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Child's Play: Why increasing opportunities to play and be active may improve students' academic and physical outcomes

by Katie Stokes-Guinan

Recess and physical education opportunities in American schools are on the decline

The long-held tradition of providing children with opportunities to play and be active during the school day has come under threat in recent years as schools have cut back on the amount of time during the school day devoted to recess and physical education (PE). Under pressure to increase test scores and boost student achievement, up to 40% of school districts in the United States have reduced or entirely eliminated recess in order to devote more time to core academic activities (Zygmunt-Fillwalk & Bilello, 2005). In fact, perhaps a quarter of all elementary schools no longer provide a regularly scheduled recess time for students in all grades (McKenzie & Kahan, 2008).

The decline in recess opportunities for students in the United States has been coupled with a reduction in time devoted to physical education. Some estimates indicate that less than 5% of elementary school students receive daily physical education (Robert Wood Johnson Foundation, 2007). Part of the reason for this decline may be that school principals do not perceive PE as having any academic value or as contributing to student learning (Siegel, 2007).

Altogether, it is clear that U.S. students are spending less and less time engaged in physical activity and free play during the school day. This may in turn contribute to increasing rates of obesity and poor physical fitness (Datar & Sturm, 2004). The consequences of this trend for students' academic achievement, however, is unclear (Taras, 2005).

Recess, play, and physical activity provide students with opportunities to develop important life skills

Even if educators have not recognized the academic value of the less structured, more physically active parts of the school day – such as recess and PE – they have long recognized the other ways in which recess and PE positively contribute to children's experiences in school. For example, recess and PE provide children with opportunities to foster social relationships with their peers (Pellegrini & Bohn, 2005) and to practice skills such as self-control, sharing, problem solving, cooperation, and conflict resolution (National Association for Sport and Physical Education, 2001; Zygmunt-Fillwalk & Bilello, 2005). Recess and PE can also be optimal times for children to develop their physical abilities. Further, any engagement in physical activity during PE and recess carries obvious health benefits.

Evidence on the academic and attention benefits of recess, play, and physical activity

Despite recognizing the social, emotional, and physical benefits of recess, play, and physical activity, many educators have de-emphasized the development of these skills to focus on the more pressing need of boosting student achievement. This response may be a reaction to the increased accountability for student achievement legislated in the 2001 federal No Child Left Behind Act (NCLB). Although reducing or eliminating recess and PE is often done in the name of increased student learning, the impact may be counterproductive, slowing down or even producing a decline in academic achievement. In fact, evidence reviewed below points to the positive effects that recess, physical activity, and PE may have on student learning and achievement.

Academic benefits

Most of the evidence linking physical activity to student achievement comes from studies looking at the impact of PE classes. Overall, there seems to be consensus among those who have studied the issue that reducing the amount of instructional time devoted to "academic" subjects in order to devote more time to PE does not harm students' academic achievement (Carlson, et al., 2008; Coe, Pivarnik, Womack, Reeves, & Malina, 2006; Sallis, et al., 1999; Taras, 2005). Further, schools that have reduced their PE time have not seen reliable improvements in student achievement (Smith & Lounsbery, 2009).

Although research has shown that directing school time away from PE and toward academic subjects has not raised achievement, there is less agreement on whether adding more PE hours increases academic achievement. Some researchers argue that more PE boosts achievement mainly for girls (Carlson, et al., 2008; Grissom, 2005) and others contend that PE boosts achievement for all students (Smith & Lounsbery, 2009). Coe et al. (2006) did not find any positive academic benefits from PE participation in their randomized control study, but they concede that the students only participated in a minimal amount of physical activity during PE classes which may have influenced their findings.

Although PE itself may be beneficial, engagement in physical activity separate from PE classes has also been associated with academic achievement (Robert Wood Johnson Foundation, 2007). One study found that physical activity engaged in outside of PE classes was more important for predicting academic achievement than the amount of time children spent in PE in school (Stevens, Yen, Stevenson, & Lochbaum, 2008). Another study found that students who engaged in higher intensity activities outside of school had higher academic achievement than their peers who engaged in lower intensity activities (Coe, et al., 2006). These findings should be read with caution, however, as students who engage in different amounts of physical activity may also differ in other ways that influence their academic achievement.

