



Navigating screen time and language development: An integrated review of parental roles and research trends (2019–2023)

Lim Seong Pek ¹

 0000-0002-0322-7572


Rita Wong Mee Mee ^{2*}

 0000-0002-8294-7569

Fatin Syamilah Che Yob ¹

 0000-0002-2519-277X

Venoth Nallisamy ¹

 0009-0009-1595-4863

Jun S. Camara ³

 0000-0003-1081-2048

Cathy Mae Toquero ⁴

 0000-0002-6044-6771

¹ Faculty of Education and Liberal Arts, INTI International University Malaysia, Nilai, MALAYSIA

² Center for Language, National Defense, University of Malaysia, Kuala Lumpur, MALAYSIA

³ School of Advanced Studies, Pangasinan State University, Pangasinan, PHILIPPINES

⁴ College of Education, Mindanao State University, General Santos City, PHILIPPINES

* Corresponding author: ritawong@upnm.edu.my

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ABSTRACT

The growing incorporation of digital media into children's everyday lives has sparked serious concerns about how it affects language development in particular. This research uses a dual-method approach to investigate the relationship between screen time, parental involvement, and children's language development in line with sustainable development goal 4 (SDG 4), which promotes inclusive and high-quality education. A bibliometric analysis was carried out from 2019 to 2023 to map the larger research environment using co-citation and co-occurrence methodologies. The analysis found that sedentary behavior, mental health, and physical health were the most prevalent research clusters. This suggests that language development is not a topic that is widely covered in literature. Language-specific evidence from a few chosen studies was compiled in a narrative review to support these conclusions. This synthesis demonstrates how excessive screen time is linked to delays in vocabulary acquisition, syntactic development, and general verbal competence, especially when parental mediation is lacking. Active parental mediation techniques that seem to lessen these adverse impacts and encourage more fulfilling educational experiences include co-viewing and vocal interaction. This work bridges a critical gap in language-focused research by combining bibliometric and narrative findings, in addition to mapping the intellectual terrain of screen time research. The results call for further multidisciplinary focus on the moderating influence of parental techniques and the language effects of digital media. In order to meet SDG 4, our research ultimately supports educational and policy initiatives that create digital settings that help young children develop their communication skills and lifelong learning.

Keywords: educational gap, engagement, language development, parental, screen time

INTRODUCTION

The pervasiveness of screen-based devices in today's technologically advanced society has raised concerns about their effects on children's development, especially in the area of language acquisition. Children are using screens during critical developmental windows, and early exposure to digital media is becoming more widespread (Gath et al., 2023). With sustainable development goal 4 (SDG 4) calling for inclusive and equitable quality education and opportunities for lifelong learning for all, the relationship between screen time, parental mediation, and children's language development has thus become a pressing area of scholarly research.

Children's experiences with digital media are greatly influenced by their parents, and how they view and react to screen time can either lessen or increase the negative developmental effects of it. Research suggests that parental attitudes have a substantial impact on how children use digital technology. These attitudes might range from restrictive behaviors (limiting duration or content) to active mediation (co-viewing and discussing information) (Kaya, 2020; Varghese & Karuppali, 2023). Such mediation is particularly important for language development, as interactions during media viewing can either help or hurt language pragmatics, syntax comprehension, and vocabulary expansion (Mustonen et al., 2022). The majority of studies focus on the wider health effects of screen time, like obesity, sleep disorders, and mental health, whereas bibliometric mapping shows a dearth of research explicitly targeting linguistic consequences. As a result, the literature is still fragmented.

Concerns about screen time have historically originated in the television era, when studies first found links between extended exposure and developmental hazards. These concerns have subsequently changed as mobile devices, applications, and on-demand entertainment have become more popular, leading to in-depth research on the effects of these technologies on children's language, social, and cognitive development (Rayce et al., 2024). As children shifted to remote schooling and had less in-person connections, the COVID-19 pandemic increased screen time even more, raising worries about expressive communication, speech, and literacy deficits. Researchers like Moore et al. (2020) found significant shifts in screen habits, play behavior, and physical activity during this time, which may have long-term effects on developmental trajectories.

There is currently a dearth of bibliometric synthesis of the literature, despite the fact that narrative reviews and empirical investigations have brought to light significant evidence about the connection between screen usage and delayed language acquisition. Previous bibliometric research has mostly concentrated on the health hazards associated with sedentary behavior, which has left a gap in mapping the relationship between screen time research and language outcomes and parental mediation. In order to illustrate the research landscape on children's screen time and parental participation, this study uses bibliometric analysis, which uses co-citation and co-word analysis. The study highlights pertinent literature that specifically addresses language development by incorporating a narrative review, even if the retrieved dataset includes studies with more general health concerns. This combination method maintains the integrity of the original dataset while resolving the discrepancy that reviewers saw between stated goals and retrieved data.

