



# Sustained Attention in Three-Year-Old Children: The Impact of Teaching Conditions and Choice

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## Abstract

This study investigates how different teaching conditions affect the sustained attention of 3-year-old children during play in early learning environments. Play is considered a primary method for young children to learn. The teaching conditions examined were child-initiated choice, adult choice, and adult presentation. Ninety-three children participated in the study, which took place in a university laboratory preschool. The classrooms were evaluated using the Early Childhood Environment Rating Scale-Revised (ECERS-R). Researchers recorded how long the children focused on toy play across the three conditions and then analyzed the data using a fixed-effects model ANOVA. Child-initiated choice resulted in the longest attention spans, followed by adult choice, with adult presentation yielding the shortest attention spans. These results highlight the importance of choice and autonomy in helping young children sustain attention, implying that educators should create learning experiences and environments that reflect children's interests and developmental needs to increase both engagement and learning.

**Keywords** Child sustained attention · Child-initiated choice · Play

Many 3-year-old children spend extended hours each week in center-based early learning environments, where the quality and duration of care have been shown to significantly influence foundational skills, including attention, early learning, and social development (Bi et al., 2024). This role significantly influences the formation of secure trusting relationships in children (Ferreira et al., 2020; Rivas et al., 2023; Spilt & Koomen, 2022) as well as their development and learning (Miller et al., 2022; Pianta & Hofkens, 2023). It is noteworthy that, despite the limited requirements for working with young children, research has recognized the profound influence that early childhood teachers have on child development (Manning et al., 2019). Given the foundational role of attention in the learning process, there is a compelling need to understand and identify strategies that best support children's attention. The quality of teacher-child interactions may directly influence a child's capacity

for attention, as nurturing environments can scaffold sustained engagement with materials and peers. However, limited research has examined how specific teaching conditions influence sustained attention in preschool-aged children during free-choice play, leaving a gap in identifying which instructional contexts best support Early attention development. This study aims to identify the most effective teaching conditions for promoting sustained attention in 3-year-olds, in alignment with recommended pedagogical practices, by incorporating both play and child choice.

## The Significance of Play

Play is a natural inquiry process (Parker et al., 2022) characterized by intrinsic motivation (Jefferson-Buchanan, 2022), pleasure (Huizinga, 2025), symbolic nature (Creaghe & Kidd, 2022), and process-driven qualities (Taylor & Boyer, 2020). Play is widely acknowledged as a primary avenue for learning in young children (Bergen et al., 2020). To support learning and development in 3-year-olds, early childhood educators can employ scaffolding techniques (Vygotsky, 1978) to offer 'just the right help at just the right time,' thereby facilitating more advanced play and higher-order

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thinking in young children (Gillespie & Greenberg, 2017, p. 90). Adults frequently assume the role of a “play partner” with young children, serving as agents of socialization (Chen et al., 2018; Corsaro, 2017; Schneider, 2016). Play is a strenuous form of work for children, enabling them to develop skills that contribute to cognitive, physical, social, and emotional growth throughout their lives (Almon, 2018; Felehi et al., 2022). Consequently, play is a vital indicator of children’s well-being and a necessity in early learning (Miller & Almon, 2009). However, play is expected to yield specific learning outcomes for young children (Wood, 2014). Existing research highlights that engaging materials offer children opportunities to develop skills and grasp conceptual understanding. Engagement in learning experiences is recognized for its developmental significance (Coelho et al., 2019). Therefore, enhancing children’s engagement with materials in their learning experiences is highly desirable. Engagement has been defined as a child’s interactions with materials and people in their environment in a manner that aligns with the situation and their developmental stage (Coelho et al., 2019). Through engaged play, children have opportunities to practice and develop their skills.

Sustained engagement in play supports immediate learning while fostering an internal drive to overcome challenges, referred to as mastery motivation, a concept introduced by White (1959) to describe the innate desire to interact competently with the environment by pursuing challenges and persisting in problem-solving without relying on external rewards. One of the key skills nurtured through play is mastery motivation (Wang et al., 2023), which involves the ability to problem-solve independently and master tasks voluntarily (Fokkens-Bruinsma et al., 2020). Children engage their internal motivation by choosing what and how to play (Rodriguez-Meehan, 2022). In addition, play contributes to language development through children’s interactions with adults, who provide rich linguistic input and responsive communication during play episodes (Prins et al., 2023).

