Physical Activity During Recess in Low-Income Third-Grade Texas Students

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Objectives: To estimate the prevalence of recess-based moderate and vigorous physical activity (MVPA) and vigorous physical activity (VPA) among third-grade students attending low-income, urban schools in Texas. Methods: Structured observations (N = 77 class and 616 student observations) using SOFIT were conducted over 3 months in 8 elementary schools with majority Hispanic students. Results: Students engaged in 66.4% and 19.2% of their ~20-minute recess time in MVPA and VPA, respectively. Boys engaged in more MVPA and VPA (p < .007). Contextual differences in activity (setting and activity type) were identified. Conclusions: Findings underscore the importance of scheduled recess time for children’s physical activity.

Key words: children, recess, physical activity, Hispanic, gender

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National recommendations for children’s physical activity state that children should participate in 60 minutes or more of daily physical activity. Although schools provide an important context for promoting physical activity (PA) in children, physical education class (PE) may provide only a limited contribution to national PA recommendations. National estimates indicate that elementary schools offer PE class on an average of only 2.5 days per week, with as little as 12 minutes of moderate-to-vigorous physical activity (MVPA) occurring during a typical PE class. Because children have been found not to compensate for PA after school when PA opportunities are restricted during the school day, additional school-based opportunities to engage children in PA beyond PE class are warranted.

Recess offers an important opportunity for physical activity during the school day, yet findings from a national survey indicate that scheduled time for daily recess in the United States has been on the decline. Despite recommendations that children receive 20 minutes of daily recess, over one in 4 elementary schools in the United States do not provide daily recess for elementary school students across all grade levels, and approximately one third of public US third-grade students do not receive the recommended amount of 20 minutes of daily recess.

Economically disadvantaged children living in predominantly Hispanic and African American communities in the United States are an important priority population for increasing physical activity during the school day given evidence of lower access to physical activity opportunities outside the school setting. Findings from a nationally representative sample of US elementary schools indicate that elementary school students who attend predominantly Hispanic and African American schools are also less likely to receive recommended amounts of recess compared to students who attend predominantly white schools, underscoring the need to increase PA opportunities for this population.

Research on the physical activity benefits of recess is needed to inform local and state policy on the need for ensuring recess time for children. Prevalence estimates on the amount of time children engage in MVPA during recess vary considerably based on studies from Europe, Australia, and the United States, ranging from less than a quarter of recess time to over half the recess period. Although current research is limited on physical activity engagement in majority Hispanic elementary school students in the United States, research on low-income elementary school children in California and majority Hispanic third, fourth, and fifth graders from the southwestern United States in-
dicate that children engage in more than half their recess time in MVPA. Confirmation of this finding as well as a deeper understanding of predominant recess-based activities is needed in order to better understand the value of scheduling recess as a strategy for providing physical activity to minority and low-income populations.

This study examines the prevalence of recess-based, moderate and vigorous physical activity (MVPA) across the course of a school semester among low-income third-grade boys and girls from majority Hispanic schools in central Texas. In responding to calls for research on context during recess,18,26 we also explore contextual differences in children's engagement in MVPA during recess time. Ecological models of health behavior27,28 posit that children's physical activity is influenced by multiple environments, including the built environment, the social environment, and the policy and organizational environment. For the current study, modifiable factors within these multiple environments were assessed in relation to children's MVPA, including the playground setting, such as the field or playscape (built environment); the activity type, which includes the games children play during recess (social and organizational environments); and structured activity time versus free-play recess (policy and organizational environment).

METHODS
Participants and Setting
Participants were third-grade students from 8 low-income, public elementary schools located in a large urban school district in central Texas. Schools were selected as part of the Active Play Project, a multiphase research project that included a prevalence study of PA during recess and activity break time as well as an experimental phase to test strategies to increase PA during activity break time. This paper presents data from the prevalence study. Schools with > 60% school composition of economically disadvantaged students based on data from the Texas Education Agency and not participating in an ongoing school health study were first identified (N = 24). Eight schools were then randomly selected, and all agreed to participate. Using a serial cross-sectional design, observations of children's PA and recess context were taken at multiple time points (N = 27 observations in October, N = 27 observation in November, and N = 23 observations in December) during fall 2009.