The study's theoretical foundations include socio-ecological and cognitive development theories, which advocate that children's settings, caregivers, and media experiences interact dynamically to influence language development (Council on Communications and Media et al., 2016; Madigan et al., 2019). According to this concept, parental mediation seems to be a crucial factor affecting language-related outcomes, indicating that behavioral and educational interventions need to take the family's digital habits into account. Furthermore, considering how important early language competency is for later reading comprehension and academic success, it is imperative to comprehend how screen exposure interacts with parental actions in order to advance national education agendas that are in line with SDG 4.

Even though there are many empirical studies on the relationship between parental mediation and children's screen time, the literature is still dispersed and lacks a clear framework to direct curriculum integration and educational policy. This disarray has led to a topic gap, with the majority of research concentrating on the effects on public health without converting findings into useful, developmental, or pedagogical models, especially when it comes to language development. In order to fill this contextual gap, this study purposefully blends narrative synthesis and bibliometric analysis, providing a formal basis that can help policymakers, educators, and curriculum developers. By combining different data into a coherent

analytical model, the study moves closer to a more cohesive and instructive framework. The study's particular goals are as follows:

1. To assess the most significant previous research and current trends in screen time and parental involvement using co-citation analysis.
2. To identify novel conceptual patterns in the field, co-word (co-occurrence) analysis is employed.
3. To draw attention to its lack of presence in the major clusters and offer narrative perspectives on language development in order to enhance the bibliometric analysis.

METHODOLOGY

Using a bibliometric analysis based on co-citation and co-occurrence (co-word) methodologies, this study methodically examined the body of research on children's screen time and parental participation through the lens of language development. To statistically evaluate publishing patterns, intellectual structure, and thematic evolution within a research topic, bibliometric analysis provides a rigorous and reproducible method (Donthu et al., 2021; Li et al., 2023). By employing this approach, the study not only pinpoints significant contributions and new trends, but it also promotes evidence-based policymaking that is in line with SDG 4, which places a strong emphasis on early childhood education and high-quality education.

The Web of Science (WoS) Core Collection supplied the data for this bibliometric evaluation due to its robust citation analytics and comprehensive indexing of high-impact journals (Greer et al., 2021). The first search encompassed papers from 2019 to 2023 and employed the TS field, which analyzes titles, abstracts, and keywords, to ensure wide coverage. The words "screen time" and "parental" were employed. The inclusion criteria were maintained to guarantee dataset consistency even though the content generated by this string mostly addressed general health issues like obesity, sedentary behavior, and sleep difficulties. Rather, the current analysis concentrates its focus by separating studies in the dataset that particularly address language development using a narrative review section (Madigan et al., 2022; Mustonen et al., 2022). With this dual method, topic refining is possible without altering the bibliometric base.

There were two fundamental bibliometric methods used. Co-citation analysis was first used to find fundamental works that were often referenced together. This revealed shared theoretical underpinnings and clusters of intellectual influence within the area (Esenovna et al., 2024; Eyimaya & Irmak, 2020). This approach reveals a domain's intellectual architecture by charting the relationships between academic works using common references. Visual networks were created and the overall link strengths between frequently co-cited documents were measured using VOSviewer software. Topics like the negative health effects of sedentary behavior, parental mediation techniques, and early childhood media exposure were among the dominating groupings identified by the investigation.

The second method was a co-occurrence (co-word) analysis, which revealed important research themes and new subjects by determining how often particular keywords appeared together across the dataset (Shrestha et al., 2022; Wider et al., 2023). This semantic mapping provided information about the intersections of terms like "screen time," "language development," "obesity," and "parental mediation" in the literature. The visualization of the co-word network in VOSviewer allowed density analysis and thematic clustering. Although the most commonly used phrases focused on behavioral and physical health issues, pertinent language-related studies were later highlighted in the discussion to make clear their place in the larger dataset.

Overall, a systematic review of the development of research on screen time and parental mediation was made possible by this bibliometric methodology. Through improving keyword cleaning techniques, defending the initial search parameters, and differentiating between language-specific and general health themes, the study resolves the methodological issues brought up by reviewers and matches its analytical approach with its stated objectives. The findings not only highlight existing research trends but also identify unexplored areas for further study, especially with regard to language development, which is a crucial component of educational equity under SDG 4.

Table 1. Inclusion criteria for bibliometric analysis

WoS database	All
Time period	2019 to 2023
Search field	TS
Search keywords	"screen time" and "parental"
Citation topics meso	All
Document type	Article or review article
Language	English

Search String

For the bibliometric analysis, this study set precise inclusion criteria to guarantee a targeted and comprehensive evaluation. The WoS was chosen as the main database because of its wide reach and strict guidelines indexing. WoS is renowned for providing strong citation analysis tools and covering high-impact journals (Yan & Zhiping, 2023), which makes it a perfect option for assessing research trends and scientific influence (Greer et al., 2021). The bibliometric analysis of all pertinent records from 2019 to 2023 is shown in [Table 1](#). The TS field, which included the titles, abstracts, and keywords of the publications, was included in the search to guarantee a thorough capture of relevant studies (Madigan et al., 2020). The terms "screen time" and "parental," which were often used, indicated a general interest in the literature on parents' engagement in their children's screen time.

