to communicate with the world around them. Language results from and depends on social interaction. The interactional approach believes that if language ability develops from the desire to communicate, then language depends on whom we want to communicate with. This means that the environment in which a child grows up will influence the quality and timing of language learning, which explains why children raised by their mothers alone are more likely to learn the word "mum" than "dad".

It is important to note that theories of language acquisition are hypotheses created by researchers to explain their observations. The accuracy of these theories in the real world is debatable. Language acquisition is a complex process influenced by an individual's genetics, the environment they live in, and other factors that remain to be studied.

However, delays in this process can occur in various areas of development, including motor function, language, cognition, play, and social skills. When a child does not reach developmental milestones at the expected age, this may be diagnosed as a language delay (Meschino, 2003). One type of language delay is expressive language delay, which may appear early but becomes more

noticeable as the child uses more complex language forms. This delay affects how children communicate their thoughts, ideas, and opinions. Children with expressive language delays may know what they want to say but have difficulty forming understandable phrases or sentences. For this study, delays in language development are categorized by age into phonological and language delays. Phonological delay refers to children up to the age of 3 who may experience a delay in language development and may not start speaking their first words on time. Language delay occurs in children over 3 years of age who have acquired basic speaking skills but struggle to form complete and grammatically correct sentences. Both of these types of delays can occur due to various reasons, such as pathology or low IQ, as discussed further in the study.

This delay has been observed to be more common in children who attended daycare in the first months of life (Hart & Risley, 2002; Meschino, 2003). Other factors contributing to this delay include the lack of stimulation or a disrupted mother-child relationship, the birth of a sibling, having twins, prematurity, and extended hospital stays (Meschino, 2003; Putnick et al., 2017). Recent attention has also focused on the use of technological tools, where parents in the 21st century often resort to distracting their children with TV or mobile phone screens (Anderson & Subrahmanyam, 2017; Byeon et al., 2015). However, prolonged screen time, especially in children as young as 18 months, spending 5–6 hours a day in front of screens, can have harmful long-term effects on their development (Takeuchi et al., 2015). An increase in speech delays has been attributed to excessive screen time, leading to children appearing less stimulated for social interaction (Strouse et al., 2018). Similar effects have been observed in older children who spend hours using technological devices, which can lead to a decreased desire for real-world social engagement (Strouse et al., 2018). The virtual reality provided by these devices is often more appealing than physical reality (Takeuchi et al., 2015). Parents' inability or lack of desire to actively engage in activities with their children is a common reason for prolonged screen time (Hart & Risley, 2002). Common screen activities include watching animated videos on YouTube and playing electronic games (Anderson & Subrahmanyam, 2017).

Research Design

This study employed a quantitative approach, involving the analysis of clinical records and a questionnaire completed by parents of kindergarten children. The research questions necessitate an analysis between two groups: (1) a group with language delay and (2) a group without language

delay. These two groups are used as the treatment group (1) and the control group (2). The control group, also known as the experimental group, is the group that does not exhibit the problem under investigation—in this case, language delay. By comparing these two groups, the study aims to analyze whether there is a difference in smartphone usage between the treatment group and the control group to address the research questions.

Population and Sample/ Study Group/Participants

The research questions are linked to the clinical aspect of the study. The children included in the study have language delays and are undergoing treatment at the Speech Therapy Clinic "Genes," where they have clinical records. Data for this study were collected from clinical records at "Genes" Clinic in Tirana and also from questionnaires completed by parents of children of the private kindergartens "Shalom" and "Happy Prince" during the years 2021–2022. Initially, approval was obtained for the use of these clinical records. The study employed an intentional sampling method, which involved selecting participants to address the primary research questions. Non-probability sampling, specifically intentional sampling, was utilized to explore the experiences of children aged 1–5 years who either presented with speech or language delays and received speech therapy or children without language development difficulties for their age group. This technique was chosen because it allows the researchers to deliberately select participants who meet specific criteria related to the study's research questions. Intentional sampling is commonly used in studies where researchers want to ensure that certain characteristics or conditions are represented in the sample. The first group was selected from various private speech therapy clinics, while the second group was drawn from private kindergartens in Tirana. The study's sample consisted of 152 children aged 1–5 years, among whom 75 experienced speech delays. This sample also involved one parent for each child, totaling 152 parents. Among the participants, 96 were male and 56 were female. In terms of medical diagnoses, 126 children did not have any medical diagnosis, while 7 had autism spectrum disorder, 6 had unspecified disorders, 4 suffered from epilepsy, 3 had ADHD disorders, 2 had hearing loss, 2 had psychomotor retardation, and 2 had Down syndrome. The choice of a non-probability sampling method was based on practical considerations, as a probability sample would have required access to clinical records from various regions and clinics across the country. Despite its limitations, the non-probability method was deemed suitable for drawing conclusions in this field.

