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Amount and environmental predictors of outdoor playtime at home and school: A cross-sectional analysis of a national sample of preschool-aged children attending Head Start

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Abstract

Outdoor play is an important contributor to children's physical activity and the prevalence, correlates, and environmental predictors of it among young children are not well characterized. This study aims to estimate the amount of time preschool-aged children attending Head Start spend playing outdoors at home and school, and whether aspects of the home and school environment are associated with greater outdoor play. We analyzed data ($n=2529$) collected in spring 2007 in the Head Start Family and Child Experiences Survey (FACES). Overall, 37.5% of children played outside at home >2 h per weekday. Children who had a yard near home to play in or who had visited a park or playground or gone on a picnic with a family member in the last month were more likely to have >2 h per weekday outdoor play at home, but having a playground within walking distance of the home was not related to home outdoor playtime. On average children played outdoors at Head Start for 36 min per day. The amount of time children played outdoors at home was not related to school outdoor time.

Keywords

Preschool children; Active play; Outdoor play; Environmental correlates; Outside environment

1. Introduction

The importance of physical activity for children's healthy development is well established (Baranowski et al., 1992; Boreham and Riddoch, 2001; Sallis et al., 2000), and guidelines for physical activity in children under age 5 have been developed by a number of organizations globally (Davies et al., 2011; Institute of Medicine. Committee on Obesity Prevention Policies for Young Children., 2011; National Association for Sport and Physical Education, 2009). Current recommendations suggest that preschool children be active for at least 180 min per day (Davies et al., 2011), or an average of at least 15 min of every hour they are awake (Institute of Medicine. Committee on Obesity Prevention Policies for Young

Children, 2011). The National Association for Sport and Physical Education (2009) recommends that preschoolers spend at least 120 min per day engaging in structured and unstructured physical activity. Evidence has shown that outside play is positively associated with physical activity (Baranowski et al., 1993; Brown et al., 2009; Sallis et al., 1993) and children are more likely to move more outside than when they are inside (Brown et al., 2009; Klesges et al., 1990). Research also suggests that encouragement of outdoor play and fostering an environment of movement among children improves the physical, emotional, social, and cognitive health of children and may be important in the prevention of childhood obesity (Burdette and Whitaker, 2005b; Milteer et al., 2012). However, today's children are spending less time outside than any previous generation (Clements, 2004). Despite what we know about the benefits of physical activity for young children and the relationship of outdoor playtime to physical activity, few research studies have focused on the amount or predictors of children's outdoor play.

Empirical evidence is limited on correlates of young children's outdoor play. Analyses of the Fragile Families and Child Wellbeing Study, a large prospective cohort of children born in 1998–99 in twenty urban areas across the US, have investigated maternal reports of preschool children's outdoor playtime in relation to aspects of neighborhood safety and cohesion (Burdette and Whitaker, 2005a; Kimbro et al., 2011). These studies do not support the hypothesis that children play outdoors more in safer neighborhoods (Burdette and Whitaker, 2005a; Kimbro et al., 2011). Beyond neighborhood safety, we are unaware of studies directly examining whether aspects of preschool-age children's home environment (such as availability of a yard or playground) are associated with time spent outdoors. A longitudinal study of school-age children (ages 5–12 at baseline) in Australia did not find evidence that environmental aspects of the home (such as size of yard, and having nearby locations for physical activity) were associated with outdoor play (Cleland et al., 2010). There is also a literature examining some of these environmental factors in relationship to preschool children's physical activity (Davison and Lawson, 2006; Ferreira et al., 2007; Lovasi et al., 2011) and weight status (Dunton et al., 2009; Williams et al., 2012). For example, one study of low-income preschool-age children in New York City related children's physical activity and weight status to measures of their neighborhood environment such as intersection density, traffic volume, and park and playground access (Lovasi et al., 2011); another study of low-income preschool-age children in Cincinnati, Ohio examined whether proximity to neighborhood playgrounds and other aspects of the environment were related to weight status (Burdette and Whitaker, 2004), but outdoor play was not assessed in either of these studies.