## The Value of Choice

Two foundational components of play experiences are choice and autonomy. While closely related, choice refers to the act of selecting among options. In contrast, autonomy encompasses the broader sense of control and self-direction that arises from being able to make those choices. (Colliver & Doel-Mackaway, 2021). Choice of materials is one aspect of choice that can be provided in an early childhood classroom to support engagement in play (DiCarlo et al., 2003; Rodriguez-Meehan et al., 2022). There are many benefits to providing opportunities for choice compared to the absence of choice, including “better performance, more motivation,

and greater life satisfaction” (Misuraca et al., 2024). These benefits include a reduction in challenging behaviors among children (Rajaraman et al., 2023), improved task performance (Fridkin & Hurry, 2025), increased use of oral language and increased vocabulary (Goldfeld et al., 2022), and enhanced academic achievements (Fridkin & Hurry, 2025).

Choice in the early learning classroom exists on a continuum between teacher-led and child-led approaches. Educators make daily decisions on the level of choice for each learning experience and for each child (King & Howard, 2016; Press et al., 2020). Choosing feels rewarding (Heuer et al., 2019) and is crucial for developing persistence and focused attention (Garofalo et al., 2019), as well as facilitating the practice of self-regulation skills and processes (Xue et al., 2023).

In early childhood classrooms, offering meaningful choices supports engagement by aligning activities with children’s preferences, thereby increasing motivation and attentiveness. Research suggests that choice can have a significant impact on child behavior, including children with access to preferred activities exhibiting higher engagement levels (Maimaran & Salant, 2019) and a decreased likelihood of displaying problematic behavior (Sullivan & Roane, 2018). Recent research also suggests that children exhibit greater engagement in child-initiated activities than teacher-directed ones (Prykanowski et al., 2018).

While the prevailing view often favors more choices, a study exploring the effects of excess choices found that a limited number of options may be more advantageous (Tian & Wu, 2019). This is likely due to the increased conflict individuals experience when confronted with numerous attractive alternatives, often leading to the decision not to choose (Scheibehenne et al., 2010; Slattery et al., 2022). This “non-choice” decision may be eliminated when the desirability gap between options is substantial (Scheibehenne et al., 2010; Slattery et al., 2022). The present study investigates the influence of varying levels of choice on the duration of sustained attention exhibited by early preschool children.

## Sustained Attention

Sustained attention, defined as the capacity to focus on a specific task for an extended period while excluding other stimuli (Fisher, 2019; Slattery et al., 2022), holds pivotal importance. Attention naturally shifts from one stimulus to another (Esterman & Rothlien, 2019; Slattery et al., 2022), with a significant increase from 2 to 4 years (Ruff & Lawson, 1990; Ruff & Capozzoli, 2003). The average attention span for a 3-year-old child is a topic of considerable interest in developmental psychology. Research indicates that

children at this age frequently exhibit sustained attention for 2 to 8 min (Ruff & Capozzoli, 2003), depending on the task and the child's level of interest in it. For instance, studies suggest that sustained attention in young children can be defined as the ability to focus on a task or stimulus for longer than 3 s (Yu & Smith, 2016). Hands-on tasks, allow for exploration, and incorporate novelty—such as puzzles, block building, or dramatic play—have been shown to support longer attention spans in preschoolers.

Research highlights the importance of attention span in early childhood (Shannon et al., 2020; Simon et al., 2023), noting that attention span at age four can predict educational outcomes later in life (McClelland et al., 2013; Yung et al., 2021). This suggests that while 3-year-olds may have shorter attention spans, developing these skills is crucial for later learning and cognitive development. The influence of environmental factors on attention span cannot be overlooked. For example, the study by Ashori et al. (2018) emphasizes the role of sensory integration in enhancing attention and motor skills in children, suggesting that structured activities can improve attention spans. This is particularly relevant for 3-year-olds, who benefit from engaging and interactive environments that help them develop their ability to focus.

