Recess: Implications for Cognitive Performance

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Recess has recently become a source of increased controversy and several research studies (Pellgrini & Smith, 1993; Pellegrini & Bjorklund, 1997; Jarrett, 2002; Pellegrini, Huberty, & Jones, 1995) have examined the effects of providing recess to students. Some schools are rescinding recess in favor of implementing more time for classroom instruction in efforts to increase levels of student achievement. However, other studies have found that recess provides a social benefit by allowing students to interact with their peers (Pellegrini & Smith, 1993; Pellegrini & Bjorklund, 1997). Still other studies have found that providing breaks from instruction actually increases learning (Toppino, Kasserman, & Mracek, 1991; Jensen, 1998).

Studies have shown that when recess is delayed, students become more inattentive, and accordingly, more active during the actual recess (Pellegrini & Davis, 1993; Pellegrini, Hubert, & Jones, 1995). Additionally, Jarrett (2002) discovered that students were more attentive during class when recess was provided. Smith and Hagan (1980) conducted a study which examined how confinement (indoor classroom work) related to nursery school children's outdoor play. They found that the longer the confinement period, the more active behavior exhibited on the playground, as well as no gender differences, suggesting that there is a general need and motivation for physical activity and that need increases as a function of confinement.

Pellegrini, Huberty, and Jones (1995) conducted experiments among kindergarten students and students in grades two and four to determine the effects that the timing of recess had on attention. The authors hypothesized that confining students before a period of play would result in older students engaging in increased social interaction and physical activity moreso than younger

children, given older students' requisite social cognitive skills. Pellegrini et. al also offered two additional hypotheses: implementing a longer period of social play deprivation prior to recess would result in a higher level of inattention to at-hand tasks before recess, and attention to tasks following a period of recess would be positively related to the level of physical activity engaged in during the recess.

In their first experiment, Pellegrini et. al (1995) examined how length of the confinement period affected playground behavior of both girls and boys and the level of attention given to assigned tasks both before and after recess. Children from kindergarten and grades two and four participated in the experiment. For two days of the week, children were given a recess at 10:00am, deemed a short confinement period. Alternately, on two separate days of the week, recess began at 10:30am, viewed as a long confinement period. Children in grades two and four were given a gender-preferential task, defined as the teacher reading a story to the class, both before and after recess, where the gender of the main character deemed the story either male-preferential or female-preferential. Instead of the gender-preferential task, kindergartners were given the opportunity to work at different interest centers throughout the classroom prior to and following the recess period. Experimenters observed each student using instantaneous recording methods as every 30 seconds, the experimenter recorded the exact behavior of the student, whether it was inattention, physical activity, or social interaction.

Pellegrini, Huberty, and Jones (1995) found a significant effect among fourth graders for the length of the confinement period as related to inattention. Students were more inattentive during the longer confinement period as compared to the shorter period. There was also a main effect found for gender as girls were determined to be more inattentive during the male-preferred task and boys were more physically active during the recess period than girls. Fourth graders were more social than

second graders, particularly after the long confinement period. The results from this first experiment suggested that longer confinement periods within a classroom be utilized to stimulate social behaviors.

A second experiment replicated these results; however, there was speculation that because both experiments were conducted during the winter months, children tended to be more active to generate body heat. Thus, a third experiment was similarly designed, with the exception that the recess provided was indoors, so as to maintain a constant temperature. The same method as the previous two experiments was employed. Results were also similar to the first two experiments, such that boys were found to be more active than girls during recess, particularly during the longer confinement period. These results suggest that providing students with frequent breaks within a classroom setting is beneficial for motivating students' attention to sedentary tasks by allowing them time to explore novel social and physical environments and expend their store of energy before returning to the calm of the classroom.

Pellegrini and Davis (1993) also conducted a study that examined the effects of short and long confinement periods, followed by a recess, on attentiveness. Children in one third-grade classroom participated in the study. Students participated in a normal morning schedule of classroom tasks, with a break provided in the middle of the instruction. Two conditions were examined: students given a short confinement period (2.5 hours of sedentary classroom work) and students with a long confinement period (3 hours of sedentary classroom work). Children were observed prior to, during, and after recess and their behaviors were recorded using standardized checklists. Behaviors were recorded on a 7-point Likert-type scale for: fidgeting, concentration, non-social exercise, social exercise, vigor of exercise, non-social sedentary behaviors, and social sedentary behaviors.