Factors in the school environment related to preschoolers' physical activity, including outdoor activity, have been evaluated in the Children's Activity and Movement in Preschools Study which was conducted in South Carolina (Brown et al., 2009; Byun et al., 2011; Dowda et al., 2009; Pate et al., 2008). Children were sedentary during most of the time they spent at school (Pate et al., 2008), but children were more likely to be physically active when they were outside (Brown et al., 2009). Larger playgrounds, open space to play in, and portable (balls, etc.) rather than fixed playground equipment were aspects of the outdoor environment that were associated with greater physical activity (Brown et al., 2009; Dowda et al., 2009). Increasing attention is being paid to the physical activity environments and policies of child care centers (Copeland et al., 2012; Copeland et al., 2011; Dowda et al., 2009; Trost et al., 2010; Whitaker et al., 2009), but to the best of our knowledge, no large national US study has investigated time children spend in outdoor play while at preschool.

Our objectives were: (1) to estimate the amount of time low-income US preschool-age children spend playing outdoors at home and at school; (2) determine whether outdoor play was related to children's sociodemographic characteristics and weight status; and (3) assess

the extent to which aspects of children's physical environments at home and school are associated with outdoor play. We hypothesized that preschool children who had access to outdoor play spaces would spend more time playing outdoors. To accomplish these objectives we analyzed data from a national study of 3- and 4-year-old children attending Head Start. Head Start is the largest federally funded preschool program in the United States, serving almost 1 million low-income children and their families (US Department of Health and Human Services, Administration for Children and Families, 2012a).

2. Methods

2.1. Study population

We analyzed data collected in the Head Start Family and Child Experiences Survey (FACES) 2006, a longitudinal study designed to assess the experiences and outcomes of children in Head Start and their families (West et al., 2007). The study, funded by the United States Department of Health and Human Services and conducted by Mathematica Policy Research, involved interviews with the program director, center director, classroom teacher, and parent or legal guardian along with direct observation of the classroom and child (West et al., 2007). We have a restricted data-use agreement to analyze data from FACES 2006 (US Department of Health and Human Services, Administration for Children and Families, 2010), and the Office of Responsible Research Practices at The Ohio State University determined that our analyses were exempt from IRB review.

The sampling procedures for FACES 2006 have been described (West et al., 2007). To obtain a representative sample of children newly entering Head Start in the fall of 2006, a 4-stage clustered, stratified sampling design was used (West et al., 2007). With probability proportional to size, 60 Head Start programs were selected from the 2004–05 Head Start Program Information Report (US Department of Health and Human Services, Administration for Children and Families, 2012b), and 2 centers per program and 3 classrooms per center were sampled. Within each classroom, an equal probability random selection method was used to select approximately 10 children per classroom. A total of 3315 children with parental consent were enrolled in fall 2006, and 2914 children were assessed in spring 2007. We focused our analyses on spring 2007 because it was the first wave at which information was available about children's home and school outdoor playtime as well as environmental factors, such as access to play space, which could facilitate outdoor play.

2.2. Outside play

We estimated each child's typical weekday time spent playing outdoors at home and at school. Time spent outside at home was derived from two questions in the parent interview. First, parents were asked "We are interested in the kinds of things [CHILD] did on the last day you followed your regular routine. Did your child spend any time playing outside?" If the parent responded yes to the first question, they were then asked, "About how much time does [CHILD] spend playing outside on a typical weekday? Would you say more than 2 h, 1–2 h, or less than 1 h?"

Children's time spent playing outside at school was derived from the classroom teacher interview. Teachers were asked, "Think for a moment about a typical day in your program during the last month. On a typical day, about how many minutes per day do the children in your class play outside?" The response was open-ended and teachers estimated the number of minutes children in their class spent playing outside daily.

2.3. Environmental characteristics predicting outdoor play

Teachers and parents were asked about some environmental characteristics that could potentially facilitate outdoor play. We examined these environmental characteristics to determine if they were associated with the amount of time children played outside at home and at school. Three questions from the parent interview and one from the teacher interview pertained to the outdoor environment of the children. Parents were asked: “Is there a yard, either your own or someone else’s around your home, where [CHILD] can play?”, “Is there a park or playground within walking distance of your home where [CHILD] can play?” and “In the past month, has anyone in your family done the following things with [CHILD]? Visited a playground, park, or gone on a picnic?” Teachers were asked, “Do children in your class have an outdoor playground they can use during the day?”