A thorough examination of theme links within the literature was made possible by the inclusion of all Meso-level citation topics associated with these keywords (Raj et al., 2022). To ensure a selection of high-quality, peer-reviewed materials, the bibliometric analysis only included papers and review articles published in English. This meticulous selection procedure guarantees that the study offers a thorough and up-to-date summary of the state of research in the selected topic (Suhaimi & Mahmud, 2022).

RESULTS

With 409 publications and 5,282 cumulative citations, the WoS database shows a high level of scholarly interest in the research on "screen time" and "parental." These studies are regularly cited in later research, as seen by an average of 12.91 citations per article. The significant impact and applicability of the research in this area is demonstrated by the h-index of 32, which indicates that at least 32 publications have been cited 32 times or more. The studies' complexity and breadth are highlighted by the meter in [Figure 1](#), which examines several aspects of screen time, its impact on children, and how parental engagement can either lessen or exacerbate these effects.

Performance Analysis

The performance analysis gives a summary of the most important papers, journals, writers, organizations, and nations that have contributed to the study of screen time and parental participation in children. According to the statistics, themes relating to public health have received the majority of scholarly attention, with fewer works specifically focusing on language development outcomes. This constraint is further examined in the discussion.

The effects of the COVID-19 epidemic on children's screen-time habits, levels of physical activity, and mental health are covered in many of the top 10 most quoted articles. With 679 citations, the Moore et al. (2020) study is notable for its understanding of how the pandemic changed children's play and mobility. Likewise, additional frequently referenced research focuses on topics including family dynamics and physical exercise, sedentary behavior, and myopia risk. Although the discourse was greatly influenced by these works during a time of rapid lifestyle change, they focus more on behavioral and health consequences than language acquisition.

The International Journal of Behavioral Nutrition and Physical Activity, BMC Public Health, and the International Journal of Environmental Research and Public Health are the top three publication venues in terms of production, each with 38 articles. The latter only produced 17 pieces, but the impact and scholarly reach of its contributions are highlighted by its high citation total of 1,103. The interdisciplinary character of

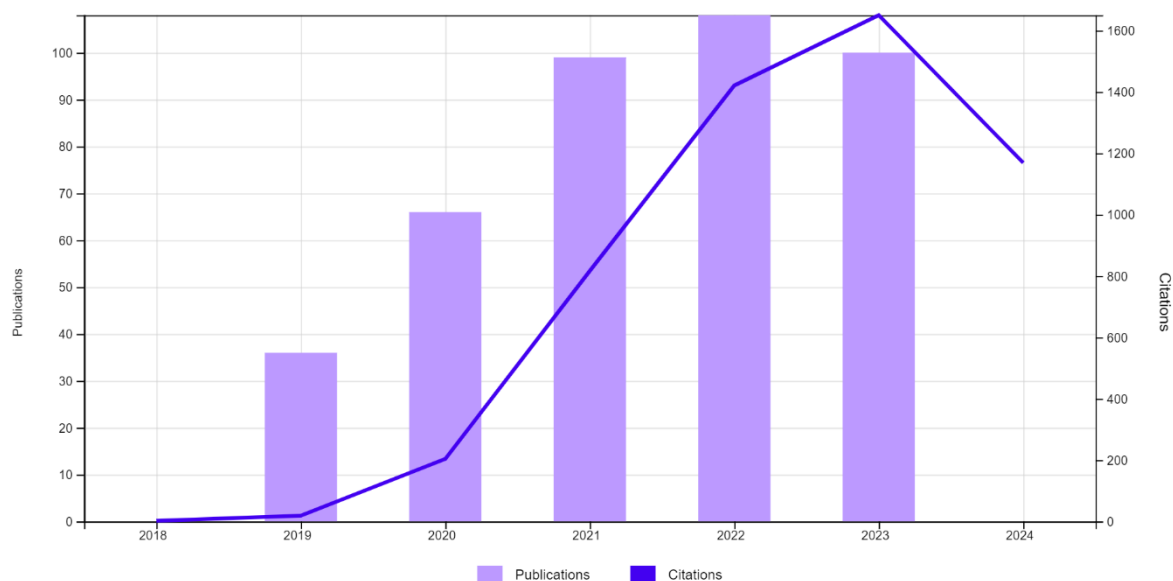


Figure 1. Quantity of publications and citations between 2014 and 2023 (Source: Authors' own elaboration from WoS database)

screen time research is reflected in these journals, which cover behavioral science, psychology, education, and public health.

