

EFFECT OF INDOOR AND OUTDOOR RECESS PERIODS AND PHYSICAL
EDUCATION ON THE CLASSROOM BEHAVIOR
OF ELEMENTARY SCHOOL STUDENTS

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Running Head: EXAMINATION OF INDOOR AND OUTDOOR RECESS PERIODS

Effect of Indoor and Outdoor Recess Periods and Physical Education on
Classroom Behavior of Elementary School Students

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ABSTRACT

This study examined the impact of physical education and recess location (indoor vs. outdoor) on classroom behavior of 1st graders during structured class activities. Specific consideration was given to the attention-related behaviors of working, fidgeting, and listlessness. Using the attention restoration theory, it was hypothesized that students would demonstrate higher levels of attentive behavior on days when recess was conducted outdoors than on days when recess was conducted indoors. Furthermore, students were expected to demonstrate a higher level of attentive behavior on days when they were provided with physical education class compared to days when they were not provided physical education. Participants were 11 students (six boys and five girls; 6-7 years old) from a Midwestern U.S. elementary laboratory school. Systematic observation of classroom behaviors was conducted during the afternoon during a structured academic activity. A 30 minute time sampling session was used to observe each student's behavior for a 5 second interval before recording the data and moving on to the next student. Findings indicated that the students were less fidgety and listless on days when there was an outdoor recess period. The observations also indicated that the students were less likely to be fidgety on days when they took part in scheduled physical education classes.

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CHAPTER I

INTRODUCTION

The nature of children's play has significantly changed over the past 40 years. First of all, children spend less time playing outside, and what time they do spend outside is much more structured and supervised than in the past (Arbogast, Kane, Kirwan, & Hertel, 2009; Mainella, Agate, & Clark, 2011). In addition to this reduction in opportunities for time in the outdoors, youth spend a considerable amount of time using new technologies like video games and electronic devices that are mentally taxing (Arbogast et al., 2009). Recent governmental research has indicated that American children spend 90% of their time indoors and only 4% of that time is spent outdoors doing unstructured activities. Approximately 60% of all children spend 15 hours or more each week using the internet or playing computer games (Lord, 2008). Some reasonable explanations for this are that parents tend to limit the amount of time that their children can spend outside due to lack of supervision (Arbogast et al., 2009). Another reason maybe the potential dangers of nearby street traffic and child abduction (Godbey, 2006; Jacobi-Vessels, 2013).

A national study conducted by the Centers for Disease Control and Prevention (2014) estimated that only 58.9% of the school districts required regularly scheduled recess. The increased focus on students achieving higher standardized test scores by administrators and teachers could decrease the opportunities that students have during school to be physical active (Mahar, 2011). Some educators believe that minimizing recess time will create more instruction time and greater scholastic performance among students. This is just a general opinion at this time and is not based on empirical evidence

or findings (Holmes, Pellegrini, & Schmidt, 2006; Jarrett, 2002; Pellegrini & Bohn, 2005). Regardless, the further reduction in physical activity only compounds the effect of the loss of play time outside of school and has the potential to undermine the academic benefits that recess provides.

Impacts of Recess

School recess periods have been recognized around the world as an important time within the school day when children are allowed “to engage in physical activity, conversations and activities with their peers relatively free from adult intervention” (Holmes et al., 2006, p. 736). Elementary school children become increasingly more inattentive the longer recess is delayed. As a result, the children are more likely to engage in active play during recess (Jarrett, 2002; Mahoney & Fagerstrom, 2006). Allowing children to play either indoors or outdoors may provide respite that allows students to mentally recuperate from extended periods of focused attention within the classroom (Arbogast et al., 2009).

Impacts of Play/Outdoor Environments

Outdoor play is beneficial, but adults sometimes have a tendency to encourage the children to play structured games with set rules. Overuse of structured play discourages the use of imaginative play and may reduce any possible calming effects from the environment (Arbogast et al., 2009). Children are motivated to engage in physical activity when given extended playtime in environments that are abundant with plants and animals. Outdoor play areas abundant with vegetation may motivate children to be more physically active than they would be in built areas with little to no vegetation (Jacobi-Vessels, 2013).