2.4. Additional variables

Children’s age, gender, race/ethnicity, mother’s education level, income-to-poverty ratio, whether the child lived in a single-parent household, and the type of Head Start program the child attended (full-day or half-day) were reported in the parent interview. The Head Start center the child attended was coded as to the Census region of the country in which it was located (Northeast, Midwest, South, and West)(US Census Bureau Division of Geography, 2012). The month in which the parent and teacher were interviewed was also recorded. Children’s height and weight were measured by trained FACES staff using a standardized protocol (West et al., 2010). Height and weight were measured twice and if the measurements did not agree, a third measurement was taken. Body mass index (BMI) was calculated as kg/m^2 and values of BMI that were more than 3 standard deviations from the overall mean were not included in the FACES dataset (West et al., 2010). Gender specific BMI-for-age percentiles were calculated based on the Centers for Disease Control and Prevention growth charts (Kuczmarski et al., 2002).

2.5. Analytic approach

Children were included in our analyses ($n=2529$) if they had information available on outdoor play at home and at school. We compared characteristics of children missing data on these variables to children included in our analytic sample. To account for the complex survey design our analyses included sampling weights that adjust for planned over-sampling and non-response (West et al., 2010), and we used the SURVEY procedures in SAS version 9.2 (SAS Institute, Cary, NC) for statistical testing and variance estimation (SAS Institute, Inc., 2003). We tabulated the percentage of children with >2 h per weekday of outdoor play at home in relation to children’s age, gender, race/ethnicity, weight status, maternal education, single parent household, Head Start program type, month of parent interview, and region of the country. We used Rao–Scott design-corrected likelihood ratio χ^2 tests with an α level of 0.05 to determine statistical significance.

For each of the three variables about the home outdoor environment, we used logistic regression to estimate the odds of the child having >2 h per weekday outdoor playtime at home (versus ≤ 2 h), estimating these odds both before and after adjustment for covariates. The first adjusted models controlled for child age, gender, race/ethnicity, weight status, mother’s education, single-parent household, Head Start program type, month of interview and region. In a second model, we also adjusted for the other two environmental variables. In post-hoc exploratory analyses, we examined the combined effect of the home environmental variables that were statistically significantly related to having >2 h per weekday of outside play at home. Using cross-product terms in logistic regression models, we also evaluated whether associations between the home environmental variables and home outdoor play varied by region of the country.

We determined the percentage of children whose outdoor playtime at school was <20 min per day, 20–30 min per day, >30–60 min per day, and >60 min per day; these categories were selected based on examination of the distribution of school outdoor playtime for natural break points. We calculated the average minutes of time children spent outdoors at school and examined how time spent outside at school was related to sociodemographic characteristics, region, month of teacher interview, weight status, outdoor time at home, and having a playground at school. We used linear regression analyses to assess these associations, and evaluate whether associations between having a playground at school and time spent outdoors differed by region of the country.

3. Results

3.1. Participant characteristics

Among the 2529 children included in our analysis, the mean (95% confidence interval [CI]) age was 53.0 (52.2–53.8) months, and 23.0% (95% CI: 20.9–25.0) had an income to poverty ratio less than 50% of the poverty threshold. Additional characteristics of the children are presented in Table 1. Children who were assessed in spring 2007 but excluded from our analyses because of missing data ($n=385$) were more likely than children included in our analyses ($n=2529$) to be of non-Hispanic black race/ethnicity (37% vs. 32%) or non-Hispanic white race/ethnicity (24% vs. 20%) and less likely to be Hispanic (30% vs. 39%); they were more likely to be from the Midwest (30% vs. 23%) but did not differ in gender, age, weight status, maternal education, single-parent household, or Head Start program type (data not shown).

3.2. Amount of outdoor play at home

Parents reported that 37.5% (95% CI: 34.3–40.7) of children typically spent more than 2 h per day playing outside at home, 40.6% (95% CI 37.8–43.4) spent 1–2 h playing outside at home, 12.8% (95% CI: 11.0–14.6) spent some time outside but less than 1 h per day, and 9.1% (95% CI: 7.5–10.8) were reported by the parent to not have played outside at home on the last typical weekday. Characteristics associated with children's greater time playing outdoors at home were non-Hispanic white race/ethnicity, low maternal education, and having been interviewed in March or May rather than in April (Table 1).

