Walking to school: Community design and child and parent barriers

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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.

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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, &
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, additive or composite 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 (Saenzs & Handly, 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 & Srivinasa, 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, Schroeter, & Greene, 2004; Yarlagadda & Srivinasa, 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 Fronogenesis-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 (Ahlpport, Linnman, 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, Adbal, 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 (Saenzs & Handly, 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.
thus making it difficult to discern whether environmental conditions, perceptions of those conditions, or both are important in walking to school. Furthermore, only two of the 24 articles included both child and parent perceptions, but neither compared child and parent perceptions directly (Timperio et al., 2006; Timperio et al., 2004). Although one (Timperio et al., 2004) found that children believe their parents have more negative perceptions of route walkability, this possibility requires testing through direct comparison of child and parent perceptions. Finally, no published studies were found examining walks to school in new urbanist or LEED—ND pilot communities.

Thus, we compare parent-child dyads’ perceptions of barriers to walking to school across communities that vary in environmental supports for walkability. Then we test the hypothesis that walkable community design, proximity to school, few child and parent perceived barriers, and lower child BMI individually and jointly relate to walking to school.

2. Methods

2.1.Walkable communities/samples

Participants were from three distinct groups. In the “walkable community,” students attended a walkable school centrally sited in a walkably-designed community that featured narrow streets leading to the school, no cul-de-sacs, road-separated walking paths, and an adjacent community recreation center. Town homes and single family detached dwellings were clustered on relatively small lots (median = 0.12 acres), so that all students lived within a mile of school (see Table 1). In the “mixed community,” children attended the walkable school but lived just outside the boundary of the walkable community, so that the path to school traversed the walkable community; 75% lived within a mile of school. This community featured standard suburban design—many cul-de-sacs (12.76 per 100 developed acres of parcels) and larger lots (median = 0.25 acres). In the “less walkable community,” students lived in a neighborhood near the two other groups but in an area with larger lots (median = 0.35 acres) so that only 35% lived within a mile of school. The neighborhood had many cul-de-sacs (6.56 per 100 acres) and fewer walkable features, with the school sited on a busy road with a sidewalk on only one side of the street. Community effects in subsequent multivariate models were represented by two effect codes, weighted to assure orthogonality (Pedhazur, 1982). First, the walkable school communities (walkable and mixed) were contrasted with the less walkable community. Second, the walkable community was contrasted with the mixed community.

2.2.Sampling/procedures

Data collection, in spring 2007, was approved by University of Utah and school district Institutional Review Boards. School-wide assemblies were used to introduce the study; the approved procedures involved recruitment at school, with students responsible for taking home and returning parent surveys, permissions, and informed consent forms. The student surveys and assent forms were completed at follow-up visits to each classroom, with researchers present to answer any questions. Of the 335 names on the fifth grade rolls for 11 classes across the two schools, 6 parents opted not to participate and 211 agreed to participate by the beginning of the study (62.99%). The remaining parents never returned forms to opt in or out of the study; the end of the school year was imminent so that it was not possible to engage in subsequent rounds of recruitment and one-week data collection. Of the 211 agreeing to participate, a subset actually completed parent surveys (n = 177) and student surveys (n = 193). Similar percentages of students across the two schools provided surveys with walking information: 55% (105/189) from the walkable school (n = 24 walkable and n = 81 mixed community) and 60% (88/146) from the less walkable school.

2.3. Measures

2.3.1. Walks to school

Self-reports for walks to school (CDC, 2006) asked about usual travel means to and from school (walk, bike, car, carpool, school bus, other). The walking to school item, which has shown good test–retest reliability in past research (kappa > 0.80, Alexander et al., 2005), has students report the total number of times (0–10) they usually walked to (0–5) and from (0–5) school during the week. This total was inverse transformed and reflected to reduce skew (Tabachnick & Fidell, 2001) (i.e., transformed walk to school = (2 – (1/walk to school + 0.5))); the z-score for skew of 1.62 was acceptable (Field, 2000).

2.3.2. Parent barriers

Perceived barriers included five items that emphasize environmental barriers over barriers that are less modifiable (e.g., weather). Items were adapted from existing surveys (CDC, 2006; New York City Department of Transportation, 2004), which parents rated on a 1 (strongly disagree) to 4 (strongly agree) scale. For parent perceptions of barriers, a principal components analysis with Varimax rotation detected one component, which was verified by high Cronbach’s alpha index of internal consistency (eigenvalue = 3.44, and alpha (α) = 0.89). Barriers included: unsafe to cross (“Streets are dangerous to cross along the route to school”); unsafe traffic (“The traffic along the route makes the walk unsafe”); difficult to walk (“It would be or is difficult for my child to walk from home to school”), too far to walk (“The distance between the school and home is too far to walk”), and crime (“The dangers of crime along the route makes the walk unsafe”).

