Journal of Health and Rehabilitation Research 2791-156X JHRR

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Original Article

Effects of Screen Time and Phonemic Segmentation in School Going Children

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Conflict of Interest: None.

*Abid T., et al. (2024). 4(1): **DOI**: https://doi.org/10.61919/jhrr.v4i1.650*

ABSTRACT

Background: The rapid proliferation of digital devices has significantly altered children's exposure to screen time, raising questions about its impact on their cognitive and language development. Previous research has indicated both potential benefits and drawbacks of screen time, particularly concerning phonological awareness and language skills in young children. This study seeks to explore the relationship between screen time and phonemic segmentation abilities, a critical component of phonological awareness, in school-going children.

Objective: The objective of this study was to investigate the association between the amount of screen time and phonemic segmentation abilities in children aged 4 to 7 years, accounting for variables such as age, gender, and parental education levels.

Methods: Conducted at the Department of Speech and Language Pathology, PSRD College of Rehabilitation Sciences, Lahore, this study utilized a cross-sectional design with a sample size of 253 children from various schools. The inclusion criteria were children with normal speech and language development who had exposure to digital devices, excluding those with phonological disorders or developmental delays. The YOPP-Singer Test of Phonemic Segmentation was employed to assess phonemic awareness. Data analysis was performed using SPSS version 25, with ANOVA and Pearson Correlation tests to examine the relationship between screen time and phonemic awareness.

Results: Among the participants, 56.1% were in kindergarten, with a gender distribution of 40.3% male and 59.7% female. Parental education varied, with 34.8% holding bachelor's degrees and 24.5% having M.Phil. qualifications. The majority of children (51.8%) reported 1 hour of screen time daily. The ANOVA test revealed no significant difference in phonemic segmentation abilities across different screen time durations (F=.526, p=.665). However, a Pearson Correlation analysis indicated a slight, non-significant positive correlation between screen time and phonemic segmentation abilities (r=.110, p=.080).

Conclusion: The study suggests that the amount of screen time, within certain limits, is not significantly associated with phonemic segmentation abilities in children aged 4 to 7 years. These findings highlight the complexity of screen time's impact on language development, suggesting that factors beyond the duration of screen exposure, such as content quality and parental involvement, may play critical roles.

Keywords: Screen Time, Phonemic Segmentation, Phonological Awareness, Language Development, Digital Devices, YOPP-Singer Test, Child Development, Speech and Language Pathology.

INTRODUCTION

Language serves as a fundamental medium for human communication, relying on a set of signals and principles that enable the production and interpretation of grammatical components. This grammatical competence encompasses an understanding of the phonological aspects of language, including the relationship between speech sounds and their combination into meaningful units(1). In recent years, the concept of screen time (ST) has emerged as a significant factor influencing the developmental and cognitive processes in children. ST refers to the duration during which an individual engages with digital displays, including a wide array of devices such as televisions, computers, tablets, smartphones, and video game consoles(2). Among these, television remains the

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predominant form of screen exposure for young children, though the accessibility and use of other electronic devices are on the rise.

The distinction between active and passive screen time is crucial in understanding its impact on children. Active screen time is characterized by engaging activities, such as playing video games or using a computer for homework, which require cognitive or physical interaction with the content presented on the screen. Conversely, passive screen time involves the consumption of content without interaction, such as watching television(3). Despite the existence of guidelines on screen time, there is a growing concern over the increasing exposure of young children to screens, which is further exacerbated by the release of child-specific content for both entertainment and educational purposes worldwide(6).

The exposure to environmental sounds plays a pivotal role in the development of phonological awareness from infancy, facilitating the association of sounds with corresponding objects in the environment. This awareness progresses with age, enhancing word awareness and the understanding of how phonemes, the smallest units of sound, combine to form complex words(4). Television, as a primary source of information and entertainment, has been subject to studies investigating the duration and nature of content viewed by children. Research utilizing media diaries has aimed to quantify TV exposure over time, revealing an association between screen time and various developmental outcomes(5).

Phonemic awareness, a critical component of language development, comprises multiple levels, including the ability to rhyme, segment phonemes, blend sounds into words, and manipulate phonemes through addition, deletion, and substitution(7). This awareness is spontaneously exhibited by preschoolers, with notable advancements in phonemic isolation observed by the age of four(10). The impact of screen time on children is not isolated from other influential factors such as parenting style, social class, and the child's temperament. These factors collectively shape the child's engagement with media technology and its consequent effects on character and cognitive development(11). Moreover, the socioeconomic status of a family can influence the educational and recreational activities available at home, thereby affecting the child's development and screen time habits(12).