There are several theories as to why physical education and physical activity may contribute to increased academic achievement. One theory is that the life skills students can develop in PE – such as self-expression, problem solving, conflict resolution, and teamwork skills – may translate to improved academic achievement (National Association for Sport and Physical Education, 2001; Zygmunt-Fillwalk & Bilello, 2005). Others suggest that PE may foster improved concentration skills and classroom behavior (Robert Wood Johnson Foundation, 2007; Sibley & Etnier, 2003; Strong, et al., 2005). Finally, it may simply be that the fitness improvements enjoyed by students who participate in PE or any sort of physical activity promote positive academic outcomes.

Indeed, a number of studies have found a positive relationship between fitness and academic achievement and a corresponding negative relationship between obesity and academic achievement (Castelli, Hillman, Buck, & Erwin, 2007; Grissom, 2005; Taras & Potts-Datema, 2005). Physical fitness levels and weight status have been shown to relate to students' scores on standardized tests (Chomitz, et al., 2009; Smith & Lounsbery, 2009), and changes in physical fitness over time have corresponded with changes in students' scores over time (London & Castrechini, 2009). Importantly, in the study by London and Castrechini, this relationship held up even after controlling for other influences on academic acheivement including race, ethnicity, and socioeconomic status. Further, the relationship between fitness and academic achievement seems to start early – before students enter fifth grade – but may taper off by high school.

Although the exact mechanism by which physical fitness is related to academic achievement is unknown, many have offered speculative ideas. One theory is that fit students have more opportunities to learn, as they have been shown to miss fewer days of school

due to illness as compared to their less-fit peers (National Association for Sport and Physical Education, 2001). Another theory contends that self-esteem is the mediator between physical fitness and academic achievement (Chomitz, et al., 2009). Specifically, it has been noted that obese children, and particularly obese girls, are more likely than their non-obese peers to suffer from depression and low self-esteem (Fallon, et al., 2005; Johnson, et al., 2008; Schwimmer, Burwinkle, & Varni, 2003; Strauss, 2000; Williams, Wake, Hesketh, Maher, & Waters, 2005). It is possible that depression and low self-esteem mediate the relationship between fitness and achievement, as these factors may prevent students from fully participating in their classes and academic activities. Finally, it may be that there are unmeasured characteristics, such as motivation or self-efficacy, that exert an influence on both physical fitness and academic achievement (Chomitz, et al., 2009; London & Castrechini, 2009).

Current research suggests that physical activity and participation in PE classes may contribute to students' academic achievement. However, recess provides another opportunity during the school day to foster physical activity that may support academic achievement. But if students must be physically active during recess to reap academic benefits, the benefits may not be shared equally among all students. This may occur, for example, because at all grade levels boys are more likely than girls to become physically active during recess time. Boys are also more physically active outside of school (U.S. Department of Health and Human Services, 2004). Gender differences in physical activity at recess may be related to differences in opportunities, peer expectations, and how children view recess (e.g., as an opportunity to play actively or to socialize). Overall, it seems that children are more likely to become physically active during recess if they receive prompts from teachers or their peers, have access to adequate space and equipment, and are allowed to spend their time outdoors. Children also tend to be more active when adults make direct attempts to structure recess games and activities (McKenzie & Kahan, 2008). The value of an adult who can organize and structure children's play has been widely recognized in Great Britain, where many public parks employ paid play workers whose jobs are to structure opportunities for kids to engaged in all sorts of social, creative, linguistic, cognitive, and physical play (Kim, 2009). Such efforts may increase physical activity during recess and also promote academic gains.

Attention benefits

While fitness and participation in physical activity through PE classes or recess may be related to academic achievement, evidence suggests that physical activity is not the only pathway by which recess may influence academic achievement. There are promising signs that time to engage in any kind of non-academic activity – such as occurs during recess and PE – may help boost children's ability to pay attention in the classroom (Robert Wood Johnson Foundation, 2007; Sibley & Etnier, 2003).