Several studies suggest that spending time outside near nature may aid in the recovery of attention and intellectual functions after engaging in activities that require a high level of mental concentration (Berman, Jonides, & Kaplan, 2008; Berto, 2005; Depledge, Stone, & Bird, 2011). Children and adults are also believed to perform analytically better on objective measures after viewing or spending time in naturally green environments (Taylor & Kuo, 2009; Tennessen & Cimprich, 1995).

Indoor vs. Outdoor: Why does it matter?

Aborgast et al. (2009) have noted that, “In Britain, the replacement of a paved school playground with a grassy meadow reduced behavior problems and improved students’ grades” (p. 451). Pellegrini, Huberty, and Jones (1995) found that students were significantly more attentive in class after having either indoor or outdoor recess. Thus, it may be that indoor and outdoor environments are equally effective, and that any kind of physical activity, structured or unstructured, is equally beneficial.

Summary

Recess is an activity at school that can be either an individual activity or a group activity. Most schools have scheduled recess outside when the weather is nice. During inclement weather the teacher will conduct supervised recess indoors. Various studies have reported that spending time outside near nature can assist in the recovery of attention and improve performance on assigned tasks, but benefits have been documented for both indoor and outdoor settings. Still, theory suggests that, when students have access to an outdoor playground that is ambient with natural vegetation, they may be more likely to engage in active play with their peers. To examine this issue further, the following research questions were proposed:

Q1: What impact does physical education have on the attention-related classroom behaviors of first grade students?

Q2: What impact does recess location (indoor vs. outdoor) have on the attention related classroom behaviors of first grade students?

CHAPTER II

LITERATURE REVIEW

In the 1980's, it was common practice for schools to have one or two 15-20 minute recesses every day (Gross-Loh, 2007). In recent years, school administrators at elementary schools have decided to either cancel or reduce the length of recess periods. Physical education is frequently considered to be an adequate replacement for recess, without completely considering the “nonphysical components of unstructured play” (American Alliance for Health, Physical Education, Recreation, and Dance, 2001, p. 11). There are three main arguments used by teachers and administrators to question the value of recess with regard to the school curriculum. The three common arguments against recess include: (a.) it detracts from instructional time during a busy school day, (b.) if recess has been randomly placed within the school schedule, it could be disruptive to the students sustained work patterns, and (c.) it promotes aggression and antisocial behavior during recess (Blatchford, Creeser, & Mooney, 1990; Gross-Loh, 2007; Jarrett, 1998; Pellegrini & Bjorklund, 1996; Pellegrini & Bohn, 2005; Pellegrini & Smith, 1993).

In reality, bullying accounts for less than 2% to 3% of the students' total behavior (Pellegrini & Smith, 1993). One negative effect of canceling recess is that doing so prevents students from learning how to resolve conflicts and cooperate with their peers. The students also have less time for reflection or to develop their imagination (American Alliance for Health, Physical Education, Recreation, & Dance, 2001).

Attention to Classroom Tasks after Recess

There are two complementary theoretical theories that support the use of recess. These theories suggest that increasing the frequency of recess periods throughout the school day is beneficial to student mental health. Massed versus distributed practice

suggests that learning can be maximized by dividing the task up and working on it in small segments over time (Holmes et al., 2006; Pellegrini & Bjorklund, 1996, 1997). Prior research using this particular theory suggests that school age children will be more attentive to their school work “when effort is distributed, rather than massed” (Pellegrini & Bjorklund, 1997, p. 36). This spacing of tasks might make the tasks more interesting and may keep the students more engaged in their assigned tasks. Considering the positive effects of distributed practice on student’s attention to classwork, it is confusing as to why this practice is not a common academic standard in the U.S. (Pellegrini & Bjorklund, 1996).

Cognitive immaturity theory suggests that young children cannot process information as efficiently as older children (Holmes et. al., 2006; Pellegrini & Bjorklund, 1996, 1997). The immaturity of the children’s nervous systems and lack of experience prevents them from being able to perform more complex cognitive tasks with the same efficacy as older children and adults. Since young children have shorter attention spans they are more susceptible to distractions and should be more attentive after breaks between focused intellectual activities. Use of unstructured breaks such as “recess” during the school day can reduce the cognitive interference after long periods of structured instruction (Holmes et al., 2006; Pellegrini & Bohn, 2005). By scheduling recess breaks before and after academic lessons, school officials can promote more on-task behavior during independent practice sessions (Mahoney & Fagerstrom, 2006). Furthermore, it has been argued that replacing recess with physical education will not provide the same kind of mental health benefits, because of the structured nature of the physical education classroom (Pellegrini & Bohn, 2005).

