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Effects of Classroom-Based Physical Activities on Off-Task Behaviors and Attention: Kindergarten Case Study

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Abstract

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Keywords

Off-Task Behaviors, Attention, Physical Activities, Kindergarten, Case Study

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Effects of Classroom-Based Physical Activities on Off-Task Behaviors and Attention: Kindergarten Case Study

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The qualitative case study's purpose was to determine if classroom-based physical activities would affect student off-task behaviors during instruction and students' perceptions of ability to focus before and after activities. Research questions focused on kindergarteners' ability to focus after classroom-based physical activity, perceptions of their ability to focus change with implementation of classroom-based physical activity, and effect of classroom-based physical activity on behavior. Kindergarteners were involved in daily activity stations such as jumping on trampolines, walking balance beams, crawling, and hopscotch. Three students were purposively selected as participants. Data were collected using interviews, video recordings, field notes, and off-task behavior frequency charts and analyzed using a constant comparative method. Study results indicated that implementation of classroom-based physical activities decreased students' off-task behaviors. Decrease in off-task behaviors increased students' perceptions of their ability to pay attention and remain on-task. Recommendations for future research include using a control group and participants diagnosed with ADHD. Keywords: Off-Task Behaviors, Attention, Physical Activities, Kindergarten, Case Study

Teachers in the United States face many challenges in the classroom today, from increased academic content to student management behaviors. A challenge that has intensified in the past decade is the amount of time a child is asked to sit and attend to tasks during the school day (Mulrine, Prater, & Jenkins, 2008). The demands of the No Child Left Behind (NCLB) Act has caused administrators to increase instructional time to meet curricular goals and increase student academic achievement, which has resulted in elimination or drastic reductions in amount of recess time (Holmes, Pellegrini, & Schmidt, 2006; Mahar et al., 2006). The NCLB Act was a reauthorization of the Elementary and Secondary Education Act of 1965. NCLB was passed by the US Congress in 2001 and mandated states to develop new standardized assessments for students and ensure that teachers were highly qualified. To receive federal school funding, states had to give these assessments to all students at select grade levels, If adequate yearly progress was not demonstrated, schools and administrators could be penalized. Mulrine et al. (2008) found that extended academic instructional time can be difficult for children, especially those with attention deficit hyperactivity disorder (ADHD). Having children sit for prolonged periods of time can contribute to behavior issues in the classroom and be counterproductive to academic performance.

Increased time sitting still in the classroom may lead to children becoming fidgety and progressively more off task. The off-task behavior prompts teachers' requests for attention, continuing the cycle. Fidgeting is an indicator children are not moving enough during the day (Strauss, 2014).

The Centers for Disease Control (CDC) reported that in recent years the percentage of young people diagnosed with ADHD has increased from 7.8% in 2003 to 11% in 2011 (Centers for Disease Control and Prevention, 2014). According to the CDC, children with ADHD have difficulties controlling impulsive behaviors, paying attention, and being overly

active. Bright (2011) found that children need to move when working on a mental task and fidgeted more when required to store and process information; this is especially true for children with ADHD. Fidgeting occurs more often while children are performing reading and math tasks than watching a movie.

Why is movement and physical activity so important? Spending more time engaged in instruction and keeping students in an upright position for longer periods of time requires movement. Strauss (2014) identified that some children have poor core strength and balance due to underdeveloped vestibular (balance) systems, which is caused by restricted physical movement. For these children, longer instructional time without movement will be difficult. According to Blythe (2005), the first year of life is when a child makes vital brain connections necessary for gaining muscle strength against gravity. This strength aids in the ability to crawl and walk. The vestibular system refers to balance or functioning within the force of gravity. Babies gain muscle strength and balance through movement. Blythe further suggested that there is limited space for children to engage in free physical play in communities and far less movement opportunities for children of today's generation than those of the past. "Immature vestibular functioning is frequently found amongst children who have specific learning difficulties such as dyslexia and dyspraxia, problems of attention, language impairment, and emotional problems" (Blythe, 2005, p. 17). Children must have some control over their bodies in order to pay attention. "A child who is unable to sit still and maintain attention needs more frequent opportunities to move around and to exercise the body in order to concentrate again" (Blythe, 2005, p. 137). To stay completely still is an advanced level of movement that is dependent on motor skills that are mature. According to Blythe (2005), "Effective education reaches all levels and systems in the brain through a combination of instruction and physical development" (p. 177). Given the importance of activity for children's healthy development, how can schools and teachers provide children with the movement and physical activity that is needed?