Children's ability to focus and pay attention changes significantly over the elementary school years, but in all cases it is not the same as that of adults. For students to be able to function in school at an optimal level, they must be able to resist distraction and concentrate for extended periods of time (Pellegrini & Bjorklund, 1997). Both anecdotal evidence from Asian schools (Pellegrini & Bohn, 2005) as well as experimental evidence from American schools (Pellegrini & Bjorklund, 1997) indicate that children are less attentive in class just before recess as opposed to just after recess. Further, children seem to be less attentive the longer they go without a break, with boys having more trouble than girls paying attention during long periods of academic instruction (Pellegrini & Bohn, 2005). In addition, teachers tend to rate the behavior of their classrooms better when their students have more recess breaks (Barros, Silver, & Stein, 2009), although this finding is confounded with the fact that the students who received more recess breaks were less likely to be poor or members of minority groups than students who received fewer recess breaks. Not all researchers agree that students' attention is improved in the period right after recess, however. Klein (2004) finds that middle school students may have a hard time settling down into good classroom behavior right after a recess break, particularly one that was long in duration.

Pellegrini and Bjorklund (1997) have applied work in the cognitive sciences on massed versus distributed practice to develop a theory to explain how recess may improve children's academic achievement. Massed practice refers to engaging in a learning task for an extended, concentrated period of time. On the other hand, when practice is distributed, participants are given breaks while completing a task. People of all ages learn faster and better when their learning efforts are distributed rather than massed – in other words, when they are provided breaks rather than forced to concentrate for long periods of time.

When schools provide children with recess breaks throughout the day, they may automatically foster distributed rather than massed practice, supporting the attention of young children. The improved attention that is likely to result, of course, should positively influence learning. However, while evidence of the effects of massed versus distributed practice on attention are strong, the effects of massed versus distributed practice on actual learning have not yet been proven (Pellegrini & Bjorklund, 1997).

Regardless, it seems to be the mental break provided by recess that is most important for fostering classroom attention as opposed to the specifics of what children do during their break. Evidence for this includes the fact that post-recess attention does not seem to be related to whether children have recess indoors or outdoors (Pellegrini, Huberty, & Jones, 1995), how children behave during recess (Pellegrini & Bjorklund, 1997), or even how long the recess break lasts (Barros, et al., 2009).

Call for additional research using sound methodologies

Recently, a clear trend has emerged of schools cutting out time for recess and PE. This has occurred both in the hopes of boosting academic achievement as well as for cost cutting purposes as budgets have been reduced. These efforts, however, may be more harmful than helpful to students. Schools that have reduced the time that students spend in PE in order to devote more time to "academic" subjects have not necessarily seen increases in student achievement (Smith & Lounsbery, 2009). In fact, the evidence suggests that the increased fitness associated with PE classes and other opportunities to be physically active are related to academic achievement. Recess breaks during the school day may also improve academic achievement either through improving fitness, if children are active, or through increasing students' ability to pay attention by providing children with needed mental breaks throughout the day.

Nonetheless, more research on this subject is needed. To date there have been few longitudinal studies linking physical activity and physical fitness with academic achievement. However, without the ability to track how changes in fitness and activity over time correspond with changes in achievement, we have little information about the causal direction of this relationship. Therefore, we cannot know whether fitness leads to improved academic outcomes, whether strong academic achievement leads to better fitness, or whether something else is causing both the improved fitness and the improved academics. PE and other opportunities to be physically active may be the link between the two, but the current literature cannot conclusively support this claim.

Similarly, many of the studies linking recess and play with improved attention suffer from methodological problems that make it difficult to trust their conclusions. In many cases, the children receiving one type of intervention (e.g., more recess periods, longer recess periods, etc.) are different from the children receiving a different type of intervention (e.g., fewer recess periods, shorter recess periods). Thus, it is difficult if not impossible to attribute any differences in outcomes to the intervention because the outcome could just as easily be attributable to the underlying differences in the students. For example, Barros, et al. (2009) found that teachers rated their students' behavior better if they had at least one recess period per day. However, the students who did and did not have daily recess periods were not equivalent. Those who received less recess were more likely to be poor and minority, and these are also the students who are more likely to be rated as having behavioral problems. Very few studies have used a randomized experimental design, the gold-standard of research. Future research using randomized experimental designs would provide the kind solid evidence that is currently lacking in the debate about the relationship between fitness, play, and recess on the one hand and attention and academic achievement on the other.

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For more information about this literature review, please contact Katie Stokes-Guinan at kstokesguinan@stanford.edu.

John W. Gardner Center for Youth and Their Communities
Stanford School of Education
505 Lasuen Mall
Stanford, CA 94305-3083

Tel: (650) 723-1137
Fax: (650) 736-7160
Email: gardnercenter@lists.stanford.edu
Web: http://gardnercenter.stanford.edu