



Neighborhood context and immigrant children's physical activity



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ABSTRACT

Physical activity is an important determinant of obesity and overall health for children, but significant race/ethnic and nativity disparities exist in the amount of physical activity that children receive, with immigrant children particularly at risk for low levels of physical activity. In this paper, we examine and compare patterns in physical activity levels for young children of U.S.-born and immigrant mothers from seven race/ethnic and nativity groups, and test whether physical activity is associated with subjective (parent-reported) and objective (U.S. Census) neighborhood measures. The neighborhood measures include parental-reported perceptions of safety and physical and social disorder and objectively defined neighborhood socioeconomic disadvantage and immigrant concentration. Using restricted, geo-coded Early Childhood Longitudinal Study-Kindergarten (ECLS-K) data ($N = 17,510$) from 1998 to 1999 linked with U.S. Census 2000 data for the children's neighborhoods, we utilize zero-inflated Poisson (ZIP) models to predict the odds of physical inactivity and expected days of physical activity for kindergarten-aged children. Across both outcomes, foreign-born children have lower levels of physical activity compared to U.S.-born white children. This disparity is not attenuated by a child's socioeconomic, family, or neighborhood characteristics. Physical and social disorder is associated with higher odds of physical inactivity, while perceptions of neighborhood safety are associated with increased expected days of physical activity, but not with inactivity. Immigrant concentration is negatively associated with both physical activity outcomes, but its impact on the probability of physical inactivity differs by the child's race/ethnic and nativity group, such that it is particularly detrimental for U.S.-born white children's physical activity. Research interested in improving the physical activity patterns of minority and second-generation immigrant children should consider how neighborhood context differentially impacts the health and physical activity of children from various racial, ethnic and nativity backgrounds.

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1. Introduction

Childhood obesity is a significant public health issue for children and adolescents in the United States (Ogden et al., 2008), and rates of obesity and physical activity in young children varies across racial, ethnic, or nativity groups such that minorities and second-generation immigrant children are more likely to be overweight (Hernandez and Charney, 1998; Kimbro et al., 2007; Popkin and Udry, 1998) and less likely to be active (Moore et al., 2008; Ross et al., 2012). Given that children's physical activity takes place largely in a neighborhood context, and that different race/ethnic groups experience varied neighborhood environments (Yen and Kaplan, 1999), it seems plausible that these neighborhood differences could account for some of the racial/ethnic and nativity gap

in weight status and physical activity. For example, aspects of the social environment (e.g. social cohesion, parental safety perceptions) and the built environment (e.g. quality of parks, road hazards) of neighborhoods are associated with the physical activity of residents (Brownson et al., 2001; Davison and Lawson, 2006; Franzini et al., 2010; Kimbro and Schachter, 2011; Miles and Panton, 2006), and these features of neighborhoods differ across race/ethnic groups in the U.S. (Lichter, 2013). Immigrant children of all race/ethnicities are at high risk for low levels of physical activity (Singh et al., 2008), and understanding the health trajectories of children in immigrant families is critically important, as today one in every four children in the U.S. lives in an immigrant family (Hernandez et al., 2008). Very few existing studies linking neighborhoods to children's physical activity have used nationally representative data to assess neighborhood effects in differentiating between foreign born and US born children as well as simultaneously taking into consideration objective, subjective, and dynamic measures of neighborhood contexts and quality (Foster

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and Giles-Corti, 2008; Sallis and Glanz, 2006). Thus, given the clustering of children within varying neighborhood contexts, it is critically important to assess how neighborhoods impact physical activity, which in turn impacts the likelihood of obesity.

This paper fills this research gap by using data from a large, nationally representative cohort study linked with contextual data at the census tract level from the U.S. Census to test a theoretical model relating the differential neighborhood contexts experienced by children of different race, ethnic, and nativity backgrounds to their physical activity. We address several questions: (1) Differentiating by race/ethnicity and nativity status, what are the physical activity patterns of US-born and immigrant children? (2) Do parental perceptions of safety, perceptions of the built environment, and neighborhood socioeconomic disadvantage and immigrant concentration impact children's physical activity? (3) And finally, does the impact of immigrant concentration on children's physical activity differ by racial-ethnic and nativity status?

2. Ethnicity, nativity, and children's physical activity

In a study of over 68,000 children in the U.S., Singh et al. (2008) find that more than one third of Black, Hispanic and Asian immigrant children and adolescents failed to meet the recommended levels of weekly physical activity. Although this study assesses how parental perceptions of safety are associated with physical activity, it cannot account for the varying sociodemographic context (such as the neighborhood environment) in which physical activity occurs for immigrant youth. Patterns of physical activity also vary by immigrant generation status, although findings are often conflicting and employ differing measurements of acculturation and physical activity (Allen et al., 2007; Carvajal et al., 2002; Gordon-Larsen et al., 2003; Liu et al., 2009; Taverno et al., 2010). Additionally, most research on the relationship between children's generation status and physical activity is limited to Hispanic youth, which excludes children from other racial/ethnic immigrant populations (Liu et al., 2009; Taverno et al., 2010).