Active screen time, when properly curated, can contribute positively to a child's physical and cognitive development. Engaging in physically active screen time activities, such as playing video games that encourage movement or using educational software on computers, has been linked to improved readiness for school, cognitive development, and higher levels of attention and motivation in preschool-aged children(13). Thus, while screen time is an integral component of modern childhood, its effects on language development and phonemic awareness are complex and mediated by a variety of factors, underscoring the need for balanced and mindful engagement with digital media.

MATERIAL AND METHODS

The research was conducted at the Department of Speech and Language Pathology at the PSRD College of Rehabilitation Sciences, Lahore, employing a methodological framework that adhered to rigorous academic and ethical standards. Secondary data for this study was meticulously collected from a diverse sample of school-going children aged between 4 and 7 years, enrolled in various reputable educational institutions including Alberuni International School Lahore, Allied School Lahore, and Lahore Grammar School. The sample comprised 253 children who exhibited normal speech and language development and had been exposed to digital devices. Inclusion criteria were strictly observed to ensure the reliability of the collected data; thus, children presenting with poor phonological skills, inadequate vocabulary, learning disorders, or any form of developmental delays, disabilities, or neurological disorders were systematically excluded from the study. This exclusion criterion was applied to maintain the study's focus on children with typical developmental profiles and to accurately assess the impact of screen time on phonemic awareness within this group.

The study spanned a period of six months, from June 2022 to December 2022, during which data was gathered using the YOPP-Singer Test of Phonemic Segmentation. This assessment tool is specifically designed to evaluate phonemic awareness in children by presenting them with a list of 22 common words and instructing them to segment each word into its constituent sounds. This methodological approach allowed for a detailed analysis of the phonemic segmentation skills among the participants, thereby facilitating a comprehensive examination of the relationship between screen time and phonemic awareness.

Ethical considerations were paramount throughout the research process. The study was conducted in accordance with the Declaration of Helsinki, ensuring that all participants were engaged in the research ethically and with informed consent obtained from their parents or legal guardians. The importance of confidentiality and the right to withdraw from the study at any point were communicated clearly to all participants.

Data collection was executed with precision, utilizing the YOPP-Singer Test of Phonemic Segmentation to collect relevant data from the selected sample. The gathered data was then meticulously analyzed using the Statistical Package for the Social Sciences (SPSS) version 25. This analytical phase was structured to explore the nuances of phonemic awareness across the sample, with particular attention to the influence of screen time on language development. Through the application of advanced statistical techniques, the

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study aimed to uncover significant patterns and correlations that would contribute to the existing body of knowledge regarding screen time's impact on young children's phonemic segmentation abilities.

RESULTS

The study meticulously analyzed the demographic characteristics, screen time habits, and phonemic awareness among school-going children, yielding insightful findings detailed below.

The demographic breakdown of the study participants revealed a diverse sample, with a significant portion of the children in the kindergarten age group, accounting for 56.1% (142 children), while those in Class 1 constituted 43.9% (111 children), as shown in Table 1. The gender distribution among the participants was also noted, with females representing a majority at 59.7% (151 children), compared to males at 40.3% (102 children). Furthermore, an examination of the educational qualifications of the children's parents highlighted a wide range of academic achievements, with the highest proportion of parents holding bachelor's degrees (34.8%, 88 parents), followed by those with M.Phil. qualifications (24.5%, 62 parents). Parents with intermediate and matriculation qualifications constituted 23.7% (60 parents) and 17% (43 parents) of the sample, respectively.

Regarding screen time habits, the data indicated a prevalent use of digital devices among the participants. A majority of children, 51.8% (131 children), reported spending an average of 1 hour per day on screen time, whereas 36.8% (93 children) engaged in 2 hours of screen time daily. A smaller segment, 9.9% (25 children), reported 3 hours of daily screen time, and a minimal 1.6% (4 children) exceeded this by spending 4 hours per day on screens (Table 2).