In this field, a number of writers became key figures. Tremblay, M. S. is notable for having written 11 publications with a total of 1,168 citations, most of which examined public health concepts related to screen time, physical inactivity, and child development. Additionally, two of the most active researchers are Carson, V. and Hesketh, K. D. who have contributed to important conversations around screen-related behaviors and parental roles. Despite having greatly influenced the discipline, these researchers have tended to concentrate on health-related topics with little to no indirect interaction with linguistic or educational outcomes.

With 17 publications, Deakin University is the top-ranked institution, followed by Ghent University (13 articles) and the Karolinska Institute (16 articles). Universities like the University of British Columbia and the University of Ottawa produced fewer publications, but their higher citation averages indicated that their work had an influence. The majority of these institutions exhibit significant public health orientations, which is consistent with general trends in the study of screen usage.

In terms of geography, the United States leads the field with 1,334 citations and 98 publications, demonstrating ongoing leadership in screen time research. Significant contributions are also made by Australia (57 articles) and Canada (49 publications), with Canada outpacing Australia in citations, demonstrating the intellectual significance and global reach of Canadian research. Germany, Sweden, China, and other nations make significant contributions as well, bringing regional diversity to the conversation.

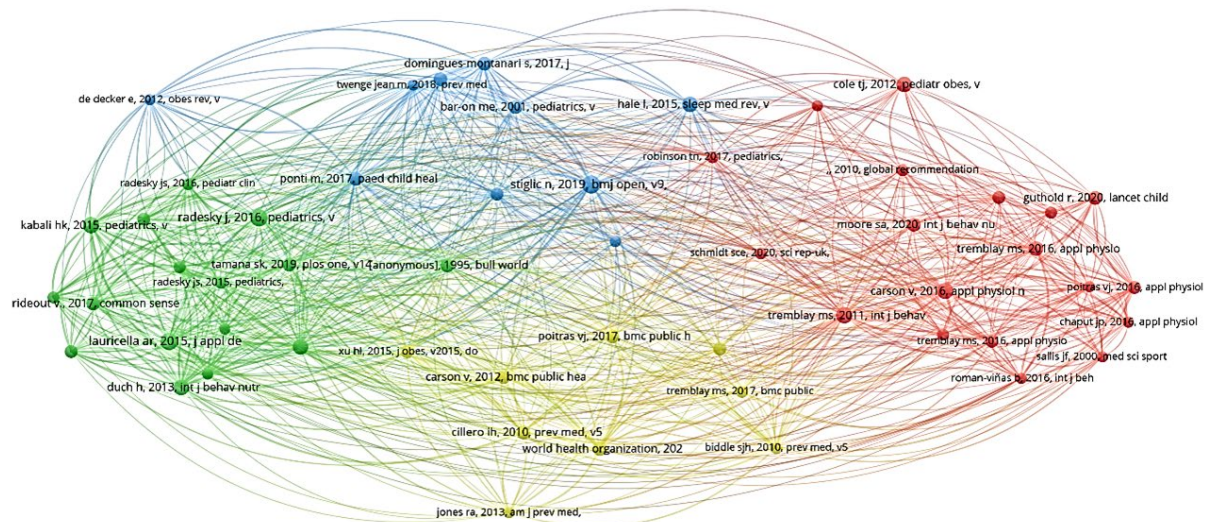
As seen above, the performance analysis highlights a solid and growing corpus of research on children's screen time and parental mediation, especially in fields connected to health. The relative lack of language development themes among the most often mentioned publications and sources, however, highlights the necessity for more focused research. In order to complement the bibliometric results and highlight an underrepresented yet educationally significant aspect of the discourse, these patterns support the importance of including a narrative lens that is centered on language-related outcomes.

Co-Citation Analysis

Using VOSviewer, a co-citation analysis of the top 10 publications (Table 2) on screen time and parental participation in children offers important insights into the relationships and impact of important research in this area. According to the analysis, Stiglic and Viner's (2019) article has the most citations (33), with a total link strength of 130, demonstrating its substantial influence on further research. Their systematic study, which

Table 2. Co-citations (top 10 articles)

Rank	Authors	Citations	Total link strength
1	Stiglic and Viner (2019)	33	130
2	Radesky et al. (2016)	30	104
3	Lauricella et al. (2015)	28	117
4	Carson et al. (2016)	27	119
5	Tremblay et al. (2011)	27	93
6	Kabali et al. (2015)	26	110
7	Madigan et al. (2019)	25	114
8	Duch et al. (2013)	24	116
9	Cole and Lobstein (2012)	23	32
10	Hale and Guan (2015)	23	59

**Figure 2.** Co-citation analysis (Authors's own visualization using VOSviewer)

looks at how screen usage affects children's and teens' health and wellbeing, is a key component of the conversation.

With 30 citations and a total link strength of 104, Council on Communications and Media et al. (2016)'s work comes in second. Because it explores media consumption in young brains and emphasizes the importance of screen time for early development, this study—which was published in *Pediatrics*—is significant. Also well-known are Lauricella et al. (2015) and Carson et al. (2016), whose research highlights the intricate relationship between young children's screen usage, sedentary behavior, and health indicators. These studies' strong link strengths show how important they are in determining future lines of inquiry.

