Transportation Research Part A 72 (2015) 62–70

Contents lists available at ScienceDirect

Transportation Research Part A

journal homepage: www.elsevier.com/locate/tra

Street characteristics to encourage children to walk

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ARTICLE INFO

Article history:
Received 4 March 2014
Received in revised form 5 December 2014
Accepted 17 December 2014
Available online 12 January 2015

Keywords:
Walkability
Incivilities
Upkeep
Fear of crime
Urban design
Pedestrian activity

ABSTRACT

An experiment tested whether physical disorder affected low to moderate income African–American children's choice of street to walk on and their parents' choice of a street for them to walk on. The experiment used an innovative desktop simulation in which 32 fourth and fifth grade African–American children and 30 parents viewed and explored pairs of virtual walk-through streets manipulated on disorder (across three contexts and two other street and sidewalk characteristics) and picked from each pair the one to walk on (child) or for the child to walk on (parent). Each participant was asked to report the reasons for the choices. The analysis revealed that children and their parents were more likely to walk (or have the child walk) on streets lower in disorder. Reported reasons for choices confirmed the importance of physical disorder in affecting walking choices. Low-cost improvements in order may make streets more desirable for recreational walking.

1. Introduction

The U.S. faces an obesity epidemic, one that is most severe among children, minorities and low income populations (Ogden et al., 2010, 2012; Singh et al., 2010). The Institute of Medicine recommends moderate physical activity, such as walking, as a way to prevent obesity (Birch et al., 2011). Moderate activity can improve health (Biro and Wien, 2010) and save billions of dollars in medical and productivity costs (Hammond and Levine, 2010).

Walking is the most commonly reported physical activity and one that relates to the character of the built environment (Cervero and Duncan, 2003; Craig et al., 2002), and in particular to aesthetics (Owen et al., 2004). A review of eighteen studies of the relationship of physical and perceived attributes of the environment to walking found perceived aesthetics associated with walking for exercise, neighborhood walking, and total walking (Owen et al., 2004). For example, a survey of 3392 Australian adults revealed that men and women were more likely to report walking for exercise or recreation in a more aesthetically pleasing environment (Ball et al., 2001); a survey of 351 adults in British Columbia found that walking was associated with perceived neighborhood aesthetics (Rhodes et al., 2006); and two surveys of 107 residents in neighborhoods differing in walkability reported better neighborhood aesthetics in the more walkable communities, and residents in the more walkable neighborhoods exhibited 70 more minutes of physical activity per week, as measured through accelerometers (Saelens et al., 2003).

Although individual and social factors affect physical activity and walking (Bauman et al., 2012), a well-designed physical environment matters (Brownson et al., 2009; Ding et al., 2011; Sugiyama et al., 2009). People who live in walkable neighborhoods are more likely to be physically active (Frank et al., 2005) and to walk (Ding et al., 2011; Gallimore

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http://dx.doi.org/10.1016/j.tra.2014.12.004
0965-8564/

et al., 2011; Smith et al., 2008; Van Stralen et al., 2009). Aesthetics, defined as positive affective response to the environment, has particular importance; people prefer to walk in places they perceive as aesthetically appealing (Ding et al., 2011; Moudon et al., 2006). Among the physical factors associated with environmental aesthetics, the present study focuses on one: physical disorder. Physical disorder includes such things as worn paint, overgrown or dry lawns, weeds, rusted fences, uneven or cracked sidewalks or pavement, litter, graffiti, abandoned cars, abandoned or trash-filled lots, dilapidated, and vacant or boarded up buildings. Each lessens the neatness and order of a place. The broken window theory posits that such minor cues of public disorder (in this case physical cues) can lead to serious crime and urban decay (Kelling and Cole, 1996). These physical cues to disorder may suggest to residents and potential offenders that the area lacks guardianship. According to routine activity theory, reduced guardianship would likely increase crime (Hollis-Peel et al., 2011). Theory and research also indicates that humans prefer orderly, neat and well maintained environments (Hagerhall, 2000; Kaplan and Kaplan, 1989; Nasar, 1994) and that disorder, particularly in areas with depressed social, racial, or economic conditions, has negative effects (Sampson and Raudenbush, 2004). Cross-sectional studies find increased fear of crime, crime, and decrease sense of community related to actual and perceived physical disorder often called incivilities, (Doran and Lees, 2005; Franklin et al., 2008; Nasar, 1983b; Perkins and Taylor, 2002; Robinson et al., 2003; Sampson et al., 1997).