While the average attention span for a 3-year-old can vary, it is generally characterized by brief bursts of focus, typically lasting a few minutes at a time. Various factors, including the nature of the task, individual differences, and environmental stimuli, influence this attention span. Most daily tasks hinge on sustaining attention (Blotenberg & Schmidt-Azert, 2019). Sustained attention is also integral to successful social interaction (Capozzi & Ristic, 2018), as it is required to focus on the cues that inform appropriate responses (Murphy et al., 2007). Moreover, sustained attention is a precursor to executive function (Brandes-Aitken et al., 2019; Fisher, 2019; Reynolds & Roman, 2016).

Despite its critical significance, limited research has been done on how young children develop sustained attention (Addanki et al., 2022; Ruff & Lawson, 1990). What is known is that selective attention begins to emerge in infancy and undergoes substantial development during the preschool years (Amso & Scerif, 2015; Hoehl & Berten-thal, 2021; Reynolds & Romano, 2016; Rose et al., 2001; Ruff & Lawson, 1990). Selective attention involves choosing which stimuli to focus on, while sustained attention maintains that focus over an extended period of time. These processes are interrelated, with selective attention often serving as a precursor to sustained attention. Selective attention during infancy has also been linked to the development of self-regulation and executive function during the preschool years (Brandes-Aitken et al., 2019; Johansson et al., 2015; Veer et al., 2017).

The ability to sustain attention is a prerequisite for effective learning (Bandura, 1989; Diamond, 2013; Ruff & Capozzoli, 2003). As an increasing number of school-age children show deficits in maintaining attention during various learning-related tasks, researchers are becoming more focused on understanding this development and how to support it in the early years. Bandura's social learning theory (1989) states that attention constitutes the first of four elements in the learning process. Prior research has indicated that child choice influences attention (Casey & McWilliam, 2007; Doke & Risley, 1972; LeLaurin & Risley, 1972); therefore, interventions that incorporate an element of choice show promise and warrant evaluation. Previous research (DiCarlo et al., 2016) indicated that preschool-age children engaged with toys for longer durations when teachers employed a child-choice teaching condition and that 2-year-olds engaged with toys for longer durations when teachers used an adult choice teaching condition (DiCarlo et al., 2023), prompting an investigation into which teaching condition would produce the most extended duration of attention in 3-year-olds.

The constructs of choice, play, mastery motivation, and attention collectively form an interconnected framework. When children are provided a choice in play, they exhibit increased engagement, which fosters intrinsic motivation and supports the development of sustained attention, a crucial skill for learning and self-regulation.

This study aims to (1) determine the average duration of sustained attention exhibited by 3-year-olds when playing with a self-selected toy, and (2) compare the effectiveness of three teaching conditions—child choice, adult choice, and adult presentation—on children's sustained attention during toy play.

## Method

### Participants and Setting

Three-year-old children enrolled in an Early learning program were targeted for inclusion in the present study. Participants included 93 children: 47% females ( $n=44$ ) and 53% males ( $n=49$ ); 64% White children, 15% Asian children, 12% Black children, and 10% other. The participating children were functioning within normal limits for their chronological age, as determined by the Ages & Stages Questionnaire (ASQ-3) (Squires & Bricker, 2009). Because one of the research questions was to determine the duration of child attention, children with identified disabilities were excluded from the study. Children were recruited through voluntary enrollment in the university's laboratory preschool. Informed parental consent and child assent were obtained. No participants withdrew or were excluded after data collection began.

Data were collected across six classrooms at a laboratory preschool on a university campus. Three-year-old classrooms were evaluated yearly using the Early Childhood Environment Rating Scale-Revised (ECERS-R) (Harms et al., 2014). They were required to obtain a score of at least 5, indicating a “good” learning environment (Early et al., 2018), on a 7-point scale. All classrooms met the criteria specified by the ECERS-R, including learning centers and free play time requirements. All three-year-old teachers in the target classrooms met the state criteria to be lead teachers, which included having a Child Development Associate Credential. The data were collected during free-choice center time. Before collecting child data, Institutional Review Board approval was obtained, and informed consent was obtained from all teachers and parents. Consent was obtained from the child before each observation.

