

A SYSTEMATIC LITERATURE REVIEW ON THE IMPACT OF CIRCLE TIME MUSIC AND SONG ACTIVITIES ON CHILDREN'S EXECUTIVE FUNCTION

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Abstrak

Fungsi eksekutif merupakan aspek penting dalam perkembangan anak usia dini, karena berperan dalam mengatur perhatian, mengingat informasi, dan beradaptasi dengan perubahan. Kegiatan musik dan lagu selama circle time diyakini dapat mendukung perkembangan fungsi eksekutif secara efektif. Penelitian ini merupakan tinjauan literatur sistematis yang bertujuan untuk mengevaluasi dampak kegiatan musik dan lagu selama circle time terhadap fungsi eksekutif anak usia dini. Data dikumpulkan melalui pencarian studi dari database terpercaya seperti *Scopus*, *Science Direct*, *ERIC*, *Elicit*, dan *Open Knowledge Map*, yang memenuhi kriteria inklusi tertentu. Hasil penelitian menunjukkan bahwa aktivitas musik selama *circle time* memiliki pengaruh positif terhadap peningkatan fungsi eksekutif, termasuk perhatian, memori, dan kontrol diri. Namun, respons anak terhadap kegiatan ini berbeda-beda, tergantung pada karakteristik individu seperti temperamen dan gaya belajar. Keterbatasan studi dan kekurangan penelitian longitudinal menuntut penelitian lebih lanjut, terutama yang menyesuaikan kegiatan berdasarkan kebutuhan individual anak. Temuan ini mendukung penerapan kegiatan musik dalam lingkungan pendidikan anak usia dini sebagai strategi untuk mendukung perkembangan fungsi eksekutif secara optimal.

Kata kunci: circle time; fungsi eksekutif; kegiatan musik; perkembangan anak; tinjauan pustaka sistematis

Abstract

Executive function is a crucial aspect of early childhood development, playing a vital role in attention regulation, memory, and adaptability. Music and song activities during circle time are believed to effectively promote the development of these functions. This study is a systematic literature review aimed at evaluating the impact of music and song activities during circle time on young children's executive functions. Data were collected through searches of reputable databases such as *Scopus*, *Science Direct*, *ERIC*, and *Open Knowledge Map*, following specific inclusion criteria. The findings indicate that music activities during circle time positively influence executive functions, including attention, memory, and self-control. However, children's responses to these activities vary depending on individual characteristics such as temperament and learning styles. The limited number of longitudinal studies and research within specific cultural contexts highlight the need for further investigations, especially those tailored to individual needs. The results support incorporating music-based activities in early childhood education as an effective strategy to enhance executive function development.

Keywords: circle time; executive function; music activities; child development; systematic literature review

INTRODUCTION

Executive functions are higher-order cognitive processes that enable children to regulate attention, remember instructions, inhibit impulsive responses, shift between tasks, and

organize goal-directed behavior. In early childhood education, these skills are closely related to school readiness, self-regulation, social participation, and the ability to follow classroom routines. For children aged 3-6 years, executive function stimulation is most appropriate when it is embedded in playful, meaningful, and socially interactive learning activities.

Music and song activities are frequently used in early childhood classrooms because they combine repetition, rhythm, movement, listening, turn-taking, and emotional engagement. These characteristics are theoretically relevant to executive function development. For example, singing a song with changing tempo requires children to monitor cues and adjust behavior; movement songs require inhibitory control when children must stop, wait, or change actions; and repeated lyrics support auditory working memory. Therefore, circle time provides a promising classroom context for integrating music activities that stimulate executive function.

Recent studies support the relationship between music-based activities and executive function. A systematic review by Rodriguez-Gomez and Talero-Gutiérrez (2022) concluded that music training is associated with executive function performance in children. A later meta-analysis focusing specifically on preschool children aged 3-6 years found positive effects of music training on inhibitory control, working memory, and cognitive flexibility (Lu et al., 2025). Classroom-based music-movement activities have also been shown to improve inhibitory control in preschoolers (Suppalarkbunlue et al., 2023), while self-directed music play has been associated with improvements in working memory and inhibitory control (Kosokabe et al., 2021).

