The influence of physical activities on children language development: a systematic literature review

La influencia de las actividades físicas en el desarrollo del lenguaje infantil: una revisión sistemática de la literatura

Authors

Fitria Kamelia [1]
Margana [2]
Agus Widyantoro [3]

[1] Yogyakarta State University (Indonesia)
[2] Yogyakarta State University (Indonesia)
[3] Yogyakarta State University (Indonesia)

Corresponding author:
Fitria Kamelia
fitriakamelia.2022@student.uny.ac.id

How to cite in APA

Kamelia, F., Margana, M., & Widyantoro, A. (2025). The influence of physical activities on children language development: a systematic literature review. *Retos*, *66*, 620–627. https://doi.org/10.47197/retos.v66.111929

Abstract

Introduction: language development is a great indicator of a child's future growth. However, not all children achieve age-appropriate language milestones. Intervention through physical activity can be a significant contribution to language development.
Objective: this study systematically reviewed the data linking physical activity to children's language development.
Methodology: this study employed a systematic review approach, exploring many journal databases such as ERIC and SAGE. This analysis included empirical studies from the previous five years that focused on children's physical activity and language development. Articles that were irrelevant and came from questionable publications were excluded from this investigation. ERIC and SAGE databases yielded 1583 publications. Seven publications meeting inclusion criteria were reviewed in this systematic review. PRISMA was used for routine procedures in this investigation.
Results: this systematic review found that physical activities in natural settings, integrated into children's routines, and conducted in a stimulating environment can positively impact language development by providing opportunities for communicative participation through play and games.
Conclusion: Physical activity can improve communication from several angles. Future research should concentrate on the most significant types of physical activity for children's language development.

Keywords

Physical activity; language development; children development.

Resumen

Introducción: el desarrollo del lenguaje es un gran indicador del crecimiento futuro de un niño. Sin embargo, no todos los niños alcanzan los hitos del lenguaje apropiados para su edad. La intervención a través de la actividad física puede ser una contribución significativa al desarrollo del lenguaje.
Objetivo: este estudio revisó sistemáticamente los datos que vinculan la actividad física con el desarrollo del lenguaje de los niños.
Metodología: este estudio empleó un enfoque de revisión sistemática, explorando muchas bases de datos de revistas como ERIC y SAGE. Este análisis incluyó estudios empíricos de los cinco años anteriores que se centraron en la actividad física de los niños y el desarrollo del lenguaje. Los artículos que eran irrelevantes y provenían de publicaciones cuestionables fueron excluidos de esta investigación. Las bases de datos ERIC y SAGE arrojaron 1583 publicaciones. En esta revisión sistemática se revisaron siete publicaciones que cumplieron con los criterios de inclusión. PRISMA se utilizó para los procedimientos de rutina en esta investigación.
Resultados: esta revisión sistemática encontró que las actividades físicas en entornos naturales, integradas en las rutinas de los niños y realizadas en un entorno estimulante pueden afectar positivamente el desarrollo del lenguaje al brindar oportunidades para la participación comunicativa a través del juego.
Conclusión: la actividad física puede mejorar la comunicación desde varios ángulos. Las investigaciones futuras deberían centrarse en los tipos de actividad física más significativos para el desarrollo del lenguaje de los niños.

Palabras clave

Actividad física; desarrollo del lenguaje; desarrollo infantil.

Introduction

Language development is the foundation for communication and social interaction, and it is also a good predictor of a child's overall development. Preschoolers are at a critical stage of language development, when their capacity to speak, understand, and interact begins to emerge significantly. However, not all children reach age-appropriate language milestones. Recently, it has been shown that many toddlers experience delayed language development (Aziz et al., 2023; Pasaribu et al., 2023; Vrinda et al., 2022). This delay is mainly induced by excessive screen media exposure (Simonović & Hinić, 2024), and it is perceived as a distraction from more essential developmental tasks. In relation to this, Maromi & Pamuji (2024) added that three main causes of speech delays in children include physical, environmental, and social problems, to accurately diagnose, a thorough assessment is necessary, including medical and audiological exams, language development assessments, parent interviews, and direct observation.

