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The Impact of State Laws and District Policies on Physical Education and Recess Practices in a Nationally-Representative Sample of U.S. Public Elementary Schools

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Abstract

Objective—This study examined the impact of state and school district-level policies on the prevalence of physical education (PE) and recess in a nationally representative sample of U.S. public elementary schools.

Design—Analyses from annual, nationally representative, cross-sectional surveys of School Administrators in the US.

Setting—Data were collected through surveys conducted between February and June during the 2006-07, through 2008-09 school years. State laws and district policies were compiled annually by UIC researchers using established legal research techniques.

Participants—The sample size was 47 states, 690 districts, and 1761 schools.

Main Exposures—State and District-level PE and recess-related laws

Outcome Measures—Twenty minutes of daily recess and 150 minutes of PE weekly

Results—The odds of schools having 150 weekly minutes of PE increased if they were located in states (OR, 2.8; 95% CI, 1.3-5.7) or school districts (OR, 2.4; 95% CI, 1.3-4.3) having a law or policy, respectively, requiring 150 minutes of PE weekly. Schools located in states with laws encouraging daily recess were significantly more likely to have 20 minutes of recess daily (OR, 1.8; 95% CI, 1.2-2.8). District policies were not significantly associated with school-level recess practices. Adequate PE time was inversely associated with recess and vice versa suggesting that schools are substituting one form of physical activity for another rather than providing the recommended amount of both recess and PE.

Conclusions—By mandating PE or recess, policy makers can effectively increase school-based physical activity opportunities for youth.

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INTRODUCTION

The Physical Activity Guidelines for Americans [1] recommend that school-aged youth (ages 6-18) get 60 minutes or more of moderate-to-vigorous physical activity (MVPA) daily. Children spend the majority of their waking hours in school, thus schools are important locations to focus obesity prevention activities, such as increasing physical activity (PA) opportunities [2]. During the typical school day children have three potential opportunities for PA: 1) Physical education (PE) classes, 2) recess, and 3) other unstructured physical activities such as PA breaks or before/after-school activities.

PE class can increase daily PA levels of children [3] and more weekly hours of school-based PE have also been shown to encourage favorable PA behaviors in adulthood [3]. PA has also been linked to positive influences on concentration, memory and classroom behavior [4] and overall academic achievement [5-6]. The national recommendation for school PE—endorsed by the National Association of Sports and Physical Education (NASPE) [7] and the American Heart Association [8]—is that elementary school (ES) students be offered at least 150 weekly minutes of PE. However, fewer than 20% of third-grade students at public ES in the U.S. were offered this amount during the 2007-08 school year (SY) [9].

Recess also provides another important opportunity for regular PA, particularly among ES students, has been shown to be a good source of PA [10-12], and can account for up to half of the recommended 60 minutes of MVPA [10]. The unstructured nature of recess provides students discretionary time to be active while playing. Participating in recess is associated with teacher reports of better student classroom behavior, better focus and less fidgeting among students [13-16]. NASPE recommends that all ES students be provided with at least one daily session of recess for a period of at least 20 minutes [17]. While only a few studies have examined the impact state-level policies have on the amount of time allocated to PE and/or PA during the school day, all show an increase in the number of weekly PE minutes after the passage of a state law [18-20]. However, implementation of state policy varied across the affected school districts [19-20] and some schools cited competing time demands as a barrier to full implementation [19]. A limitation of these studies was that they examined individual states, did not account for additional policies at the school district level, and only focused on PE and/or PA without examining recess-related policies. We build on existing evidence by examining the impact of state and school district-level policies on the prevalence of PE and recess in a nationally representative sample of U.S. public ES; this is the first study to do this. We focus on PE and recess because these are two primary opportunities for in-school PA time at the elementary level.

METHODS

Our study collects information on food environments and PA in ES (ES), as well as district-level policy data from corresponding school districts, and relevant state laws. This study was approved by the UIC Institutional Review Board.

SAMPLE

Our nationally-representative samples were developed at the Institute for Survey Research at the University of Michigan, using sampling frames based on the National Center for Education Statistics (NCES) Common Core of Data (CCD) [21]. Because ES vary in grade composition (e.g., K-3rd grade, 2nd-5th grade), all schools were required to include a 3rd grade. Public schools from all coterminous U.S. states (excluding Alaska and Hawaii), were eligible for sampling. School weights adjusted for potential non-response bias by modeling every school's propensity to respond based on: student enrollment; school racial/ethnic

composition; percent of students eligible for free/reduced lunch (FRL); region; and, urbanicity.