From the association between screen time and developmental outcomes (Madigan et al., 2019) to mobile media exposure (Kabali et al., 2015), the variety of themes reflects the nature of the study field. All of these studies together create a strong body of knowledge that shapes our thinking now and directs future research on children's screen time and parental participation.

Although these studies provide important insights, they focus more on environmental, behavioral, and health effects than language development in general. Four separate clusters were created thematically by the co-citation network, each of which in [Figure 2](#) and [Table 3](#) represents a major area of research within the larger field of screen time and parental mediation, respectively.

With 19 articles, cluster 1 (red) is mostly concerned with the negative health effects of children's screen usage and sedentary behavior. A thorough review of sedentary behavior and its correlation with health markers in school-aged children and youth is the main focus of the selected publications. Carson et al. (2016) and Tremblay et al. (2016) highlight the significance of incorporating sleep, sedentary behavior, and physical exercise into children's health recommendations. Additional articles in this cluster evaluate worldwide physical activity trends and how they affect the health of children. This cluster is quite influential, but it

Table 3. Co-citation cluster on screen time and parental

Cluster no and color	Cluster labels	Number of articles	Representative publications
Cluster 1 (red)	Health impacts of sedentary behavior and screen time	19	Carson et al. (2016), Chaput et al. (2016), Cole and Lobstein (2012), Ezzati and Baumgartner (2017), Guthold et al. (2020), Poitras et al. (2016), Roman-Viñas et al. (2016), Schmidt et al. (2020), & Tremblay et al. (2011, 2016)
Cluster 2 (green)	Parental influence and early childhood screen time	16	Duch et al. (2013), Kabali et al. (2015), Lauricella et al. (2015), Madigan et al. (2019), Radesky et al. (2016), Rideout (2017), & Tamana et al. (2019)
Cluster 3 (blue)	Psychological and physiological effects of screen time	10	Domingues-Montanari (2017), Hale and Guan (2015), Lissak (2018), Stiglic and Viner (2019), & Straburger et al. (2013)
Cluster 4 (yellow)	Environmental and contextual influences on screen time	9	Carson and Janssen (2012), Cillero and Jago (2010), Jones et al. (2013), Poitras et al. (2017), & Tremblay et al. (2017)

primarily represents a focus on physical and biological health, paying little attention to the effects on language or cognition.

Cluster 2 (green) comprises 16 papers that examine how early childhood variables and parental influence affect screen time. The research presented here looks at the intricate relationships that exist between media exposure, parental conduct, and early children's developmental outcomes. Publications by Lauricella et al. (2015) and Council on Communications and Media et al. (2016) are important because they show how early media exposure can affect developmental milestones. There is not much direct emphasis on language development in this cluster, despite the fact that several articles discuss attention issues and developmental delays. This cluster, however, establishes the conceptual framework for comprehending parental mediation as a crucial variable, hence intensifying its significance for upcoming language-focused studies.

Ten articles in cluster 3 (blue) address the negative psychological and physical impacts of screen use on children and teenagers. The cluster contains systematic evaluations that address the wider health consequences of screen time, such as its effects on sleep and mental health, such as the one by Stiglic and Viner (2019). Both Lissak (2018) and Domingues-Montanari (2017) advance our knowledge of how excessive screen time can result in physical health issues as well as psychological anguish. The lack of explicit mention of language skills in this corpus of work, despite the fact that cognitive and emotional development are at its core, further supports the underrepresentation of linguistic outcomes in the most co-cited research.

The contextual elements in children's home surroundings that affect screen time are the main topic of the nine articles in cluster 4 (yellow). This covers correlations between children's screen-viewing behaviors, parental rules, and home environments. Important studies such as Carson and Janssen (2012) look at how different aspects of the home environment can influence screen-time habits. By examining how parental and environmental factors influence sedentary behavior, Poitras et al. (2017) expand on this conversation to the early years. Like the others, this cluster lacks particular research on the effects of screen time on language, although being useful in comprehending more general behavioral patterns.

Therefore, the co-citation analysis provides a clear map of the intellectual contours in the area of parental mediation and screen time. The clusters that were found highlight common research topics in the areas of environmental impacts, psychological well-being, parental involvement, and health outcomes. Nevertheless, they also show that the most influential literature noticeably lacks language development as a primary priority. The justification of adding a narrative review to the bibliometric analysis that directly examines the linguistic implications of screen time and the moderating function of parental participation is further supported by this theme gap. By incorporating these findings, the study not only draws attention to the literature's strengths but also promotes more focused research on language outcomes, a facet that is still underutilized despite its importance for education and development.

