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Walking to school: Community design and child and parent barriers

Melissa A. Napier [a], Barbara B. Brown [a,*], Carol M. Werner [b], Jonathan Gallimore [a]

[a] Family & Consumer Studies Department, University of Utah, 225 S 1400 E RM 228, Salt Lake City, UT 84112-0080, United States
[b] Psychology Department, University of Utah, Salt Lake City, UT, United States

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ABSTRACT

The roles of community design and parent and child perceptions of walkability to school are tested for associations with walking in three communities: a walkable new urbanist community, a mixed community (standard suburban community where the walk to school traversed part of the new urbanist community), and less walkable standard suburban community. Perceived environmental barriers to walking to school are measured and compared for fifth graders ($n = 193$) and their parents ($n = 177$). Results showed that children and parents often agreed on walking barriers, except an interaction showed that — in the less walkable community — parents perceived worse barriers than did their children. Perceptions of barriers increased from walkable, to mixed, to less walkable communities. Students walked more when they attended the school in the walkable community, they lived near school, parents and children perceived fewer barriers to walking, and children had lower BMI scores, net of demographic controls. Thus the walk to school is embedded within multiple types of supports, all of which should be addressed to encourage walking to school.

1. Introduction

As concerns mount over increasing rates of child physical inactivity, obesity, and associated health problems (McGavock, Sellers, & Dean, 2007; Sallis, Prochaska, & Taylor, 2000) the number of children walking to school has declined. In 1969, 40.7% of children walked or biked to school compared to only 12.9% in 2001, a 68% decline, according to analyses of the National Personal Transportation Survey (McDonald, 2007a). Since the 1960s and 1970s, children's overall levels of physical activity have also declined (Salmon & Timperio, 2007) and youth obesity prevalence has tripled (LaFontaine, 2008). A recent review showed that walking to school was associated with healthier levels of physical activity (Lee, Orenstein, & Richardson, 2008). Students who walk to school have been found to have fewer problems with excess weight, measured as lower Body Mass Indices (BMIs; Ozdemir & Yilmaz, 2008; Rosenberg, Sallis, Conway, Cain, & McKenzie, 2006). The U.S. Centers for Disease Control and Prevention (CDC) has adopted a public health goal to help reverse the trend of inactive school commutes. Their goal is for children to increase short walking trips to school (those <1 mile) from 31% in 1995 to 50% by the year 2010 (CDC, 2000). Currently, a similar goal is under consideration for Healthy People 2020 (U.S. Department of Health and Human Services, 2009). This study will examine how parent and child perceptions, community design features, and child BMI all relate to walking to school.

Our approach derives from a transactional model (Altman & Rogoff, 1987; Werner, Brown, & Altman, 2002), which presumes that walking to school is not simply an individual choice but is embedded in and inseparable from a larger psychological, social, environmental, and policy context. Although similar to social ecological model often used in physical activity research (Sallis et al., 2006), the transactional model is more likely to emphasize that physical environments have important functional and symbolic qualities that are inseparable from behavioral patterns, such as the important role played by perceived environmental qualities and the cultural milieu represented in parental judgments of safety (Werner & Altman, 1998).

We believe that the provision of a walkable environment is a necessary, but not sufficient condition for reclaiming the walk to school. Societal pressures have created the expectations that children do not walk to school, in part due to parental and child perceptions that walking to school is neither safe nor convenient. Some researchers have claimed that today's children are part of a "bubble wrap" generation where children's active travel around home is restricted by a combination of parental anxieties, time pressures, and environmental changes (Malone, 2007). Indeed, compared to the past, children throughout the world are less likely to be able to walk without adult accompaniment from homes to a variety of destinations (Kyttä, 2004; Prezza, Alparone, Cristallo, &

* Corresponding author. Tel.: +1 801 581 7111; fax: +1 801 581 5156
E-mail address: Barbara.brown@fcs.utah.edu (B.B. Brown).

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Luigi, 2005). We ask whether a new walkable community design can support more school walks, despite national declines in walking to school (McDonald, 2007a) and general trends toward protectiveness among parents (Carver et al., 2005). Thus we test the separate and combined effects of community design, parent perceptions, children perceptions, and child BMI on reported walks to school for students in more and less walkable communities.

1.1. Review of environmental factors and walking to school

Walkable environments are gaining increased research attention and are measured in a variety of ways at different levels of analysis. For researchers who examine fairly macro level measures of walkability, the "3Ds" of walkability are common defining features—density, diversity, and pedestrian friendly design (Cervero & Kockelman, 1997). Population density makes walking efficient, decreases the appeal of driving through congestion and scarce parking, and creates demand for destinations. Diversity or mixed use brings many walking destinations together in an area (Owen, Humpel, Leslie, Bauman, & Sallis, 2004). Pedestrian friendly design entails well-connected street networks that create fairly short and direct routes between destinations. For researchers who examine walkability at the micro level, additional extensive measures are available to assess the concept of pedestrian friendly design, including environmental evidence of traffic safety, crime safety, pleasantness of environmental aesthetics, and amenities en route (e.g., trees shading the sidewalks, benches available for sitting) (Day, Boarnet, Alfonzo, & Forsyth, 2006). Although much research has demonstrated the relationship of walkable environments to walking (Saelens & Handy, 2008) and health outcomes such as obesity among adults (Brown et al., 2009), less research examines walking in children (Frank, Kerr, Chapman, & Sallis, 2007; Kerr, Frank, Sallis, & Chapman, 2007).