### Behavior Definitions

Toy play served as the operational measure of child attention, using toys commonly found in preschool classrooms (DiCarlo et al., 2016). Toy play was defined as the appropriate manipulation of toys in line with their intended use (Sidhu et al., 2022). After the initial manipulation, continued engagement, such as looking at or commenting on the toy, was also counted as toy play. Only interactions involving designated toys were recorded. Disruptive behaviors (e.g., throwing toys not meant to be thrown) or aggressive (e.g., hitting another child with a toy) were not coded as toy play (DiCarlo et al., 2003).

### Teaching Conditions

Data were collected during three teacher-directed conditions across 61 total observation sessions. The sessions were rotated across conditions to reduce order effects, with 33% beginning with child choice, 31% with adult choice, and 36% with adult presentation. Before each session, the observer reviewed the assigned condition with the teacher and reminded her not to engage with the child after delivering the prompt.

In the child choice condition, the teacher approached the child and gave a neutral directive: “Go play.” In the adult choice condition, the teacher offered two toys known to be highly preferred by the child and said, “Would you like to play with the (puzzle) or the (blocks)?” In the adult presentation condition, the teacher selected a preferred toy that had not already been used in that session and gave the prompt, “Why don’t you play with the (dolls)?” Teachers selected toys based on their knowledge of each child’s preferences, which they had developed during the first two months of the school year. These included a mix of open-ended toys (e.g., blocks, paint, animals) and closed-ended toys (e.g., shape sorters, puzzles).

The classroom teacher was asked to select each child’s preferred toys, so the toys introduced varied across children. It is important to note that all classrooms scored high on the ECERS tool, indicating that all materials used were developmentally appropriate for the children’s ages. Because the focus was on the child’s independent attention to the toy, any teacher interaction beyond the initial prompt would result in the exclusion of data. No sessions were disqualified for this reason.

### Experimental Design and Analysis

This study is an exploratory quantitative study. The duration of attention to toys (toy play) of 93 children was recorded across three treatment conditions (child-initiated, adult choice, or adult presentation). Potential confounding variables include child familiarity with the toys, individual differences in temperament, and the strength of the teacher-child relationship. While these factors were not directly measured, efforts were made to standardize procedures and rotate conditions across classrooms. Data were analyzed using a fixed-effects model ANOVA. Before testing hypotheses, One-way ANOVA with child race, gender, and age as the between-group variable were run separately on children’s attention to explore possible race or gender main effects. Tests revealed no attention differences based on gender, child age in months, or race ( $p$ -value range, 0.73–0.88).

### Inter-Rater Reliability

Inter-rater reliability (IRR) between coders was assessed in 48% ( $n=45$ ) of the children. Agreement was calculated using the independently recorded scores; observers did not resolve discrepancies. One-way random intraclass correlations (ICC) were calculated to determine the degree of agreement in child attention to toy play provided by the coders for each teaching condition (Landers, 2015). This type of ICC is recommended for IRR when there are random pairs conducting reliability (Gisev et al., 2013; Landers, 2015). The ICC for child initiated was 0.99, adult choice was 0.95, and adult presentation was 0.98, indicating good reliability (Cicchetti, 1994; Hallgren, 2012). Therefore, 99%, 95%, and 98%, respectively, of the variance between raters is attributable to actual differences.

### Results

A one-way analysis of variance was conducted to evaluate the relationships between child attention and play condition. ANOVA is used to compare teaching conditions and demonstrate the differences between two or more samples (e.g.,

child-initiated, adult choice, adult presentation) (Gravetter & Wallnau, 2009). Before proceeding with testing hypotheses, an ANOVA with child race as the between-group variable were run separately on children's attention to explore possible race main effects. There were no significant differences between race, child age in months, or child gender in terms of child attention ( $p$ -value range, 0.78–0.91). Average attention for three-year-olds across the teaching conditions varied. *Child-initiated choice* averaged 233 s (range, 12–1590 s), with a standard deviation of 287 s. *Adult choice* averaged 195 s (range, 0–932 s), with a standard deviation of 205 s. *Adult presentation* averaged 121 s (range, 0–638 s), with a standard deviation of 125 s. See Figs. 1 and 2. Outliers were retained to reflect the authentic range of observed attention across individual children.