3. Neighborhood environments and children's physical activity

Research investigating child and youth outcomes at multiple levels and in multiple contexts focuses on neighborhoods as a key locale of activity for young people (Browning et al., 2004; Furstenberg, 1999). We conceptualize the relationship between neighborhoods and children's physical activity as operating through institutional resources and collective socialization (Jencks and Mayer, 1990). In other words, neighborhoods may influence children's physical activity via mechanisms relating to resources including the built environment (e.g. lack of quality parks or playgrounds) (Powell et al., 2006; Sallis et al., 2009), or to differences in neighborhood social processes (e.g. how well the neighbors know and trust one another) (Carroll-Scott et al., 2013; Franzini et al., 2010; Giles-Corti and Donovan, 2002; Humpel et al., 2002; Moore et al., 2008). Neighborhoods might also influence children's physical activity if the residents who comprise neighborhoods have different sets of cultural and social norms surrounding parenting as it relates to child health and wellbeing (Leventhal and Brooks-Gunn, 2000). For example, if it is the norm for residents to encourage their children to be active, levels of physical activity for children are likely to be greater. We expect these two mechanisms to be related; as neighborhoods which are well-resourced and have high trust among residents are also likely to be neighborhoods where parents are more comfortable allowing their children outside for physical activity (Kimbro and Schachter, 2011).

Research on children and adolescents is mixed in terms of finding significant associations between physical activity and the neighborhood environment, and is largely dependent upon which aspect of the neighborhood is observed (i.e. perceived safety, neighborhood-level SES, social cohesion, etc.) (Burdette and Whitaker, 2005; Carver et al., 2008; Ding et al., 2011; Gomez et al., 2004; Molnar et al., 2004; Mota et al., 2005). The mixed findings may be the result of study design. For example, some studies focus on specific age groups (Burdette and Whitaker, 2005; Molnar et al., 2004) (preschool and ages 11–16, respectively), while others ask about overall physical activity without specifying whether this occurs within the neighborhood context (Davison and Lawson, 2006). Further, some studies are cross-sectional (Burdette and Whitaker, 2005), some are longitudinal (Lumeng et al., 2006), and the majority lack complex models that consider mediating and moderating factors together with correlates of physical activity (Ding and Gebel, 2012). Importantly, none of these studies have attempted to simultaneously examine the influences of individual- and neighborhood-SES, the built environment, and the social dimensions of neighborhoods (Ding et al., 2011).

Parental concern about child safety is likely to be particularly relevant in determining children's outdoor activities (Kimbro and Schachter, 2011). In higher socioeconomic areas, perceived “stranger danger” and traffic safety concerns are most problematic; while in lower socioeconomic areas general physical safety concerns (e.g., violence) are prevalent and associated with lower levels of physical activity for children and youth (Carver et al., 2008; Davison and Lawson, 2006; Weir et al., 2006). A recent review, however, finds that although perceptions about traffic safety have a more consistent association with youth physical activity, overall, support for a correlation between children's physical activity and measures of crime/general safety is limited (Ding and Gebel, 2012; Tappe et al., 2013). The authors acknowledge that many studies use crude measurements that often combine various domains of safety (e.g. crime and traffic), which might account for the limited association (Ding et al., 2011).

Aspects of the built environment in neighborhoods, including population density, well-maintained sidewalks, good lighting, and the availability of green and recreational spaces, are expected to influence the physical activity of residents (Handy et al., 2002). For adults, research consistently shows that these aspects of the built environment are positively associated with physical activity (Booth et al., 2000; Humpel et al., 2002). It is likely that the built environment influences the outdoor activities of children in similar ways. In a review of 65 studies on children's physical activity (ages 3–12) and the built environment, Ding et al. (2011) find that the most consistent correlates with physical activity include access/proximity to recreation facilities, traffic speed/volume, mixed land use, residential density and walkability. Indeed, busy streets and a lack of sidewalks discourage children's outdoor activities (Sallis and Glanz, 2006). Children living in poor, dense neighborhoods, however, may walk more as a means of transport (such as to school) than other children, and children who perceive *more* neighborhood hazards evidence more physical activity (Romero et al., 2001). In addition, a recent study of urban, mostly disadvantaged children found that poor children were playing outside *more* than their less-poor counterparts (Kimbro et al., 2011). These findings parallel that for urban adults living in disadvantaged areas.

Residential context is perhaps especially likely to influence the development of immigrant youth. Often, immigrants live in immigrant “enclaves” (Portes and Rumbaut, 2001), or neighborhoods with a high concentration of immigrants from the same race/ethnic group (Osypuk et al., 2009; Portes, 1998). Immigrant enclaves might impact the health and specifically the physical activity of youth through several pathways. Neighborhoods with a high

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