2.3.3. Student barriers

Children responded to the same five barriers as parents, with appropriate rewording, and the parallel scale resulted in one principal component (eigenvalue = 3.00), which was internally consistent (α = .83).

2.3.4. Distance to school

The mileage between home and school was taken from a geographical information system (GIS) or odometer measures for missing (new) addresses. GIS measures were verified by driving for a subsample of 10 addresses.
2.3.5. BMI

Given that lower Body Mass Indices (BMIs) have been associated with more walking to school (Rosenberg et al., 2006), parental reports of child heights and weights were obtained and child BMIs ((pounds/\text{inches}^2) \times 703) computed (CDC, 2008). Because of many missing BMI reports (reduced \( n = 146 \) parents who returned complete BMI data; many parents reported weight but not height), BMI was included in a secondary analysis to allow the most complete data set to be utilized.

2.3.6. Control variables

The walkable community was advertised for its walkable features, so this parent preference was measured (“ideally my child would walk to school”) and controlled. The walkable community parents agreed more with this statement, \( F(2, 190) = 13.81, p < .01 \). Consistent with past research (Kerr et al., 2006), parent education was controlled. In addition, lower levels of homeownership and fewer rooms per dwelling in the walkable community were controlled (home ownership \( F(2, 190) = 6.37, p < .01 \); rooms in home \( F(2, 190) = 6.00, p < .01 \)). Group mean substitution was used to impute missing control variables, given that 18 parents did not return the survey.

3. Results

3.1. Statistical analyses

To test parent–child agreement on barriers, individual perceived barriers were tested in a community (walkable, mixed, and less walkable) by respondent (parent vs. child) general linear model (GLM) with respondent treated as a repeated measure within dyads. Univariate tests are reported, given that many model (GLM) with respondent treated as a repeated measure.

3.2. Descriptive statistics

Table 1 shows that 88% of the walkable community students sometimes walked to school compared to only 17% of the less walkable community students. Distances to the school from home are also consistent with community walkability differences, with walkable community students averaging 0.38 miles compared to less walkable community students averaging 1.30 miles. In all cases, students in the mixed community scored in between students in the walkable and less walkable communities.

3.3. Parent/child perceptions of barriers across communities

The differences across communities are robust, with significant multivariate and univariate differences on all five barriers (see Table 2). The pattern shows least concern about barriers in the walkable community, intermediate in the mixed community, and highest in the less walkable community. Although parents and children did not differ in barrier perceptions (\( F < 1 \), a significant multivariate interaction emerged (see Table 2), with three significant univariate tests. In these three significant interactions, parent and child reports of barriers were fairly similar in the walkable community but distinctly different in the less walkable community, with parents showing greater concern than their children (interaction F’s: unsafe to cross road \( F(2, 149) = 3.19, p < .05, \eta^2 = 0.04 \); unsafe traffic \( F(2, 149) = 7.24, p < .001, \eta^2 = 0.09 \); difficult walk \( F(2, 149) = 5.51, p < .01, \eta^2 = 0.07 \); all stepdown Fs, \( p < .05 \), meaning that each variable explained significant unique variance). Fig. 1 illustrates, for unsafe traffic perceptions, the general form of all three interactive effects. The composites for parent and child perceptions of barriers are retained for the analysis of walk-to-school frequency.

3.4. Associations with walking to school

Simple correlations and a multivariate generalized estimating equation (GEE in SPSS–16 software) are employed to relate variables to walking to school. GEE analyses, chosen to adjust for clustering of students within classrooms, tested the relationship between walking and child and parent barriers, distance to school, community design, and controls; BMI was added to the equation in a second analysis with reduced \( n \).

At the univariate level, walkable community design, proximity to school, parent preferences for the child to walk to school, and parent and child perception of few barriers all significantly correlate with walking to school (see Table 3). Furthermore, in the GEE analysis, most of these variables retain their significance, controlling for all other variables. Specifically, walkable and mixed community students walked to school more frequently than those from the less walkable community. In addition, students living further away walked less frequently. For the perceived barriers, both parent and child perceptions of more barriers relate to less walking. The control variable of parents’ preferences for their children to walk to school is strongly correlated with students’ frequencies of walking, but correlations with other independent variables reduced this variable to insignificance in the multivariate equation. The same drop to non-significance occurred for the contrast between the walkable and the mixed community.

Recall that BMI was excluded from the main analysis, because of missing cases. When the smaller subsample with BMI was tested,
lower BMIs were related to more walking to school \( (r = -18, p < .05; B = -0.031, p < .05) \) and other coefficients retained their significance levels. Despite the drop in sample size to 146, adding BMI improved overall model fit (Corrected Quasi Likelihood under Independence Model Criterion decreased from 73.77 to 64.13, indicating better model fit).

