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## Parent safety perceptions of child walking routes

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## ABSTRACT

Walking rates to school remain low for U.S. children in large part due to parent concern for child safety. Little research exists that identifies which features of streets and intersection lead parents to feel that walking is unsafe for their children. In this study, parent volunteers conducted an audit of streets and intersections leading to seven elementary schools in a suburban school district. Parents were most likely to feel concern about streets that lacked sidewalks or had sidewalks with obstructions. Wheelchair-accessible routes were seen as appropriate for walking children. Parents expressed concern over safety at intersections, particularly those involving large streets; traffic controls did not mollify their concern. These results support the use of appropriate behavior models for assessing walking choices, highlight the importance of well-maintained sidewalks and age-appropriate crossings for young families, and demonstrate the importance of including the public in street audits.

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## 1. Introduction

Childhood obesity in the U.S. is rising at the same time that opportunities for physical activity are decreasing (Dollman et al., 2005). Active transportation (e.g., walking, biking) to school can provide children opportunities for more daily physical activity, which can, in turn, help reduce childhood obesity and obesity-related morbidity (Handy et al., 2002; Lee and Zhu, 2008). Children who walk to school are more physically active than those who are driven (Cooper et al., 2003), and such activity creates additional opportunities for socialization, outdoor play, and exercise (Sallis et al., 2004). Unsupervised play also results in better cognition skills (Hüttenmoser, 1995). Currently as few as 15% of the U.S. student population arrive or depart school by foot or bike, in sharp contrast to some 60% of students just one-half century ago (see Fig. 1; McDonald, 2007; McDonald et al., 2011). Declines in walking have been greatest among elementary-aged children (distance adjusted decrease from 40.7% in 1969 to 13.1% in 2009) and for children who live within one mile of their school (85.9% in 1969 to less than 50% in 2009) (ibid).

For children, the decision to walk is strongly tied to parent concerns over safety (Carver et al., 2010; Kerr et al., 2006; Moore et al., 2010). Concerned parents are less likely to let their children walk to and/or from school (Carver et al., 2010; Kerr et al., 2006; McMillan, 2007), particularly when their child is young (Timperio, 2004). Parents point to traffic danger as a primary source of their concerns (Carver et al., 2008b; Kerr et al., 2006; Martin and Carlson, 2005). To address this issue, policy makers and transportation planners have championed changes to infrastructure that reduce the danger of traffic to people walking. The literature is equivocal as to whether such changes lead more children to walk to or from school (e.g., Boarnet et al., 2003; Staunton et al., 2003).

What is frequently lacking in both policy discussion and research is a mechanism for describing how environmental cues are interpreted. This is especially true with children, whose decisions are constrained to a large degree by their parents. In this capacity, McMillan (2005) described parents as gatekeepers. She wrote:

Given particular elements of urban form, a parent forms opinions about the ability of the physical environment to support different modes of travel for their child's trip to school, and these opinions dictate the decision of how the child gets to school. (p. 449)

