

ORIGINAL ARTICLE

Effective interventions used by preschool teachers to develop executive functions in preschoolers with attention difficulties

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ABSTRACT

Aim: This study explores the interventions used by preschool teachers to develop executive functions in preschoolers with attention difficulties. It aims to provide a comprehensive understanding of effective interventions for fostering executive function development, as viewed from the perspectives of preschool teachers.

Materials and Methods: A qualitative study was conducted through semi-structured interviews with thirty preschool teachers. Thematic analysis was employed to examine the interventions proposed by teachers for enhancing executive functions in preschoolers with concentration difficulties. The results were subsequently discussed in relation to the existing literature.

Results: The results indicate that motor games and interest-driven activities are the most effective in developing executive functions in children with attention difficulties. Teachers suggested that successful interventions often incorporate rhythm and movement, aligning with children's interests.

Conclusions: Early and effective interventions aimed at developing executive functions in preschoolers at risk of ADHD can delay the onset of symptoms and enhance academic success. Teachers emphasise that motor games and activities based on children's interests are key strategies for improving concentration and self-regulation; however, further research is required to validate these findings.

KEY WORDS: ADHD, Preschoolers, Interventions, Executive Functions, Preschool Teachers

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INTRODUCTION

Executive Functions (EFs) and self-regulation are essential cognitive processes that influence success across various life domains, including education, work, and social relationships, by enabling individuals to manage novel and complex situations [1]. These functions begin to develop in infancy, grow rapidly during preschool years, reach maturity in late adolescence, and decline in later adulthood [2]. During preschool, the core components of executive function (working memory, cognitive flexibility, and inhibitory control) undergo significant development [3]. Deficits in these areas are linked to a higher risk of developing Attention Deficit Hyperactivity Disorder (ADHD) [4], making early interventions vital [5].

Targeted early interventions for preschoolers have been shown to enhance executive functions (EFs), delay or reduce symptoms of ADHD, and improve long-term developmental outcomes, potentially decreasing the need for formal diagnosis and associated healthcare costs [6]. Effective strategies commonly include imaginative play, storytelling, music, motor games, and quiet activities [7]. Additionally, approaches such as digital tools, mindfulness practices, martial arts, and aerobic exercise are also beneficial, particularly when aligned with children's interests [8]. Recent research further supports the effectiveness of interventions that integrate physical activity, structured play, mindfulness, and educational technologies to strengthen executive functions (EFs) in preschoolers exhibiting ADHD symptoms [9,10]. In academic contexts, teachers have also utilised storytelling, rhymes, music, and visual aids to promote attention and self-regulation [11], underscoring the value of creative and multimodal approaches in early childhood education.

Play remains a powerful medium for cognitive and emotional development. It aids in managing behavioural challenges while supporting the growth of executive function skills [12, 13]. Imaginative play is particularly effective in promoting inhibitory control and is associated with improved learning outcomes in children with developmental difficulties [14]. Storytelling – especially dramatised or sequential – has also been shown to improve emotional literacy and attention regulation [15].

Physical activity supports both mental health and the development of executive functions, particularly when combined with cognitive challenges [16]. Calming routines, such as yoga, encourage controlled movement and foster self-regulation strategies [17, 18]. Music-based interventions have been linked to improvements in self-regulation and inhibitory control, particularly for children with ADHD [19]. Additionally, arts-based activities, including painting and group cultural experiences, enhance metacognitive and behavioural skills [20]. While digital tools such as educational

robotics show promise [21], passive screen time may hinder self-regulation [22], highlighting the importance of guided, interactive media use [23].

The literature highlights the critical role of executive functions in social development and the emergence of psychopathology, particularly among children with ADHD and externalising behaviours, where deficits in EFs are closely linked to symptom manifestation. Interventions targeting EFs in the preschool years have proven effective, particularly in reducing attention-related difficulties. Numerous studies and reviews have highlighted the success of diverse approaches – including play, storytelling, physical activity, music, art, and technology – in enhancing executive functions, even among children without diagnosed ADHD. However, a gap remains concerning preschool teachers' perspectives on which interventions they find most effective for children with attention difficulties. This study aims to address this gap by exploring the perceived effectiveness of interventions proposed by the Centre on the Developing Child at Harvard University [7], as well as those involving digital tools [10], robotics [21], art-based methods [20], and child-directed activities [8].

AIM

This study explores the interventions used by preschool teachers to develop executive functions in preschoolers with attention difficulties.

It aims to provide a comprehensive understanding of effective interventions for fostering executive function development, as viewed from the perspectives of preschool teachers.

MATERIALS AND METHODS

This qualitative study explored kindergarten teachers' perspectives on the most effective interventions for children with concentration difficulties in the classroom. The sample comprised thirty active teachers from Greece and England. Using convenience sampling, the researcher, who is also a kindergarten teacher, initially contacted colleagues, who then referred others. After obtaining ethical approval, participants received detailed information and consent forms via email. Semi-structured interviews, informed by a literature review and pilot-tested with five teachers, were conducted in person or by phone between March 30 and May 15, 2024.