Another theory used to justify the importance of recess is the novelty theory. This theory suggests that behavior is primarily influenced by the degree of novelty associated with the activity. Based on this theory is reasonable to conclude that the students would display more off-task behaviors during a longer study period. In addition to this highly energetic play during recess should increase students' on-task behaviors after recess. Exercise has been associated with increased attentional behavior during various cognitive tasks (Pellegrini & Davis, 1993).

Research has examined the effect of differential recess timing regimens on attention to class tasks. Holmes et al. (2006) observational study used cognitive immaturity theory when considering how changing the length of scheduled recess from 10 to 30 minutes would affect preschoolers' classroom attention. Findings from this study indicated that a 20 minute recess period is needed to enhance the students' learning and attention to tasks after recess. These results also seem to be consistent with the massed versus distributed practice of using breaks between cognitive tasks. Results also indicated that the boys were less attentive than the girls after the recess period. Pellegrini et al. (1995) found in their experimental study using recess timing regimens that boys were more inattentive when recess was scheduled later in the morning. The venue used during the recess period also had a positive effect on student attentional capabilities toward classroom tasks. In an earlier within-subjects design field experiment on recess timing regimens, researchers also considered how a student's gender and time working on course material in the classroom affected playground behavior during recess. The effects of the pre-recess confinement indicated that the male students were more restless during the longer confinement periods. Students who participated in more physically active play

were less attentive after returning to the classroom. The students who were less active and socialized more with their peers during recess were more attentive in the classroom after recess. Pellegrini and Davis (1993) suggest that, because boys and girls play different types of games on the playground, one gender may display more on-task behaviors than the other gender. Since boys tend to play more physically active social and non-social games, they should be more inattentive after recess. The researchers also concluded that girls tend to participate in social activities that are less active during recess, which may allow them to be more attentive in the classroom after recess. It is likely that the researchers could have made biased conclusions with regard to gender stereotypes. Social sedentary behavior during recess is believed to assist in concentration and increase fidgety behavior after recess.

One of the more unusual observation studies was conducted at a school where the students do not usually have recess scheduled during the school day. Instead of recess, the students had physical education three times a week. The researchers obtained permission for two 4th grade classes to have recess once a week on days with no scheduled physical education. The students' on-task, fidgety, and listless behaviors were studied for the same two time periods on recess and non-recess days. On recess days they were observed before and after recess. Results indicated that the students' pre-recess period behavior did not change between the recess and non-recess days. On non-recess days the students were on-task 85% and fidgety 16% of the time. Students were 90% on-task and fidgety 7% of the time on recess days. The students were less productive on days when they had uninterrupted instructional time. When the students do not take part in recess as a part of the school day, there are higher occurrences of fidgety and off-task behavior

(Jarrett et al., 1998). This study did not consider how the students' interaction with nature during outside recess will affect their behavior in the classroom after recess.

Outdoor Recess and Play

Why is outdoor play important to children's physical and psychological health?

One explanation is the biophilia hypothesis, which suggests that humans are hardwired to interact with natural environments. This means that interacting with living flora and fauna are essential to maintaining good health. Young children learn by doing sensory and physical activity. Natural environments abundant with plants, streams, lakes, the sky, and animals are believed to contribute more to cognitive and physical development than manufactured indoor environments (Rivkin, 1997).

There are several hypotheses that have been suggested to explain why children are not playing outside as frequently as past generations. One explanation, often referred to as nature deficit disorder, asserts that play deprivation is not caused by a lack of play space, but the children's disinclination to choose free and spontaneous outdoor play (Mainella et al., 2011). Nature deficit disorder suggests that, now days, people are more likely to use built and technological media rather than go out and spend time interacting with nature. Many parents reinforce this behavioral tendency, as they think it is advantageous for their children to participate in a variety of structured activities after school. Structured activities can provide positive youth development, but unstructured outdoor play also has its merits (Mainella et al., 2011). When children create their own games and rules like kick the can, they are learning that the rules are flexible and can be changed based on the circumstances. Unstructured play outside allows the children to

learn about important social skills, local plants, and wildlife (Elkind,2006; Jacobi-Vessels, 2013).