The purpose of this study was to explore the impact of an implementation of physical activity in the classroom on kindergarteners' off-task behaviors. The following questions were focused on during the course of this study:

- How do kindergarteners describe their ability to focus after classroom-based physical activity?
- How will the kindergarteners' perceptions of their ability to focus change with the implementation of the classroom-based physical activity?
- Will off-task behavior after classroom-based physical activity change and if so, how?

Literature Review

Recess is a tool that school systems can use to provide children with the opportunity for brain breaks as well as movement and physical activity. According to the National Center for Education Statistics (2005), the mean number of minutes for recess per day in the central part of the United States was 30.2 minutes for Grade 1 in 2005. Even though benefits of recess are known, there is a trend toward reducing or eliminating recess altogether (Murray & Ramstetter, 2013). The loss of recess impacts a child's ability to engage in physical activity as well as interacting freely with peers (Holmes et al., 2006). Recess, as defined by the CDC, is "regularly scheduled periods within the elementary school day for unstructured physical activity and play" (Centers for Disease Control and Prevention, 1997, as cited by Murray & Ramstetter, 2013, para. 1). Murray and Ramstetter (2013) have shown recess to benefit the development of social skills as well as a child's cognitive, physical, and emotional well-

being. Recess allows children the opportunity to play, move, rest, and socialize. Following recess, students are more attentive and perform cognitive tasks with better efficiency. Even though the duration of recess diminishes with the age of the student, the benefits of taking breaks from academics to enhance cognitive performance applies equally to young children and adolescents. The American Academy of Pediatrics has stated that recess is a necessity for a child's development and should not be eliminated for academic or punitive reasons (Murray & Ramstetter, 2013).

Pellegrini, Hightshoe, LaRue, Northup, and Ridgway (2003) studied the effects of recess on classroom behavior of children with ADHD. Children who were not diagnosed with ADHD were also evaluated for a comparison to the children with the diagnosis of ADHD. The children in the Pellegrini et al. study were 8 years old, enrolled in second grade, and had a prior diagnosis of ADHD. Three peer groups were formed and included three children. Children in the peer groups did not have a diagnosis of ADHD. Observations of the participants in the classroom were done at specific intervals to determine the best time to introduce recess. Participants were observed at the same times each day on both recess and nonrecess days. Observers were looking for the following behaviors: off task, inappropriate vocalizations, out of seat, fidgeting, and playing with objects. Observations were completed pre- and postrecess at the same time each day. The results showed that postrecess inappropriate behaviors were at higher levels for all participants on the days with no recess. The mean percentage of inappropriate behaviors was 70% for days with no recess compared to 35% on days with recess. The three peer groups showed the same trend of inappropriate behaviors for days with recess and days without recess. In conclusion, levels of inappropriate behaviors were higher on nonrecess days for the three participants with ADHD. The results also showed the level of inappropriate behavior for all participants, including peer groups, increased over time on nonrecess days. Although results showed recess as beneficial for both peer groups and children with ADHD, this finding may suggest that recess is particularly beneficial for children with ADHD (Pellegrini et al., 2003).

Another area where teachers can incorporate movement and physical activity to students' days is within the classroom. One physical activities program implemented into classrooms is the Boost Up/S.M.A.R.T. (Stimulating Maturity through Accelerated Readiness Training) program. This particular program is used for "boosting the developmental readiness of visual, auditory, kinesthetic, and vestibular systems in literacy applications" (Palmer & DeBoer, 2004, p. 2). This program uses specific movements to help develop vestibular system and mobility skills needed to stimulate the brain. Activities to stimulate the brain stem include spinning, rolling, cross-pattern walking, creeping, and fine motor activities. S.M.A.R.T. is meant to be done 30 minutes a day, every day (Minnesota Learning Resource Center, 2009).

Very little research has been done on implementing physical activities into the classroom. A group of researchers studied the implementation of yoga on improving attention in primary-aged children (Peck, Kehle, Bray, & Theodore, 2005). Yoga, which incorporates physical postures as well as mental concentration and breath control, tends to support attention, self-control, and body awareness. Students in the study had been selected because of attention difficulties in the classroom but were not diagnosed with ADHD. The children participated in yoga exercises and were observed by the school psychologist in the classroom immediately after the intervention during whole group instruction or individual seatwork. Results of the study indicated an improvement of on-task behaviors for the participants. Although on-task behaviors slightly decreased during the follow-up stage, they were still higher than the baseline observations. This study demonstrated that yoga could improve student concentration in the classroom (Peck et al., 2005).