Although the relationships are complex, threat and perceived risk tend to be higher for "vulnerable" populations, such as women and children, and in situations with a climate of fear, such as high crime neighborhoods. In response to the perceived threat and fear, people constrain their behavior; they avoid places they consider dangerous, or only go to them with others or with protection (Gates and Rohe, 1987). Studies confirm that people avoid places they perceive as fearful, and that the avoidance increases fear and worsens mental health (Doran and Lees, 2005; Maxfield, 1977; Nasar and Fisher, 1993; Rader et al., 2007; Roman and Chalfin, 2008; Whitley and Prince, 2005). As one study reported, for fear "the most common behavioral response is to stay home and complain about the police" (Maxfield, 1977). Thus physical incivilities, by increasing fear of crime, could reduce moderate physical activity such as walking.

Perceptions of the neighborhood by parents, and in particular mothers, may limit when and where their children walk (Dias and Whitaker, 2013; Timperio et al., 2004). However, it is also important to consider those conditions on which the child's and parent's perceptions agree, because those areas of agreement might more likely affect the child's walking. Thus, the present study obtained responses of parents and their children.

Obesity and associated health problems are among the highest for African–American children, and they heighten as income levels drop (Cossrow and Falkner, 2004; Day, 2006; Flegal et al., 2002). African–Americans have twice the rates of obesity as do Caucasians (Flegal et al., 2002). Thus, the present study focused on low to moderate income African–American children. We expected to find that physical disorder would reduce the likelihood that these children would choose a street to walk on and would reduce the likelihood that their parents would choose a street for their children to walk on.

2. Materials and methods

2.1. Participants

Thirty African–American parents (27 women and 3 men) and 32 children (21 fourth graders, 12 girls, 9 boys; 11 fifth graders, 5 girls, 6 boys) participated in the study. Fourth graders are nine to ten years old; and fifth graders are ten to eleven years old. All interviews took place in public libraries. Reflecting the higher percentage of women parent in the sample, most African–American children live with one parent, the mother (Kreider, 2007). This also fits with research highlighting the importance of the mother's perception on where and when the child walked (Dias and Whitaker, 2013).

In the metropolitan area of Columbus, OH, superintendents of two urban school districts (Whitehall and Westerville), that had high percentages of the desired population, asked seven principals to send a letter to all parents of fourth and fifth grade children with a self-addressed stamped return card, e-mail address, and phone number to contact if interested in participating. Whitehall, east of Columbus, OH (5.26 square miles), had 3681.9 people per square mile and 1725.2 housing units per square mile (U.S. Census Bureau, 2010). It has five parks and three elementary school playgrounds (City of Whitehall, 2014; Whitehall City Schools, 2014). Westerville, north of Columbus, OH, (12.5 square miles) had 3436 people per square mile and 1671 housing units per square mile (U.S. Census Bureau, 2010). It has 40 parks and 14 elementary school playgrounds (City of Westerville, 2014; Westerville City School District, 2014). Both are car dependent (walk scores of 49 and 29 respectively) neighborhoods (Walk Score, 2014a,b), though Westerville has a traditional mixed-use walkable town center. A low response rate (<1%) from the school recruiting led to additional recruiting at district libraries. There, of the 30 parents approached who had children in fourth and fifth grade, 28 (about 93%) agreed to participate. We approached many parents who did not have a fourth or fifth grade child, and we did not ask them to participate. Each child received a $5.00 gift certificate, and each parent could enter a drawing for one of six $50.00 gift certificates, a football signed by The Ohio State University football coach, or another signed by the only two-time Heisman trophy winner, Archie Griffin.[1] The Ohio State University Institutional Review Board approved all procedures.

[1] The Heisman trophy, awarded each year to the best U.S. college football player, is the most prestigious college football award.