With the increased amount of time students are spending in structured activities, recess may be the only time of day that the students get to have unstructured play time. Outdoor playgrounds with ample vegetation are more likely than traditional playgrounds to encourage physical activity (Jacobi-Vessels, 2013). Across the world, recess periods allows children to be physically active, socialize with peers, and allow the child to relax after long periods of intense concentration (Jarrett, 1998).

One quasi-experimental study where kindergarteners at a Norwegian school were allowed to play in a forest on a regular basis considered whether the affordances of the landscape would have an effect on how the children played (Fjørtoft, 2001). The researchers also considered how the outdoor play activities would affect the children's motor skills. The diversity of the landscape had a direct effect on how the children played in the forest. Significant differences were found between the experimental group and the reference group on balance and coordination in the posttest. Results from the posttest indicated a connection between versatile play and the students motor fitness abilities. The forest provided a rich natural environment that stimulated motor development while the children were playing and learning about the outside world (Fjørtoft, 2001).

Preteen students who have a scheduled recess periods tend to do better in the classroom compared with students who spend the same time periods working on traditional learning activities (Mainella et al., 2011). When students spend their recess playing on a playground that has an ample amount of vegetation, the students are more likely to have an increased attention span after recess (Jacobi-Vessels, 2013).

Effects of the Outdoor Environment on Attention

A vast amount of the research on this topic is based on attention restoration theory. There are two types of attention mentioned in this theory: directed attention and fascination (Hartig, Evens, Jamner, Davis, & Gärling, 2003). Directed attention requires concentrated mental effort to sustain focus and to prevent distractions from interfering with the intended task. Interacting with an environment that does not require the continued use of directed attention will allow the fatigued person to recover their capacity to use directed attention. Directed attention fatigue occurs after prolonged and intense use of direct attention (Berto, 2005). This reduces the individual's ability to use direct attention and diminishes his or her ability to ward off distractions (Berman et al., 2008; Kaplan, 1995; Perkins, Searight, & Ratwik, 2011; Tennessen & Cimprich, 1995). What makes an environment restorative? Getting away from the mental task that required directed attention, as well as a sufficient amount of fascinating and unusual stimuli. Also, the individual's purpose and inclinations should be compatible (Tennessen & Cimprich, 1995).

Our understanding of how nature can assist with the recovery of directed attention fatigue has been vastly studied using a variety of variables. For instance, research has considered the relationship of natural views from college dormitories on university students' capacity for direct attention. University students who had a more naturalistic view from their dormitory windows displayed a greater capacity to use direct attention. The researchers concluded that the students' judgments about common activities requiring directed attention may have been affected by their mood (Tennessen & Cimprich, 1995). Another conclusion was that natural views may provide for restoration

of directed attention. Research has also been conducted on how viewing photographs of restorative areas, urban areas, and geographic designs affect the individual's ability to recover from mental fatigue. A location's total configuration has an impact on its restorativeness (Berto, 2005). Attentional capacity may be revitalized by exposure to environments high in restorativeness. This rejuvenation will occur even if the individual has brief exposure to the environment (Berto, 2005). The peacefulness of a natural environment is also believed to restore mental fatigue (Berman et al., 2008).

Prior research has also considered whether going on a walk in an urban or natural setting has a restorative effect on direct attention. For example in a two phase experimental study by Berman et al. (2008), fatigued participants were asked to go on a walk in a urban or natural field setting . In the second experiment, fatigued participants looked at photographs of urban and natural environments before completing the backwards digit span task. Similar findings from both experiments indicated a consistent improvement in attention after interacting with nature.

Outdoor Recess vs. Physical Education

A majority of the states in the United States have mandated that physical education be included in the school curriculum. Most of these mandates do not specify how much instructional time should be spent on physical education classes, so the amount of time students spend in physical education classes varies from school to school. The National Association for Sport and Physical Education recommends that students have about one hour of physical activity per day. There is one exception to the mandate. According to state accountability programs, if recess or PE is negatively effecting the

schools scores on the state aptitude test than the state could reduce their funding (Dills, Morgan, & Rotthoff, 2011).