A second study implemented a classroom-based physical activity program called Energizers to examine the effects of physical activity and on-task behaviors in the classroom Mahar et al. (2006). The Energizers program uses short physical activities that allow students to stand and move throughout instruction. Activities are about 10 minutes in length and require no equipment and little teacher preparation. Student on-task behavior was observed for 30 minutes during instruction before the intervention and immediately following the intervention. Results of the study indicated that on-task behaviors improved from pre- and postintervention for all classes. The study included all students in the classroom but focused specifically on students in the class that were the least on task. During the intervention period, on-task behavior increased 20% after the Energizers program. In conclusion, the study showed that 10 minutes of physical activity in the classroom improved student on-task behavior for all students, especially those that are most often off-task (Mahar et al., 2006).

As a kindergarten teacher, I am challenged with rigorous expectations that are inching higher every year. Higher expectations mean an increase in instructional time, however, 5-year-olds are not meant to sit for extended periods of time. A balance must be found between instructional time and time preserved for developmentally appropriate activities such as movement and play. Allowing children opportunities to move and be active, decreases off-task behaviors. Eliminating distractions helps focus instruction and therefore, class time is more productive and successful. I believe kindergarten students can successfully meet rigorous expectations if they are allowed to be children. Although school is demanding: it is my job to ensure my students have fun doing it. My co-author is a teacher educator, specializing in early education. The research focus sprouted from the difficulties we saw emerge in our classrooms.

Design and Methodology

Setting

For the current study, participants attended a Title 1 public elementary school located in the upper Midwest. Title 1 assistance, financed by the US Department of Education, is provided to schools with a high percentage of students from low-income families. Assistance is designed to support students in meeting state academic standards. The elementary school in this study had 84.8% free or reduced meals, thus qualifying for Title I assistance. The school served children kindergarten through fifth grade. Approximately 279 students were enrolled in the fall of 2014. Over half of the students attending were enrolled in the English Language Learner program. The school had four kindergarten classrooms with an average of 18 students per class. This elementary school was chosen for the case study as it was where the researcher and main author was employed.

Participants

Three students were purposively selected from the group of English-speaking students within the classroom and were chosen as participants in this case study. Students enrolled in the English Language Learner program were excluded from the study because it was unknown if they would understand the interview questions. The remaining five students within the classroom were *not* English language learners (ELLs), and one of the students had been retained from the previous year. The student who was retained was also excluded. Consent forms were sent home with the remaining four students and the three that returned them signed were chosen for the study. The children lived with parents and siblings throughout the study. Participants attended a full-day kindergarten program. They were in

school for a total of 30 hours per week, 6 hours per day, 5 days a week. The classroom consisted of 18 total children: 8 girls and 10 boys. Thirteen students were enrolled in the English Language Learner program. Languages present in the classroom included Spanish, Swahili, and English.

Students' names were changed for study purposes and identities were never exposed. The name of the state, district, and school were not revealed to anyone but the researcher, the co-author, the school principal, and the Institutional Review Boards of the co-author's university and the primary author's school district. Participants were not isolated at any time and nonparticipants were unaware of who the participants were. The Institutional Review Board at the co-author's university and primary author's school district accepted the research proposal, ensuring participants' rights were thoroughly protected.

Methods

This qualitative instrumental case study used multiple data sources including student interviews, field notes, videotaping, and frequency charts. The decision to conduct an instrumental case study was reached after reading Thomas' (2011) description of case models. Thomas believed that instrumental case study was the best choice if a researcher's "purpose in trying to understand with a view to making things better (p. 98). The kindergarten teacher/researcher completed the study over 8 weeks in everyday classroom instruction before, during, and after the gross-motor stations, which were classroom-based physical activities for students to work on gross and fine motor skills. These physical activities focused on a child's balance, hand-eye coordination, pincer grasp, and core strength. Students participated in activities such as walking on a balance beam, jumping on minitrampolines, crawling on mats, using tweezers, and tracing a variety of lines with a finger. All students participated and rotated through two to three stations daily (see Figure 1).



Figure 1. Gross-Motor Stations

At the start of the study, before the gross-motor stations were introduced, all students were videotaped two times the first week during a whole group lesson that occurred prior to the gross-motor station time and again after the stations occurred to set a baseline for student off-task behavior. During the first week of the study, three participants were interviewed individually about their perceptions of being focused during whole group instruction.