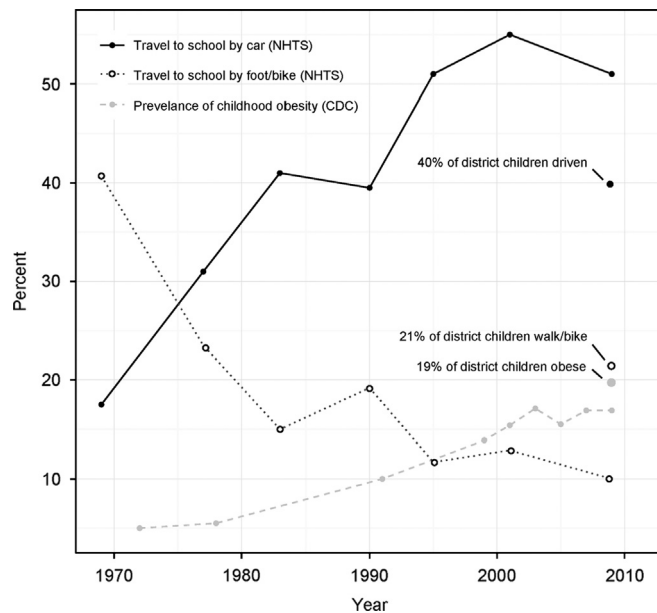
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**Fig. 1.** National changes in how elementary-aged children arrive at school alongside prevalence of childhood obesity. Similar rates found within participating school district, shown at right. Transport data from U.S. Department of Transportation, National Highway Traffic Safety Administration data, adapted from *American Journal of Preventive Medicine*, 32:(6), N. C. McDonald, Active transportation to school: Trends among U.S. school children, 1969–2001, 509–516, copyright 2007, with permission from Elsevier. NHTS 2009 values from McDonald et al. (2011). U.S. school travel, 2009: an assessment of trends. *American Journal of Preventive Medicine*, 41, 146–151. Childhood obesity data adapted from Ogden and Carroll (2010). Prevalence of obesity among children and adolescents: United States, trends 1963–1965 through 2007–2008. Atlanta: Centers for Disease Control and Prevention. National Center for Health Statistics, 201(0).

Surprisingly little is known about which features of streets networks mediate parent concern. This paper contributes to the child pedestrian safety literature in two ways. First, our study focuses on the specific microvariables found in streetscapes<sup>4</sup> (e.g., trees, sidewalk width, curb cuts, uninterrupted sidewalk path) and their association with parent ratings for child pedestrian safety. Second, our data are derived from direct parent observations of the entire street network serving a suburban school district. The combination of these approaches allowed us to analyze which features of the street environment had the strongest association with parent ratings of safety or concern for child pedestrians. Clarifying this relationship can provide a more specific framework for promoting street designs that facilitate changes in child walking behavior.

## 2. Research approach and data collection

Data were obtained as part of the Community and Schools Together (CAST) project, a 5-year childhood obesity tracking project that employed multiple community-based participatory research methods to examine environmental influences on the prevalence of overweight and obesity in a sample of elementary-aged children from a Eugene, Oregon, suburban school district. The data were acquired on location by parent participants using mobile GIS technology to conduct a comprehensive inventory of street, sidewalk, and crossing features, and to rate their comfort and concern if an unaccompanied child were to walk along the assessed street. The protocol and informed consent procedures for this study were approved by the Institutional Review Board of Oregon Research Institute.

### 2.1. Study sample

The school district serves approximately 6000 students, 3000 of whom are located in seven elementary (K–5) schools. Compared to the state of Oregon, the school district has a larger percentage of students eligible for free and reduced lunch (41.5% state vs. 46.8% district), a smaller percentage of students with English as a Second Language (ESL) (10.3% state vs. 2.2% district), and a slightly smaller percentage of Hispanic students (17.2% state vs. 13.9% district) (Oregon Department of Education, 2007). Data previously collected from the school district during the 2008–2009 school year ( $n=2316$ ) indicated that 19% of children were obese;<sup>5</sup> the percent of obese children varied among the seven schools from 13% to 28% (Moreno et al., 2013). Four of the seven schools had children who were more obese than the national average for elementary students of 18.8% (Ogden and Carroll, 2010). A random survey of parents of CAST students in 2009 ( $n=409$ ) indicated that 41% drove their child to and/or from school.

### 2.2. Study area

The school district covers 31 square miles of the northwest quarter of Eugene, Oregon, a city with a population of 150,000, and extends into surrounding rural lands (Fig. 2). Most students (93%) live within the 13.5 square miles of the school district that intersect with the

<sup>4</sup> The United States term 'sidewalk' is synonymous with the United Kingdom term 'pavement'. Further, in this paper 'street' encompasses not only the roadbed itself, but also sidewalk(s) and planting strip between the sidewalk and the road if such exist.

<sup>5</sup> Excess weight among children in the United States is defined in relation to the 2000 CDC sex-specific BMI-for-age growth charts (see Ogden and Carroll, 2010). A child is obese if their Body Mass Index exceeds the age and sex specific 95th percentile.

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