

# Demographic, Physiologic, and Psychosocial Correlates of Physical Activity in Structured Exercise and Sports Among Low-Income, Overweight Children

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## ABSTRACT

**Objective:** To describe correlates of physical activity (PA) in structured exercise and structured sports sessions among low-income, overweight children participating in a community-based PA program.

**Methods:** A total of 93 children (55% male; 91% Hispanic) aged 8–14 years were included. Participants wore pedometers in a sample of 10 of 59 total sessions offered; mean steps per minute were calculated for structured exercise and sports sessions. Separate multivariable regression models tested associations between steps per minute in exercise and sports sessions and 5 potential correlates: baseline body mass index *z*-score, aerobic fitness (Progressive Aerobic Cardiorespiratory Endurance Run laps), perceived athletic competence (Harter self-perception profile), sex, and age.

**Results:** Only age ( $\beta = -2.9$ ;  $P = .02$ ) significantly predicted steps per minute in exercise sessions. Age ( $\beta = -4.3$ ;  $P = .007$ ), fitness ( $\beta = 0.45$ ;  $P = .03$ ), and male sex ( $\beta = 8.7$ ;  $P = .02$ ) significantly predicted steps per minute in sports.

**Conclusion and Implications:** In structured exercise and sports, perceived competence may not influence overweight and obese children's PA. However, girls and older or less fit children may engage less actively, especially in sports.

**Key Words:** physical activity, psychosocial factors, physical fitness, obesity, children (*J Nutr Educ Behav.* 2015; ■ :1-7.)

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## INTRODUCTION

According to the most recent objectively measured, nationally representative data, 42% of US children and 8% of adolescents achieve the recommended 60 minutes of daily moderate to vigorous physical activity (MVPA).<sup>1</sup> Among other benefits, regular physical activity (PA) promotes healthy weight and reduces risk for health problems including hypertension, dyslipidemia, and insulin resistance.<sup>2</sup> Whereas all children benefit from

PA, increasing activity levels among overweight or obese children may be particularly important to reduce adiposity-related metabolic risk.<sup>2</sup>

Efforts to increase children's activity have achieved limited success: in 1 review, 43% of youth PA interventions detected significant increases in MVPA or total PA, and pooled effects were small, at about 4 additional minutes MVPA/d.<sup>3</sup> Research providing fuller understanding of PA correlates is needed to inform more effective interventions. Whereas a

growing body of research points to the importance of environmental correlates of PA in youth, individual-level factors—including demographic, physiologic, and psychosocial characteristics—may be equally predictive of PA and have important implications for intervention design.<sup>4</sup>

Research in youth has typically examined correlates of overall PA, but emerging evidence suggests that the importance of individual correlates may vary among the different contexts in which PA occurs (eg, school recess vs after-school time).<sup>5</sup> This context-specificity of PA correlates is consistent with behavioral theories that account for environmental determinants of health behaviors. Social Cognitive Theory (SCT), for example, posits that behaviors are the product of dynamic relationships among personal, behavioral, and environmental factors.<sup>6</sup> Given the influence of environmental variables on health behavior, it follows logically that PA correlates likely vary depending on the contexts in which activity occurs.

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Research also suggests that PA correlates vary among population subgroups. For example, correlates may be different among overweight or obese youth compared with normal-weight youth.<sup>7,8</sup> Examining PA correlates within specific population subgroups as well as within well-defined PA contexts may enable more effective tailoring of PA programs and policies. Studies investigating PA correlates among low-income and racial/ethnic minority children, who experience obesity disproportionately, are needed to inform efforts to increase PA in underserved populations and close health disparities.<sup>9</sup> Recognizing gaps in the literature, this study's objective was to evaluate demographic (age and gender), physiologic (aerobic fitness and body fatness), and psychosocial (perceived athletic competence) correlates of objectively measured PA in both structured exercise and sports sessions among low-income, overweight and obese Hispanic children participating in an after-school PA program.