Results indicated that boys engaged in significantly more non-social exercise, social exercise, and non-social sedentary behaviors than girls, and girls engaged in significantly more social sedentary behaviors than boys. Boys were also more vigorous in their play than girls. It was also observed that those in the longer confinement period exhibited more fidgeting and less concentration. However, following recess, it was found that partaking in social sedentary behavior during recess was positively correlated with higher levels of concentration and less fidgeting, while social and non-social exercise were positively correlated with fidgeting in class after recess, and non-social sedentary behaviors were negatively correlated with concentration. These results suggest that active play at recess may actually hinder subsequent classroom attentiveness, while merely providing students with an opportunity to socialize may increase their levels of attentiveness following the break in instruction.

All of these studies show that there are visible effects from providing breaks in instruction, particularly recess. The effects seen on concentration and fidgeting indirectly lead one to assume that there would also be effects on a student's cognitive performance, as attention levels and arousal levels of a student within a given situation have significant effects on performance. However, no studies have directly taken this assumption into account and examined the effects of breaks in instruction on students' cognitive performance. Rather, most studies have focused merely on the effects of recess and other breaks in instruction on attention levels and social behaviors of children.

As prior research has revealed (Stevenson & Lee, 1990; Pellegrini & Smith, 1993; Pellegrini & Bjorklund, 1997), recess can be prematurely correlated with student achievement and attention. It also has implications for the social interactions of children. Whether recess is present in schools within the United States can have real implications for the success of our nation's schools. At what point in a given school day recess, or an additional break(s) in instruction, is presented is even more

critical, as implementing breaks in instruction can provide opportunities for students to not only develop their social skills, but also provides them with a respite from the cognitive load that a particular lesson may render. Providing breaks to students, and how those breaks are best formed, are most important for providing the optimal learning situation that will allow students to reach their potential.

Much research has endeavored to find a correlation between recess and attentiveness in class, but there should be research conducted on how recess affects cognitive performance as well. With accountability in education being touted by the government, effects on performance should be a focus, as assessment scores are where accountability is measured.

The first step to helping students achieve their learning potential is to discover how much students should be learning at one time. This study endeavors to answer that particular question, and whether frequent or infrequent breaks of either active or more social activity are superior.

In an argument for the inclusion of recess in a school day, Pellegrini (1997) advances the cognitive immaturity hypothesis, suggesting that young children are unable to process large amounts of information at once. As a result, distributing tasks over time, as would be allowed with breaks in instruction, should result in higher attention as well as higher performance. Pellegrini (1992) found that social interaction and play at recess during kindergarten predicted first grade achievement better than standardized tests given at the kindergarten level. In addition, a study that compared schools within the United States, Taiwan, and Japan, found that children in Asian countries, where students typically have higher levels of achievement than those in the United States, spend less time in school than American students (Stevenson & Lee, 1990). Stevenson and Lee (1990) compared classroom routines of schools within the United States, Taiwan, and Japan, and found that students in the two Asian countries examined had frequent breaks in learning, often 10-15 minutes for every 40-50

minutes of instruction. Although this pattern suggests that there might be cognitive benefits to recess, there is still very little empirical research concerning this topic.

The purpose of this study is to investigate the effects of providing breaks within instruction on the cognitive performance of students, defined by tests that are standardized across classrooms that are using the same curriculum. Several questions have gone unanswered thus far, and necessitate answers, such as, how often should breaks in instruction be provided? Should students partake in active tasks or non-active tasks during these breaks? Do reprieves in instruction help students to reach optimal levels of cognitive performance?

This study will hopefully provide answers for these questions by indicating possibilities for optimal learning situations that will enhance students' levels of cognitive performance on classroom assessments. Based on previous research concerning the effects of recess on attention levels, it is hypothesized that providing more frequent breaks in instruction and allowing participation in activities that expend rather than conserve students' energy will provide the best scenario for improving performance on classroom assessments.

Procedure

Subjects and Setting

Twelve fourth-grade classes from New York City public schools with teachers who have less than 3 years of experience in the classroom will participate in the experiment ($n \approx 250$). Teachers will have less than three years of experience because within the New York City public school system, there is a high rate of turnover among teachers and most teachers are relatively new to the profession. Parental consent will be assured with consent forms sent to each child's home in the form of a teacher's note. The classes will be comparable in terms of socioeconomic status and academic

ability, and representative of the general population of New York City classrooms concerning these two variables, based upon school and classroom profiles, which will provide the demographic information necessary for this study. Dependent variables in the study will be achievement scores on structured classroom assessments. Two independent variables will be manipulated - the amount of instruction provided before a break is given, and the amount of activity allowed during the break.