Various intervention strategies have been explored to address delays in children's language development. These include contextual elements such as increasing communication between children and parents, because the interactions affect children's vocabulary, comprehension, and motivation to read, exhibiting good language from instructor (Ece Demir-Lira et al., 2019; Zhang et al., 2024). Additionally, by boosting linguistic stimulation through music activity, which has demonstrated to be a healthy and efficient way of improving phonological awareness, especially in early childhood (Skubic et al., 2021). Lastly, when kids get older, teachers may employ play-based activities to foster social development by promoting conversation and friendships (Gibson et al., 2021).

However, it is crucial to address the issue of excessive screen time as it is a major contributor to children's delayed language development. Children who used screens for 2 or more hours per day had higher rates of reported behavioral issues, delayed developmental milestones, and worse language acquisition (McArthur et al., 2022) . The detrimental physical and psychological health consequences for a developing children are significant implications (Vaidyanathan et al., 2021). As a result of the need of preventing technology usage throughout childhood, it is crucial to take care of the next generation of children, who were born into the digital age. This is why studies on the advantages of physical activities have been established. It is critical to develop techniques to limit children's screen time, and improve levels of physical exercise in order to raise healthy children and, by extension, healthy adults(Sá et al., 2022) . Tandon et al. (2021) argued that more physical activity can lead to less screen time. And finally, a reduction in daily screen time will help children develop their language skills (Rithipukdee & Kusol, 2022). This can be done by the substantial help from their parents and the healthcare team. Equally important, Maromi & Pamuji (2024) suggested that helpful interventions should also come from school-based programs as the education centre. Educational agents play an important role in facilitating language acquisition since children get instruction at various periods of their development.

Furthermore, physical exercise is linked to the enhancement of children's development across several domains, including motor skills, social abilities, emotional intelligence, and cognitive functions (Ernst et al., 2021; Kahan et al., 2023; Senol, 2021). The healthy development of young children is greatly aided by physical activity (Ernst et al., 2021). Physical activities has a favorable association between age, physical education, and critical thinking. Many toddlers benefit from physical education in terms of emotional and social development (Wang, 2022). Children who participate in physical exercise are more interested in movement, environmental exploration, and social engagement, which reduces their time spent on digital gadgets. Physical activity is critical for children's overall development, including overcoming the negative effects of excessive screen time on their language development. Furthermore, while earlier research has comprehensively covered physical activities, this study focuses on combining current evidence about how physical activities might affect children's language development. In this article, we aim to conduct a systematic evaluation of the available evidence on the association between physical activities and children's language development. This method is likely to bring fresh insights for educators, therapists, and parents as they build successful techniques to enhance children's language development, particularly through pleasant physical activities that promote holistic growth.

Method

This research performed a systematic review following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) standards (Page et al., 2021). The inclusion criteria for papers evaluated in this review were empirical research concentrating on the role of children's physical activities on children language development in the preschool children context, published during the past five years (as of 2021). The major selection criteria included article quality (only peer-reviewed journals), and topic relevance. Meanwhile, exclusion criteria included rejecting papers published in lesser-known journals, as well as those with no topic relevance, that were not written in English, were published before 2021, and did not specifically discuss the effect of children physical activities on language development. Mendeley software was used to extract and analyze all selected publications, removing duplications. A total of 1583 publications from the ERIC and SAGE databases were successfully recognized. Finally, eight research articles meeting the inclusion criteria had been selected for the systematic review.

The following picture illustrates the basic processes of the Preferred Reporting Items for Systematic Review and Meta-Analyses (PRISMA) analysis implemented in this study.