Participants were familiar with working with the teacher at the table in the back of the room through small group and independent class work. The interview consisted of nine questions. The questions asked concerned the students' perception of how well they paid attention during class, what they liked and disliked about kindergarten, what made it hard for them to pay attention, and whether they liked movement breaks and the associated reasons for liking or disliking the movement breaks.

Each week for 7 weeks, participants were observed and an off-task behavior frequency-chart was completed twice a week. Frequency charts were completed during whole group instruction just before the stations for 5 minutes and then following the stations during whole group instruction for 5 minutes. During this observation time, the whole class was videotaped. The researcher used video to increase dependability of the data. The researcher referred back to the video as she reviewed her field notes and created an accurate account of what happened during the observations. The last week of the study, the participants were interviewed individually by the researcher about their perceptions of their ability to focus during whole group instruction. The interview was given only to the participants and consisted of the same questions previously asked in the first week of the study with the addition of three questions: whether they liked the stations, what they liked about the stations, and how the stations helped focus attention during instruction if at all.

Data collection and analysis occurred simultaneously using a constant comparative method (Thomas, 2011). The researcher and co-author determined that field notes from the videotaped observations, frequency charts, and interviews of participants documented student attitudes, thinking, and behavior would give an accurate account of the classroom setting. All data, whether confirming or contradictory, were examined and noted by the researcher. The researcher and co-author then re-read the data again and notes and observations were made. Field notes were first analyzed by the teacher/researcher looking for evidence of students' attention patterns and changes in the student's behavior over time.

Field notes and interviews were read once to identify common strands and patterns and then reread by the teacher/researcher and co-author to identify verbal and nonverbal behaviors as noted in the field notes for themes that related to the study's research questions. Words and word patterns were highlighted and then put into the program called Wordle to make a visual map of the verbal data collected (Thomas, 2011). Recurrent themes were identified and given codes. Codes included self-perception, motor off task, noise off task, or passive/other off task. Motor off-task behaviors include rocking their bodies, stretching their legs, or standing on their knees. Noise off-task behaviors include talking to a neighbor, blurting, and making noises when not necessary. Passive/other off-task behaviors include playing with clothing or shoelaces, staring into space, and playing with hair.

To ensure reliability and validity, peer debriefing sessions took place once a month with the researcher's advisor/co-author and on-site colleagues. Triangulation of the data sources was used to build a justification for the themes which in turn, added validity to the study (Creswell, 2009; Tellis, 1997). A thick description of the setting and findings provided a richer perspective that added to the validity of the findings (Creswell, 2009).

Findings

The findings will be reported for each case study participant. Case study information is reported by an analysis of each case in sequential order according to the timeline of the study (Creswell, 2009).

Lauren's Story

Lauren was the first born of two children in her family. She was 5.7 years at the time of the study. Lauren had an outgoing personality and had many friends in the class. She was often found with students who needed extra support or guidance with behaviors. Lauren loved playing in the house center during free play, acting out scenarios and playing with the dollhouse. Her academic interests were journal writing and listening to stories.

The initial interview with Lauren sought to determine her perspective on kindergarten, ability to pay attention, and how she felt about specific movement breaks. She reported that her favorite parts of kindergarten were computers, centers, and morning meeting. The worst part of kindergarten was *read to self* because she felt alone. When asked what makes it hard for her to pay attention, she responded, "When kids are talking, and when kids are not sitting crisscross." Lauren was asked how well she thought she did at paying attention in school and quickly responded, "Good." When asked if she liked the movement breaks that had already been incorporated into the daily routine she responded, "Yes, you are teaching me how to get those muscles working."

Observation field notes taken during the initial interview indicated Lauren was highly distractible during the interview and questions often had to be restated for her. Lauren was busy looking around the classroom at the other students and after being asked a question, she often paused to think but then began watching other students and forgot the question. Although she struggled to pay attention to what was being asked, she felt that she did a "good" job paying attention in school.

During the two baseline observation periods, frequency charts indicated that Lauren's off-task behaviors slightly increased from the first recording to the second on each day. Between the first and second recordings, on each of the 2 days, the researcher continued to teach without movement breaks. Lauren's off-task behaviors consisted of motor off task and passive/other off task. Observation field notes of the baseline period showed Lauren's off-task behaviors to be not sitting crisscross and playing with fingers/objects. These behaviors distracted her attention from the lesson that was being presented to the whole group. Her clothing was one source of distraction for her.

Over the course of 7 weeks, frequency charts were completed 2 days a week prior to and immediately following the gross-motor stations. Lauren's off-task behaviors as seen in Figure 1 generally decreased from pre- to postrecordings for all but 3 days. On Day 1 of Week 2 and Day 1 of Week 5, Lauren's off-task behaviors slightly increased. On Day 1 of Week 6, the number of off-task behaviors were maintained from pre- to postrecordings.