Although these studies indicate the potential of music-based activities, direct research on music and song activities specifically during circle time remains limited. This review therefore focuses on music, song, rhythm, movement, and classroom group activities that are conceptually compatible with circle time practices in early childhood education. The review addresses two questions: (1) How do previous research findings describe the relationship between music and song activities in group/circle-time contexts and early childhood executive function? (2) What forms of music and song activities are most relevant for supporting children's executive function?

METHOD

Literature was systematically searched between January and March 2025 using several academic databases relevant to education, psychology, and early childhood research, including Scopus, ScienceDirect, ERIC, PubMed, and Frontiers. Additional studies were identified through Open Knowledge Map, Elicit, and manual reference screening. The search focused on publications published between 2020 and 2025 using combinations of the following keywords: *music, song, music movement, music play, circle time, preschool, early childhood, executive function, inhibitory control, working memory, and cognitive flexibility*. All retrieved records were exported and screened following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA 2020) guidelines. Duplicate records were removed prior to title and abstract screening. Full-text articles were subsequently assessed against predefined eligibility criteria.

Eligibility Criteria

The inclusion criteria for this review comprised peer-reviewed journal articles and systematic reviews published between 2020 and 2025 that investigated preschool-aged children

(approximately 3–6 years old) or included preschool populations within systematic reviews. Eligible studies examined music-related activities, including singing, rhythm-based activities, music movement, music play, or music training, and reported outcomes associated with executive function, such as inhibitory control, working memory, or cognitive flexibility. Studies were excluded if they focused solely on passive music exposure, failed to assess executive function outcomes, involved participants outside the early childhood age range without providing separate analyses for preschool children, or lacked sufficient bibliographic verification and methodological rigor.