Figure 1. PRISMA flowchart of the article selection process

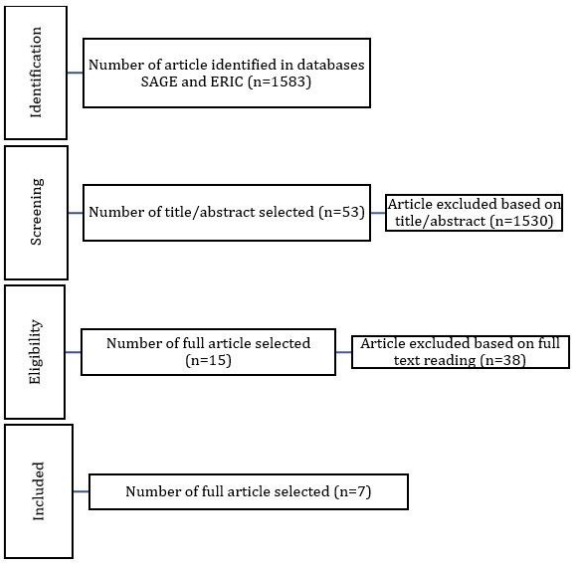

Figure 1 shows the systematic selection of papers utilized in this study. The flowchart shows how many records were detected, reviewed, and eliminated in accordance with PRISMA principles. This systematic methodology improves the study's transparency and assures scientific rigor in integrating data on the influence of children's physical activities on their language development. During the identification phase, 1583 articles were discovered in the SAGE and ERIC databases. Secondly, the screening phase yielded 58 articles with pertinent abstracts and titles. Third, following a comprehensive review, 15 full articles were deemed eligible. Ultimately, seven articles were finally chosen for study.

Results

Researchers have found an associated connection between physical activity and language development in preschool children. The findings may differ based on the type of intervention, the period of the study, and the individuals' characteristics. Despite differences, research consistently emphasizes the significance of physical activity in children's language development. The table below displays the findings of empirical studies undertaken by researchers and practitioners about the impact of children's physical exercise on their language development. The review includes seven profoundly pertinent papers.

Table 1. Results of a review of the influence of physical activities on children language development

Author	Sample	Research Design	Research Objective	Findings
(Novikova et al., 2024)	16 preschool children	Quantitative	To compare children's language usage in an indoor classroom against an outside natural setting in a nature-based preschool.	Children who play actively in outside natural settings appear to experience more favorable context for children's language development, allowing them to speak longer and make complex utterances.
(Olive et al., 2024)	134 preschool children	Experimental	To assess the impact of the Active Early Learning (AEL) childcare center-based physical exercise intervention on early childhood executive function and expressive language.	Integration of the AEL physical activity intervention into the daily childcare routine was effective in enhancing children's executive function and expressive language development.
(Rodríguez-Guerrero et al., 2023)	219 preschool children	Descriptive correlational study	To understand the motor development of children aged 4 to 5 years, encompassing both fine and gross motor skills, and their correlation with language and mathematics development.	Gross motor skills are moderately related to language and mathematical development, whereas fine motor skills (coordination) are weakly correlated to language and mathematical development
(Prins et al., 2023)	18 children aged 4-7	Descriptive qualitative	To investigate the correlation between engagement in natural surroundings and children's language utilization.	Children employed a greater quantity of language and utilized more sophisticated language when engaging in play at the nature-based playground, using language to reference the components of their physical activity.
(Schwartz et al., 2021)	14 preschool children	Qualitative ethnographic approach	To conceptualize free play as a social and linguistic learning activity that facilitates young learners' progression towards second language production.	Free play fosters a productive environment suitable to language usage. During free play, children exhibit more physical and emotional engagement compared to structured academic pursuits.
(Lee et al., 2022)	3 preschool children	Experimental design	To assess the impact of collaborative physical activities on the social interactions of children with autism spectrum disorder (ASD) in China.	Following the initiation of the intervention, there was a marked enhancement in participants' listening skills during courses and their relationships with peers. Following the intervention, another participant began to cultivate friendships and communicate with peers and educators in a more affirmative manner. .
(Singer et al., 2024)	13 speech and language therapists	Qualitative cyclical design	To investigate language therapists' viewpoints on contextual (environmental and personal) elements in early infancy that correlate with communicative involvement in children with language disorders.	An engaging and enriching setting offers several chances for communicative involvement, since it encompasses engagement in play, games, and exposure to diverse sounds, sights, and experiences.