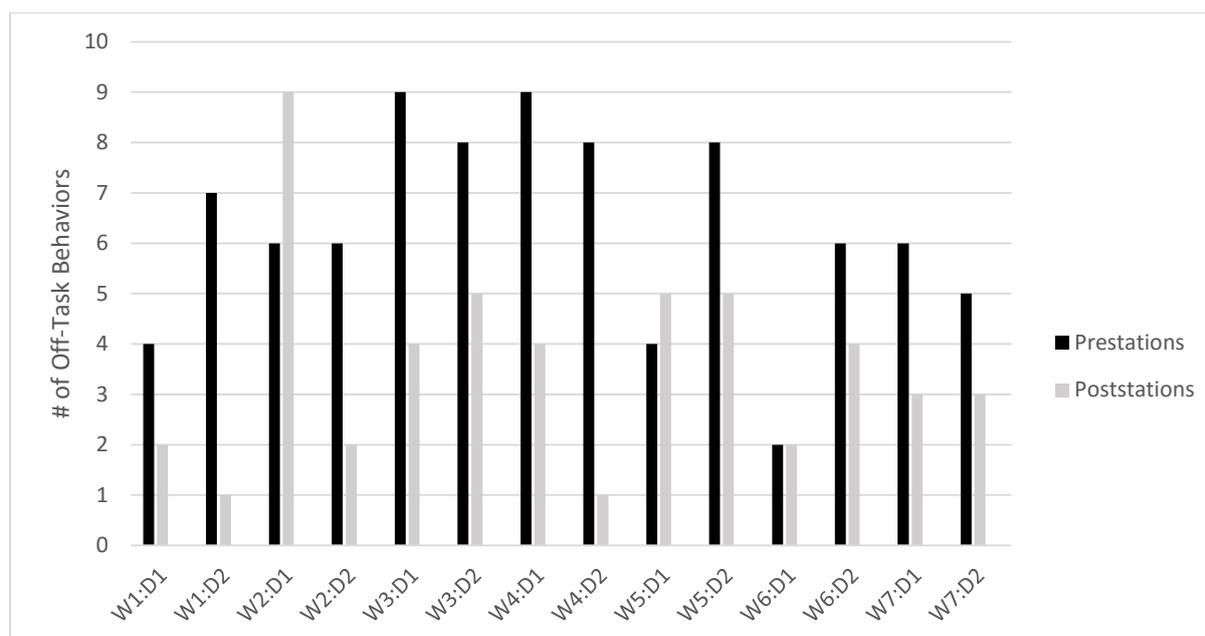


Figure 1. Lauren's Off-Task Behaviors During Implementation

Observation field notes reported that the main source of Lauren's off-task behaviors were playing with objects and not remaining seated. The objects that distracted Lauren the most were articles of clothing that she was wearing such as a sweatshirt with a zipper, shoelaces, and glasses. When not seated, she would be up on her knees, reclined back with her legs out, or turned to one side with one knee up. These behaviors generally decreased following the gross-motor stations.

The postinterview revealed that Lauren found it was hard to sit still for long periods of time. Lauren thought that the station activities helped her sit still because "they're exercise. We get stronger." Her favorite gross-motor activity was jumping on the trampoline. Lauren thought that she did better at sitting still after doing the gross-motor stations because "it's strong work."

Emily's Story

Emily was 6.1 years at the time of the study. Emily had an outgoing, vibrant personality and had many friends in and outside of the classroom. She had a very matter-of-fact disposition and took school work seriously. Emily loved playing at recess with her classmates, playing in the house center, and putting puzzles together. Her academic interests included reading, journal writing, and math activities.

During the initial interview, Emily listed math, centers, read to partner, and playing outside as her favorite parts of kindergarten but greatly disliked when "it's freezing out at school." When asked what makes it hard to pay attention at school, Emily replied, "When kids be naughty. When Austin cries, it makes it hard to work." Emily's perspective on how well she did at paying attention in school was thumbs up. "Is true, I do good in school," she said. She was also asked if it was hard for her to sit for a long period of time; she shook her head no and said, "It's easy." Emily was then asked about the movement breaks and if they helped her learn. She said, "Yes, gets you stronger, smarter, and neck muscles help you learn."