Co-Occurrence Analysis

The frequency and connections between keywords in the chosen literature on children's screen time and parental participation are highlighted by the co-occurrence analysis (Table 4). The most often used terms,

Table 4. Co-citations (top 10 articles)

Rank	Keyword	Occurrences	Total link strength
1	Screen time	180	795
2	Children	137	594
3	Adolescents	112	558
4	Physical-activity	104	513
5	Sedentary behavior	83	469
6	Physical activity	78	422
7	Obesity	72	371
8	Health	61	306
9	Associations	54	304
10	Sleep	53	268
11	Overweight	49	271
12	Youth	49	260
13	Childhood	48	243
14	Television	43	218
15	Prevalence	41	189

which reflect the primary demography of interest, are, predictably, “screen time” (180 occurrences), “children” (137), and “adolescents” (112). Keywords like “physical activity” (104), “sedentary behavior” (83), “obesity” (72), and “sleep” (53) highlight the field’s emphasis on the negative effects of screen time on both physical and mental health.

However, language development-related terms are less common, indicating that although the literature regularly looks at the behavioral and health effects of screen time, it typically leaves out in-depth analyses of cognitive-linguistic effects. The necessity for greater synergy between health research and educational development—particularly with regard to reading and communication skills—is emphasized by this thematic imbalance. The quantitative, correlational nature of the area is further demonstrated by terms such as “associations” (54) and “prevalence” (41).

Co-Word Analysis

As a bibliometric method, co-word analysis looks at the connections between terms or keywords in literature. Co-word analysis (Figure 3), which examines the frequency and proximity of terms in research publications, finds thematic clusters that provide insight into the organization and main ideas of a certain field of study. Co-word analysis aids in identifying the primary themes and subtopics that researchers are interested in, such as the psychological effects of media consumption, the function of parental mediation, and the effects of screen time on physical health, in the context of screen time and parental engagement (Table 5).

With 17 themes like “physical activity,” “obesity,” and “childhood obesity,” cluster 1, “physical health and obesity risks,” emphasizes the critical analysis of screen time’s contribution to youths’ declining physical health. The correlation between screen time and other sedentary habits and negative health markers like elevated body mass index (BMI) and obesity prevalence is thoroughly reviewed in representative research such as Carson et al. (2016) and Tremblay et al. (2016). These studies highlight how too much screen time lowers physical activity and creates conditions that lead to weight gain and metabolic problems. By offering international BMI cut-offs, Cole and Lobstein (2012) expand on this discussion and highlight the widespread significance of obesity as a result of sedentary lifestyles. By examining changes in screen time and physical activity during the COVID-19 shutdown, Schmidt et al. (2020) provide more evidence of these hazards and show how interruptions worsen obesity trends. Public health-driven initiatives are reflected in the focus on risk assessments and epidemiological metrics. However, there is a study blind hole regarding developmental learning outcomes because language and cognitive skills are not specifically examined within this cluster.

are linked to improved screen-time habits. Although this cluster offers a solid basis for examining parental influences, it is also essentially silent on language acquisition results, underscoring the need for future bibliometric studies that more successfully integrate developmental and educational issues.

Eleven terms, such as “health,” “sleep,” and “sedentary behavior,” comprise cluster 3, “behavioral and health associations,” which focuses on the relationships between screen time and various behavioral and health outcomes. Two notable studies that carefully investigate how excessive screen time impacts sleep patterns and results in sedentary lifestyles, which in turn influence general health and well-being, are Stiglic and Viner (2019) and Hale and Guan (2015). Lissak (2018) and Domingues-Montanari (2017) investigate physiological and psychological impacts, including impaired cognitive function and increased stress levels in children and teenagers. The Council on Communications and Media et al. (2013) explore the broader impacts of media consumption on the behavior of young people and linked excessive screen time to a lower level of physical activity and a higher risk of chronic illnesses. The verbal or communicative domains continue to receive little explicit attention, despite the fact that these behavioral constructs are crucial for holistic development. The findings, however, offer circumstantial support for the idea that too much screen time may supplant developmental activities like language-rich play and interactions between caregivers and children.

Utilizing eleven phrases such as “mental-health,” “depression,” and “COVID-19,” the mental health and COVID-19 cluster highlights the increasing concerns around the psychological impacts of screen time, which have been made worse by the COVID-19 pandemic. Research like Carson and Janssen (2012) and Poitras et al. (2017) examine how environmental factors, including youngsters utilizing screens more during lockdowns, have exacerbated mental health issues in children. Research in this cluster indicates that the pandemic-induced shift to remote learning and fewer in-person interactions has led to higher rates of depression and anxiety. Research on how contextual changes, such as house confinement, have altered screen-time patterns and further impacted mental health is conducted by Tremblay et al. (2017) and Cillero and Jago (2010). Jones et al. (2013) track these behavioral shifts and discover a significant rise in screen-based activities and their correlation with mental health problems. Despite being largely focused on psychological health, this cluster is particularly relevant in showing how environmental disruptions, such school closures, may limit children’s access to organized language input. This is an area that need greater empirical examination.

