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What matters when children play: Influence of Social Cognitive Theory and perceived environment on levels of physical activity among elementary-aged youth

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ABSTRACT

Objectives: Social Cognitive Theory (SCT) has often been used as a guide to predict and modify physical activity (PA) behavior. We assessed the ability of commonly investigated SCT variables and perceived school environment variables to predict PA among elementary students. We also examined differences in influences between Hispanic and non-Hispanic students.
Design: This analysis used baseline data collected from eight schools who participated in a four-year study of a combined school-day curriculum and environmental intervention.
Methods: Data were collected from 393 students. A 3-step linear regression was used to measure associations between PA level, SCT variables (self-efficacy, social support, enjoyment), and perceived environment variables (schoolyard structures, condition, equipment/supervision). Logistic regression assessed associations between variables and whether students met PA recommendations.
Results: School and sex explained 6% of the moderate-to-vigorous PA models' variation. SCT variables explained an additional 15% of the models' variation, with much of the model's predictive ability coming from self-efficacy and social support. Sex was more strongly associated with PA level among Hispanic students, while self-efficacy was more strongly associated among non-Hispanic students. Perceived environment variables contributed little to the models.
Conclusions: Our findings add to the literature on the influences of PA among elementary-aged students. The differences seen in the influence of sex and self-efficacy among non-Hispanic and Hispanic students suggests these are areas where PA interventions could be tailored to improve efficacy. Additional research is needed to understand if different measures of perceived environment or perceptions at different ages may better predict PA.

Introduction

Physical activity (PA) among youth is associated with both immediate and long-term health benefits (Dwyer et al., 2009; Gordon-Larsen, Nelson, & Popkin, 2004). Participating in a combination of moderate and vigorous PA for 60 min per day reduces body adiposity, increases aerobic fitness, reduces blood pressure, and improves bone mass, among other health benefits (US Department of Health and Human Services, 2008). However, only

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around 18% of youth meet national recommendations for aerobic activity (US Department of Health and Human Services, 2013). Moreover, the amount of time children engage in PA declines continuously from childhood to adolescence to adulthood (Pate et al., 2009), and the gap between time spent in PA and recommendations is larger among girls than boys (Nadar, Bradley, Houts, McRitchie, & O'Brien, 2008). Ethnic differences in the amount of time spent in PA may also emerge as children move into adolescence; however, the number of studies which have recruited elementary-aged youth from ethnic minority groups is limited (Gesell et al., 2008; van der Horst, Chin A. Paw, Twisk, & van Mechelen, 2007).

Schools provide the opportunity for cost effective and efficient delivery of PA instruction and programs due to the large number of children they reach, the amount of time children spend in school, and the potential for PA equipment to be present in schoolyards. PA at school may be especially important for minority children living in low-income, urban areas where PA opportunities and facilities are often limited (Umstattd Meyer, Sharkey, Patterson, & Dean, 2013; Wright, Giger, Norris, & Suro, 2013). Children may engage in moderate or vigorous PA at various times throughout the school day, including during recess, physical education classes, lunch, and regular classroom time (Nettleford, McKay, Warburton, McGuire, & Bredin, 2010; Tudor-Locke, Lee, Morgan, Beighle, & Pangrazi, 2006). Due to academic demands, opportunities for PA during the school day in the form of physical education classes may be reduced (Slater, Nicholson, Chriqui, Turner, & Chaloupka, 2012); however, after-school programs provide students with access to school facilities and have been shown to promote increased PA among youth (Branscum & Sharma, 2012; Iversen, Nigg, & Titchenal, 2011; Tudor-Locke et al., 2006). Previous work has observed that girls spend less time engaged in PA than boys both during and after school (Nettleford et al., 2010; Ridgers, Saint-Maurice, Welk, Siahpush, & Huberty, 2011), and some ethnic differences may also exist (Ridgers et al., 2011).