Data were analysed through thematic analysis, following the steps outlined by Braun and Clarke [24]: transcription, familiarisation, coding, theme development, and presentation. This method was chosen for its suitability in examining subjective experiences, consistent with Tongs' [11] study conducted in Hong Kong.

To ensure validity and reliability, the researcher reviewed interview transcripts multiple times, conducted participant validation, and sought peer review for consistency. Ethical protocols were strictly followed; participants were informed of their rights, provided with consent forms, and assured of confidentiality. Names were anonymised, data were encrypted, and all printed materials would be destroyed after ten years. Participants were offered access to psychological support if needed and referred to ADHD Hellas [25] for additional resources. Interviews were arranged flexibly, including phone or video conferencing, to ensure participants' comfort and informed consent.

ETHICS

This work complies with the principles of the Declaration of Helsinki.

RESULTS

Participants highlighted the increasing challenge of managing preschoolers with concentration difficulties, noting a significant rise in such cases over the past five years. Although each child demonstrates unique characteristics, common patterns emerged. These children exhibit strong cognitive potential but struggle to maintain attention on tasks, activities, or play. Their efforts are frequently left incomplete, and they often display restlessness, impulsiveness, disorganisation, and a higher tendency for accidents. Additionally, some show aggressive or rude behaviour, have difficulty respecting boundaries, and appear either withdrawn or overly dominant in peer interactions. Individualised support or one-on-one instruction often leads to improved concentration, particularly when activities align with the child's interests or involve novelty.

One participant stated: „They often fail to consider the consequences of their actions before responding, acting impulsively. Some may also exhibit aggressive or rude behaviour towards other children or toys. They find it challenging to adhere to rules" (P.18).

The data analysis provided insights into the research question regarding which EF interventions preschool teachers perceive as most effective for children with concentration difficulties. Teachers prioritised motor games and interest-based activities, followed by music, new technologies, art, imaginative play, storytelling, quiet activities, and traditional games.

MOTOR GAMES

Motor games were frequently described as highly engaging and beneficial for sustaining attention. Their dynamic nature, including rhythmic movement, encourages prolonged participation and better adherence to the rules. Teachers noted that even when children deviate from rules during motor play, it is less disruptive, given the overall flow of the activity. The integration of cognitive tasks into motor games was also emphasised as a strategy to enhance learning outcomes. Calming motor exercises, such as yoga, were recommended to support attention during subsequent structured tasks.

A participant reported: „They thoroughly enjoy motor games, as they incorporate music and a change of rhythm whenever they are in motion. They can engage in these activities independently and pursue them with great enthusiasm. I believe it alleviates their tension and benefits them if a calming motor activity follows afterwards" (P.2).

ACTIVITIES BASED ON CHILDREN'S INTERESTS

Interventions derived from children's interests were ranked as the second most effective strategy. These activities reportedly lead to high levels of focus, cooperation, and motivation among children with concentration difficulties. Teachers strongly supported this approach, advocating for curriculum designs that are rooted in student interests. However, they expressed concern regarding the limitations imposed by mandated, pre-structured programmes from the Ministry of Education and the need to prepare children for more rigid pedagogical approaches in primary school.

A teacher noted: „When something originates from the student and his interests or from the interests of his classmates, it effortlessly captures their attention. This is the most effective method. Children become focused, can collaborate with their peers, and feel the need to share their interests with others" (P.28).

MUSIC

Music was seen as an effective tool for improving attention and reducing impulsivity. Rhythmic patterns were particularly beneficial, offering both emotional regulation and opportunities for social interaction. Children preferred engaging with musical instruments and rhythm-based games over more traditional musical learning, such as singing. Movement-based music activities – like the „lava dance" or „freeze dance" – were also noted to enhance spatial awareness and focus.

One participant highlighted: „I have noticed that it calms them down magically. They enter a state of ecstasy. It's not just the singing; the playing of instruments also has this effect... When there is a movement within the music, it aids them significantly, allowing them to concentrate" (P.15).

NEW TECHNOLOGY

Participants acknowledged the advantages of using interactive technologies to promote cognitive engagement and attention. Activities such as virtual museum visits, coding with Bee-Bots, and interactive whiteboard games were noted for their effectiveness. However, teachers cautioned against excessive screen time, particularly passive use such as video viewing. They emphasised the importance of setting clear boundaries and suggested implementing „technology contracts" to manage transitions and expectations.

Teachers pointed out: „Yes, I use new technology more often, and I engage in activities that stimulate thinking... I need to remind them of the rule from the outset: a contract is required" (P.6).

„I don't use it. The kindergarten where I work in England is free from new technologies; the children have no contact with screens or any other technological devices" (P.10).

ART ACTIVITIES

Opinions on art activities were mixed. Some teachers found that children with attention difficulties struggled to complete crafts or lacked attention to detail. Others felt that when art tasks matched the child's interests, they became more focused and collaborative. Free painting – particularly with tempera and watercolours – was highlighted as especially effective, especially when children could paint standing at an easel, combining movement with creativity.