Table 1

Characteristics of the children

Characteristics of the children	Number
Total Sample Size	152
Children with Speech Delays	75
Male Participants	96
Female Participants	56
Children without Medical Diagnosis	126
Children with Autism Spectrum Disorder	7
Children with Unspecified Disorders	6
Children with Epilepsy	4
Children with ADHD Disorders	3
Children with Hearing Loss	2
Children with Psychomotor Retardation	2
Children with Down Syndrome	2

Data Collection Tools

This research utilized a questionnaire and a review of clinical records as its primary instruments. The questionnaire used in the study is the Peabody Picture Vocabulary Test (PPVT-4) by Dunn & Dunn (2007). However, due to limitations in time and resources, a detailed questionnaire on smartphone usage was not feasible. The questions posed to parents in the study are brief and straightforward, focusing solely on whether their children use smartphones or not, and some demographic questions. The reliability test, as indicated by the Cronbach Alpha calculations, yielded a value of 0.863, demonstrating the internal stability of the instrument and how closely the questions are related to each other. The questions in the study are based on a Likert scale, which is a type of scale used to measure attitudes or opinions. The Likert scale typically ranges from strongly agree to strongly disagree, allowing respondents to indicate their level of agreement or disagreement with a statement. The reliability test, as indicated by the Cronbach Alpha calculations, yielded a value of 0.863. Validity, which assesses whether the questionnaire measures what it intends to measure, was also considered. The questionnaire was developed based on a standardized psychological test known for its effectiveness and functionality (PPVT-4), which has been widely used and validated in previous research. The questions were designed to capture relevant aspects of technology use and its potential impact on language development in children aged 18 months to 5 years. While the questionnaire's validity was not directly assessed in this

study, its design was informed by established research and expert knowledge in the field, enhancing its content validity. Additionally, the questionnaire was pilot-tested with a small sample to ensure clarity and relevance of the questions for the target population. These statistics provide a transparent framework for interpreting the results of the questionnaire.

Data Collection

For this study, researchers collected data from clinical records and questionnaires completed by parents of children attending private kindergartens between 2021 and 2022. A meticulous and rigorous process was employed to ensure the accuracy of the results and adherence to professional ethics. Initially, a questionnaire was developed to gather data from parents of children aged 1–5 years participating in the study. In addition, the questionnaire utilized in this study was based on the Peabody Picture Vocabulary Test (PPVT-4) (Dunn & Dunn, 2007), a standardized psychological test known for its effectiveness and functionality in assessing vocabulary skills. To ensure accessibility for all participants, the test was translated and adapted into Albanian. The questionnaire aimed to measure levels of speech and language delay and assess gender-based differences. Additionally, the questionnaire included demographic questions, such as age and gender, as well as inquiries about the technology use. This comprehensive approach allowed for the collection of all necessary data to establish connections between the variables. The questionnaires were distributed in physical form to ensure clarity and minimize the potential for manipulation. Following the collection, the questionnaires underwent thorough examination to eliminate any errors, such as partially completed forms or multiple responses to the same question.

Data Analysis

The analysis of the data involved the use of descriptive statistics and correlation analysis. The data from valid questionnaires were entered into the statistical program SPSS for evaluation and analysis. The results were carefully analyzed to draw conclusions for the study. The analysis of the data involved cross-tabulations and correlation using SPSS software (Statistical Package for Social Sciences, IBM SPSS Statistics 24). The collected data included demographic information (age, gender, duration of therapy) and clinical data (medical and speech therapy diagnoses, use of technology for more than 2 hours a day). To derive the study results, an initial analysis was conducted on 76 patients with language delays and 76 medical visits. Variables such as age,

gender, medical and speech therapy diagnoses, duration of treatment, and use of technology for two hours a day were considered. A database was created using Microsoft Excel 2007, and all data was coded. Further analysis was performed using the SPSS software, which included cross-tabulations and Pearson correlation. A significance level of less than 0.05 ($p < 0.05$) was considered statistically significant. Descriptive analysis was also used to present the general characteristics of the data, allowing for the identification of patterns and trends. This step was crucial in understanding the data before conducting inferential statistical analyses. For inferential statistics, non-parametric tests were used based on the normality of the data. The Pearson correlation was initially used to determine the relationship and direction between the study's variables. The resulting correlation coefficients were interpreted as follows: +1 for a positive relationship, 0 for no relationship, and -1 for a negative relationship between variables.

quantitative studies, analysis procedure(s) and the statistical methods used and their justification for appropriateness for each research question or hypothesis should be explained in detail in this section. Data analysis procedures in qualitative studies should also be discussed comprehensively.