3.3. Environmental variables in relation to home outdoor play

Most children had a yard to play in near their home (93.7%, CI: 92.3, 95.1), and a majority had a playground within walking distance (65.7%, CI: 61.7, 69.8); children were also likely (89.8%, CI: 87.7, 91.9) to have visited a playground, park, or gone on a picnic with a family member during the last month. Having a yard to play in and having been taken to a playground, park, or on a picnic with a family member, were associated with greater time spent playing outdoors at home (Table 2). However, having a playground within walking distance was not associated with time spent outdoors at home. Adjusted for child and parent characteristics, region of the country, and date of interview, children who had a yard near the home in which to play were 2.16 (95% CI: 1.45–3.22) times as likely as children without a yard to spend >2 h playing outside at home on a typical weekday, and children who had visited a playground or park or who had gone on a picnic with a family member in the last month were 1.82 (95% CI: 1.23–2.68) times as likely to spend >2 h playing outside at home (Table 2). These estimates were little changed when each was adjusted for the two other environmental variables (Table 2). We did not find that these associations between home environmental variables and home outdoor play differed by region (P value > 0.05 for all interaction terms).

Overall, 84.1% (CI: 81.8, 86.5) of children had both a yard to play in and had visited a playground or park with a family member in the last month, but this estimate varied by region of the country ($p=0.0004$) with 88%, 87%, 82%, and 74% of children in the South, West, Midwest, and Northeast, respectively, having both of these environmental variables. None of the other socio-demographic characteristics we examined were associated with the likelihood of having both of these home environmental variables (data not shown). With adjustment for region of the country and all other covariates, children with both environmental variables were 1.96 (CI: 1.47–2.61) times as likely as other children (i.e. those with neither or only one of these two variables) to spend greater than 2 h playing outside at home on a typical weekday.

3.4. Amount of outdoor play at school

Teachers reported that children played outside at Head Start for a mean (CI) of 36.3 (33.5–39.1) min per day. Overall, 12.1% of children spent <20 min per day playing outside at school (5.7% spent <10 min per day) and 2.6% spent >1 h per day (Table 3). The amount of time children spent playing outside at school was not related to sociodemographic characteristics, weight status, month of interview (data not shown) or to their time spent playing outside at home (Table 3). Children attending a full-day Head Start program played outside at school for an average (CI) of 39.3 (35.8, 42.8) min per day in comparison to children attending a half-day program, who were estimated to play outside at school for 33.5 (29.7, 37.3) min per day ($P=0.02$). The region of country in which the Head Start center was located was associated with time spent playing outside at school ($P=0.004$), with children in the West, South, Northeast, and Midwest getting, respectively, an average (CI) of 39.7 (35.0, 44.3), 39.7 (35.6, 43.7), 35.9 (29.9, 52.0), and 27.3 (21.8, 32.9) minutes outside playtime at school per day.

3.5. School playground in relation to outdoor play at school

Most children (96.9%) had access to a playground at school. Having a playground at school was associated with greater time spent outside at school (Table 3). On average, children who did not have access to a playground at Head Start, were reported by their teacher to spend a mean (CI) 7.7 (1.4, 14.1) minutes less time outside at school per day than children who did have a playground. Although the percentage of children without a playground at school did not differ by region ($P=0.49$), the association between having a playground at school and children's time playing outdoors at school varied by region (P value for interaction <0.0001). In the Northeast, children who lacked a playground at school were estimated to play outdoors at school 11.3 (CI: 3.7, 18.9) minutes less per day than children in the Northeast who had a school playground. Comparable estimates for the South and West were 5.9 (1.8, 10.0) minutes and 17.3 (12.5, 22.2) minutes per day. In the Midwest, children who did *not* have access to a playground at school were estimated to spend an average of 13.4 (1.9, 24.9) minutes *more* playing outdoors at school each day than children who had a school playground.

4. Discussion

Our analysis of a large nationally representative sample of children completing their first year in Head Start during spring 2007 indicated that more than one-third of these children typically played outdoors at home for more than 2 h per weekday. Regardless of the amount of time children spent playing outdoors at home, they spent, on average, about 35 min playing outdoors at school. We found that children's time spent outside at home was greater when they had access to a yard to play in near their home or when they had recently visited a park or playground with a family member. However, having a playground within walking distance of child's home was unrelated to outdoor playtime. To the best of our knowledge,

no national studies of children this age have investigated both home and school outdoor play or the association between aspects of the home and school environment and outdoor playtime.

