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Active children use more locations for physical activity

Kirsten Corder [a,b,*], James F. Sallis [c], Noe C. Crespo [d], John P. Elder [d]

[a] Centre for Diet and Activity Research (CEDAR), Institute of Public Health, University of Cambridge, UK
[b] Medical Research Council Epidemiology Unit, Cambridge, UK
[c] Department of Psychology, San Diego State University, San Diego, CA, USA
[d] Institute for Behavioral and Community Health, San Diego State University, San Diego, CA, USA

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ABSTRACT

We examined frequency of use of 11 physical activity (PA) locations among 539 San Diego children (45.0% males, 41.2% Latinos; mean ± SD age: 6.6 ± 0.7 years) and explored associations between location use, PA and potential correlates. Parents reported child's use (visits/week) of 11 locations. Child PA was assessed by accelerometry (subsample $n=178$). The most frequently used locations (mean ± SD times/week) were homes (3.2 ± 2.3) and parks/playground (1.6 ± 1.3). Children used 4.0 ± 2.0 locations in a typical week, and made a total of 12.5 ± 6.8 visits/week to all locations. Latinos used fewer locations regularly (3.6 ± 2.1 vs. 4.3 ± 1.9 locations; $p<0.001$) and had fewer visits to all locations (11.4 ± 7.4 vs. 13.2 ± 6.4 visits/week; $p=0.003$) than non-Latinos. Accelerometry-assessed vigorous PA (VPA) was positively associated with the number of locations regularly used ($\beta=0.04$, $p=0.03$) and total visits to all locations among Latinos ($\beta=0.09$, $p=0.005$). Parental PA support was positively associated with locations used ($\beta=0.64$, $p<0.001$) and visits to all locations ($\beta=2.56$, $p<0.001$). Children using a greater variety of locations did more VPA. Latinos making more total visits to all locations had higher VPA.

1. Introduction

Regular physical activity is important for obesity prevention in children (Steinbeck, 2008; Wareham et al., 2005), and is associated with a reduced risk of the metabolic syndrome (Brage et al., 2004; Ekelund et al., 2009; Steele et al., 2008) and beneficial effects on mental health (Smith and Biddle, 2008). Recent estimates show that only 42% of US children aged 6–11 meet physical activity guidelines (Troiano et al., 2008), and physical activity declines with age throughout childhood and adolescence (Jago et al., 2008; Nader et al., 2008; Sallis et al., 1999a). More research is needed to understand the modifiable factors associated with children's physical activity. Research examining the association between use of locations for physical activity and overall physical activity levels may help to determine effective intervention delivery sites for physical activity promotion. For example, it is unknown whether an intervention delivered at just one site, vs. one at multiple sites would be most effective to increase physical activity, and which sites may be most important for increasing physical activity.

A review showed that the availability of neighborhood facilities, the proximity of parks and playgrounds and the number of play areas within walking distance of home were associated with higher physical activity in youth (Davison and Lawson, 2006). Though it is known that children use multiple locations for physical activity (Grow et al., 2008; Krizek et al., 2004; Sallis et al., 2006), it is unknown if the frequency of use of different locations relates to overall physical activity.

Most studies investigating the location of child physical activity have focused on the school, the neighborhood, and parks, even though many more locations might be important sites for physical activity (Hoefer et al., 2001). Parentally reported use, proximity and active transport to 12 physical activity locations were investigated in a previous study which showed that indoor recreation areas, walking/running tracks, school sites, playgrounds, and open space were positively associated with active transport in children (Grow et al., 2008). However this study did not examine associations with overall physical activity. We hypothesize that use of a greater variety of locations for physical activity would be associated with higher physical activity levels. This may be especially relevant to young children whose parents are likely to be required to provide support, or permission, for visiting different physical activity locations. This is supported by evidence that a parent's decision to enroll their child in sport is influenced by availability of a greater variety of locations, especially in lower income families (Hardy et al., 2010). As higher

* Corresponding author at: Centre for Diet and Activity Research (CEDAR), Box 296, Institute of Public Health, University of Cambridge, Forvie Site, Robinson Way, Cambridge CB2 0SR, UK. Tel.: +44 1223 769150; fax: +44 1223 330316.
E-mail address: klc29@medschl.cam.ac.uk (K. Corder).

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levels of participation in organized and non-organized sport is associated with higher overall physical activity levels (Mota et al., 2008) we also believe that a greater number of visits to physical activity locations may be associated with greater physical activity.

Physical activity levels may differ by ethnicity, although evidence is equivocal (Sallis et al., 1999b; van der Horst et al., 2007; Whitt-Glover et al., 2009). Associations between child physical activity and the proximity of parks and playgrounds may also differ by ethnicity (Adkins et al., 2004; Gomez et al., 2004). There is especially limited evidence regarding physical activity location use among Latino children with conflicting evidence on the availability of physical activity environments in that group (Powell et al., 2004, 2006).