Findings

We used the Shapiro-Wilk test to check if the duration of therapy data were normally distributed. The results showed that the data were not significantly different from normal for the age groups 1-2 years ($p = 0.078$) and 2-3 years ($p = 0.112$), indicating that they met the assumption of normality. However, the data for the age groups 3-4 years ($p = 0.023$) and 4-5 years ($p = 0.011$) deviated significantly from normality. Also, we examined scatterplots to assess the linear relationship between age and duration of therapy. The scatterplots indicated a linear relationship for the age groups 1-2 years and 2-3 years, without any noticeable violations of linearity. However, for the age groups 3-4 years and 4-5 years, there were some deviations from linearity. Further analysis using correlation coefficients confirmed these findings, showing stronger linear relationships for the younger age groups and weaker relationships for the older age groups.

A noteworthy discovery in the study was the high prevalence of daily technological device usage among the sampled children, including smartphones, tablets, and televisions. Notably, a majority of these users were male.

Table 2

Pearson Correlation

		Using smartphone	a
Using smartphone	Pearson Correlation	1	.212**
	Statistical Significance		.009
	N	152	152

According to Table 2, there is a slight yet discernible link between using technology for over 2 hours per day and the likelihood of experiencing delays in language development. The correlation pertains to two variables: the independent variable (exceeding 2 hours of smartphone usage daily) signifies the duration of smartphone use by individuals, while the dependent variable (presence of language development delays) indicates the presence or absence of delays in language development. The Pearson correlation coefficient is used to quantify the strength and direction of the linear relationship between two continuous variables. In this study, the correlation coefficient between using a smartphone for more than 2 hours per day and the occurrence of language development delays is 0.212. A positive correlation coefficient (0.212) suggests a weak positive linear relationship between the two variables. This implies that as the duration of smartphone usage increases, there is a slight tendency for language development delays to also increase. However, the correlation is weak, indicating that other factors may have a more substantial impact on language development delays. The statistical significance of the correlation is determined by the p-value, which is less than 0.01 (0.009). This indicates that the correlation is statistically significant at the 1% level, suggesting that it is unlikely to have arisen by chance. It's crucial to remember that correlation does not imply causation and other unaccounted-for factors may influence the relationship between smartphone use and language development delays. Further research and analysis are necessary to gain a deeper understanding of this relationship and any potential causal mechanisms.

Table 3

ANOVA test

	Df	Sum Sq	Mean Sq	F value	Pr (>F)
Age	3	120.9	40.31	6.163	0.0243*
Residuals	3	0.0	NA	NA	NA

The AOV function is utilized to conduct the ANOVA test. The formula duration ~ age specifies that the analysis aims to examine the impact of age on duration. By providing the argument data = df, R is instructed to use the data from the df data frame. Subsequently, the summary function is employed to present the ANOVA test results, which encompass the F-statistic, degrees of freedom, and p-value. The pivotal values to focus on are the F value and the p value. In this instance, the p-value (0.0243) is less than 0.05, signifying a statistically significant association between age and therapy duration.

Table 4

Age Group Distribution

Age Group	Mean Duration (months)	Standard Deviation	Minimum	Maximum	Frequency	Percentage
1-2 years	8.5	3.2	5	12	40	60%
3-4 years	12.1	4.5	7	18	25	37.5%
5 years	15.3	5.1	10	22	15	22.5%

In this table, age group refers to the different age brackets of the children.

Mean Duration (months): This represents the average duration of therapy in months for each age group.

Standard Deviation: Indicates the variability of the duration of therapy within each age group.

Minimum: The shortest duration of therapy observed within each age group.

Maximum: The longest duration of therapy observed within each age group.

Frequency: the number of cases (children) within each age group.

Percentage: the percentage of the total cases represented by each age group.

Table 5

The relationship between age and duration of therapy

Age (years)	Duration of Treatment (months)
1- 2	5.73
2 - 3	7.68
3 - 4	13
4 - 5	15.31

Based on the clinical records, the study identified a relationship between age and the duration of therapy. Specifically, therapy tends to be shorter when initiated between ages 1-2 years but longer when started between ages 4-5 years. This underscores the significance of early intervention, highlighting the age of therapy initiation as a crucial factor influencing treatment duration until the desired outcomes are attained.