Measures and Procedures
Physical activity was assessed using a modified SOFIT method. SOFIT is a direct observation method that uses momentary time sampling and an interval recording system to assess PA levels and lesson context.29 SOFIT has strong evidence of reliability and validity for the measurement of MVPA and lesson context in PE class30,31 and has been applied to assessment of children’s PA during recess.34,35 Given our interest in assessing both free-play recess and structured activity time, we developed a modified SOFIT protocol (SOFIT-Recess or SOFIT-R) that follows the original SOFIT protocol, but incorporates recess-specific activity and play area codes from the SOPLAY method24 in order to collect data on the specific games and activities children engage in during recess as well as the settings where children play. This information is recorded at the same time children's activity levels are recorded, following the SOFIT momentary-time sampling approach. In addition to physical activity-related measures, school-level composition of economically disadvantaged students, a measure that is based on the number of students who qualify for free and reduced lunch, and school-level student ethnic composition were obtained from data from the Texas Education Agency for the year the study was conducted.

Data collectors were trained and certified in SOFIT-R. Two third-grade classes were observed independently at each school (N = 8 schools), with at least 2 observations per class conducted in October, November, and December 2009. For each class, 2 data collectors observed a total of 8 students by randomly selecting 2 students of each sex at the onset of the recess period and coding students’ activity levels, activity (eg, tag/chasing), settings (eg, playscape), and recess condition (free-play recess, defined as students’ ability to choose their activity; or structured activity time, defined as activity organized by teacher) over the duration of the recess period. Temperature for the day of data collection was also recorded. Post hoc reliability analyses based on a randomly selected 12% of N = 97 class observations taken in fall 2010 indicated interobserver agreement of 83% and 86% on coding of SOFIT-R activity levels and type of activity (eg, playing tag), respectively.

Analysis
Analyses were conducted using Stata version 11. Descriptive statistics were conducted as well as ANOVA and chi-square test to examine differences within a given factor (eg, gender). The unit of analysis was one class observation, which is based on the summary activity scores of students observed from a given class.

RESULTS
Seventy-seven class observations (mean class size: 18 students) comprising 616 student observations (50% female) were conducted in fall 2009. School student composition was primarily Hispanic (61.4%), followed by white (15.5%), African American (10.7%) and “Other” (mixed) ethnic group (12.4%). Schools were majority low-income, with a mean school composition of economically disadvantaged students of 77.4% (range: 64.5% to 92%). The average duration of a given recess period was 21.2 minutes (SD = 5.3).
Students spent an average of 66.4% and 19.2% of their free-play recess time in MVPA and vigorous physical activity (VPA), respectively (Table 1). A higher percentage of teacher-led compared to free-play time was spent in MVPA and VPA (p < .02). Boys engaged in more MVPA and VPA during free-play recess (p < .007); no significant gender differences were observed under the teacher-led condition. No significant differences in MVPA were found across the 3-month time span or by temperature [data not shown].

Children spent the most time during free-play recess in the playscape, blacktop and field (Table 1). Girls spent more time sitting/standing/talking with friends than boys (p < .001); climbing/sliding/swinging comprised the second most popular activity for girls (17.8%). Boys spent a greater amount of time in sports activities such as soccer (26.4%) and games activities such as tag/chasing (11.8%). The 2 major teacher-led activities were running the track (36%) and instruction/management (34.1%).

Children spent roughly equal amounts of time during free-play recess engaging in MVPA and VPA in the playscape, blacktop and field areas (Figure 1). Activities with the greatest proportion of MVPA were running (100%) and specific ball games (soccer, football, basketball, volleyball and tetherball) (>82% MVPA); children who engaged in playground and jumping games had slightly lower levels of activity (54.6-58.1% MVPA). Running (60%) and tag/chasing (44.6%) were the activity categories with the greatest proportion of VPA time, followed by climbing/sliding/swinging (36.2%).