STATE-LEVEL DATA

State PE and recess-related laws effective as of September 2006, 2007, and 2008 were compiled by UIC researchers [22] using primary legal research techniques [23-24] through searches of the Lexis and Westlaw state statutory and administrative law databases (September of each year was chosen as reflective of the laws in place as of the beginning of each SY, 2006-2007, 2007-2008, and 2008-2009). The state law information was validated against secondary source compilations available from the Trust for America's Health annual *F as in FAT* reports [25-28], the National Association of State Boards of Education State School Health Policy Database [29], and the National Conference of State Legislatures legislative summary reports [30-31].

Each state's laws were reviewed and analyzed by two coders to create three-category variables, which focus on time requirements for PE and daily recess.. The variables differentiate between strong (=2), weak (=1), and no policies (=0). For the PE time variable, state laws were coded: *strong* if they met the NASPE standard for time spent in PE by requiring that students receive 150 minutes of PE weekly; *weak* if they included a lesser requirement (i.e., <150 minutes per week) or suggested, but did not require, 150 minutes weekly; and *no policy* if they did not address PE time requirements. For recess, we examined if a state law existed requiring daily recess for ES students (=2), if the state law encouraged or suggested daily recess (=1), or if there is no state law addressing daily recess for ES (=0).

DISTRICT-LEVEL DATA

Concurrent with school administrator surveys, researchers collected congressionally-mandated school district wellness policies [32-33]. Wellness policies were required to include goals for PA and, although not required, nearly all addressed PE [32-33]. District wellness policies and other relevant school district policy documents (i.e., regulations, curricula standards, etc.) were gathered for all corresponding school districts that contained ES in our sample for each of the school years. Wellness policies were gathered via website searches with telephone and mail follow-up, as necessary. Wellness and related policies were obtained from 94%, 94%, and 97% of all districts included in the sample for the study years, respectively. All district policies were double-coded and analyzed by two trained researchers using the same coding scheme applied to the state laws and, for this analysis, the focus is on the district policies related to amounts of time required/suggested for PE and recess for ES students. All policies were coded to reflect policies in place as of the first day of each SY of interest (the day after Labor Day was used as the proxy for the first day of the SY).

SCHOOL-LEVEL DATA

Data Collection—Data were collected with mail-back school surveys conducted during SYs 2006–07, 2007–08, and 2008–09, primarily between February and June of each SY. Our survey was mailed to the school principal and a \$100 incentive was offered. Response rates calculated using the American Association for Public Opinion Research method 2 [34]—counting partial responses as complete—across the three years, respectively, were 54.6% (578 schools); 70.6% (748 schools); and 61.8% (641 schools).

Survey respondents were asked about the number of days per week and number of minutes for which each PE class was scheduled during a typical week for 3rd grade students. This information was combined to calculate the total minutes of PE weekly and we calculated a

dichotomous outcome variable according to the NASPE standard for PE 150 minutes per week (=1) versus any amount less than 150 minutes weekly. Survey respondents were also asked to report on possible barriers to implementing or maintaining regular PE classes, each coded yes (1) or no (0), including: lack of necessary staff; inadequate indoor facilities/equipment; inadequate outdoor facilities; competing demands for teaching other subject areas; physical education is not a high priority for district administrators; no state or district policies requiring PE; and, financial constraints.

Respondents were asked about scheduled recess during a typical week for 3rd grade students including the number of days per week, times per day, and total number of minutes per day of recess. This information was combined to create a dichotomous outcome of whether students were offered at least 20 minutes a day of recess every day of the week (1) or not (0), corresponding to national recommendations for recess. At schools without regularly scheduled recess, respondents were asked to indicate which of the following reasons why not, each coded as yes (1) or no (0): inadequate resources (staff, facilities, etc.); or competing time demands for academics. Multiple approaches were tried for constructing the outcome variables and dichotomization was the best fit for the data.

To control for relevant school-level characteristics, demographic and socioeconomic data were obtained [21]. We obtained data from the 2006-07 Common Core of Data (CCD) file for the corresponding year of survey data, and from the 2007-08 CCD file for the 2007-08 and 2008-09 survey data, as the 2008-09 demographics were not available at the time of analysis. Variables included FRL, coded in tertiles (lowest tertile as the referent group); race/ethnicity of the schools' students, coded in four mutually exclusive and exhaustive categories of majority Black, Majority Hispanic, diverse (no majority race), or majority White (referent group); and locale, coded as suburb, rural, township, or city (referent group). The length of the school day, provided through the ES survey, was also included.