An analysis of variance was conducted to examine the relationship between the teaching condition and child sustained attention. Figure 2 illustrates the distribution of sustained attention durations across the three conditions using box plots. Each box plot displays the interquartile range (IQR), with the line inside the box indicating the median. Whiskers represent variability outside the upper and lower quartiles, and dots reflect individual outliers. The condition had a significant effect on sustained attention,  $F(2, 278) = 5.94$ ,  $p < .001$ ,  $\eta^2 = 0.044$ . There was a statistically significant difference between child sustained attention across contexts with a small effect size. Results indicated that three-year-olds spent varying amounts of time engaging in play, depending on the context.

Further statistical testing was conducted to determine specific differences between pairs of conditions. The Games-Howell test, which involves pairwise comparisons of the means, indicated two significant comparisons. Children's

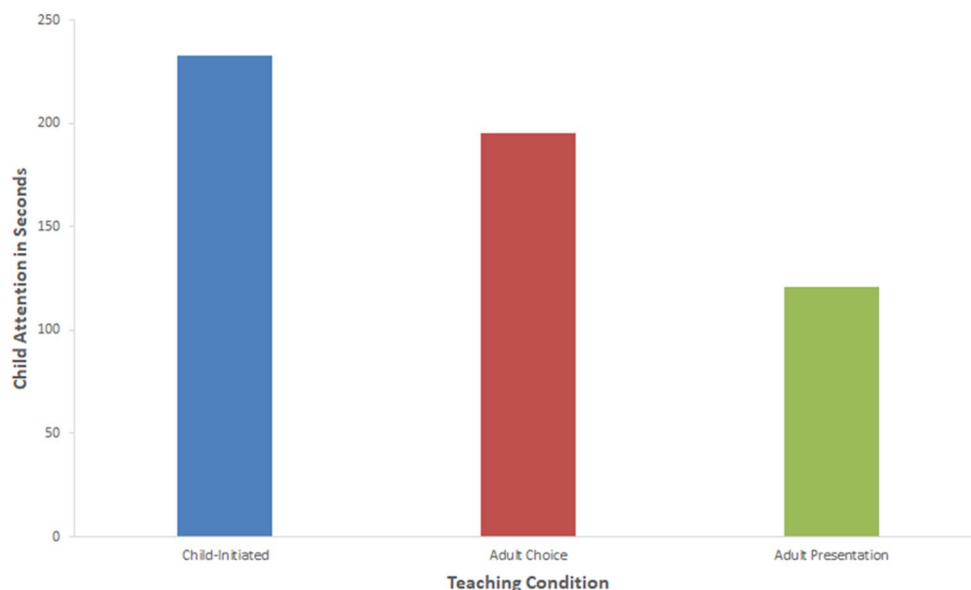
attention in the *child initiated* and *adult choice conditions* were significantly longer than the *adult presentation* ( $p < .01$ ). The *child-initiated* and *adult-choice* comparisons were nonsignificant. Children attended in the *child-initiated* condition on average 38 s longer than in the *adult choice* condition and 1 min 52 s longer than the *adult presentation* condition.