Planners propose that walkable community designs might serve as upstream community health interventions that enable children to walk to school again. Designs that support children's walking include schools closer to home (Babey, Hastert, Huang, & Brown, 2009; Larsen et al., 2009; McDonald, 2007a,b; Schlossberg, Greene, Phillips, Johnson, & Parker, 2006; Timperio et al., 2006; Yarlagadda & Srinivasan, 2008), greater neighborhood densities (Braza, Shoemaker, & Seeley, 2004; Kerr et al., 2006; McDonald, 2008), mixed use (McMillan, 2007), less exposure to busy roads en route to school (Timperio et al., 2006), and pedestrian friendly design features such as more windows on the street (McMillan, 2007) or more sidewalks (Fulton, Shisler, Yore, & Caspersen, 2005). However, neither density nor mixed use related to walking to school in other studies, with one author suggesting that children or pedestrians taking mandatory trips might be less responsive to walkability factors (Ewing, Schroeer, & Greene, 2004; Yarlagadda & Srinivasan, 2008). Interconnected street designs, which support walkability by making routes more direct and convenient, are associated with children's walks in some studies (Braza et al., 2004; Schlossberg et al., 2006) but not in others (Kerr et al., 2006; Timperio et al., 2006). Thus some evidence links separate walkability features to walking among children (Sallis & Glanz, 2006), but mixed results suggest more research is needed.

Furthermore, few studies have examined communities designed with a wide range of features intended to revive walking, such as new urbanist (Leccese & McCormick, 2000) or LEED—ND (Leadership in Energy and Environmental Design— Neighborhood Developments) communities (U.S. Green Building Council, 2007). The new urban charter explicitly values school walkability: "Schools should be sized and located to enable children to walk or bicycle to them" (Leccese & McCormick, 2000, p. 105). New urbanist community designs, which include moderate densities, well-connected streets, and multiple walkable destinations, have been found to support more adult walking in the neighborhood (Brown & Cropper, 2001; Rodriguez, Khattak, & Evenson, 2006). One study found that older high-income communities with these features, but not explicitly designed as new urban communities, support more walking to school (Kerr et al., 2006).

Thus, this study will examine walking to school for Daybreak, Utah (see www.daybreakutah.com), planned by the new urbanist team of Fregonese-Calthorpe Associates (Riggs, 2006), which has been recognized as one of 500 U.S. new urban sites (Steuteville, 2008). The Daybreak community offers a school sited in the heart of the community, not on a highly trafficked edge, with no cul-de-sacs to interfere with route directness or street interconnectedness for pedestrians. It also offers pedestrian friendly features such as sidewalks, walking paths, small lots, multiple front porches and rear loaded parking, as well as amenities such as neighborhood green spaces and community gardens en route to school.

1.2. Review of parent and child perceptions and walking to school

Many studies have shown that parents have strong concerns about the environmental conditions along the walk to school. The major types of concerns include those of perceived street-crossing danger, traffic danger, general difficulty walking, perceived distance, and crime danger (Ahlport, Linnan, Vaughn, Evenson, & Ward, 2008; Hume et al., 2009; Kerr et al., 2006; Merom, Tudor-Locke, Bauman, & Rissel, 2006; MMWR, 2005; Panter, Jones, & van Sluijs, 2008; Schlossberg et al., 2006; Timperio et al., 2006; Ziviani, Scott, & Wadley, 2004). When parents perceive such barriers, their children are often less likely to walk to school (Carver et al., 2005; Kerr et al., 2006; MMWR, 2005; Ziviani et al., 2004). These concerns have been shown to be independently related to walking to school, even when controlling for an index of multiple environmental assessments of walkability (Kerr et al., 2006).

Surprisingly, children's perceptions of barriers are generally unrelated to whether they walked to school. Among sixth and eighth grade U.S. girls, walking, biking, or skating to school was unrelated to girls' perceptions of neighborhood safety, traffic, or crime (Evenson et al., 2006). Among 10- to 12-year-old Australians, walking or biking to school was not related to their perceptions of heavy traffic, strangers, and unsafe roads (Timperio, Crawford, Telford, & Salmon, 2004). Among 9- to 11-year-old UK students, more neighborhood walking was related, counter-intuitively, to perceived heavy traffic and unsafe streets (Alton, Adab, Roberts, & Barrett, 2007). Some studies yield less surprising results: perceived safety related to more walking to school (Rodriguez & Vogt, 2009) and perceived distance is associated with less active transportation (McDonald, 2008). One methodological review notes that perceptions of environments may differ by age (Nasar, 2008), which suggests that parents and children may differ in their perceptions of walkability of the same route. Another suggests that environmental features such as aesthetics and traffic safety may matter less for utilitarian walks, such as the walk to school (Saelens & Handy, 2008). Either way, these results call for research that compares parent and child perceptions of walkability as well as combining both sets of perceptions with objective features of community design when testing associations with walking to school.

In sum, this research addresses several gaps in the growing research on walking to school. Few studies assess both objective and perceived measures of walkability. In Panter et al.'s (2008) review of environmental factors associated with active travel among youth, 24 studies had environmental measures, but only three (Kerr et al., 2006; McMillan, 2007; Timperio et al., 2006) had both perceived and objectively assessed environmental measures,