The broad theme focus of current screen time research on physical health, parental mediation, and psychological well-being is supported by the co-word analysis. However, because the most often used phrases still underrepresent language development and communication skills, it also draws attention to a significant theme gap. In addition to the bibliometric results, this analysis supports the use of narrative synthesis to bridge the gap between children’s linguistic development and parental mediation techniques. The study adds value in this way by advocating for multidisciplinary integration across psychology, education, and public health in future research objectives.

Narrative Review

Quantitative bibliometric mapping alone is insufficient to comprehend how screen time affects children’s language development; a more thorough interpretive lens into the developing literature is needed. This narrative review adds to the bibliometric results by examining important empirical research and theoretical frameworks that influence the state of the field’s understanding. In a world where children are surrounded by technology, the review highlights recurrent patterns, important gaps, and useful implications by concentrating on the relationship between screen time, parental mediation techniques, and developmental outcomes. Through a thematic synthesis of foundational literature, it emphasizes how parental involvement and media content quality can have a big impact on children’s language development.

The language development challenge in the digital era

Concern regarding digital devices’ possible effects on children’s developmental outcomes, particularly with regard to language acquisition, has grown globally as a result of their fast spread. Since screen-based interactions now make up a significant amount of children’s daily routines, academics and professionals have questioned whether these interactions promote or impede language development. Increased screen usage is frequently negatively correlated with children’s expressive and receptive language skills, according to studies like Madigan et al. (2019). Digital platforms provide rich multimedia exposure, but they do not provide

the turn-taking, interpersonal interactions that are essential for early language development, particularly when parents or other caregivers are not actively involved.

The mediating role of parents: Strategies and significance

The impact of screen time on language outcomes is increasingly understood to be influenced by parental mediation. Three primary categories of mediation techniques were distinguished by Council on Communications and Media et al. (2016): active mediation (conversation about content), co-viewing (watching without engagement), and restrictive (limited time or material). Positive language development has been most closely associated with active mediation among these. Talking with their children during or after media exposure gives them the chance to practice critical thinking, vocabulary development, and comprehension (Duch et al., 2013; Lauricella et al., 2015). As language models, parents provide explanations, probes, and extensions of their children's answers in ways that are not possible for screen-based platforms to do on their own. The importance of family engagement in making sure that screen time enhances rather than replaces in-person conversation is highlighted by this.

Content matters: Educational media vs. passive consumption

The influence of screen content varies. One important conclusion drawn from the literature is that content type is very important. Linebarger and Vaala (2010) make a distinction between fast-paced entertainment media and narrative-based educational programs. Programs that incorporate audience involvement pauses, like "Dora the explorer," have been shown to improve vocabulary retention and syntactic development. These results show that instructional materials can help students learn languages, but only if they are created with pedagogical goals in mind and used sparingly. However, excessive use reduces the advantages of educational content. According to Tamana et al. (2019), if screen usage surpasses the daily limitations advised by pediatric recommendations, even top-notch programs may impede language development. Common side effects of extended screen time include decreased physical activity, sleep disturbances, and decreased parent-child connection.

Parental beliefs and socio-demographic factors

The way parents see screen time has a significant impact on how their children interact with technology. Parents who view television as an instructional instrument are more likely to use active mediation techniques, according to Mustonen et al. (2022). On the other hand, those who depend on screens for amusement or behavioral control frequently permit uncontrolled use, which leads to the loss of interactions that are rich in language. In addition to being purely attitudinal, these behavioral tendencies are frequently influenced by sociodemographic factors like parental education, household income, and digital literacy. Additionally, families from lower socioeconomic backgrounds could find it difficult to obtain high-quality instructional materials or advice on mediation techniques, according to Rayce et al. (2024). Interventions must therefore be socioeconomically and culturally relevant in order to help all families properly manage screen time.

Limitations of screen-based learning and the case for face-to-face interaction

Although screens can provide further assistance with language acquisition, they should not be seen as a replacement for interpersonal communication. According to Gath et al. (2023), language acquisition is greatly influenced by social interactions that screens cannot completely duplicate, such as eye contact, taking turns, facial emotions, and instant feedback. Children who frequently converse with their caregivers have a more sophisticated vocabulary and syntax than children who spend most of their time in front of a screen. Furthermore, young children may be unable to understand and generate language properly due to the cognitive load imposed by visually and auditorily demanding media. Therefore, it is important to use screen-based tools sparingly and to supplement them with rich, interactive discourse.

DISCUSSION

The current study uses an integrated bibliometric and narrative review technique to investigate the relationship between children's screen time, parental mediation, and language development. The narrative review allowed for a more thorough examination of micro-level evidence, especially with regard to language

learning, while bibliometric analysis offered macro-level insights into the main research trajectories between 2019 and 2023. Existing research mostly focuses on the negative health effects of screen usage, including obesity, sleep disturbance, and sedentary behavior, according to co-citation and co-occurrence analyses (Carson et al., 2016; Stiglic & Viner, 2019).