In analyses of the Fragile Families cohort, Burdette and Whitaker found that mother's perceptions of neighborhood safety were not related to the amount of time their 3-year-old child played outdoors on weekdays (Burdette and Whitaker, 2005a). In the Fragile Families cohort, Kimbro et al. reported that at age 5 years, children's weekday outdoor play was also not predicted by mother's perceptions of neighborhood safety, although more outdoor time was associated with higher neighborhood social cohesion (Kimbro et al., 2011). Counter-intuitively, they found that the more signs of neighborhood physical disorder interviewers observed (litter, graffiti, broken windows, etc) the greater the child's estimated time spent outdoors, and that children living in public housing also had higher outdoor play (Kimbro et al., 2011).

Studies have been conducted to examine whether the physical environment is related to youth's activity levels, but evidence is mixed and few studies have focused on young children (Davison and Lawson, 2006; Ferreira et al., 2007; Sallis et al., 2000). In a study of 4-year-old children attending preschool in San Diego County, California in the early 1990s, Sallis et al. found higher physical activity levels among children who had access to play spaces and spent time outdoors (Sallis et al., 1993). However, in a more recent study of low-income preschool children in New York City, in which physical activity was assessed by accelerometry, access to parks and playgrounds was not related to physical activity (Lovasi et al., 2011). We did not find that having a playground within walking distance of the child's home was related to the amount of time they spent playing outdoors, but we did find that having access to a yard to play in or being taken by a family member to a playground, park, or picnic was associated with greater outdoor time. Having both of these two environmental variables was best, and the majority of children were in that category. Although sociodemographic characteristics were not associated with having both of these environmental variables, we did note that children in the Northeast were least likely to have both. Controlling for region and sociodemographic characteristics, children who had both these environmental variables were almost twice as likely to spend more than 2 h per day playing outdoors at home as children who had one or none. These findings should be interpreted while keeping in mind that only 6.3% of children did not have a yard near home to play in and 10.3% had not been taken to a park, playground, or on a picnic in the prior month. For many low-income families, facilitating outdoor time for young children may be difficult. Many parents have safety concerns for their children's well-being outside, or may lack resources and time to supervise outdoor play due to job demands (Goodway and Smith, 2005; Kimbro and Schachter, 2011).

We did not find differences related to weight status in the percentage of children with >2 h of outdoor play at home. Some (Kimbro et al., 2011), but not others (Burdette and Whitaker, 2005a), who have investigated the association between BMI and outdoor play in preschool-age children have reported lower levels of outdoor play among children with higher BMI. Some studies of older children suggest that access to park and recreational areas may help prevent obesity (Wolch et al., 2011). Our study, which was not directly focused on weight status, does not suggest that obese children spend less time playing outdoors. However, our analyses were cross-sectional and it is possible that as consequence of their weight status parents encouraged overweight children to spend more time outdoors.

Increasing attention is being paid to the policies, practices, and environments that may facilitate and encourage physical activity for children in preschools, and there is much variability between schools in these aspects (Copeland et al., 2011; Trost et al., 2010). To

encourage active play in young children, research findings suggest that preschools should not only consider the amount of time children spend outside, but also the type of activities, as well as the characteristics of the outdoor environment. For example, a greater level of physical activity was found for preschoolers who had access to open space with vegetation and larger playgrounds with more portable equipment (such as balls and other objects) rather than fixed playground equipment (Brown et al., 2009; Dowda et al., 2009; Trost et al., 2010). We found that nearly all children in Head Start had access to a school playground. Having a playground at school was significantly associated with time spent outside during the school day, except in the Midwest. Unexpectedly, for children attending Head Start centers in the Midwest, outdoor time was greater if there was not a playground available at school; this result is difficult to interpret without additional contextual information.

It should not be assumed that simply increasing time spent outdoors will make children more active (Alhassan et al., 2007; Trost et al., 2010). Federal regulations governing Head Start (45 CFR 1304) stipulate that programs provide time, indoor and outdoor space, and equipment to encourage children's active play and gross motor development and give programs flexibility in how they meet these goals; regulations do not require daily outdoor play or specify details of the outdoor environment. Consistent with evidence from a 2008 survey of Head Start program directors (Whitaker et al., 2009), our analyses indicate that the majority of children attending Head Start have daily outdoor playtime and few children lack access to a school playground.