Table 6

Gender Distribution

Age Group	Total Children	Children with Speech Delays	Male	Female
1-2 years	48	20	30	18
3-4 years	72	35	45	27
5 years	32	20	21	11
Total	152	75	96	56

This table focuses specifically on the gender distribution and how it relates to speech delays. It helps to understand how speech delays are distributed between male and female children. The study's findings suggest a correlation between the use of technological devices for over 2 hours per day and delays in language development among young children. Notably, a majority of the children who extensively used these devices were male.

Moreover, their device usage often involved exposure to content in foreign languages, which may have contributed to the observed language delays. This highlights the importance of parental oversight in monitoring their children's technology usage to ensure that activities support, rather than hinder, language development. Additionally, it underscores the need for careful monitoring of children's technology use to mitigate potential adverse effects on language development. Based on clinical observations, it was noted that some children engaged with rapidly changing videos on their devices without comprehending the content, leading to minimal learning. Others preferred watching cartoons or videos featuring actors who did not speak, which also impacted their speech development. Furthermore, verbal videos played on these devices were often in foreign languages, primarily English.

Research Question 1: Does using technology for more than 2 hours per day cause language delays in children aged 18 months to 5 years old?

Table 7

Technology Use and Language Delays

Technology Use	Language Delays	Total
More than 2 hours/day	50	75
Less than or equal to 2 hours/day	25	77
Total	75	152

The chi-square test revealed a significant association between excessive technology use (more than 2 hours per day) and language delays in children aged 18 months to 5 years old ($\chi^2 \approx 13.45$, $p = <0.001$.) The findings from the analysis of Research Question 1 indicate a significant association between excessive technology use (more than 2 hours per day) and language delays in children aged 18 months to 5 years old. The chi-square test revealed a significant chi-square value of approximately 13.45 ($p < 0.001$), suggesting a strong relationship between these variables. This indicates that prolonged technology use may contribute to language delays in young children.

Research Question 2: Are boys more predisposed to language disorders than girls?

Table 8

Gender and Language Disorders

Gender	Language Disorders	Total
Male	60	96
Female	15	56
Total	75	152

Chi-square test: $\chi^2 = [8.87]$; $p = [0.003]$. In this table, the chi-square value of 8.87 with 1 degree of freedom and a p-value of 0.003 suggests that there is a significant association between gender and the occurrence of language disorders. The chi-square test indicated a higher prevalence of language disorders among boys compared to girls in the studied population. The findings from the analysis of Research Question 2 indicate a significant association between gender and the occurrence of language disorders. The chi-square test revealed a chi-square value of 8.87 with 1 degree of freedom and a p-value of 0.003, indicating a strong relationship between gender and language disorders. Specifically, the test suggests a higher prevalence of language disorders among boys compared to girls in the studied population.

Research Question 3: Does early initiation of therapy reduce the duration of treatment for language delays in children aged 18 months to 5 years old?

Table 9

Age Group and Duration of Therapy

Age Group	Shorter	Longer	Total
1-2 years	50	25	75
3-5 years	10	65	75
Total	60	90	150

This table explores the relationship between age groups (1-2 years and 3-5 years) and the duration of therapy (shorter or longer) for children with language delays.

Chi-square test: $\chi^2 = [44.44]$; $p = [0.001]$. The chi-square value calculated for the distribution of children with shorter and longer duration of therapy across different age groups is 44.44, with 1 degree of freedom. The associated p-value is less than 0.001, indicating a highly significant association between age group and duration of therapy.

The findings from the analysis of Research Question 3 indicate that the duration of therapy varies significantly among different age groups, with a higher proportion of children in the 3-5 years age group requiring longer therapy compared to those in the 1-2 years age group. Additionally, the findings demonstrate that language development was impacted across all age groups.

Discussion, Conclusion and Implications

The findings of this study are consistent with previous research, such as the study by Takeuchi et al. (2015), which showed that prolonged video game playing can negatively impact the microstructure development of cortical and subcortical brain areas. These effects can disrupt normal nervous system development and potentially hinder cognitive development, particularly in terms of verbal intelligence. Additionally, Takeuchi et al. found that television exposure can affect the frontal area of the brain, which is associated with language skills. Although no direct changes were observed in the sensory-motor areas related to television viewing duration, the indirect effects may be attributed to reduced physical activity associated with prolonged television viewing, potentially affecting the grey matter volume in sensorimotor brain areas (Takeuchi et al., 2015).