Field notes taken during Emily's initial interview indicated a very attentive girl who was eager to work one-on-one with the researcher. Each question was answered quickly and without hesitation or pause for thought. The actions in the classroom around Emily were

hardly noticed. Emily dropped her head, sighed, and seemed disappointed when told that there were no more questions and that she was done.

The first day of the baseline week, completion of a frequency chart showed Emily's off-task behaviors were maintained pre- and postrecordings. On the second day of observation, the frequency chart indicated a decrease in off-task behaviors. Observation field notes showed her off-task behaviors to be playing with the necklace she wore on the second day.

Seven weeks of off-task behavior frequency charts showed that Emily's off-task behaviors as seen in Figure 2 generally decreased from pre- to postrecordings. On Day 1 of Week 2, Emily was absent from class, and on Day 2 of the same week, the number of off-task behaviors remained the same from pre- to postrecordings. Day 2 of Week 5 indicated an increase of off-task behaviors from pre- to postrecordings. There were 4 days that her off-task behaviors dropped to zero following the gross-motor stations.

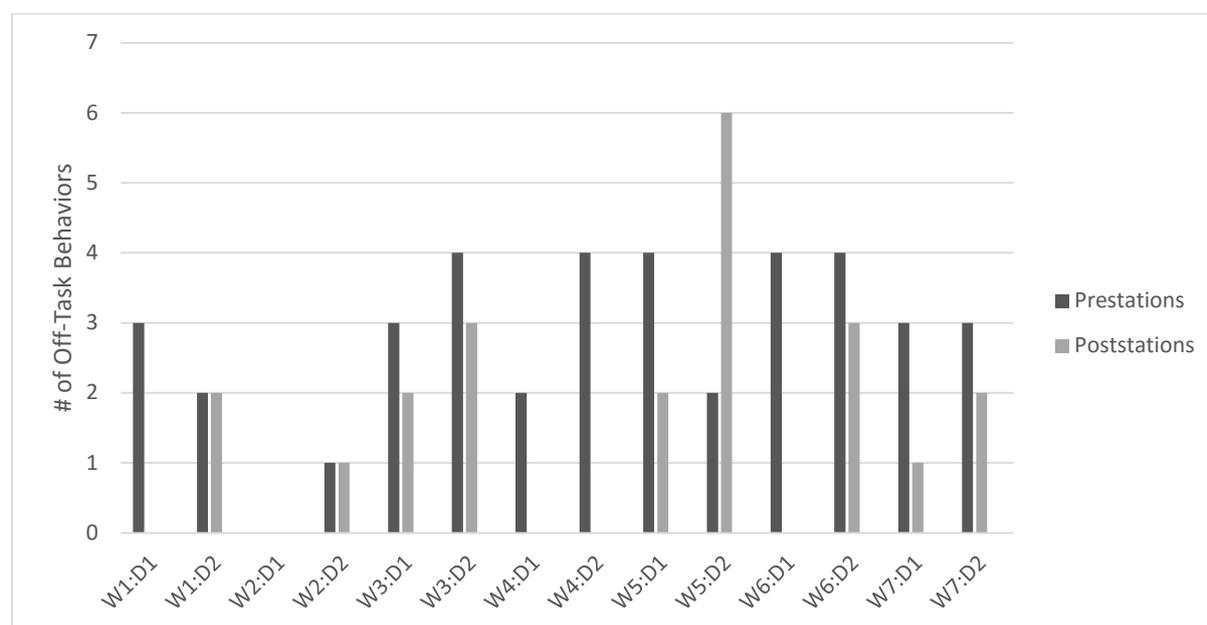


Figure 2. Emily's Off-Task Behaviors During Implementation

Observation field notes showed that Emily was typically very attentive during instruction. Few off-task behaviors were recorded each day. The source of her off-task behaviors when recorded were talking to her neighbor, playing with objects, and not sitting crisscross. The objects that distracted Emily most frequently were a necklace she had been wearing and her hair.

Emily's postinterview revealed that she felt it was not difficult for her to sit still for long periods of time. She enjoyed doing the gross-motor stations and when asked why, she replied, "When I jump on the trampoline, it helps me sit still because I did something fun." Her favorite gross-motor activities included jumping on the trampoline, walking on the balance beam, crawling, and playing hopscotch.

Mike's Story

Mike was the second born of two children in his family. Mike was 5.3 years at the time of the study. Mike had an active personality and played with many of the boys in the class. He was often found wherever the action was. Mike enjoyed being out at recess, building in the blocks center, and playing computer games. His academic interests included

reading, math games, and counting. Mike was always eager to participate in class and to contribute to discussions.