4.1. Limitations

Our analyses are representative of 3- and 4-year-old children completing their first year in Head Start in spring 2007 and may not apply to older or more affluent children or those living outside the US. Our analyses are cross-sectional and do not provide evidence of causality. A strength of our study is that we were able to examine both home and school outdoor time, but neither parent nor teacher reports of children's time spent outdoors were objectively validated and both may be subject to recall and/or social desirability bias. Although we did not assess physical activity, there is some evidence to indicate that parental report of preschool children's time spent playing outdoors correlates with measured physical activity (Burdette et al., 2004). In addition, the response options in which parents reported their child's outdoor time were broad and we do not know whether parents included the time they thought that the child spent outdoors at school in their estimates. However, we found no association between time spent outdoors at home and at school which suggests that they did not.

We analyzed data that were collected in the spring. Time spent outside may depend on climatic conditions with children spending more time outdoors in temperate months (Baranowski et al., 1993), and it is possible that the associations we observed between environmental variables and outdoor play could be moderated by season (Lovasi et al., 2011). We do not know how sensitive our findings are to climate and weather conditions. We found small differences in time spent outdoors relative to region and month of data collection, and we have adjusted our analyses for these variables. To reduce the risk of deductive disclosure, information on the location in which children live and go to school was limited to region of the country, and it is possible that our findings would have been different if we had greater detail on location. To further investigate the role of the environment in outdoor play, intervention studies are needed to help determine which aspects of children's environments best promote time outdoors; such studies should consider the possibility of effect modification relative to region or season.

5. Conclusions

Among a nationally representative sample of preschool-age children completing their first year in Head Start in spring 2007, more than 1 in 3 children were playing outdoors at home for greater than 2 h each weekday and almost 9 in 10 were playing outdoors at Head Start for at least 20 min each weekday. The amount of time children played outdoors at home was not related to school outdoor time. Increasing children's outdoor playtime at Head Start may be especially important for the children who do not have much outdoor playtime at home. Environmental variables that were associated with greater time spent playing outdoors were having a playground at school, having a yard to play in near the child's home, and having visited a park or playground or gone on a picnic with a family member in the last month. Future research is needed to evaluate the extent to which other aspects of the home and school environment can be modified to facilitate young children's active outdoor play.

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Table 1

Children attending Head Start: descriptive characteristics and prevalence of outdoor play at home >2 h per weekday.

Characteristic	N (%) ^a	>2 h/weekday outside play at home, Percentage (95% CI)	P value ^b
Total	2529	37.5 (34.3–40.7)	
Gender^c			
Female	1235 (48.9)	35.6 (31.5–39.8)	0.15
Male	1289 (51.1)	39.3 (35.3–43.2)	
Age cohort			
3-year-olds	1540 (53.8)	36.4 (33.3–39.5)	0.34
4-year-olds	989 (35.6)	39.0 (33.6–44.2)	
Race/ethnicity^c			
White, non-Hispanic	512 (22.4)	46.3 (38.6–54.0)	0.007
Black, non-Hispanic	819 (33.1)	32.8 (27.5–38.0)	
Hispanic/Latino	974 (35.7)	36.0 (31.7–40.4)	
Other	216 (8.7)	38.6 (29.8–47.7)	
Mother's highest education^c			
Less than high school diploma	869 (36.7)	41.8 (37.4–46.1)	0.01
High school diploma or GED	777 (32.9)	36.9 (30.9–42.8)	
Some college	572 (24.1)	33.4 (28.7–38.0)	
Bachelor degree or higher	155 (6.3)	28.5 (20.5–36.5)	
Single-parent household			
No	1359 (53.0)	37.1 (33.3–41.0)	0.76
Yes	1170 (47.0)	37.8 (33.9–41.7)	
Child's weight status^d			
Underweight (<5th)	54 (2.7)	35.3 (20.9–49.8)	0.92
Healthy weight (5th–<85th)	1493 (61.2)	36.9 (32.8–41.0)	
Overweight (85th–<95th)	475 (19.1)	38.7 (32.8–44.5)	
Obese (≥95th)	430 (17.0)	38.3 (33.6–43.0)	
Head Start program type^c			
Half-day ^e	1284 (52.3)	38.9 (34.6–43.3)	0.26
Full-day	1235 (47.7)	35.6 (31.2–40.0)	
Region of country^f			
Northeast	381 (13.5)	31.1 (25.5–36.7)	0.34
Midwest	594 (23.5)	40.1 (31.3–49.0)	
South	966 (38.0)	38.2 (33.3–43.1)	
West	588 (25.0)	37.2 (32.6–41.8)	
Month of parent interview			
March	682 (29.2)	41.6 (34.9–48.2)	0.008
April	1078 (41.3)	32.6 (28.5–36.7)	
May	769 (29.5)	40.2 (36.1–44.2)	