Both physical education and recess should be included in the elementary school curriculum. Outdoor recess and physical education provide two different kinds of physically active play outside of the classroom. Recess allows the children to participate in unstructured play. This means that the children get to socialize freely with their peers, create their own games, explore and learn about nature. Physical education class on the other hand are more structured and tends to required more rigorous physical activity from the students (Dills et al., 2011).

Inclusion of physical education and recess during the school day could influence the students' academic achievement. Some of the arguments against including these two types of physical activity suggest that the students' will have less time for learning the academic subjects. Energetic and active play at recess has been negatively correlated with students' attentiveness after recess (Dills et al., 2011; Jarrett et al., 1998). There could also be a brief decline in achievement immediately after recess. Dills et al. (2011) survey study on the effects of physical education and recess on students' attention and achievement in the classroom. Findings from this study indicated that neither recess nor PE provided any kind of statistically or economically significant impact on students learning abilities.

On the flip side of this argument, physical activity during the school day may assist in the recovery of attentional behaviors and increase students understanding of coursework. Another benefit of recess is that it increases the amount of work that students' are able to complete in the classroom. There is a positive correlation between

students' participation in moderate playground activities and post-recess attention (Dills et al., 2011; Jarrett et al., 1998). In addition, students are less fidgety and listless after recess. Findings from Pellegrini and Davis (1993) and Pellegrini et al. (1995) indicated that elementary students become increasingly more inattentive when delaying recess.

Synthesis of Literature and Purpose Statement

By considering the vast amount of literature that has been published about attention restoration theory. It is possible to conclude that there are classroom benefits that are inherently related to time that students spend participating in outdoor recess. Past research indicates that some of the effects from outdoor recess also occur indoors. Additional research should be conducted to consider how attentional behaviors are affected by indoor and outdoor recess. Further research should also be conducted on the impact of physical education classes on attentional behaviors of students in the classroom.

The purpose of this study was to examine the impact of outdoor activities and recess on the attentive classroom behavior of 1st grade students. To examine this issue, the following hypotheses were tested:

H1. Students will demonstrate higher levels of attentive behavior on days when recess is conducted outdoors than on days when recess is conducted indoors.

H2. Students will demonstrate higher levels of attentive behavior on days when they are provided Physical Education class compared to days when they are not provided Physical Education class.

CHAPTER III

METHODS

Population

The target population for this study consisted of several second grade classes from elementary schools located in the Midwestern United States. Schools were located in a rurally located town with a population size of approximately 10,000 residents. In addition, the local university houses about 7,000 college students. Physical education for students in this community typically involved two 30-minute recess periods scheduled daily, with one recess in the morning and one in the afternoon. Physical education was scheduled for two to three days each week.

The accessible population used for the study consisted of first grade students who were attending Horace Mann Laboratory School centrally located on the campus of a public 4-year university. The school is a “learning laboratory” for college students, which provides a very high student to teacher ratio in the classroom, often as low as 4 to 1 during educational sessions. This elementary school is used as a part of the university’s teacher education program. So the students are already accustomed to having university students observing and assisting the main teacher within the classroom. Three times a week the students attend physical education classes. In addition to this the students also have two 30 minute recess periods daily. Parents pay modest tuition fees for attendance, but the school is open to the general public and financially supported through the university budget..

Sample

Participants of the study were students from a 1st grade class at the university-run laboratory school. The school is a part of a university campus and is located in a moderately sized farming community. The class consisted of 11 students (six boys and five girls). Data for this study were collected in the spring, so the children's age range was 6-7 years old. Ethnically, the students were 82% Caucasian, 9% African American, and 9% Middle Eastern. A convenience sample of students from the 1st grade class were observed during the study. Parental consent was acquired from a research waiver that the parents signed at the beginning of the school year. Students who did not have a school liability waiver that had been signed by a parent or guardian would be excluded from the study, all students had a waiver on file. **Setting**

The school setting used in this study was unique because it had a fully functioning elementary school on the first floor and classrooms for college education majors on the second floor. Students of the "lab school" are accustomed to having university students observing or interacting with them in the classroom. Furthermore, there is a very high student to teacher ratio (3-1) because of the number of graduate assistants and student teachers who support the primary classroom teachers. The students' normal weekly afternoon schedule consists of:

Monday, Wednesday, Friday 12:00-12:30pm Physical Education

Tuesday and Thursday 12:00-12:30pm Content Literacy

Monday – Friday 12:30-1:20pm Math

Monday – Friday 1:20-1:50pm Science or Social Studies

Monday – Friday 1:50-2:10pm Recess

Monday, Wednesday, Friday 2:10-2:30pm Spelling

Monday, Wednesday, Friday 3:00-3:15pm Math

Tuesday and Thursday 2:10-3:10pm Writing Workshop

Instrumentation

Prior to creation of the instrument, the researcher contacted the schools' principal to determine if there were any documentation procedures being used by the school to measure attentional behaviors. At that point in time, the school did not have any kind of specific procedures to measure this type of behavior. The observation schedule utilized in this study was developed by the researcher. For each day of observation, the researcher recorded the setting where recess and physical education occurred and whether or not the students had physical education. A coding system was generated from analyzing information from a previous study by Jarrett et al. (1998). The coding system accesses the following specific attentional behaviors:

- **W (Work)** – On-task behavior, doing assigned work, discussing work with a partner, looking at or listening to the teacher.
- **F (fidgety)** – Excessive movement, tapping, swinging of arms or legs.
- **L (listless)** – Staring out the window, slumping over, not paying attention to their work or the lesson, eyes closed.

Procedures

Prior to the study, an observation schedule was created to track the attention behaviors outlined in the coding system. One week prior to the start of the observation period, a key containing student photos and the name of each student in the 1st grade class was acquired from the school's principal. After the researcher memorized the name and appearance of all the students, the key was destroyed. The 1st grade students were

observed daily during the school week from the end of March to the end of April. The daily observations lasted for a period of 30 minutes after the end of afternoon recess. The start of the daily observation periods varied slightly due to the fact the students' schedule was not being manipulated. To ensure that the students were being observed for a maximum of 30 minutes, a digital watch was used to time the observation. Each day during the observation period, the researcher would watch the entire class as a nonparticipant observer. The researcher made no attempt to manipulate what the students were taught before or after recess.

At the beginning of the observation period, the researcher would write down on the observation schedule whether the students had recess indoors or outdoors. Next the researcher would record if the students had PE on that day. Time sampling was then used to observe each student multiple times in 5 second increments. After observing a student for 5 seconds, the researcher would circle the behavior code or codes (W, F, L) by the student's name. Once this was done the researcher would move on to the next student on the list. When the entire class had been observed, the process would be repeated and this process continued throughout the entire observation period. More than one behavior could be recorded during each timed interval. If none of the coded behaviors occurred during the 5 second interval, then the segment on the paper would be left blank. If a student was absent during the interval, then a line was drawn through the segment. At the end of the observation period, the researcher added up each student's score for the three specific behaviors and calculated a cumulative percentage for each code (W, F, and L). The cumulative percentage is calculated by adding up the number of times each type of

behavior occurred during the 5 second intervals. This process was followed every school day over a 20 day observation period

Research Design and Data Analysis

This study involved a repeated measures research design. The independent variables were recess setting (indoor vs. Outdoor) and Physical Education (yes vs. no). The dependent variables were the three elements of classroom attention-related behaviors (Working Fidgeting, Listlessness). Paired samples t-test was used to examine research hypotheses.

Internal Validity

The following section examines the extent to which the study controlled for the eight primary threats to internal validity. Threats that were left uncontrolled are discussed in regard to limitations.

Subject characteristics. Subject characteristics refers to the extent to which the compared study groups differed in some way prior to the beginning of the study. In this case, repeated measures were taken, which eliminates all concern for subject characteristics. Essentially, the groups are identical because the scores for each condition come from the same participants.

Maturation. Maturation is caused when an intervention changes over a long period of time. This aspect is controlled due to the fact that the observation period was only for a short period of time.

Mortality. A mortality threat refers to the lost subjects during the course of the study due to illness or failure to complete the requirements of the experiment. To

minimize mortality decay all participants of the study had to have a guardian sign a liability waiver. None of the students were excluded due to lack of consent or illness.

Participant attitudes. Participants may decide to behavior differently based on the novelty of the treatment used during a study. This aspect was control due to the fact that the students were accustomed to having college students either student teaching or observing classroom activities.

Testing. If a pretest is used participants may be inclined to work harder. The material on the exam may inform subjects on what is being studied. If the subjects practice they may do better on the posttest. For the current study this was not a threat.