Discussion

This study had analysed literature about the impact of physical activities on children's language development. The purpose was to give an overview and resources for using physical activities in therapeutic settings for children with language development problems. The review mainly revealed that children with more physical activities tend to have positive outcomes on their language development (Novikova et al., 2024; Prins et al., 2023; Rodríguez-Guerrero et al., 2023).

Previous study (Schwartz et al., 2021) It was shown that when children engage more actively, both physically and emotionally, during unstructured play compared to formal academic pursuits, it fosters a favorable environment for language usage. The frequency analysis of observed children's actions revealed

that most L2 production transpired during free play. Supporting this, past research (Dalimier & Woulds, 2019) revealed that kinaesthetic exercises improve student motivation and engagement in language acquisition, highlighting the value of physical activities in the classroom.

Furthermore, children that engage in active play within outside natural environments appear to have a more favorable background for language development, enabling them to articulate longer and more complex utterances (Novikova et al.,2024). This indicates that physical activities that are held in nature will double the benefit for children language development. In relation to this, previous study (Prins et al., 2023) explained that the nature-based playground had twice as many utterances on the environment as a place ('interaction environment') compared to the non-nature-based playground. Language usage in nature-based playgrounds was not only incorporated in play situations, but also in the physical environment itself. Previous study (Rodriguez et al., 2010) found The linguistic elements encompassed incorrect L2 utilization, peer language mediation, inventive reiteration, self-directed discourse, emphasis on linguistic structure, and corrective feedback on others' language inaccuracies.

Additionally, not only do the settings or environments where physical activities happen affect how well they help with language development, like whether they happen in nature or not, but structured and planned physical activity is also a success factor in improving children's language and communication skills. Existing studies revealed that the AEL (Active Early Learning) 6-month peer-coach intervention, which included physical activity in the daily curriculum of childcare centers, improved executive function components such as inhibition, attention shifting, and expressive vocabulary (Olive et al., 2024). In addition, using cooperative physical activities with an interdependent group contingency enhanced social connections for children in the physical education context, which also extended to free play (Lee et al., 2022). To optimize the advantages of inclusive education for children with ASD, preschool educators and personnel should provide collaborative physical activities that encourage significant engagement and enjoyable relationships (Lee et al., 2022).

What is more, gross motor abilities have a moderate correlation with linguistic and mathematics development, but fine motor skills (coordination) have a less correlation, particularly in boys (Rodríguez-Guerrero et al., 2023). Gross motor activities are frequently carried out as part of group play or social contact, providing children with opportunities to actively utilize language (Rodríguez-Guerrero et al., 2023). In gross motor activities, children are encouraged to communicate to arrange games, explain rules, and solve issues, all of which contribute to language development. Teaching children's motor skills is vital not just for fulfilling physical movement milestones, but also for their linguistic development. In line with this, another study (Mulé et al., 2022) found that inactive children performed worse on language development assessments than those who participated in organized activities at sports clubs.

This review emphasized the importance of physical activities in promoting language development in children, especially those with language development difficulties. Nevertheless, it is essential to examine the geographical and environmental support required for the sustained practice of physical activities. Given the persistent concerns and the influence of physical activities on children's language development, more research is highly recommended to explore these areas more comprehensively.

Conclusions

This article presents a comprehensive review of the way physical activities affect children's language development. Only 7 articles out of 1583 recognized publications were analyzed for relevance. The study found that physical exercise is crucial for children's language development, particularly for those with language development difficulties. Physical exercise intervention is crucial for optimum language development, supporting children's overall growth and development.

Physical activities that positively influence children's language development include physical activities held in an outdoor setting with nature, physical activities integrated into children's routines, and physical activities conducted in a stimulating and rich environment that may offer several chances for communicative engagement, as it encompasses involvement in play, games, and the exposure of children to diverse noises, sights, and experiences.

Future study should focus on the most important forms of physical exercise for children's language development, particularly expressive and receptive language abilities. Physical educators, linguists, psychologists, and exercise scientists should work together to generate comprehensive research that address the multidimensional nature of physical activity's influence on language development.