GED=General Equivalency Diploma

^aUnweighted *n*. Percentages are weighted and confidence intervals account for complex sample design.

^bRao–Scott likelihood ratio χ^2 *P* for group differences comparing >2 to ≤2 h per weekday outside play at home.

^c5 children were missing data for gender, 8 for race/ethnicity, 156 for mother’s highest education, 10 for Head Start program type.

^dBMI from measured height and weight, gender-specific BMI-for-age percentiles relative to CDC growth reference; 77 children missing data.

^eIncludes 43 children attending home-based Head Start.

^fCensus regions: Northeast (CT, ME, MA, NH, RI, VT, NJ, NY, PA); Midwest (IN, IL, MI, OH, WI, IA, KS, MN, MO, NE, ND, SD); South (DE, DC, FL, GA, MD, NC, SC, VA, WV, AL, KY, MS, TN, AR, LA, OK, TX); West (AZ, CO, ID, NM, MT, UT, NV, WY, CA, OR, WA).

Table 2

Association between home environmental variables and outdoor play at home >2 h per weekday.

Environmental variable	Home outdoor playtime >2h/weekday, % (95% CI) ^a	Unadjusted OR (95% CI)	Adjusted ^b OR (95% CI)	Adjusted for 2 other environmental variables ^c OR (95% CI)
Yard near home^d				
Yes	38.5 (35.2–41.9)	2.33 (1.62–3.35)	2.16 (1.45–3.22)	2.12 (1.41–3.18)
No	21.2 (15.2–27.2)	1 (referent)	1 (referent)	1 (referent)
Playground near home^d				
Yes	38.4 (34.8–42.1)	1.14 (0.89–1.46)	1.18 (0.90–1.54)	1.16 (0.90–1.51)
No	35.4 (30.2–40.7)	1 (referent)	1 (referent)	1 (referent)
Visited a playground, park, or had picnic within last month^d				
Yes	38.7 (35.9–41.6)	1.84 (1.33–2.54)	1.82 (1.23–2.68)	1.74 (1.18–2.56)
No	25.6 (18.1–33.1)	1 (referent)	1 (referent)	1 (referent)

^aPercentages are weighted and 95% confidence intervals account for complex sample design.^bAdjusted for child age, gender, race/ethnicity, weight status, maternal education, single parent household, Head Start program type, region of the country, and month of parent interview (March, April, or May 2007).^cModel includes 3 environmental variables, child age, gender, race/ethnicity, weight status, maternal education, single parent household, Head Start program type, region of the country, and month of parent interview (March, April, or May 2007).^d1 child was missing data for yard, 3 for playground near home, and 7 for visited a park or playground in the last month.

Table 3

Association between outdoor play at school and school playground availability and home outdoor playtime.

School outdoor playtime (min/day) ^a	N (%) ^b	Has a school playground, % (95% CI)	P value ^c	Home outdoor playtime >2 h/weekday, % (95% CI)	P value ^d
<20	306 (12.1)	94.2 (86.3–100)	0.02	62.6 (54.0–71.1)	0.27
20–29	1134 (44.3)	96.4 (93.3–99.6)		61.3 (57.0–65.5)	
30–60	982 (41.0)	98.0 (95.4–100)		63.1 (58.6–67.6)	
<60	107 (2.6)	100.0 (N/A)		75.2 (69.2–81.2)	

^aReported by classroom teacher as a continuous variable.

^bN is unweighted, percentages are weighted and 95% confidence intervals account for complex sample design.

^cP value from linear regression models [outcome=minutes of outdoor play at school, predictor=has playground at school (yes, no)].

^dP value from linear regression models [outcome=minutes of outdoor play at school, predictor=home outdoor playtime >2 h/day (yes, no)].