### 4. Discussion

Among respondents in this study, the number of children walking to the school in the walkable community was relatively high in comparison to the less walkable community as well as in comparison to CDC goals and other studies. The data show student respondents from the walkable community school may exceed current CDC walk-to-school goals to attain 50% of short trips to school by walking by 2010. In the current study, 88% of the walkable community, 60% of the mixed community, and 17% of the less walkable community student respondents ever walked to school, regardless of their distance to school. A re-computation of walking rates in the current study for only those students living within a mile of school (part of the CDC goal) shows that 88% of walkable community, 78% of mixed community and 45% of less walkable community student respondents walk to school. Recent national reports state that 47.9% of 9- to 15-year-old children walk or bike (≥1 day/week) when residing a mile or less from school (Martin, Lee, & Lowry, 2007). Thus, having a walkable community design is associated with above average rates of walking for our respondents. Even for student respondents who live in a standard suburban community, if their route to school traverses a walkable community, they also walk to school at relatively high rates.

Unlike past research, this study used comparable parent and child perceptions and demonstrated that, although parents and children often agreed about barriers, both views independently associate with walking. However, parents in the less walkable community perceived greater barriers than their children did. Future research could examine whether these disagreements are related to evidence of lesser child pedestrian safety and to parent-child conflicts over the child’s neighborhood activity levels and independent mobility.

These results demonstrate that multiple supports for and barriers to walking are important, including: walkable community design, short vs. long physical distances, and child and parental perceptions of barriers to walking to school. Furthermore, each of these independent variables is important for the others. Results suggest that the decision to walk is complex, with influences embedded within both the social and physical milieu. Although past research has emphasized the importance of parental perceptions of barriers, these results suggest that future efforts to create or improve walkable environments for children should address physical environmental supports as well as promote active involvement of both children and their parents.

Unlike many studies of community differences, this study introduced a control for selection threat (the possibility that parents who value walking choose to live in the walkable community) by including in the statistical model the parental preferences for their children to walk to school. Unfortunately, this precautionary effort may have actually overcontrolled for selection if parents’ preferences changed over time in response to the walkability of their neighborhoods. Finally, the data are limited in that they are small cross-sectional samples from only two schools, and rely on self-reports of walking. Furthermore, the communities are too new for census data to exist to determine if respondents are representative of all parents in the community, although response rates across communities were similar.

### 4.1. Policy and design implications

Communities can support walking by addressing child and parent perceptions of barriers to walking to school. Both the traffic-related and crime-related barriers could be addressed with supportive policies such as walking school buses—where parents walk large groups of neighborhood children to school (Kearns, Collins, & Neuwelt, 2003), crosswalks, school crossing guards (Ahlport et al., 2008), and careful designation of school drop-off zones (McMillan, 2005) and safe routes to school (Boarnet, Day, Anderson, McMillan, & Alfonzo, 2005). A next step to address perceived barriers might be a “go along” walk with parents and children that would allow them to designate both the points of pride in their neighborhood as well as the barriers to walking (Carpiano, 2009). Given how sensitized parents and children are to dangers of being outside (Ahlport et al., 2008; Carver, Timperio, & Crawford, 2008), having a discussion of barriers in the context of a walk that also emphasizes strengths and good points of the community may begin to build social capital and provide a more balanced view of the neighborhood than an approach that focuses only on neighborhood deficits.