Several teachers emphasised: „In crafts, they may not fully grasp what they need to do at first... They appreciate the freedom to move, stand, and create using their imagination" (P.12).

„I believe that all our actions should stem from the children and their artistic expression..." (P.30).

IMAGINATIVE PLAY

Both free and structured imaginative play were reported to significantly aid children with concentration difficulties. During free play, children often display high levels of engagement and focus. However, challenges arose when these children attempted to control peer interactions or became upset when peers did not conform to their imagined scenarios. Structured imaginative play offered opportunities to embed cognitive goals and assess individual needs early in the school year.

One teacher stated: „The imaginary play certainly aids them as it captivates their interest... They want to take on the roles they envision and define the game accordingly. They do not readily accept others' opinions..." (P.12).

STORYTELLING

Teachers observed a decline in children's ability to attend during storytelling sessions, which they attributed to increased screen exposure. Interactive techniques – such as using expressive voice, puppets, and related props – were more effective than traditional or digital storytelling methods. Teachers also used concise stories with imagery and questions to maintain interest and promote comprehension.

Participants reported: „A few years ago, they listened to a fairy tale that they enjoyed... In recent years, with the rise of screens, the fairy tale has become increasingly meaningless..." (P.22).

„In England, we utilise story bags filled with hero dolls and objects... whenever their hero is mentioned, they stand up and act out the roles assigned to them" (P.10).

QUIET ACTIVITIES

Quiet activities, such as board games, cooking, and experiments, were used to enhance EF. However, children with attention difficulties often struggle to remain engaged in turn-based games. Cooking and experiments were found to be more successful, as they enabled children to manage impulses and sustain attention.

Teachers pointed out: „We incorporate board games into the children's daily schedules... although children with ADHD may struggle... these activities are beneficial for their growth" (P.17).

„Preschoolers with concentration difficulties... exhibit greater motivation and engage more actively in cooking and experiments..." (P.3).

TRADITIONAL GAMES

Traditional games combine movement and music to support EF development and cultural learning. While

some teachers exclude these games, others integrate them primarily during outdoor activities. Children with concentration difficulties often struggle with rule-following in such settings, but with teacher support, these games can foster socialisation and self-regulation.

One participant stated: „In the garden, we favour traditional games because the children enjoy them. However, preschoolers with concentration difficulties often struggle... A teacher can assist in integrating these children by reminding them of the rules and alleviating their tension" (P.6).

DISCUSSION

The findings of this study confirm and extend prior literature on interventions that effectively develop EFs in preschoolers with attention difficulties. Teachers identified motor activities and child-driven tasks as particularly beneficial, echoing evidence from Diamond & Lee [3] and Diamond [8], who emphasise intrinsic motivation as a catalyst for EF development.

The central role of movement-based interventions is consistent with research showing that physical activity enhances attention, working memory, and inhibitory control [16]. Teachers' emphasis on calming follow-up routines, such as yoga, aligns with Barenberg et al. [17] and Benzing et al. [18], who advocate for structured movement combined with regulation strategies.

Interest-led learning remains underutilised due to educational policy constraints, despite its proven value [3]. The challenge of balancing standardised curricula with personalised instruction is a key issue raised by participants.

Music and imaginative play, though often underestimated in structured learning contexts, emerged as powerful tools for EF support. These findings are reinforced by Antonietti et al. [19] and Thibodeau et al. [14], who demonstrate how these interventions foster self-regulation and cognitive flexibility.

The use of technology showed potential but highlighted tensions between interactive and passive media. Teachers advocated for tools like Bee-Bots, consistent with Di Lieto et al. [21] and Geronti [10], while raising concerns similar to those of Cliff et al. [22] regarding unregulated screen time at home.

Art and storytelling were more nuanced: while some children disengaged during crafts or passive story formats, interactive, interest-based approaches facilitated focus and creative expression. These findings align with those of Andersen et al. [20] and White & Carlson [15], underscoring the need for flexibility and teacher creativity.

Lastly, traditional games offer untapped potential for fostering EFs in group contexts, especially when rules are scaffolded by educators, as seen in Amani et al. [12] and Healey & Healey [13].

This study adds a qualitative dimension to the existing literature by foregrounding the voices of preschool teachers and their practical strategies. The findings emphasise that effective EF interventions must be adaptive, child-centred, and balanced with broader curriculum requirements.

CONCLUSIONS

This study highlights that kindergarten teachers consider motor games and activities aligned with children's interests as the most effective interventions to support preschoolers with concentration difficulties and enhance EFs. Engaging, rhythmic movement combined with cognitive challenges fosters sustained attention and self-regulation. Meanwhile, music, imaginative play, storytelling, and hands-on activities, such as cooking, further support EF development. However, external pressures, such as mandated curricula, may limit teachers' ability to tailor interventions to children's interests fully. The findings underscore the need for interventions that strike a balance between structure and flexibility, suggesting that active, participatory methods are most beneficial. Given the qualitative nature and sample limitations of this research, further quantitative studies involving diverse educator perspectives are recommended to expand understanding and improve early intervention strategies.

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CONFLICT OF INTEREST
The Authors declare no conflict of interest

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