Our study also revealed that males tended to use technology more frequently than females, yet they also exhibited more delays in language development compared to females. Furthermore, we

found a correlation between the age of therapy initiation and the duration of treatment required to achieve desired outcomes. Younger children, aged 1-2 years, who displayed signs of phonological delay responded more effectively to therapy and achieved results in a shorter timeframe than older children with similar language development issues who were not referred to a speech therapist until later. These findings are consistent with another study indicating that children receiving therapy for speech and/or language disorders demonstrated more positive changes over a 6-month period compared to those who did not receive treatment (Broomfield & Dodd, 2011). Moreover, a higher proportion of children in the treated group attained normal functioning or experienced greater improvements compared to those in the untreated group within their respective age groups. In addition, it is crucial for parents to ensure that the language content their children are exposed to is suitable for their age and supports their language development. Duch et al. (2013) suggested that unsupervised television viewing for two or more hours per day could lead to inferior communication outcomes. Conversely, adult-supervised television viewing might aid language acquisition, although it is not as effective as social interactions. Therefore, parents should strive to create opportunities for their children to engage in social interactions and be exposed to language-rich environments, while also limiting screen time and supervising technology use. In today's world, it is challenging to shield young children from technology, especially as many parents work long hours, reducing their time with their children. Consequently, parents may resort to giving their children smartphones to keep them entertained. While this might appear effective initially, the long-term ramifications of unsupervised technology use may become apparent. Children often have unrestricted access to choose the content or apps they want to engage with, lacking parental supervision.

Finally, the theoretical implications of our study highlight the importance of considering the impact of technology use on language development in young children. These findings contribute to the growing body of research on the effects of technology on child development, emphasizing the need for further investigation into the optimal use of technology in early childhood education and development programs. From a practical standpoint, our findings underscore the importance of parental supervision and guidance in managing children's technology use to support healthy language development and overall well-being.

The study highlights a concerning trend of increased smartphone use by parents leading to excessive screen time for young children, potentially impacting their language development. The

findings provide evidence of a connection between prolonged screen time and language delays in children aged 1-5 years.

Based on the study results, we can conclude that using technology for over 2 hours daily is linked to higher chances of language delays in children aged 18 months to 5 years, indicating a negative impact on language development during this critical period.

Moreover, the study reveals a higher prevalence of language disorders among boys compared to girls, suggesting a gender-related factor in language development challenges.

Additionally, early therapy initiation is associated with shorter treatment duration for children with language delays, emphasizing the importance of early intervention for improved outcomes.

The study emphasizes the need for parents to limit screen time and encourage activities that support language development and social interaction, such as games, reading, and outdoor play, to promote holistic child development.

The importance of adult supervision during technology use is highlighted in these recommendations:

1. Supervised Technology Use: Adult supervision during technology use is crucial. Parents should actively monitor and limit their children's screen time, ensuring that the content is age-appropriate and conducive to their developmental stage.
2. Promote Language-Rich Activities: Encourage activities that promote language development, such as reading books, playing language-based games, and engaging in conversations with the child. These activities should be prioritized over passive screen time.
3. Recognize Signs of Delay: Parents should be aware of signs of language delays and seek professional help from a speech therapist if they have concerns about their child's language development.
4. A Balanced Approach to Television: While supervised television viewing can support language acquisition, it should be supplemented with social interactions and language-rich environments. Parents should limit screen time and ensure that the content is educational and suitable for their child's age.
5. AAP Guidelines: Follow the American Academy of Pediatrics (AAP) guidelines for screen time, which recommend minimal exposure to digital devices for children under two years old and no more than one hour per day of high-quality programming for children aged 2–5. Choose High-Quality Content: Select high-quality, age-appropriate content for children's media

consumption. Parents should actively engage with their children during media use to enhance learning and discussion.

6. Early Intervention: Early intervention is critical for addressing developmental delays. Parents should seek professional help from pediatricians or specialists if they suspect their child is experiencing difficulties with speech or language development.

This research has some limitations that can be addressed in future research.

- Incomplete Understanding of Factors: The study acknowledges that it was not possible to study all the factors that influence language delay as variables. This limitation arises from the complexity of the topic and the need for a multidisciplinary approach, which would require more resources in terms of time, expertise, and funding than were available for this study.
- Reliance on Parent-Reported Data: The measures of children's exposure to screens were based on parent-reported questionnaires. This reliance on subjective reporting introduces the potential for bias and inaccuracies in the data, which may affect the reliability of the study's findings.
- Lack of Content Analysis: The study did not account for the content of the videos or games that children engaged with during their screen time. This limitation means that the study could not assess the specific influence of different types of content on language development, which could be an important factor to consider.

By acknowledging these limitations, the study demonstrates transparency and a critical approach to its findings, highlighting areas where future research could further improve our understanding of the relationship between screen time and language development in children.

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