STATISTICAL ANALYSIS

This study is a stacked cross-sectional analysis of 1,761 public ES, nested within 690 school districts, and 47 states. Due to the hierarchical nature of the data, three-level Bernoulli logit models [35-36] were used to examine the binary outcomes for recess and PE (described above), correctly adjusting the standard errors for the clustering of schools within districts and districts within states. Descriptive and regression analyses were weighted using school-level sampling weights. All data were prepared using the STATA SE v. 11, analyzed using HLM 6.08, and used 2-sided tests with a significance level of .05. Significant results are bolded in the regression tables.

Each model included demographic covariates, and relevant PE barriers or recess barriers, as appropriate. In addition, because schools sometimes substitute recess time for formal PE class time, we included the recess variable as a covariate in predicting PE outcomes, and vice versa for the recess outcome.

RESULTS

Table 1 presents descriptive statistics on the study sample. About 70% of the schools in our sample offered at least 20 minutes of daily recess and 17.9% offered 150 weekly minutes of PE. The majority of states (83%) offered no daily recess law and less than half offered some kind of law addressing the recommended 150 weekly minutes of PE.

The PE model is presented in Table 2. The odds of schools meeting the NASPE recommendation of 150 weekly minutes of PE increased if they were located in states or school districts having a law or a policy requiring 150 minutes of PE weekly. Schools meeting the NASPE recommendation for recess were significantly less likely to meet the PE

criterion (OR 0.5, 95% CI: 0.4, 0.7). Schools reporting PE not being a school priority were significantly less likely to have 150 minutes of weekly PE.

As noted in Table 3, several variables emerged as significant predictors of schools meeting the nationally-recommended criterion of offering at least 20 minutes of daily recess. Schools in states with policies encouraging daily recess had higher odds of having 20 minutes of recess daily (OR 1.8, 95% CI: 1.2, 2.8). District policies were not significantly associated with school-level recess practices. Adequate PE time was inversely associated with recess, with schools meeting the NASPE recommendations of at least 150 minutes of PE weekly being 50% less likely to meet the recess criterion. The odds of schools meeting the recess criterion were lower (OR: 0.2, 95% CI: 0.1, 0.3) if the survey respondent reported competing time demands as a barrier. Predominantly Caucasian schools were more likely than all other racial/ethnic groups to have daily recess. Schools with the highest number of students receiving FRL were less likely to have 20 minutes of recess daily (OR 0.50, 95% CI: 0.3, 0.7). Finally, having a longer school day was positively associated with meeting the NASPE standards for both PE and recess.

DISCUSSION

To our knowledge this is the first study to examine nationally the impact of state and district-level policies on public ES PE and recess time practices. Results showed that state policies are associated with increased PE and recess time in ES. Having strong district-level PE laws was also associated with increased weekly PE minutes offered in schools. More importantly, although the federal wellness policy mandate did not require districts to address PE [37], results show that having strong district-level PE policies increased the likelihood of schools having 150 or more minutes of weekly PE independent of the state having a strong PE law. We found instances where school districts adopted strong policies in states with weak or no policies (results not shown). We also found that the lack of necessary staff and the lack of PE as a district-level priority were barriers to having a greater number of weekly PE minutes. This finding coupled with results from a recent study showing that wellness policy provisions related to PA were weaker and less prominent than those related to nutrition [32] highlights the need and importance of educating district administrators about the benefits to youth of receiving an adequate amount of daily PA, as well as providing schools with the necessary resources to fully implement new policies.

We found that weak, but not strong, state-level recess laws were associated with schools having at least 20 minutes of daily recess. However, only three states' laws (Delaware, Nebraska, and Virginia) in our sample required daily recess and less than 2% of our school sample was located in these states, thus we have too few schools impacted by these laws to detect a significant effect. We also found no association between the number of weekly recess minutes offered by schools and school district recess policies; however, it is important to note that the wellness and related policies compiled for this study were not required to address recess so it may be that districts have other or informal policies that address recess time but that are outside the scope of this study.

Consistent with previous research [19] we found that a barrier to meeting the national criterion for 20 minutes of recess daily was competing time demands. Results of both models showed schools that had either 20 minutes of daily recess or 150 minutes of weekly PE were less likely to have the other, although those with longer school days were more likely to meet the NASPE requirements. This suggests that schools are substituting one form of PA for another rather than providing the recommended amount of both recess and PE. With many districts placing greater emphasis on academic achievement, schools may be sacrificing PA time in lieu of more classroom instruction. Schools may need to be better

informed about the growing evidence of the positive relationship between PA and academics [3-6, 38]. More research into this trade-off of school-based PA opportunities is warranted.