History. When an unplanned or unexpected event occurs during the course of the study. A fairly sound research design was created to try and control for this threat. A unforeseen change in location may have affected the results. In addition, weather patterns impacted the balance of indoor and outdoor recess days and how they interacted with physical education days.

Location. The type of threat can be cause by using more than one location. The environment where the study is conducted might create various explanations for the data results. The initial research design of observing in the classroom after recess should of control for this threat. Due to an unexpected change in location on one of the observation days. It is possible that the data from that day may have impacted the results. There is further explanation on this event in the limitations section.

Instrumentation. Instrument decay can be caused if the scoring procedure is changed in any way during the testing of the hypothesis. Decay can also occur if the researcher scores a numerous test one after another over an extended period of time. A repeated

measures design was used to prevent instrument decay due to scoring error. The repetition of five second interval student observations for a period of 30 minutes each could contributed to instrument decay.

External Validity –The sample used in this study was convenience sample of students from Horace Mann Laboratory School. The results of this study should not be applied to schools of a different type. In addition to this these 1st grade students who attend this school are extremely well behaved. The school also uses small student class ratios which may of affected the results. Due to the fact that a convince sample was used and the unique variables of the school. It would be wrong to assume that replication of the experiment with a group of 1st graders from another school would give you the exact same results. The ecology of this experiment may differ from other schools due a variety of variables. For instant this other schools may not have the same student teacher ratios. In addition other schools may have larger class sizes, a different type a classroom design, or teaching approaches. In the future these settings studied separately to order to verify these results apply to different school settings.

CHAPTER IV

RESULTS

Descriptive Statistics

This study considered how two different dimensions of physical activity environments would elementary students' attentional behavior. Table 1 summarizes the percentage of observations where students were recorded as "working", "fidgety" or "listless" during class activities following both indoor and outdoor recess time. Findings from table 1 indicate that the observations resulted in an average "working" rate of 83% ($SD = .08$) across all students on days when they had outdoor recess and an average of 81% ($SD = .05$) on days where they had indoor recess. For Fidgety behavior, the results indicated that all the students had an average of 16% ($SD = .05$) on days when the students had outdoor recess and an average of 24% ($SD = .12$) on days were there was indoor recess. Results for the listless behavior indicated that all the students had an average of 9% ($SD = .04$) on days when students had outdoor recess and average of 12% ($SD = .05$) on indoor recess days.

Table 1

Means and Standard Deviations for working, fidgeting, and listless behavior across indoor and outdoor recess periods.

	<u>Indoor</u>		<u>Outdoor</u>	
	<u>Mean</u>	<u>SD</u>	<u>Mean</u>	<u>SD</u>
Working	.81	.05	.83	.08
Fidgety	.24	.12	.16	.05
Listless	.12	.05	.09	.04

The second dimension of the study was a comparison of days when PE was conducted to days that it was not conducted (see Table 2). Results indicated that all the students had a “working” average of 84% ($SD = .05$) on days when physical education (PE) was scheduled. In addition to this all the students had average of 82% ($SD = .12$) on days when they did not have a scheduled PE class. For fidgety behavior, the results indicated that all the students had an average of 27% ($SD = .12$) on days when they had schedule PE and an average of 11% ($SD = .05$). In addition to this all the results for the “listless” behavior indicated that all the students had an average of 12% ($SD = .06$) on days when there was a scheduled PE class and on days when there was no PE the all the students had an average of 10% ($SD = .04$).

Table 2

Means and Standard Deviations for working, fidgeting, and listless behavior across indoor and outdoor recess periods.

	<u>PE</u>		<u>No PE</u>	
	<u>Mean</u>	<u>SD</u>	<u>Mean</u>	<u>SD</u>
Working	.84	.05	.82	.12
Fidgety	.27	.12	.11	.05
Listless	.12	.06	.10	.04

Hypothesis Tests

The first hypotheses of the study predicted that: 1) students will have higher levels of attentive behavior on days when recess is outdoors then on indoors recess days and 2) students will have higher levels attentive behavior on scheduled PE days then on days when PE is not provided.

