



Parental perceived built environment measures and active play in Washington DC metropolitan children

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ABSTRACT

Objective. Previous research identified associations between perceived built environment and adult physical activity; however, fewer studies have explored associations in children. The Built Environment and Active Play (BEAP) Study examined relationships between children's active play and parental perceptions of home neighborhood built environments within the Washington, DC metropolitan area (DMV).

Methods. With this cross-sectional study, a questionnaire was administered in 2014 to parents of children (7–12 years old) residing in the DMV. Data were collected on children's active play, home built environment parental perceptions, and demographics. Active play response data were dichotomized by whether the child did or did not meet the 60-min/day Physical Activity Guidelines for Americans (PAGAs) recommendation. Perceived home neighborhood built environment data were also dichotomized. Chi-square tests determined differences in parental perceived built environment measures between active and non-active child groups. Logistic regression assessed the association of parental perceived built environment variables with active play while adjusting for demographic variables.

Results. The BEAP Study population ($n = 144$) included a uniquely diverse population of children with 23.7% African Americans and 10.4% Asian Americans. A statistically significant greater proportion of active children's parents agreed with the importance of neighborhood esthetics, active play areas, walkability and safety as compared to the parents of non-active children. Fully adjusted logistic regression models demonstrated that some parental perceived built environment measures (e.g. access to play equipment) were predictors of their children meeting the 60-min/day PAGA recommendation.

Conclusion. Our findings support the important role of home neighborhood built environment perceptions on childhood active play.

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1. Introduction

Physical inactivity is contributing to childhood overweight/obesity in the Washington, DC metropolitan area [Washington, DC; Maryland; Virginia (DMV)]. Among DMV youth, where overweight/obesity prevalence rates range from 29% to 35%, only 16.4–23.8% have achieved the daily minimum Physical Activity Guidelines for Americans (PAGA) recommendation of 60-min of moderate-to-vigorous intensity physical activity (CDC, 2014; DHHS, 2008; NSCH, 2013). Furthermore, among some race and ethnic populations, adolescent girls, and lower socioeconomic groups, physical inactivity is disproportionately higher (Hedley et al., 2004; Skinner and Skelton, 2014).

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Research revealing the relationship between the built environment and childhood recreational physical activity is still evolving. Some evidence has shown that children and adolescents with greater physical activity reside in activity friendly neighborhoods with greater access to recreational facilities, parks and trails (Babey et al., 2008; Cohen et al., 2006; Frank et al., 2007; Gordon-Larsen et al., 2006; Grow et al., 2008; Sallis et al., 2012). For example in a nationally representative cohort of adolescents, it was found that the odds of achieving moderate-to-vigorous activity increased with increasing number of recreational facilities (Gordon-Larsen et al., 2006). In the Atlanta, Georgia region, the odds of walking among a sample of youth were two and a half times greater when there was a close recreational space within a one mile distance of the home (Frank et al., 2007). Yet, while the availability of some built environment structural components, such as recreational facilities, have identified a positive association with childhood physical activity, other studies have either not demonstrated this relationship

or found negative associations with other built environment infrastructural components (e.g. traffic speed) or conditions (e.g. crime) (Adkins et al., 2004; Davison and Lawson, 2006; McGrath et al., 2015). Specifically, a very recent study concluded that children do not benefit to the same extent as adolescents from built environment features, such as parks, playgrounds, and amenities that encourage walking or neighborhood play (McGrath et al., 2015). These negative research findings may be due to quality or perceived access and safety of the neighborhood built environment features, as well as other social or cultural subjectivities that have yet to be captured.

Some studies have identified an association between perceived built environment measures and physical activity in adults (Foster and Giles-Corti, 2008; Su et al., 2014). Yet, fewer studies have explored this association in youth. Among the small number of studies, adolescents who were more physically active also held positive perceptions of certain built environment characteristics (de Farias Junior et al., 2011; Duncan et al., 2012; Mota et al., 2005). However, the relation of these environmental characteristics with physical activity level varied by gender, age and socioeconomic status (Carver et al., 2008; de Farias Junior et al., 2011; Mota et al., 2011; Santos et al., 2009). A dearth of research has explored the relationship between parental built environment perceptions and youth activity (Carver et al., 2010; Kerr et al., 2006; Moore et al., 2014; O'Connor et al., 2014). One study sampling parents and children of the Seattle and San Diego metropolitan areas found that there were various aspects of parent perception (e.g. neighborhood esthetics) that positively correlated with children's active play overall, in the home neighborhood and in public recreation spaces (Tappe et al., 2013). However, a limitation noted by the researchers indicated that most of the study's children were from relatively affluent families and that the study sample lacked racial and ethnic diversity.