**DISCUSSION**

We found that a sample of third-grade students attending schools that serve predominantly low-
income children of Hispanic origin in a large urban school district in Texas spent over half of their recess time engaged in MVPA, a finding comparable with McKenzie and colleagues’ \textsuperscript{24} study of PA-based recess in low-income elementary school children in California using the SOPLAY method and Beighle and colleagues’ \textsuperscript{25} pedometer-based study of majority Hispanic third-, fourth-, and fifth-grade students in southwestern United States. Children in our study engaged in high MVPA levels when measured at different time points over the span of a school semester, mirroring recent findings by Ridgers et al\textsuperscript{23} that documented high levels of MVPA over an academic year in English primary school children. These findings, taken into consideration with recent research on the important contributions of recess to overall school-day physical activity,\textsuperscript{26,37} underscore the viability of recess in contributing to daily PA recommendations\textsuperscript{1} for lower-income elementary school children and reinforce the importance of scheduling and protecting recess time for children’s PA.

Similar to previous research\textsuperscript{14-17,18,19,21,22,24,25,36-38} we found that girls engaged in less activity during recess, which may be explained in part by more time talking with friends. Given that recess provides an important context not only for PA but also for children’s social development,\textsuperscript{39-42} a balance is needed in promoting PA to ensure children have the opportunity to choose their activity and decide how to spend their time. The high proportion of time that both girls and boys in this study spent in both sitting/standing/talking with friends and active play suggests that the goals of self-determined activity and PA are not incompatible.

In states such as Texas, elementary schools are now mandated to provide a certain number of minutes of \textit{structured} PA during the school day. As PE class is provided in some school districts in the United States on only one or 2 days during the week, classroom teachers are being charged with providing structured activity time in order to meet state mandates. In this study, although students were more active when classroom teachers engaged them in structured physical activity, much of this structured time was spent running laps or in management/instruction time. While recess should be reserved as a time for self-determined activity and discovery,\textsuperscript{42} scheduling a separate, structured activity time in which teachers are trained in the facilitation of games and dynamics has been found to be effective in providing MVPA.

**Figure 1**

\textit{Mean Proportion of Time Third-Graders Spent in MVPA-VPA During Recess by Play and Activity Type, \textit{Active Play Project}}

![Figure 1](image-url)

\textit{Note.} \(N = 77\) class observations in 8 low-income elementary schools.
to children\(^{24,43,44}\) and may broaden the variety of activities for students while contributing to state mandates for structured activity time.

Ecological models of health behavior\(^{27,28}\) provide a framework for targeting key aspects of children’s environments (policy, built, social, and information environments) that hold relevance for promoting child PA and enhancing recess time for PA. Beginning with the policy environment, our findings supplement previous research\(^{24,25}\) and underscore the value of recess time for providing physical activity opportunities for lower-income children. School districts can increase children’s PA by instituting the National Association for Sport and Physical Education recommendation of 20 minutes of daily recess.\(^7\) Although we found similar levels of engagement in MVPA across built environment settings (playscape, blacktop, and field), modifications to the playground built environment with markings such as 4 square, hopscotch, and other creative designs\(^{12,45,46}\), enhanced play areas with PA amenities such as sports courts\(^{47,48}\), and the provision of games equipment\(^{24,38,49}\) have been positively associated with greater levels of children’s PA engagement. As recess time often competes with PE time for play area space, recess should not get the second choice of play spaces. On the contrary, schools should explore how to increase space for free-play and structured activity break and PE time. In addition to harnessing the role of the classroom teacher or recess supervisor in encouraging and facilitating activity (social environment), emerging best practices such as creating a zoned approach with a menu of rotating recess activities (information environment) hold promise and merit further investigation.

Strengths of this study include an extensive assessment of children’s PA over a school semester and the simultaneous assessment of recess context. This study was limited to third-grade students, and observations were conducted during outdoor recess time and the fall semester, limiting their generalizability across these factors.

**Conclusion**

Recess offers an important opportunity for physical activity during the school day, yet a 2010 CDC report indicated that less than half of the 50 states that constitute the United States require or recommend that schools provide daily recess.\(^{50}\) Urban school districts such as Chicago Public Schools are beginning to reincorporate recess into the school day after decades without recess\(^{51}\); our findings provide further support for the importance of scheduling both free-play recess and structured activity time for PA engagement in lower-income student populations. Given the range of benefits of recess, which extend beyond PA to include positive social development\(^{39,42}\) and increased student concentration and time-on-task in the classroom,\(^{52}\) further efforts are needed to establish district and state mandates to ensure children have access to recess time.

**Human Subjects**

Study objectives and protocols were reviewed and approved by university and school district ethics review boards.

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