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**Table 3**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>B</th>
<th>SE</th>
<th>Lower</th>
<th>Upper</th>
<th>r</th>
<th>Wald Sig.</th>
<th>( \chi^2 )</th>
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<tr>
<td>Constant</td>
<td>1.00</td>
<td>0.31</td>
<td>1.20</td>
<td>2.41</td>
<td>−</td>
<td>34.17</td>
<td>0.00</td>
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<tr>
<td>Parent education</td>
<td>0.01</td>
<td>0.14</td>
<td>−0.30</td>
<td>0.27</td>
<td>0.07</td>
<td>0.01</td>
<td>0.92</td>
</tr>
<tr>
<td>Home owner</td>
<td>0.26</td>
<td>0.30</td>
<td>0.32</td>
<td>0.84</td>
<td>0.02</td>
<td>0.76</td>
<td>0.38</td>
</tr>
<tr>
<td>Rooms in home</td>
<td>0.00</td>
<td>0.02</td>
<td>−0.03</td>
<td>0.03</td>
<td>−0.08</td>
<td>0.00</td>
<td>0.96</td>
</tr>
<tr>
<td>Parent prefers child to walk</td>
<td>0.05</td>
<td>0.03</td>
<td>0.00</td>
<td>0.10</td>
<td>0.46**</td>
<td>2.74</td>
<td>0.10</td>
</tr>
<tr>
<td>Walkable (+) vs. mixed (−) community (×1000)</td>
<td>0.09</td>
<td>1.05</td>
<td>−1.97</td>
<td>2.14</td>
<td>0.18*</td>
<td>0.01</td>
<td>0.93</td>
</tr>
<tr>
<td>Walkable &amp; mixed (+) vs. less walkable (−) (×1000)</td>
<td>1.65</td>
<td>0.39</td>
<td>0.88</td>
<td>2.41</td>
<td>0.51**</td>
<td>17.81</td>
<td>0.00</td>
</tr>
<tr>
<td>Distance by road to school</td>
<td>−0.31</td>
<td>0.12</td>
<td>−0.54</td>
<td>−0.08</td>
<td>−0.63**</td>
<td>7.21</td>
<td>0.01</td>
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<tr>
<td>Parent perceived barriers</td>
<td>−0.28</td>
<td>0.04</td>
<td>−0.36</td>
<td>−0.19</td>
<td>−0.72**</td>
<td>38.67</td>
<td>0.00</td>
</tr>
<tr>
<td>Student perceived barriers</td>
<td>−0.19</td>
<td>0.06</td>
<td>−0.31</td>
<td>−0.06</td>
<td>−0.62**</td>
<td>8.90</td>
<td>0.00</td>
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</table>

\*p < .05.  
**p < .01.
The walkable community in the present study may provide a model of a physical design that can be considered a health promoting intervention (Schulz & Northridge, 2004), which may have other downstream benefits. The design features at Daybreak that are provided to support more walking included a centrally sited school, adjacent to a community center, surrounded by relatively narrow streets and walking paths, with homes on small lots. These features provide safe routes to school and site houses close to school, with no cul-de-sacs impeding access. Such new urbanist designs are intended to bring back pedestrian orientation to communities and may support other benefits, such as greater neighborhood contacts and more adults neighbors out walking (Brown & Cropper, 2001; Lund, 2003). Visible use of the neighborhood may also enhance perceptions of safety. In the future, it will be useful to assess the broader health-related consequences of new urbanist and other walkable neighborhood designs, beyond the walk to school.

Although such designs may encourage walking, many U.S. communities have adopted policies that create “sprawl schools.” School consolidations have created fewer but larger schools (200,000 in 1940 but only 62,000 by 1990, despite a 70% population increase). In addition, building policies often require large sites, which lead districts to choose inexpensive land on the periphery of communities, resulting in long walking distances for many (National Trust for Historic Preservation, 2000). Parents, health experts, and even developers have often been left out of such decisions. In one local case, a developer wanted to provide land for a walkable elementary school in the center of his development. The school board vetoed the site because it would have required a two-story structure, which was seen as creating a danger for escape from fires and was “too small.” Instead, the school was constructed at the edge of the community, across an arterial street; this led to many parents driving their children a short distance to school so they did not have to cross the arterial street (D. Hall, personal communication, February 22, 2010). Although communities have successfully redesigned communities to enable more children to walk to school (Staunton, Hubsmith, & Kallins, 2003), providing walkable designs at the outset is likely much less expensive. Broader community education and outreach efforts will be needed to enable parents, policy makers, health advocates, and environmental professionals and developers to participate more effectively in securing walkable school and community designs. Future research is needed to enable school boards and other decision makers to weigh the relative risks and benefits of school costs and safety issues posed by centrally located vs. peripherally located schools.

Population growth could provide the opportunity to rebuild the infrastructure needed to support walking to school. The U.S. child population will increase from 73.7 million in 2006 to 85.7 million in 2030 (EPA, 2003) and thousands of schools and communities (Nelson, 2004) will be built or renovated. In urban areas 65 million people currently live within half a mile of a school (Watson & Dannenberg, 2008). The anticipated growth and redevelopment provide important opportunities to build schools closer to homes and to design or redesign communities that promote walking for all citizens, not only children. The walkable community in this study provided students and their parents with fewer perceived barriers to walking and was related to more frequent walking to school. This case provides empirical support relevant to national efforts to enhance walkability (e.g., safe routes to school at www.saferoutesinfo.org; new urbanism at www.cnu.org).

In summary, this study found that the frequency of walking to school was related to greater proximity to school, school site in a walkable community, and few parent and student perceptions of barriers to walking to school. An analysis that added BMI (albeit with a smaller sample) showed the same results and lower BMI was also significantly associated with walking to school. The trip to and from school provides children with 10 opportunities to walk during the school week; walkable community designs may play a valuable role in fostering walking habits, as well as create the benefits of reducing automobile dependency and enhancing independent mobility of children.

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