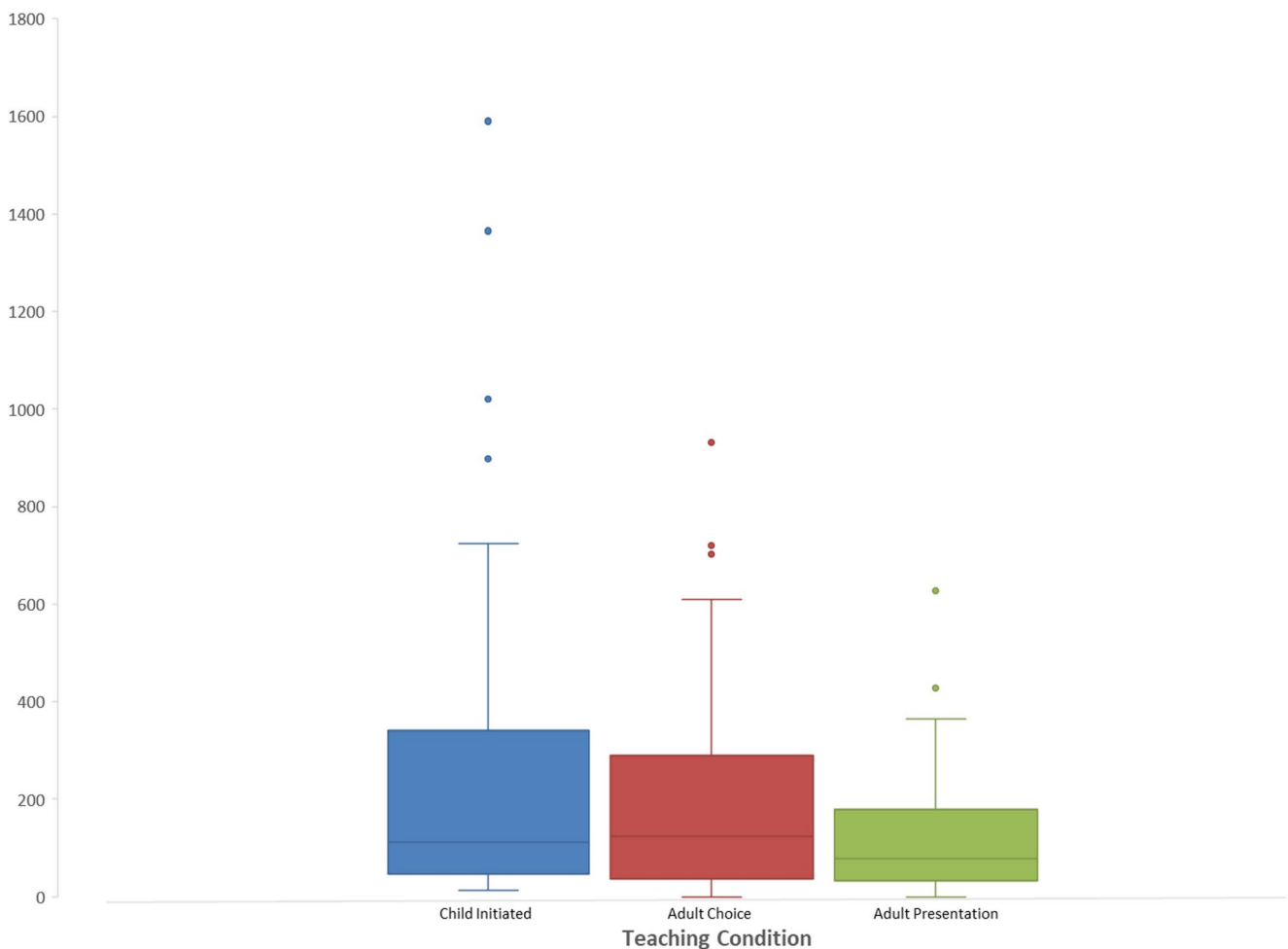
## Discussion

This research aimed to establish the average length of time children focus on a toy they choose and to identify the instructional conditions that result in the longest duration of toy engagement. Understanding how long children stay engaged with self-selected toys is crucial for establishing baseline benchmarks. These data are valuable for educators and intervention designers working with children who might experience difficulties with attention. These findings address the study's central questions; how long 3-year-olds remain attentive to a toy during free play and which teaching condition most effectively supports sustained attention.

The data indicate that choice was powerful in eliciting the attention of 3-year-olds. The teaching condition of child choice elicited the most extended duration of child attention, closely followed by adult choice. This finding is consistent with other research that suggests the ability to make choices is a powerful driver of attention in young children. Research suggests that children prefer to be allowed to make their own choices, and when presented with the option of choice, children almost always select the choice option (Doke & Risley, 1972; Fenerty & Tiger, 2010; LeLaurin & Risley, 1972; Reinhartsen et al., 2002;

**Fig. 1** Average child attention across contexts





**Fig. 2** Box Plots of child attention in seconds according to teaching condition

Tiger et al., 2006). Choice allows us to follow our interests and to engage in things we are interested in, including objects, which leads to increased learning that is more meaningful (Harackiewicz et al., 2016). In a meta-analysis of 15 studies, Morgan (2006) concluded that challenging behaviors decrease when students have the opportunity to make their own choices, leading to increased productivity and prosocial behaviors.

Alternative explanations for these findings should be considered. Children's attention may have been influenced by novelty effects, task difficulty, or individual interests. Future studies should control for these variables to better isolate the effects of choice conditions.