Despite being crucial to infant development, these subjects show a thematic imbalance in the area, with little bibliometric clustering around outcomes connected to language. Given the mounting evidence that screen time, depending on its kind, duration, and mediation, can have a substantial impact on children's language skills, this thematic disconnection draws attention to a gap in research focus (Council on Communications and Media et al., 2016; Madigan et al., 2019). In addition to showing a lack of unity among empirical studies, this also indicates the need for a unifying framework that connects curriculum-level integration and academic research, two areas that this study specifically aims to solve with its dual-method approach.

This bibliometric deficit was filled by the narrative review, which found and compiled research that explicitly connected screen time to language results. There is evidence linking excessive screen use, particularly in unsupervised settings, to impaired syntactic development, decreased expressive and receptive language ability, and delays in vocabulary development (Gath et al., 2023; Tamana et al., 2019). On the other hand, the detrimental impacts are greatly reduced when screen time is combined with parental participation, especially through active mediation techniques such co-viewing and interactive discussion (Duch et al., 2013; Lauricella et al., 2015). These results are consistent with theories of cognitive development and socio-ecology that emphasize the importance of the environment and scaffolding in language learning (Kaya, 2020; Rideout, 2017).

Theoretical Implications

The socio-ecological model's applicability in comprehending the multifaceted elements affecting child development is confirmed by the study's findings. In order to help or impede language outcomes, parental mediation functions as a proximal process that interacts with external digital settings (Bronfenbrenner, 1994; Mustonen et al., 2022). Furthermore, research demonstrates that contingent, responsive language interactions—which are frequently lacking during passive screen consumption—are essential for the best possible brain and linguistic development, supporting models of cognitive development (Rayce et al., 2024). This puts parents in a situation where they actively co-create linguistic meaning in digital places rather than just controlling screen time.

Practical Implications

The findings carry significant implications for parents, educators, clinicians, and policymakers. In order to increase awareness of both the amount and quality of screen time, parental education initiatives should be created first. In addition to educating parents about the important linguistic milestones that passive media intake may impact, these programs ought to encourage active mediation techniques. Second, to help families adopt evidence-based practices, early childhood educators should incorporate parent-facing digital media literacy into their courses. Third, contextualized recommendations that take socioeconomic disparities in media use, interactional depth, and content quality into account should replace one-size-fits-all screen time limits in health and education policy (Varghese & Karuppali, 2023).

This study highlights the need to provide equitable access to knowledge for all stakeholders, which is in line with SDG 4, which promotes inclusive and equitable quality education. Reducing educational inequities made worse by the digital divide requires making sure all children, regardless of background, receive enough language input both offline and online. Legislators ought to back neighborhood-based projects and digital inclusion initiatives that give marginalized families the skills and resources they need to maximize screen time for language enrichment.

In conclusion, the narrative synthesis fills the thematic gap by highlighting the significance of parental mediation in children's language development, even though the bibliometric analysis shows the larger research momentum toward health-related implications of screen time. To investigate causal mechanisms and long-term effects, future research should use longitudinal designs and mixed-method approaches. By providing a nuanced viewpoint on how screen time, when properly managed, might be reframed as a chance

to enrich language development rather than a threat to it, this study collectively adds to the growing conversation on digital childhoods.

CONCLUSIONS

By integrating bibliometric and narrative review approaches, this study provides a thorough analysis of the connection between children's screen use, parental mediation, and language development. It is clear from co-citation and co-occurrence analyses that, particularly in the wake of the COVID-19 pandemic, academic attention has mostly focused on the behavioral and health effects of screen time. However, by highlighting the complex impacts of screen time on language acquisition—particularly when moderated by parental involvement—the narrative review component filled a key vacuum.

The results highlight how excessive or unsupervised screen time is linked to delays in vocabulary and syntax formation, while active parental mediation—by means of activities like content selection, co-viewing, and guided discussions—can counteract these detrimental effects and promote more linguistically rich environments. In the digital age, where screen time starts early and permeates every aspect of children's daily life, these discoveries are especially important. By placing the parent-child-media triad within larger developmental and cognitive frameworks, the study supports the socio-ecological viewpoint and promotes a more deliberate and knowledgeable approach to digital parenting.

Crucially, by highlighting the importance of parental education and digital literacy as components of early childhood development programs, this study supports SDG 4's need for inclusive and equitable quality education. Policymakers and educators must work together to create focused interventions and guidelines that promote responsible screen use while reducing developmental hazards as screen time continues to change in tandem with technology advancements. In summary, this study presents digital media as a potential instrument for language enrichment rather than as something that is intrinsically harmful, so long as it is integrated within responsive, dialogic, and developmentally appropriate parental mediation methods. Future studies should keep examining these processes across time, paying special attention to the changing character of digital childhoods and a variety of sociocultural situations.

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