## METHODS

### Program Context

Data were collected in partnership with a community-based PA program in a low-income Hispanic community in East Boston, MA. Consistent with historical program practice, children aged 8–14 years were referred by health-center pediatricians based on diagnosis of overweight or obesity.

Two-hour program sessions were held twice per week from October, 2012 to June, 2013 except during school vacations or holidays; 59 sessions were offered in total. Children were assigned to 1 of 5 sites (in YMCA- or city-owned gymnasiums), each led by 2 staff hired through the US Federal Government's AmeriCorps program. Child-to-staff ratios were capped at 13:1. Sites followed standardized lesson plans aiming to achieve > 50% of time in MVPA and to build fundamental exercise and sport skills. Plans were designed collaboratively based on program staff members' experience in maximizing MVPA with this population and on health behavior-change theories including SCT and

Self-determination Theory.<sup>6,10</sup> Key motivational strategies included teaching complex skills incrementally to support mastery learning; promoting individual goal setting; engaging peer models in teaching new activities; providing autonomous choice when possible (eg, to walk or run); delivering frequent, specific positive feedback; and fostering peer-to-peer relationship building (eg, team-based activities).

For the first 10 minutes of each lesson, children engaged in semistructured free play (eg, tag games). The remaining time included 2 main sessions: exercise and sports. The exercise session included a dynamic warm-up (10 minutes), walking and running activities (20–30 minutes), and strength-building activities (10–20 minutes). Exercises were designed to be feasible for low-fit children. Popular music was played throughout. Children reported walking and running laps completed and earned small rewards such as medals for meeting mileage thresholds over time. After the exercise session there was a 10-minute break with a healthy snack (eg, piece of fruit). The sport session included sports drills and game play (40–50 minutes), which emphasized fun and skill building over competition and included soccer, basketball, ultimate Frisbee, and football. Before implementation, the staff was trained on consistent delivery of lessons and motivational strategies.

### Participants and Recruitment

To facilitate referrals, pediatricians were educated about the program during information sessions and new-hire orientation, and the health center's electronic medical records system automatically generated referral prompts for children whose well-visit measurements indicated overweight or obesity. Federal Health Insurance Portability and Accountability Act-trained program staff contacted parents by phone, and parents completed enrollment at program offices. Most research participants (n = 73) enrolled in October; 57 newly referred children joined throughout the program year. The Tufts University Institutional Review Board provided approval for protection of human subjects. Parental consent

and child assent were obtained before participation.

### Conceptual Model

Figure 1 shows the conceptual model for this research. The model was based on SCT and tested associations between individual-level child correlates (A) and PA behaviors (B) in 2 specific contexts: structured exercise and structured sports (C). Potential correlates that were prominent in prior reviews were selected. Among demographic variables, age (–) and male sex (+) have demonstrated the most consistent associations with PA.<sup>11</sup> Among physiologic correlates, adiposity has been explored most widely, but evidence of an inverse relationship remains mixed.<sup>8</sup> Different dimensions of physical fitness have also been widely tested<sup>8</sup> and cardiorespiratory fitness appears predictive of PA.<sup>12</sup> Among psychosocial correlates, several aspects of child self-concept have demonstrated strong associations with PA. A 2014 meta-analysis found that among multiple dimensions of self-concept, perceived competence (ie, a child's assessment of his or her own ability to perform sports and other recreational activities) demonstrated the strongest associations with PA; significant associations were found in both cross-sectional and longitudinal studies.<sup>13</sup> Some research found that perceived competence is lower among overweight or obese children compared with their normal-weight peers.<sup>14</sup>

### Measures

Evaluation protocols were developed collaboratively by researchers, health center clinicians, and program leaders and administered by program staff. Before baseline measurements, program staff completed classroom and field-based training on data collection protocols as well as Collaborative Institutional Training Initiative certification in human subjects research ethics. Parents completed surveys adapted from another study with recently emigrated, Boston-area Latina mothers<sup>15</sup>; questions included child's country and date of birth, ethnicity, and gender; household size and income; and mother's birth country. Household ratios of poverty

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