We also found that schools comprised primarily of racial and ethnic minority students as well as those containing the most socioeconomically disadvantaged students were less likely to offer at least 20 minutes of daily recess, with mixed racial and ethnic schools also receiving fewer weekly PE minutes. Latino and African-American children have higher rates of being at-risk of overweight or overweight than their white counterparts, and the prevalence of obesity is found to be significantly higher among low-versus high-income groups [39]. Lower-income youth also participate less in PA [40]. Existing evidence shows that students who are more physically active have lower BMI scores than more sedentary youth [38, 41], and that school-based PA has a positive effect on health outcomes and academic performance particularly among low-income and minority children [5]. Therefore, it is important to develop strategies to increase the number of minutes of recess offered specifically for these vulnerable populations most at-risk to suffer the many health complications associated with obesity.

STUDY LIMITATIONS AND CONCLUSION

There are several limitations that should be noted in our study. First, the cross-sectional design limits causal interpretation. However, this study provides valuable insight into how state and district-level policies can impact school-based PA opportunities. Second, our sample only examined public ES. Not all state laws apply to private schools and we did not have comparable district policies for private schools. Future research should examine private school policies and practices, as well as how state and district-level policies impact both middle and high schools. Third, there is potential for response bias because we used self-report school administrator data. However, similar measures have previously been shown to be reliable and valid [42]. Fifth, data were unavailable for youth PA behavior during PE and recess (e.g., percent time in MVPA), or weight outcomes such as BMI. Future research should include these measures to better understand how these programs and related policies are associated with students' health outcomes. Sixth, state and district recess policies only captured provisions for daily recess and did not capture the amount of time required/encouraged each day. We are compiling the daily recess time requirements starting with SY 2009-10 and will be able to examine whether varying daily recess time requirements are associated with school recess practices. Seventh, PE and recess time are endogenous, which may bias the results, and cannot be adjusted using HLM. Eighth, we did not have sufficient statistical power using HLM to estimate the separate effects of state and district level policies requiring <150 PE weekly minutes and those suggesting 150+ PE weekly minutes. Finally, states and districts may have non-codified or informal policies or guidance related to PE time or recess not captured by this study. However, given that such informal policies would not carry the force of law, they were not compiled for this study.

In summary, given the amount of time youth spend in school and the importance of PA, our study provides important information for policy makers. Our results show that mandating only increased PE or recess time does not result in more overall PA as schools/districts appear to compensate for any increased PA in one area by decreasing other PA opportunities. In order to increase school-based PA policy makers may need to mandate more of both PE and recess time.

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Table 1

Weighted descriptive percents and unweighted N's at the state (N=47), district (N=690), and school levels (N=1761) *

	N	Percent Yes
State-level factors (N=47 States)		
No state daily recess law	39	83.0
State law suggesting daily recess	5	11.0
State law requiring daily recess	3	6.0
No state PE time-related law	24	51.0
State law suggesting 150 min PE/weekly or requiring <150 min/weekly	17	36.0
State law requiring 150 min PE/weekly	6	13.0
Region		
Northeast	9	19.0
Midwest	12	26.0
South	16	34.0
West	10	21.0
District-level factors (N=690)		
No district recess policy	442	64.0
District policy suggesting daily recess	117	17.0
District policy requiring daily recess	131	19.0
No district PE policy	462	67.0
District policy suggesting 150 min PE/weekly or requiring <150 min/weekly	200	29.0
District policy requiring 150 min PE/weekly	28	4.0
School-level factors (N=1761)		
Outcomes		
Recess at least 20 minutes daily	1192	69.9
PE 150 minutes or more weekly	323	17.9
Barriers		
PE: Lack of staff	327	18.6
PE: Lack of indoor facilities	329	18.9
PE: Lack of outdoor facilities	164	9.6
PE: Competing demands	424	23.4
PE: PE not a school priority	98	5.7
PE: No PE policy	48	2.5
PE: Financial constraints	288	16.6
Recess: Lack of resources	30	1.7
Recess: Time demands	168	8.8
Controls		
Locale		
City	496	29.9
Suburban	634	31.8
Rural	410	26.5

	N	Percent Yes
Township	221	11.9
Racial Composition		
Majority White	873	50.4
Majority Black	136	8.1
Majority Hispanic	240	12.8
No majority race	512	28.6
Free-reduced lunch		
First tertile	609	32.4
Second tertile	643	37.8
Third tertile	509	29.8
School year		
2006-2007	515	33.1
2007-2008	670	33.6
2008-2009	576	33.2

* Data are weighted using school-based sampling weights.