Acknowledgements

The authors would like to express their gratitude to Universitas Negeri Yogyakarta and all of the lecturers who helped them assess the article's worth.

Financing

This study was conducted without external financial support.

References

Aziz, Z. W., Aljammas, E. K., & Al-Allaf, L. I. K. (2023). Impact of screen exposure on language development among toddlers and preschoolers in nineveh province. Military Medical Science Letters (Vojenske Zdravotnicke Listy), 92(3), 259–271. https://doi.org/10.31482/mmsl.2022.048

Dalimier, L. L., & Woulds, S. (2019). Physical activity and second language acquisition: mind and body working together. https://www.researchgate.net/publication/326156330

Ece Demir-Lira, Applebaum, L. R., Goldin-Meadow, S., & Levine, S. C. (2019). Parents' early book reading to children: Relation to children's later language and literacy outcomes controlling for other parent language input. Developmental Science, 22(3). https://doi.org/10.1111/desc.12764

Ernst, J., Burgess, E., & Bruno, L. (2021). Nature Preschool as a Promoter of Physical Activity in Young Children: An Exploratory Study of Nature Preschool in a Northern Climate. International Journal of Early Childhood Environmental Education, 8(3), 3.

Gibson, J. L., Pritchard, E., & de Lemos, C. (2021). Play-based interventions to support social and communication development in autistic children aged 2–8 years: A scoping review. In Autism and Developmental Language Impairments (Vol. 6). SAGE Publications Ltd. https://doi.org/10.1177/23969415211015840

Kahan, D., McKenzie, T. L., Satnick, M., & Hansen, O. (2023). U.S. Islamic Schools' Promotion of Physical Education and Physical Activity. Journal of Education in Muslim Societies, 5(1), 86–105. https://doi.org/10.2979/jems.5.1.06

Lee, G. T., He, L., & Xu, S. (2022). Using Cooperative Physical Activities in Inclusive Settings to Enhance Social Interactions for Preschoolers With Autism Spectrum Disorder in China. Journal of Positive Behavior Interventions, 24(3), 236–249. https://doi.org/10.1177/10983007211035135

Maromi, C., & Pamuji, P. (2024). When a Child is Speech Delay: Causes, Diagnosis, and Intervention. Indonesian Journal of Early Childhood Educational Research (IJECER), 3(1), 61. https://doi.org/10.31958/ijecer.v3i1.12476

McArthur, B. A., Tough, S., & Madigan, S. (2022). Screen time and developmental and behavioral outcomes for preschool children. Pediatric Research, 91(6), 1616–1621. https://doi.org/10.1038/s41390-021-01572-w

Mulé, D., Jeger, I., Dötsch, J., Breido, F., Ferrari, N., & Joisten, C. (2022). Correlation between Language Development and Motor Skills, Physical Activity, and Leisure Time Behaviour in Preschool-Aged Children. Children, 9(3). https://doi.org/10.3390/children9030431

Novikova, E., Pic, A., & Han, M. (2024). Language use in indoor and outdoor settings among children in a nature-based preschool. Environmental Education Research, 30(1), 138–152. https://doi.org/10.1080/13504622.2023.2246688

Olive, L. S., Telford, R. M., Westrupp, E., & Telford, R. D. (2024). Physical activity intervention improves executive function and language development during early childhood: The active early learning cluster randomized controlled trial. Child Development, 95(2), 544–558. https://doi.org/10.1111/cdev.14014

Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff,

J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., … Moher, D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. International Journal of Surgery, 372(88). https://doi.org/10.1136/bmj.n71

Pasaribu, A. G., Yusnadi, Y., & Machmud, M. takwin. (2023). Impact of Gadget Use on Speech Delay: Case Study of Toddlers in Tanjung Gusta Village. International Journal of Educational Practice and Policy, 42–47. https://doi.org/10.61220/ijepp.v1i2.0237

Prins, J., van der Wilt, F., van Santen, S., van der Veen, C., & Hovinga, D. (2023). The importance of play in natural environments for children's language development: an explorative study in early childhood education. International Journal of Early Years Education, 31(2), 450–466. https://doi.org/10.1080/09669760.2022.2144147