Social Cognitive Theory (SCT) is frequently used as a theoretical framework in school-based interventions (Branscum & Sharma, 2012; Brown, Hume, Pearson, & Salmon, 2013; Sharma, 2006). SCT offers a comprehensive framework for understanding PA behavior among youth at school as it addresses individual, environmental, and social constructs, as well as the dynamic interaction between person, environment, and behavior (Bandura, 1986, 2004). Studies of school and after-school PA programs have shown that self-efficacy, enjoyment, and social support are predictors of PA (Branscum & Sharma, 2012; Brown et al., 2013). While much work exists to link children's perceptions of their neighborhood and other environments with PA behavior (Holt, Spence, Sehn, & Cutumisu, 2008; Hume, Salmon, & Ball, 2005), additional work is needed to explore the behavioral impacts of children's perceptions of the physical environment in their schools (Brown et al., 2013), and little is known about how psychosocial and perceived environment variables may differ among ethnic minority populations (van der Horst et al., 2007).

The primary aims of this study were to examine 1) the relationship between SCT variables (self-efficacy, enjoyment, and social support) and PA levels among elementary school children; 2) to examine perceived PA environment variables related to schoolyards (structures, condition, equipment and supervision) and their ability to predict PA above and beyond the other SCT variables; and 3) to examine if ethnicity moderates this relationship. Due to the large Hispanic population in our dataset, we specifically examined differences in PA levels and predictors of PA between Hispanic and non-Hispanic students.

Methods

Procedure and participants

The current study sampled participants of the [blinded] study, a four-year project examining the effects of a combined curriculum and environmental intervention on children's PA during the school day. It builds on previous work to examine the influence of renovating schoolyards on PA (Anthamatten et al., 2011; Brink et al., 2010). Eight urban public schools located in Denver, Colorado were recruited to participate in the study. Schools were located in predominately low-income neighborhoods with large ethnic minority populations. Recruitment occurred April through May of 2010 and 2011. Baseline data were collected at four schools in cohort one (2010) and another four schools in cohort two (2011). Additional data were collected in school years 2011–2012 and 2012–2013. The study protocol was approved by the [blinded] Committee on Human Subjects and the [blinded] Institutional Review Board.

For this analysis, baseline questionnaire data were used. Data were collected from two randomly selected classrooms of 4th and 5th ($n = 393$) graders at the eight schools. Recruitment in these classrooms consisted of giving students in the selected classes consent forms and a parent letter explaining the study two weeks before the measurement visit. For the two weeks, teachers and study staff reminded students verbally and with parent reminder letters to return consent forms to their teacher by the measurement day. Study staff members were also available to answer any consent questions. A total of 866 students were notified of the study.

Surveys from all classes and schools were collected during a six-week window in the spring on a pre-determined measurement day. Each teacher scheduled a 45-min block of time on this day for study staff to administer the survey in the classroom and, the day prior to measurement, provided a list of all consented students to the study coordinator. On measurement day, the study staff arrived at the school 45 min prior to the scheduled start time of the survey to answer any last minute questions, assign missing study ID numbers, and to set up for survey administration. Each class participated separately with a minimum of four study staff present in each classroom during survey administration. Students whose parents did not give consent to participate remained in the classroom and were given other activities to complete by their teacher. Assent was then obtained from the consented students and study staff placed study ID numbers on both the assent and consent forms. Once this was completed, the surveys were distributed to the students, along with a pencil and eraser, and the final ID sticker was placed on the survey. Students were instructed not to put their name on the survey in order to maintain confidentiality.

Students were advised this was a not a test—but rather a survey—and that there are no right or wrong answers. They were asked to give their honest opinions and not to copy answers from other students or say their answers out loud. Students were told they could raise their hands to ask questions, which would be answered individually. One research assistant read the survey out loud while three other study staff roamed the room to be available for any specific questions or to assist any students who did not understand the survey. Students were encouraged to stay on pace with the reader, but were allowed to quietly work ahead. Research assistants were also available to translate into Spanish when necessary. Once the students were finished with the survey, research assistants collected the surveys and moved on to the next scheduled classroom. The study coordinator kept completed surveys in a secure box until they were returned to the study office. Students whose parents gave consent but were absent on the survey day were allowed to take the survey within one week of the measurement day and were