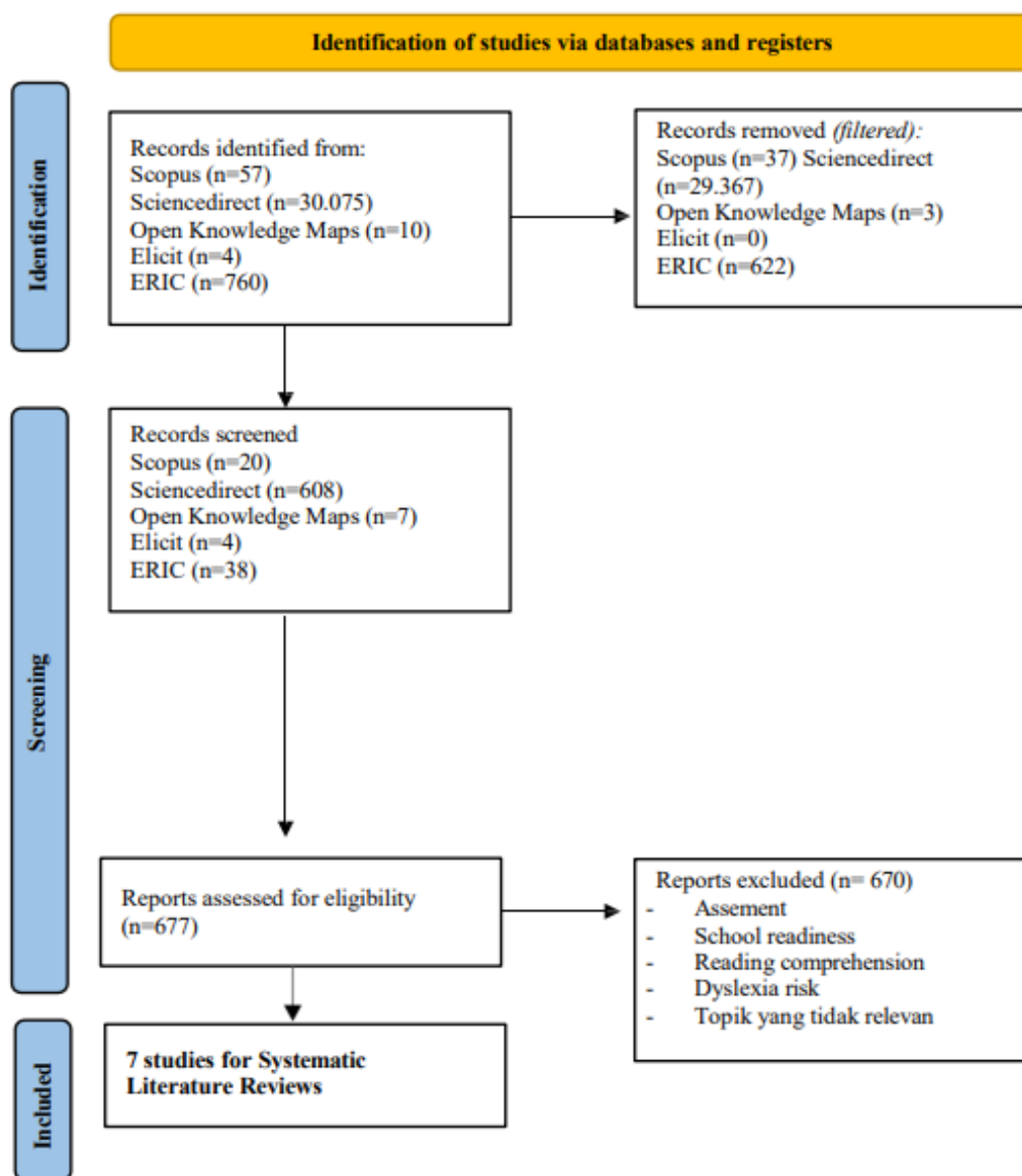


Figure 1. Flowchart PRISMA

RESULT AND DISCUSSION

Following the screening and eligibility assessment process, six verified studies published between 2021 and 2025 were included in this review. The selected studies comprised three experimental interventions, one cross-sectional study, one systematic review, and one systematic review with meta-analysis. Although none of the studies explicitly investigated

music and song activities during circle time, all examined music-based activities that are compatible with circle-time practices in early childhood settings, including singing, rhythm exercises, music-movement activities, instrumental play, and structured music training.

Across the reviewed studies, executive function was primarily assessed through three core domains: inhibitory control, working memory, and cognitive flexibility. These domains are widely recognized as essential cognitive processes supporting self-regulation, learning readiness, and social participation during early childhood.

Research Question 1: How do music and song activities contribute to executive function development in early childhood?

The findings consistently indicate a positive relationship between music-based activities and executive function development. Although the magnitude of effects varied across studies, all six articles reported beneficial outcomes in at least one executive function domain.

Inhibitory control emerged as the most frequently reported outcome. Suppalarkbunlue et al. (2023) demonstrated that classroom-based music-movement activities significantly improved preschool children's ability to inhibit impulsive responses and follow behavioral rules. Similarly, Bayanova et al. (2024) found that children with music training experience exhibited stronger motor inhibitory control than their peers without such experience. These findings suggest that activities requiring children to start, stop, wait, or change actions in response to musical cues provide valuable opportunities to practice self-regulation.

Working memory was also consistently supported through music-related activities. Kosokabe et al. (2021) reported improvements in working memory among children who participated in self-directed music play programs. Music activities often require children to remember lyrics, rhythmic sequences, movement patterns, and teacher instructions, thereby engaging memory processes that are fundamental for learning and problem-solving.

Evidence regarding cognitive flexibility was somewhat more limited but remained positive. The meta-analysis conducted by Lu et al. (2025) concluded that music training contributes to improvements in cognitive flexibility among preschool children. Musical experiences that involve changing rhythms, tempos, movement patterns, or response rules may encourage children to shift attention and adapt to new demands, which are important aspects of flexible thinking.

Overall, the reviewed evidence suggests that music-based activities provide a rich combination of auditory, motor, cognitive, and social stimulation. This multimodal engagement appears to support executive function development by encouraging children to monitor their behavior, remember information, and adjust their responses according to changing environmental demands.

Research Question 2: What types of music and song activities are most relevant for supporting executive function?

The reviewed studies suggest that several forms of music activities are particularly relevant for promoting executive function in early childhood classrooms.

First, music-movement activities appear highly effective for strengthening inhibitory control. Activities involving body movements synchronized with musical cues require children to regulate actions, control impulses, and respond appropriately to instructions. Examples

include movement songs, action songs, and rhythm-based games where children must stop, start, or change movements according to auditory signals.