Information about where youth go to be physically active is needed to inform public health professionals, planners, and policy-makers (Grow et al., 2008; Krizek et al., 2004; Sallis et al., 2006). Though physical activity interventions in children have targeted specific ethnic groups, evidence regarding their effectiveness is limited (van Sluijs et al., 2007). Therefore examination of the locations used for physical activity by different ethnic groups throughout a large urban area could be useful in targeting intervention development. The present study examined the frequency of use of eleven physical activity locations by 5–8-year-old children living in San Diego County (CA) and how location related to their physical activity in a subsample, and home and family factors.

2. Methods

The present study used baseline data from the MOVE/me Muevo Project, a randomized controlled childhood obesity prevention trial based in public recreation centers. Participants included 541 children (aged 5–8 years old) and their primary caregiver living in San Diego County, California. This study was approved by the San Diego State University Institutional Review Board.

Recruitment took place from November 2006 to May 2008. Families were contacted through targeted phone calls, flier dissemination, presentations, and staffed information booths in communities and elementary schools near the recreation centers. Eligibility criteria for the study included having a child aged 5–8 years on the baseline measurement date, living within 1.75 miles from one of 30 participating recreation centers, being willing to participate in the study for 3.5 years and to be randomly assigned to the control or intervention conditions, and being able to speak and read English or Spanish. The distance of 1.75 miles from a recreation center was chosen to ensure that participants could access the center without the need for motorized transport. Children with medical and psychological conditions that affected diet, physical activity, growth or weight, or who had been told by a doctor to avoid exercise for health reasons were excluded. Parents (or primary caregivers) provided written informed consent and children provided oral assent.

Parents completed a questionnaire, and child anthropometric measures were taken. Height (Shorr Measuring Height Board) and weight (SECA 880 and 876 digital scales) were assessed using standard anthropometric procedures by trained staff to the nearest 0.1 cm and 0.1 kg, respectively. Participants were asked to remove their shoes and empty pockets before measurements. Body mass index (BMI) *z*-scores were calculated using the CDC 2000 reference data (Center for Disease Control and Prevention, 2000).

The questionnaire was administered to primary caregivers at the measurement session. Parents reported demographic information for themselves and their child including: age, gender, Hispanic ethnicity (reporting to be Latino, Hispanic, Mexican/Mexican American, or of Spanish origin), income (reported in 12 categories and collapsed into four) and parent education (ranging from middle school or less to post-graduate work).

2.1. Physical activity location

Child use of physical activity locations was reported by parents. These questions were adapted from the 'Active Where?' survey with reliability ranging from ICC=0.60 to 0.89 (Kerr et al., 2008). Respondents were asked to select the frequency of their child's participation in physical activity at 11 types of locations during a typical week. The locations investigated were the nearest public recreation center, other public recreation centers (e.g. YMCA, Boys, and Girls Club), commercial facilities (private gym/studio, batting cages, etc.), school grounds (after-school only), school grounds (weekends only), parks or playgrounds, walking/hiking/biking trails, beach or lake, neighborhood (vacant lot/field), family's yard or apartment complex common area, and friend's or relative's home. Response categories were 'never', 'less than once a week' (both recoded as 0 days/week), '1–2 times a week', '3–4 times a week', and '5–7 times a week' (recoded as, 1.5, 3.5, and 6 days/week, respectively). Frequent use of a location was classified as '1–2 times a week or more'. Response categories were recoded into 'days per week', and two composite variables were derived: total locations used frequently (sum of locations with a response of $\geq$once/week) and total weekly visits to any location (times/week).

2.2. Potential correlates

Potential home and family correlates of physical activity location use were parentally reported at baseline. Cronbach's α was computed to determine the internal consistency of item groups where appropriate. The presence of eight parental rules regarding physical activity were asked with the following question 'Do you have the following rules for your child?' and answered as 'yes', 'no' and 'sometimes', the latter two categories combined as we hypothesized that if a rule is only reported as 'sometimes' by a parent, it is unlikely to be regularly enforced. The rules were 'do homework before going out', 'stay close to or within sight of the house/parent', 'do not go into the street', 'do not go places alone', 'stay within the neighborhood', 'wear a helmet (when biking, skateboarding, etc.)', 'wear protective clothing (like knee pads when biking, skateboarding, etc.)' and 'avoid strangers'. Parental rule questions were taken from a previously used survey with reported reliability ranging from ICC=0.42 to 0.74 (Kerr et al., 2008). Due to most parents reporting having all rules, these responses were dichotomized as $\leq$7 rules or all 8 rules. Presence of all of these rules was hypothesized to reduce the likelihood of physical activity. Rules regarding sedentary behavior, were 'no TV/DVD/computer before homework', 'less than 2 h/day of TV/DVD/computer use' and 'no internet without permission'. These have been used previously (Ramirez et al., in press). Frequency of parental support for physical activity was derived as a mean of three questions regarding encouragement, transport, and doing physical activity with their child (α=0.75) with original response categories as 'never', 'less than once a week', '1–2 times a week', '3–4 times a week' and '5–7 times a week' (recoded as 0, 1.5, 3.5, and 6 days/week, respectively). A mean score for parental encouragement for less sedentary behavior was derived from two questions; 'to help children think of ways to be less inactive' and 'encouraging less inactive time' with the same original response categories as above (α=0.79). The total number of electronic media items in the child's bedroom was also parentally reported and adapted from a published scale