‡ There are no statistically significant differences in the sample across years.

* Length of school day: mean is 6.6 hours (SD 0.40) with a range of 5.5 to 8.7 hours in length.

Table 2

Multilevel, Multivariate Associations between State and District Policy and Elementary School Physical Education Class Weekly Minutes for 3rd Grade Students*

	PE 150 Min Weekly
State-level factors	
No state PE time-related law	1.0 (Reference)
State law suggesting 150 min PE/weekly or requiring <150 min/weekly	1.4 (0.7-2.5)
State law requiring 150 min PE/weekly	2.8 (1.3-5.7)
Region	
Northeast	1.0 (Reference)
Midwest	1.6 (0.7-3.6)
South	3.2 (1.5-6.5)
West	1.7 (0.7-4.4)
District-level factors	
No district PE policy	1.0 (Reference)
District policy suggesting 150 min PE/weekly or requiring <150 min/week	0.7 (0.4-1.1)
District policy requiring 150 min PE/weekly	2.4 (1.3-4.3)
School-level factors	
Recess at least 20 minutes daily	0.5 (0.4-0.7)
Lack of staff	0.7 (0.4-1.0)
Lack of indoor facilities	0.8 (0.5-1.3)
Lack of outdoor facilities	1.1 (0.7-1.8)
Competing demands	0.8 (0.5-1.2)
PE not a school priority	0.3 (0.2-0.7)
No PE policy	0.5 (0.1-2.1)
Financial constraints	0.9 (0.6-1.3)
Length of school day	2.7 (1.8-4.1)
Locale	
City	1.0 (Reference)
Suburban	0.8 (0.6-1.3)
Rural	1.1 (0.8-1.7)
Township	0.8 (0.5-1.2)
Racial Composition	
Majority White	1.0 (Reference)
Majority Black	1.9 (1.1-3.6)
Majority Hispanic	0.7 (0.4-1.4)
No majority race	0.6 (0.4-0.9)
Free-reduced lunch	
First tertile	1.0 (Reference)
Second tertile	1.1 (0.7-1.6)
Third tertile	1.2 (0.8-1.9)
School year	

	PE 150 Min Weekly
2006-2007	1.0 (Reference)
2007-2008	0.8 (0.6-1.2)
2008-2009	1.0 (0.7-1.5)

Regressions are weighted using school-based sampling weights.

* Data are presented as odds ratio (95% confidence intervals). The sample size was 47 states, 690 districts, and 1761 schools for all models. Statistically significant differences at $p < .05$ are in bold.

Table 3

Multilevel, Multivariate Associations between State and District Policy and Elementary Schools Offering 20 Minutes of Recess Daily to 3rd Grade Students *

	Recess 20 Minutes Daily
State-level factors	
No state daily recess law	1.0 (Reference)
State law suggesting daily recess	1.8 (1.2-2.8)
State law requiring daily recess	0.8 (0.5-1.4)
Region	
Northeast	1.0 (Reference)
Midwest	1.4 (0.7-3.0)
South	0.4 (0.3-0.8)
West	2.6 (1.5-4.6)
District-level factors	
No district recess policy	1.0 (Reference)
District policy suggesting daily recess	1.2 (0.7-1.9)
District policy requiring daily recess	1.2 (0.8-1.8)
School-level factors	
PE class 150 minutes or more weekly	0.5 (0.4-0.6)
Limited resources	0.7 (0.3-1.5)
Competing time demands	0.2 (0.1-0.3)
Length of school day	1.8 (1.2-2.9)
Locale	
City	1.0 (Reference)
Suburban	0.7 (0.4-1.1)
Rural	0.9 (0.5-1.9)
Township	0.7 (0.4-1.1)
Racial Composition	
Majority White	1.0 (Reference)
Majority Black	0.4 (0.2-0.8)
Majority Hispanic	0.4 (0.2-0.6)
No majority race	0.6 (0.4-0.9)
Free-reduced lunch	
First tertile	1.0 (Reference)
Second tertile	0.8 (0.6-1.1)
Third tertile	0.5 (0.3-0.7)
School year	
2006-2007	1.0 (Reference)
2007-2008	1.0 (0.8-1.4)
2008-2009	1.1 (0.9-1.4)

* Data are presented as odds ratio (95% confidence intervals). The sample size was 47 states, 690 districts, and 1761 schools. Statistically significant differences at $p < .05$ are in bold. Data are weighted using school-based sampling weights.