Second, singing activities can support working memory development. Repetitive songs, cumulative songs, and call-and-response singing require children to retain and recall verbal information while maintaining attention to group participation. These activities are easily incorporated into circle-time routines and can provide repeated opportunities for memory practice.

Third, rhythm-based activities may foster both attention regulation and cognitive flexibility. Rhythm imitation, clapping patterns, drumming sequences, and tempo-changing exercises require children to process auditory information while adjusting their responses in real time. Such activities encourage flexible adaptation to changing rules and environmental cues.

The findings also highlight the importance of intervention quality and consistency. Lu et al. (2025) reported that intervention duration and frequency significantly influenced outcomes, suggesting that executive function benefits are more likely to emerge when music activities are implemented regularly over an extended period. Similarly, experimental studies included in this review generally reported stronger effects when music activities were structured and delivered consistently rather than as occasional enrichment experiences.

Discussion

The findings of this review align with contemporary theoretical perspectives suggesting that executive function develops most effectively through meaningful, socially interactive, and cognitively engaging experiences. Music activities naturally integrate several elements known to support executive function, including sustained attention, behavioral regulation, memory rehearsal, motor coordination, and social interaction.

One possible explanation for the positive effects of music on executive function is that musical participation requires simultaneous activation of multiple cognitive systems. Children must listen, remember instructions, coordinate movements, monitor timing, and regulate responses while participating in group activities. This combination of cognitive demands may explain why music-based interventions often produce improvements across multiple executive function domains.

The findings also support previous evidence indicating that music training can contribute to executive function development in childhood (Lu et al., 2025; Rodriguez-Gomez & Talero-Gutiérrez, 2022). However, the present review extends existing knowledge by highlighting the relevance of music activities that can be readily incorporated into everyday circle-time routines. Unlike formal music education programs that may require specialized equipment or instruction, circle-time music activities are practical, accessible, and developmentally appropriate for early childhood settings.

Despite these promising findings, several limitations should be acknowledged. First, the number of studies directly examining circle-time music activities remains limited. Most available evidence comes from broader music training or music-movement interventions rather than circle time specifically. Second, considerable variation exists in intervention duration, frequency, and outcome measures, making direct comparisons across studies difficult. Third, most studies focused on short-term outcomes, leaving questions regarding the

long-term sustainability of executive function gains. Finally, evidence from diverse cultural contexts remains relatively scarce, limiting the generalizability of current findings.

Future research should therefore investigate music and song activities implemented specifically during circle time using rigorous experimental designs, longitudinal follow-up, and culturally diverse samples. Such studies would provide stronger evidence regarding the mechanisms through which music-based circle-time practices support executive function development in early childhood.

Table 1. Literature Matrix Based on Verified Articles (2020-2025)

Reference	Design / Source Type	Participant / Focus	Music Activity	EF Component	Main Finding
Kosokabe et al. (2021)	Experimental / classroom intervention	Japanese preschool children	Self-directed music play and dramatic play programs	Working memory; inhibitory control	Music play supported improvement in working memory and inhibitory control compared with control activities.
Frischen et al. (2021)	Experimental study	Children aged 6-7 years	Instru-mental music lessons	Selected EF components	Music lessons improved some executive function outcomes, especially those linked to attention and inhibition.
Rodriguez-Gomez & Talero-Gutiérrez (2022)	Systematic review	Children across included intervention studies	Music training programs	EF performance	Music training showed potential benefits for executive function, although effects varied by design, age, and intervention type.
Suppalarkbunlue et al. (2023)	Classroom-based intervention	Preschool children	Music-movement training activities	Inhibitory control	Music-movement activities improved inhibitory control more strongly than control activities.
Bayanova et al. (2024)	Cross-sectional association study	Children aged 6-7 years	Music training experience	Motor inhibitory control	Children with music training showed stronger motor inhibitory control, but causal conclusions were limited.
Lu et al. (2025)	Systematic review and meta-analysis	Preschool children aged 3-6 years	Music training including singing, rhythm, playing, and pitch activities	Inhibitory control; working memory; cognitive flexibility	Music training had positive effects on all three EF components, with intervention duration and frequency influencing outcomes

Across the reviewed studies, music activities appear most consistently related to inhibitory control. Activities that require children to stop, wait, change movement, or respond to auditory cues can strengthen children's ability to monitor and regulate behavior. This is highly relevant to circle time because teachers commonly use songs for transitions, classroom rules, greetings, and group coordination. Music-movement activities are therefore recommended as a core strategy for supporting self-control in preschool classrooms.