With regard to the first hypothesis a Pair Samples T-test was conducted to compare how the two physical activity environments effected the three independent attentional behaviors. There was no significant difference between indoor and outdoor recess days in regard to the percentage of observations that indicated the students were “working” at the time of observation, $t(10) = .68, p = .51$. T-test results indicated that there is a significant difference between physical activity environments and the percentage of observations which indicated that the students were displaying “fidgety” behavior during the observation, $t(10) = -3.12, p = .01$. The results indicate that students tend to be less fidgety on days when they have outdoor recess. For the listless behavior, the results indicated that there is a significant difference between observations conducted on indoor and outdoor recess days $t(10) = -2.33, p = .04$. On days when the students have outdoor recess they display a lower percentage of listless behavior.

To test the second hypothesis a Paired Samples T-test was conducted to compare how days with scheduled PE class and days without scheduled PE will affect the students’ attentional behaviors. There is no significant difference between PE days and non PE days with regard to the percentage of observations that indicate that the students were “working” during the observation period, $t(10) = .52, p = .61$. For the fidgety behavior, the results indicated that there is a significant difference between observation conducted on PE and non PE days $t(10) = 4.74, p = .001$. These result indicate that the students will display a lower of fidgety behavior on there is scheduled PE class. The results from the last t-test do not indicate any significant difference between PE and non PE days with regard the percentage of observations that indicate that the students displaying listless behavior $t(10) = 1.44, p = .18$.

CHAPTER V

DISCUSSION

Data findings from the Pair Samples t-test support the primary hypothesis.

Students are less likely to be fidgety and listless on outdoor recess days than indoor recess days. The secondary hypothesis was correct with regard to the students displaying less fidgety behavior on days with a scheduled PE class. The physical education class did not significantly impact the working or listless behaviors of the students. Although the data from this study seems to indicate that PE classes reduce the amount of fidgety behavior observed within the classroom after recess. This data seems to agree with Dills et al., (2011) conclusion that the physical activity variable by itself does not significantly improve attentional behaviors.

Limitations

There are several limitations in the current study that should be address. Only one age group was studied due the fact that the author did have any assist to data because the way the study was initially designed. Studying more than one grade level would allowed for comparison of a larger range of ages. This would also allow us to see if the effects of outdoor recess are consistent between age and grade level. Another limitation was the inability to observe the students before and after recess. Observing the students before and after recess would have provided a baseline comparison to see if the outdoor recess was have a beneficial effect towards the children's attentional behaviors. The days with physical education vs. the days without should have also been studied this way.

The current study was also limited due to the fact that the elementary school was a laboratory school. So any major findings from this study might not apply to public and private schools. This particular laboratory school uses an innovative teaching ideas and

other studies may find different results due to demands placed upon the students. In addition, there is an exceptional student to teacher ratio at this particular school.

The researcher attempted to reduce the chance of instrument decay. Instrument decay may have occurred due to the fact that the researcher was observing the students for five second intervals for a period of 30 minutes each day. The students were observed on school days for an entire month. Decay could have occurred due the fact the students were observe by the main researcher. The researcher was the only observer; therefore, there was no way to verify the accuracy of observations through a second observer.

A larger sample of students should have been studied, but were not due an error in the research design. In the future studying a larger group of students may reveal additional information on this topic.

There may have been a history or location limitation due to fact that for one of the observations periods the class moved to different building so that the university students who getting a degree in education could practice teaching the first grade students. The class was also divided up so not all of the subjects could be fully observed during the observation period. This was an unplanned for change that may affected the final results.

Implications for Research

Additional research should be conducted on how indoor and outdoor recess effects students' attentional behaviors in the classroom. At this time there are only a few studies that consider both indoor and outdoor recess. While studying this topic, researchers should study a larger group of subjects or several school classes. Future studies should observe the students behavior before and after recess. Also, students should be observed before and after physical education.

Implications for Practice

School administrators should build playgrounds that include a mixture of built play structures, natural plants, and water features. Several shorter school recess periods should be included in the daily school schedule. Also by combining the elements of an outdoor classroom could be combined with the playground to inspire creative and imaginative play.

Conclusion

The current study originally was setup to find out if outdoor recess allowed the students to relax their minds so they would more focus on their classwork after they return the classroom. Also if physical education contributes to the students ability to pay attention after returning to the classroom. Results indicate that outdoor recess and physical education appear too assist in recovery of attention.

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