During the initial interview, Mike reported that he liked playing Leapster (a learning video system) and listening to readings on CD the best in kindergarten. The worst parts of kindergarten for Mike were being bad and not listening to the teacher and following directions. When asked how well he felt he paid attention in school, he said, "I'm not listening and following directions." He also stated that it was hard for him to sit still for long periods of time because "it takes a long time." Mike was asked if he thought movement breaks helped him learn and he said, "They do. It makes you strong."

Observation field notes of Mike's preliminary interview revealed that Mike was unsure of what "pay attention" meant. Even after it was defined for him, he was unsure of how to answer the questions. Mike was easily distracted by the other students in the classroom. He would turn his body away from the researcher to watch his classmates. His attention was redirected back and then he was asked questions again. He wanted to quickly answer the questions so he could get back to what was happening in the classroom. He asked, "Can I be done now?"

Mike's frequency chart from the first baseline day indicated a slight increase in off-task behaviors from pre- to postrecordings. On the second day of the baseline week, Mike's off-task behaviors were maintained from pre- to postrecordings. Observation field notes revealed Mike's off-task behaviors were talking to his neighbor, playing with objects, and not sitting crisscross.

The frequency charts completed for Mike following the implementation of the gross-motor stations revealed a general decrease in off-task behaviors poststations (Figure 3). There was only one day, Day 2 of Week 3, for which there was an increase in off-task behaviors. Frequency charts indicated that in seven out of the 14 days there was a decrease by half in Mike's off-task behaviors following the gross-motor stations.

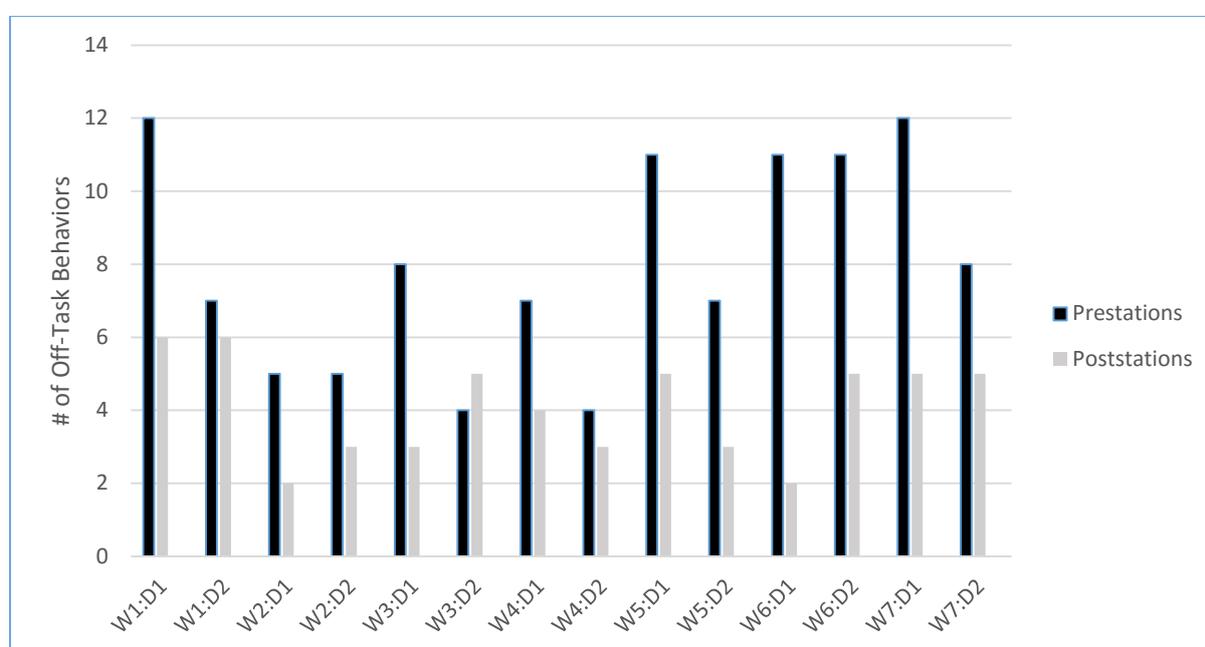


Figure 3. Mike's Off-Task Behaviors During Implementation

Field notes reported that Mike struggled with focusing attention during whole group instruction. He had a range of off-task behaviors exhibited. Behaviors included talking to his neighbor, playing with objects, fidgeting, staring into space, and not remaining seated. Mike would rock his body back and forth throughout a lesson. Objects that distracted his attention

included parts of his clothing, shoelaces, and things such as string and rocks found on the floor.