Research highlights the critical role of process quality in early learning environments, emphasizing the importance of educators' relationships with children, thoughtful environmental design, and intentional teaching practices (Burchinal, 2018). Although teacher-child relationships were not directly measured in this study, the importance of attunement to children's interests supports

the role of responsive teaching in sustaining attention. Close, responsive relationships are essential, fostering children's engagement and autonomy, which is crucial for supporting sustained attention (Acar et al., 2022; Doumen et al., 2008; Hughes & Kwok, 2006). To maximize these benefits, educators must learn and understand each child's development and interests, allowing them to design meaningful experiences that promote executive functions, including attention. This study found that the longest sustained attention in child initiated conditions was followed closely by adult choice conditions, significantly exceeding the adult-presentation condition. These results underscore the importance of teacher awareness and intentionality; when educators thoughtfully provide materials and opportunities aligned with a child's interests and allow the child to choose and initiate, they support extended engagement and attention. This finding highlights the effectiveness of environments where teachers are attuned to children's interests and use them to guide interactions and learning experiences.

## Limitations

A limitation of the present study is that the sample was collected exclusively at a university laboratory preschool site and may not be generalizable to other populations. Additionally, the sample size may be insufficient to yield sufficient statistical power. Another potential limitation may have been the teacher's ability to accurately identify child-preferred materials. Because teachers frequently offer children choices during their practice, this is a reasonable treatment strategy for the adult choice teaching condition and the adult presentation teaching condition. However, previous research with children who have identified disabilities has suggested that teachers are not always accurate in identifying preferred materials; therefore, it is recommended to conduct preference assessments to identify reinforcers accurately (Reid et al., 2003). The selection of non-preferred toys during these teaching conditions could impact the duration of attention.

Teachers were instructed to give the child the directive to “play” following each teaching condition. This study did not control for social interaction between the teacher and the targeted child, or among children, during the target child's interaction with the materials. The present study did not measure social interaction; therefore, it cannot be determined if social interaction was a variable in child attention across any of the teaching conditions.

Demographic data were only collected on gender, race, and disability. Razza, Martin, and Brooks-Gunn (2010) suggest that poverty is negatively associated with attention. Although demographic data were collected on all children in this study, socioeconomic status was not taken into consideration. Socioeconomic status may impact 3-year-olds' attention in toy play.

## Clinical Implications

This research suggests that educators should thoughtfully design classroom environments and learning centers to align with children's developmental needs and interests. While providing extended time for independent exploration is crucial, educators also play a critical role in guiding children toward materials that support development and learning. Teachers can create opportunities for meaningful engagement in an intentional environment with carefully selected toys and materials that promote developmental skills. Additionally, being attuned to children's interests and intentionally offering materials that align with those interests can significantly enhance sustained attention, supporting progress toward learning outcomes.

## Future Research

Future research should examine the order effects of different teaching conditions on child attention. Teaching conditions could be counterbalanced or presented in separate observation sessions to control for the impact of child fatigue. Preference assessments would help identify child-preferred materials before examining different teaching conditions to control for teacher inaccuracy in selecting preferred materials. Future research may consider the effects of teacher-child and peer-to-peer social interactions on child attention during play, as well as how poverty may impact child attention. Examining relationships between longer attention to toys and progress toward learning outcomes would also be valuable.

## Summary

Research indicates that when given the power to choose, preschool children select the option of choice over the option of no choice (DiCarlo et al., 2016; Doke & Risley, 1972; LeLaurin & Risley, 1972; Reinhartsen et al., 2002). In addition to the assumption that children prefer choice, the present study suggests that children prefer making choices. This preference for autonomy is evident in their selection of activities and engagement levels; when allowed to choose, children tend to attend for longer periods. This sustained attention is important as it is linked to a child's school readiness skills (Musculus et al., 2019) and social skills (Beets et al., 2014; Murphy et al., 2007), both of which are foundational for their overall development.

The preference of preschool children for choice is well-documented and supported by various studies examining the implications of choice on behavior and satisfaction. The findings underscore the significance of providing children with opportunities to make choices, as this aligns with their developmental needs and influences their engagement and satisfaction in various contexts.

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