Therefore, an objective of the current Built Environment and Active Play (BEAP) Study is to examine the relationships between children's active play and parental perceptions of the home neighborhood built environment within the DMV, an area with a unique population of racial and ethnic diversity. As an illustration of the DMV's unique diversity, the most recent census data revealed that with a population just slightly below six million and a median household income of \$90,149, there were a racial/ethnic composition of 47% White, 25% Black, 15% Hispanic and 9% Asian (CensusReporter, 2013). Additionally, among the foreign-born population, the most common places of birth were Latin American (40%), Asia (36%) and Africa (14%) (CensusReporter, 2013).

2. Methods

2.1. Study subjects and setting

Data were collected in September–December 2014 using a stratified sampling strategy in order to ensure adequate inclusion of diverse built environments. The BEAP Study questionnaire was administered to the parents and/or guardians of 2000 children between the ages of 7–12 years residing within the geographic borders of nine DMV counties and cities. These DMV areas included: Washington, DC (District of Columbia); Fairfax County, VA; Arlington County, VA; Loudon County, VA; Fairfax City, VA; Alexandria City, VA; Montgomery County, MD; Prince George's County, MD; and Frederick County, MD. The BEAP Study area consisted of 2901 block groups with varying population densities and land area sizes. Street Smart Walk Scores® were used as a tool for the stratified sampling by randomly selecting street location(s) using latitude and longitude coordinates within the block groups of each of the DMV areas (Roberts et al., 2015). The assigned median Street Smart Walk Score® of the one to three randomly selected location(s) was used to classify and stratify each block group into one of five built environment strata using the classification scheme developed by Walk Score®: (1) Walker's Paradise (90–100 score); (2) Very Walkable (70–89 score); (3) Somewhat Walkable (50–69); (4) Car-Dependent (25–49); and (5) Car-Dependent (0–24)

(StreetSmartWalkScore, 2007). Finally, a total of 2000 DMV addresses representing the five built environment strata were purchased from Alesco Data Group, a direct marketing services company. The number of purchased addresses per strata were proportional to the population of households with children as estimated by the U.S. Census Bureau (Census, 2013).

Potential study participants were mailed the BEAP Study questionnaire, a \$10 gift card, and a postage-paid self-addressed envelope with instructions to return the completed questionnaire by a specified date. Participants also had the option of completing an identical online version of the BEAP Study questionnaire via Qualtrics.com with a provided secure and encrypted web address and unique access code. The BEAP Study questionnaire, which was adapted from a survey used the Neighborhood Impact on Kids project and that underwent several iterations of reliability and validity testing, included various questions on child active play, home and neighborhood built environment features and parental rules (NIK, 2013a; NIK, 2013b; Roberts et al., 2015). Demographic data (e.g. gender, ethnicity/race) including parent reported child weight, height and pre-existing health conditions were also collected through the use of the BEAP Study questionnaire. A response rate of 10% was obtained. Incomplete questionnaires were deleted from analysis since most of the incomplete portions would have contained demographic data, which resulted in 144 (72 girls and 72 boys) responses entered into the analysis. Implicit informed consent was obtained through the return of the completed BEAP Study questionnaire.

2.2. Home neighborhood built environment variables

Parental perceptions of the home and neighborhood built environment were assessed using six questions/statement requests (Tables 2–3). The first three statement requests, “Please mark the answer that best applies to you and your child's neighborhood.”; “My child can walk or bike to the closest local park or playground (alone or with someone) because:...””; and “It is difficult for my child to be active in our home neighborhood because:...” collectively contained 44 subpart-responses in the form of statements or justifications (e.g. because there are sidewalks; because other children walk or bike) based on a four-point Likert scale of agreement. Each individual subpart-response was dichotomized into “agree” and “disagree” responses. These 44 subparts covered several home and neighborhood built environment components such as esthetics (e.g. litter), active play areas (e.g. parks), walkability (e.g. infrastructure and distance) and safety (e.g. crime). For the BEAP Study participants, home was defined based on the “home in which you and your child live” as well as the confirmed address to which the questionnaire was mail delivered. Home neighborhood was further defined as the area “within walking distance” or a “10–15 minute walk from your home”. The fourth, “Have you been the victim of a crime in your neighborhood?”, and fifth question, “Do you know someone who has been the victim of a crime in your neighborhood?”, elicited yes/no responses. Finally, the last question, “About how long would it take you to walk from your/your child's home to each of the nearest places listed below?” contained 17 subpart-destinations (e.g. indoor recreation or exercise facility) with responses ranging from 1–5, 6–10, 11–20, 21–30 and over 30 min. Again, each individual subpart-destination response was then dichotomized into “1–10 min” and “over 10 min”.

2.3. Active play variables

For the BEAP Study, physical activity has been characterized as active play. Active play was defined for study participants as “participating in vigorous-intensity or moderate-intensity activities for fun and enjoyment in an official (e.g. team sports) or unofficial capacity (e.g. neighborhood game of basketball)” (Roberts et al., 2015). Active play was estimated by aggregating data on active play frequency and duration.

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