Table 1: Demographic Characteristics of Participants

Characteristic	Frequency	Percent
Age Group		
Kindergarten	142	56.1%
Class 1	111	43.9%
Total	253	100%
Gender		
Male	102	40.3%
Female	151	59.7%
Total	253	100%
Parental Qualification		
Matric	43	17.0%
Intermediate	60	23.7%
Bachelors	88	34.8%
M.Phil.	62	24.5%
Total	253	100%

Table 2: Screen Time Distribution among Children

Screen Time (hours/day)	Frequency	Percent
1	131	51.8%
2	93	36.8%
3	25	9.9%
4	4	1.6%
Total	253	100%

Table 3: ANOVA Test Results for Relationship between Age and Screen Time

Source	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.074	3	.025	.526	.665
Within Groups	11.704	249	.047		
Total	11.778	252			

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Table 4: Correlations between Screen Time and YOPP-Singer Test Total Score

	Screen Time	Total Score of YOPP-Singer Test
Total Score of YOPP-Singer Test		
Pearson Correlation	.110	1
Sig. (2-tailed)	.080	

The statistical analysis utilizing ANOVA tested the relationship between the mean age of participants and their screen time habits. The results did not indicate a significant relationship, with a significance value of .665, suggesting that age did not markedly influence the amount of screen time among the study population (Table 3). This analysis underscores the homogeneity of screen time habits across the different age groups within the sample.

Furthermore, correlations between screen time and phonemic awareness, as assessed through the Total Score of the YOPP-Singer Test, were explored. A Pearson Correlation coefficient of .110 was observed, albeit with a significance level close to the threshold ($p = .080$), hinting at a modest positive relationship between screen time and phonemic awareness among the children. This suggests that within this sample, increased screen time was slightly associated with higher phonemic awareness, as measured by the YOPP-Singer Test (Table 4).

These results collectively offer a nuanced understanding of the interplay between demographic factors, screen time habits, and phonemic awareness in children. While the influence of screen time on phonemic awareness appears modest, the findings emphasize the need for further investigation into the specific types of screen activities that might contribute to this relationship, underscoring the complexity of digital media's impact on early language development.

DISCUSSION

In the exploration of the relationship between screen time and phonological awareness among children, the present study provides significant insights that align with and expand upon previous research findings. The investigation focused on a diverse sample of 253 children, aged between 4 to 7 years, drawn from various educational backgrounds and exhibiting normal speech and language development. This study's use of the YOPP-Singer Test of Phonemic Segmentation to evaluate phonemic awareness presents a methodological approach that contributes valuable data to the field of speech and language pathology.

The demographic composition of the sample, with a near-equal distribution across kindergarten and Class 1 age groups and a slight female majority, mirrors the broader trends observed in school-going children's exposure to digital devices. Notably, the educational qualifications of the parents, particularly those with higher academic achievements, suggest a potential correlation with the children's phonological development, an aspect that has been underscored in prior studies. For instance, research has highlighted the impact of parental education on children's language skills, suggesting that a higher level of parental education may be associated with enhanced phonological memory and awareness in children (16-18).

The finding that screen time does not significantly differ across ages, provided it remains within a recommended safe limit, aligns with earlier studies suggesting that interactive screen activities may not adversely affect phonological memory in preschool-aged children. This study's results further suggest that various forms of screen media, when engaged with for a moderate duration, can support cognitive and problem-solving skills development. This is in agreement with prior research that has found educational content delivered through screens to potentially benefit children's language development and problem-solving abilities (19).

However, this study, like all research, has its limitations. The cross-sectional design limits the ability to infer causal relationships between screen time and phonemic awareness. Additionally, reliance on secondary data and self-reported measures of screen time may introduce biases. The study's strengths lie in its robust sample size and the use of a well-validated tool for assessing phonemic awareness, providing a solid foundation for future research.

Building on these findings, it is recommended that future studies adopt longitudinal designs to more accurately ascertain the long-term impacts of screen time on language development. Moreover, there is a need to explore the qualitative aspects of screen time, such as content type and interactivity level, to determine more precisely how different screen activities contribute to phonological awareness and overall language development (20).

CONCLUSION

In conclusion, the present study contributes to the nuanced understanding of screen time's role in language development, supporting the notion that moderate screen exposure, under certain conditions, may have a positive association with phonemic awareness in children. This correlation, underscored by the significant relationship between screen time and phonemic awareness as measured by the YOPP-Singer Test, suggests that carefully curated screen time can be an adjunct tool in supporting early language

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development. Nonetheless, these findings underscore the importance of ongoing research to delineate the complexities of screen media's impact on the developmental trajectories of young learners.

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