Working memory is also supported when children remember lyrics, repeat rhythmic patterns, follow sequential instructions, or recall movement patterns. In circle time, teachers can use cumulative songs, echo singing, call-and-response routines, and rhythm imitation games. These activities require children to retain auditory and verbal information while simultaneously coordinating attention and movement.

Cognitive flexibility may be stimulated through songs that change tempo, pitch, rhythm, movement direction, or rules. For example, children may first clap slowly, then quickly, then stop, or they may change actions when a song cue changes. These shifts encourage children to adjust to new instructions and move flexibly between response patterns.

The review also shows that music activities should be structured and repeated. Evidence from the meta-analysis suggests that intervention duration, frequency, and session length influence outcomes. Short, sporadic music activities may be enjoyable, but sustained and intentionally planned activities are more likely to support executive function. For classroom practice, this means that circle time music should not be treated only as entertainment but as a planned pedagogical routine with clear cognitive and self-regulation goals.

A key limitation is that the available literature does not always use the term circle time. Many studies refer to music training, music-movement, music play, or classroom music activities. Therefore, the present review interprets these studies cautiously and applies them to circle time only when the activity format is compatible with group-based early childhood routines. Future studies should directly examine music-and-song circle time interventions using clear protocols, comparison groups, and longitudinal follow-up.

CONCLUSION

This study concludes that music and song activities during circle time hold consistent and significant potential in fostering executive function development in early childhood, particularly in the domains of inhibitory control, working memory, and cognitive flexibility. These activities, especially when involving repetition, rhythmic variation, and integrated motor engagement, have been shown to enhance children's attention, emotional regulation, and ability to follow instructions. The findings support the initial objective of this review by confirming the positive correlation between music-based interventions and executive function enhancement. Despite several limitations, including the lack of longitudinal and culturally contextual studies, the review provides valuable insights and practical implications for educators, parents, and policymakers. It also highlights the need for further research to develop innovative, technology-integrated, and culturally relevant strategies that can sustain the long-term impact of music activities in early learning environments.

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REFERENCES

- Bayanova, L., Chichinina, E., & Aslanova, M. (2024). The association between music training and executive function in 6–7-year-old children. *Frontiers in Education*, 9, Article 1333580. <https://doi.org/10.3389/feduc.2024.1333580>
- Frischen, U., Schwarzer, G., & Degé, F. (2021). Music lessons enhance executive functions in 6- to 7-year-old children. *Learning and Instruction*, 74, Article 101442. <https://doi.org/10.1016/j.learninstruc.2021.101442>
- Kosokabe, T., Mizusaki, M., Nagaoka, W., Honda, M., Suzuki, N., Naoi, R., & Moriguchi, Y. (2021). Self-directed dramatic and music play programs enhance executive function in Japanese children. *Trends in Neuroscience and Education*, 24, Article 100158. <https://doi.org/10.1016/j.tine.2021.100158>
- Lu, Y., Shi, L., & Musib, A. F. (2025). Effects of music training on executive functions in preschool children aged 3–6 years: Systematic review and meta-analysis. *Frontiers in Psychology*, 15, Article 1522962. <https://doi.org/10.3389/fpsyg.2024.1522962>
- Rodriguez-Gomez, D. A., & Talero-Gutiérrez, C. (2022). Effects of music training in executive function performance in children: A systematic review. *Frontiers in Psychology*, 13, Article 968144. <https://doi.org/10.3389/fpsyg.2022.968144>
- Suppalarkbunlue, W., Chutabhakdikul, N., Lertladaluck, K., & Moriguchi, Y. (2023). Promoting inhibitory control in preschool children through music-movement activities in the classroom. *Journal of Research in Childhood Education*, 37(2), 275–291. <https://doi.org/10.1080/02568543.2022.2111482>
- Xie, Q., & Hanafiah, M. (2023). Systematic literature review: The sustainable development of small and medium-sized enterprises under the trend of globalization. *International Journal of Professional Business Review*, 8(5), Article e01803. <https://doi.org/10.26668/businessreview/2023.v8i5.1803>