Rithipukdee, N., & Kusol, K. (2022). Factors Associated with the Suspected Delay in the Language Development of Early Childhood in Southern Thailand. Children, 9(5). https://doi.org/10.3390/children9050662

Rodriguez, D., Manner, J., & Darcy, S. (2010). Evolution of Teacher Perceptions Regarding Effective Instruction for English Language Learners. https://doi.org/10.1177/1538192709359423

Rodríguez-Guerrero, Y. I., Gil-Madrona, P., Pilar León, M., & Vásquez-Cruz, A. E. (2023). Relationship between fine/gross motor skills and language and math development in Colombian Caribbean children: A study in Barranquilla. Infant and Child Development, 32(4). https://doi.org/10.1002/icd.2430

Sá, C., Vilar, J., Magalhães, P., & Vasques, C. (2022). Sleep time, tv/video games and snack consumption in preschool children – a cross-sectional study. *Retos, 46*, 581–585. https://doi.org/10.47197/retos.v46.91165

Schwartz, M., Hijazy, S., & Deeb, I. (2021). The role of play in creating a language-conducive context in a bilingual preschool. European Early Childhood Education Research Journal, 29(3), 381–396. https://doi.org/10.1080/1350293X.2021.1928723

Senol, F. B. (2021). Physical activity and preschool children: Preschool teachers' perceptions. Southeast Asia Early Childhood Journal, 10(2), 132–146. https://doi.org/10.37134/saecj.vol10.2.9.2021

Simonović, S., & Hinić, D. (2024). Excessive screen media exposure and language delay in the development of infants and toddlers - three case reports. Experimental and Applied Biomedical Research (EABR), 25(1), 87–92. https://doi.org/10.2478/sjecr-2021-0028

Singer, I., Gerrits, E., Gorter, J. W., & Luinge, M. (2024). Speech and language therapists' perceptions of contextual factors associated with communicative participation in children with developmental language disorders. Child Language Teaching and Therapy. https://doi.org/10.1177/02656590241276693

Skubic, D., Gaberc, B., & Jerman, J. (2021). Supportive Development of Phonological Awareness Through Musical Activities According to Edgar Willems. SAGE Open, 11(2). https://doi.org/10.1177/21582440211021832

Tandon, P. S., Zhou, C., Johnson, A. M., Gonzalez, E. S., & Kroshus, E. (2021). Association of children's physical activity and screen time with mental health during the covid-19 pandemic. JAMA Network Open, 4(10). https://doi.org/10.1001/jamanetworkopen.2021.27892

Vaidyanathan, S., Manohar, H., Chandrasekaran, V., & Kandasamy, P. (2021). Screen Time Exposure in Preschool Children with ADHD: A Cross-Sectional Exploratory Study from South India. Indian Journal of Psychological Medicine, 43(2), 125–129. https://doi.org/10.1177/0253717620939782

Vrinda, R., Krishna, A. R., & Kunnath, S. K. (2022). Appropriate Screen Time Use to Prevent Speech and Language Delay in Toddlers during the Covid-19 Pandemic: A Brief Report. Disability, CBR and Inclusive Development, 32(4), 155–164. https://doi.org/10.47985/dcidj.519

Wang, C. (2022). The role of physical activity promoting thinking skills and emotional behavior of preschool children. Psicologia: Reflexao e Critica, 35(1). https://doi.org/10.1186/s41155-022-00223-1

Zhang, Y., Taumoepeau, M., & Reese, E. (2024). Context matters: Examining the linguistic aspects of educator-toddler talk. Australasian Journal of Early Childhood. https://doi.org/10.1177/18369391241306765

Authors' and translators' details:

Fitria Kamelia	fitriakamelia.2022@student.uny.ac.id	Author
Margana	margana@uny.ac.id	Author
Agus Widyantoro	agus_widyantoro@uny.ac.id	Author
Muhammad Subhan Fikri	muhammadsubhanfikri@fkip.upr.ac.id	Translator