A postinterview with Mike revealed that he felt it was difficult to sit for long periods of time. When asked if he thought the gross-motor stations helped him sit still, he said, "Yes, the stations are exercise. They build muscles in your back so you can stand up." His favorite gross-motor stations were jumping on the trampoline and hopscotch. Mike thought he was better at sitting still after doing the stations because "I want to listen to the teacher."

Discussion

One of the guiding questions of the study was whether kindergarteners' perceptions of their ability to focus would change with the implementation of the classroom-based physical activity. The initial interview gave a baseline of how participants viewed their ability to focus during whole group instruction. The participants' perception of their ability to pay attention reflected their personality. Their perception of themselves was not always consistent with the data. Two out of the three participants were able to accurately identify how well they focused during class. Children who are 5 and 6 years old can be self-aware enough and aware of their surroundings to accurately perceive and reflect on their abilities to pay attention as supported by the 2006 study by Mantzicopoulos.

Postinterviews with the participants showed that they enjoyed the physical activity stations. They all enthusiastically agreed when asked if they liked to do the stations. A favorite activity for all three of them was jumping on the trampolines. The participants viewed the activities as exercises to help them build muscles. They all thought that completing the activities every day and building muscles helped them pay attention during instruction time. Field notes and frequency charts confirmed their perceptions of their ability to pay attention during whole group instruction with the decrease in off-task behaviors.

Another guiding question was whether off-task behavior after classroom-based physical activity would change and how. During implementation of the physical activity stations, field notes and frequency charts indicated that the participants' off-task behaviors decreased from pre- to postrecordings for more than half of the days. All three participants were more attentive during whole group instruction following the physical activity stations. Station activities were presented to the class as work and not play. Students were expected to work hard but also enjoy the activities. Participants were able to exert energy and use academic skills during the stations. Stations were a break from being stationary. Breaks may have helped in refocusing the participants when whole group instruction resumed. This finding was supported by the Pelligrini et al. 2003 study.

Recommendations

Classroom-based physical activities have advantages. Preschool and primary grade level teachers should consider implementing physical activity breaks into classroom routines and transitions. Brain breaks increase student physical activity levels throughout the day as well as provide students with a break from the rigors of academic tasks. It is recommended that children ages 6–17 years should receive 60 minutes or more of physical activity per day (U. S. Department of Health and Human Services, 2012). According to experts, childhood is the time to begin the development of active lifestyles. Young children need to be equipped with the knowledge, fitness levels, motor skills, and social skills to be active (National Association for Sport and Physical Education, 2004). When off-task behaviors are decreased, students are better focused on instruction. As a result, movement in the classroom can support student learning. "Modifying student behavior through usage of physically active

academic lessons has the potential to greatly enhance learning by both increasing on-task behavior during academic instruction and decreasing behavioral disruptions throughout the school day” (Grieco, Jowers, & Bartholomew, 2009, p. 5).

Further studies may consider using mixed methods and tracking student off-task behaviors of a larger sample size for a longer period of time. A longer timeframe would better capture the impact of the implementation of classroom-based physical activities on off-task behaviors. Another consideration for future studies would be keeping track of the day’s events such as inside recess, party day, or a day after or before a break to consider outside influences on off-task behaviors for a particular day. In addition, future research should investigate the implementation of classroom-based physical activities and its effects on academic achievement. Furthermore, research that examined behaviors of 5-year old students in different school systems and countries would be rich and helpful as best practices for young children are discovered.

Future studies may also consider including participants with a diagnosis of ADHD and the impact of classroom-based physical activities on off-task behaviors. Could a similar program have the same impact on children with ADHD and be a way to manage ADHD symptoms?

Limitations

As with any research, there were limitations with the current study. Limitations included length of study, age of the participants, and the number of children involved in the study. The study lasted for 8 weeks. It would be desirable to see the research time extended over the course of a kindergarten school year or have multiple 8-week study frames over the year to examine the long-term effects of physical activity on attention and student achievement.

Another limitation was the age of the participants; 5-year-olds are still learning how to process questions and their answers in an articulate manner. The small sample of children involved in analysis prevent transfer of the results to another setting. However, case studies are known for multiple data sources and rich, thick description of the cases. The primary objective of the current study was to explore the impact of an implementation of physical activity in the classroom on kindergarteners’ off-task behaviors. This case study may aid school administrators and teachers to advocate for the need of daily physical activity for young children.

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