Materials

No requirements outside of the classroom will be interfered with by the breaks in instruction, such as physical education or other special classes. All classrooms will utilize the same mathematics curriculum, and thus, a standardized assessment instrument will be available.

Procedure

Students will first be assessed for a baseline measurement of mathematics performance using a standardized mathematics assessment. Classrooms will follow a typical daily routine with the exception of the breaks being introduced into the instruction sequence. Breaks will be in addition to each school's normal policy on recess and will always be ten minutes in length, following the mathematics lesson, taking place in the middle of the morning lessons. Breaks will be 10 minutes in length in order to provide a substantial break in instruction for the students, but to avoid creating a large disruption within the daily classroom routines. The twelve classrooms participating in the study will be randomly placed into one of four conditions, with three classrooms in each condition. The first conditional group of classrooms will provide breaks to students occurring once for every hour of instruction. The break will provide students with an opportunity to expend their energy, either in the gymnasium or outside on the playground, depending upon the weather. Students will be given the

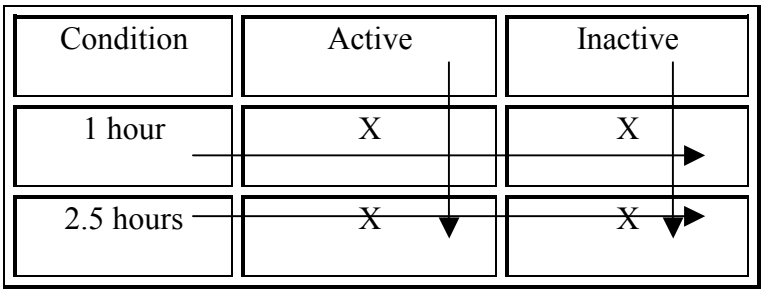
opportunity to partake in activities typical of playground or gymnasium behavior (jump roping, kick-ball, climbing, tag, etc.). Thus, for every 60 minutes of instruction, students will receive ten minutes of active distraction from learning. Classrooms in the second condition will also provide ten-minute breaks to students for every hour of instruction. However, in this condition, students will be allowed to work at various non-active centers (arts and crafts, board games, reading, etc.) within their respective classroom environments. Those classrooms participating in the third condition will have two and one-half hours of instruction before receiving a ten-minute break of active play, either in the gymnasium or outside on the playground. The fourth condition will provide students with two and one-half hours of instruction before a ten-minute break is given for non-active play at within classroom centers (arts and crafts, board games, reading, etc.). Conditions will be maintained for four consecutive weeks. Following this, students will complete a follow-up standardized mathematics assessment.

Results

Those students diagnosed with ADD/ADHD will be removed from the data analysis to maintain comparability of classrooms and avoid extreme outliers that may affect the significance of the results.

Using a two-way ANOVA test, the performance scores of each condition will be analyzed to determine which condition yields the highest level of achievement as compared to the baseline measurement. Tests will be conducted to investigate for main effects of length of confinement period prior to recess as well as activity during recess. Correlational tests will search for relationships between time and activity among each condition.

Gender differences will be investigated to determine whether it is possible that boys and girls benefit differently from the various forms of structured recess.


Condition
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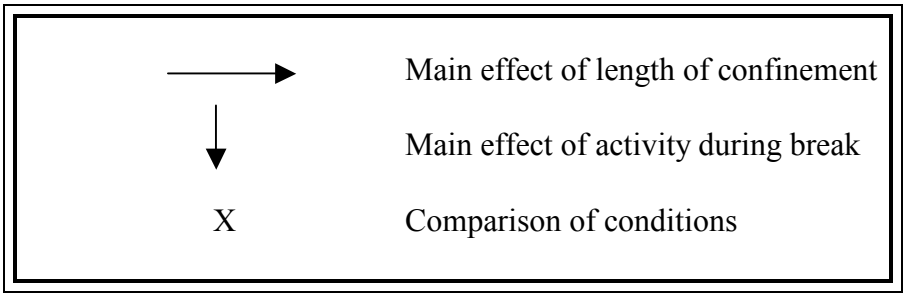
Main effect of length of confinement
Main effect of activity during break
X
Comparison of conditions

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