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Parental Factors in Children's Active Transport to School

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Abstract

Objective—Identify non-distance factors related to children's active transport (AT) to school, including parental, home, and environment characteristics. Understanding the factors related to children's AT to school, beyond distance to school, could inform interventions to increase AT and children's overall physical activity.

Study Design—Participants were in the Neighborhood Impact on Kids Study, a longitudinal, observational cohort study of children aged 6 - 11 and their parents in King County, WA and San Diego County, CA between 2007-2009. Parents reported frequency and mode of child transport to school, perceived neighborhood, home and family environments, parental travel behaviors, and sociodemographics.

Methods—Children living less than a 20 minute walk to school were in this analysis. Children classified as active transporters (walked/bicycled to or from school at least once per week) were compared with those not using AT as often.

Results—Children using AT were older and had parents who reported themselves using active transport. Having a family rule that restricts the child to stay within sight of the parent or home and more parent working hours was related to lower odds of a child using AT.

Conclusions—Children's AT to school is associated with parental AT to work and other locations. Interventions should be considered that enable whole family AT, ameliorate safety concerns and decrease the need for parental supervision, such as walking school buses.

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Keywords

walking school bus; childhood obesity; physical activity; family

Introduction

Childhood obesity in the United States has increased to nearly 17% of children¹. Only 42% of elementary school-aged children achieve the recommended amount of moderate-to-vigorous physical activity (MVPA)². In 1969, 41% of children walked or cycled to school, which declined to only 13% in 2001³. Children who use active transport (AT) to commute to school attain higher average MVPA⁴. AT to school is also associated with improved cardio-respiratory fitness⁵ and improved weight status⁶.

Distance from home to school is the leading predictor of AT to school in youth⁷. Other recognized barriers are built environment factors (busy roads, unsafe crosswalks or sidewalks⁷) and social factors (parents' concerns for safety⁸ and behavior of other children in the neighborhood⁹). Nearly 35% of U.S. children live within a mile of school, yet less than half walked or biked¹⁰. For the present study, children living within a 20 minute walk to school were evaluated to help identify non-distance barriers and facilitators of AT, and particularly to examine associations between children's AT and parents' own reported habits.

Methods

Participants

Participants were from the Neighborhood Impact on Kids (NIK) Study, a longitudinal, observational cohort study of children aged 6 to 11 and their parents in King County, WA and San Diego County, CA¹¹. NIK is designed to evaluate the association of neighborhood environmental factors with children and parent's weight status and related behaviors. Neighborhoods were assessed for their walkability at the block group level by observation and geographic information system (GIS). Block groups were selected because they represent the lowest level of Census geography that has publicly available demographic information, and its smaller geographic level has a more homogenous built environment. GIS methods created environmental metrics and identified neighborhoods walkability based on walk index and park proximity.

Only children whose parents reported living within a twenty minute walk to the child's school and had accelerometer data available were in this analysis. Distance is the well-established primary barrier to active transport. We do have distance data from home to school for our participants and found the following: For those that reported that their walk to school was less than 20 minutes, the mean distance was 0.81 (SD=0.70) miles compared to 3.61 (SD=3.26) miles for those reporting a greater than 20 minutes walk. For those reporting less than 20 minutes walk, 75.6% lived less than a mile from their school and 94.1% lived less than 1.5 miles from their school. However, we concluded that the families' perception of distance, quantified as travel time, was a more representative factor to eliminate children

from our cohort that were highly unlikely to be engaged in active transport. A cut off of 20 minutes was used, which would include most children living within a 1 mile distance per school and recommended to use AT to school per Healthy People 2020 recommendations. We also excluded children who were reported to be homeschooled and those whose data collection occurred during the summer when they would have been out of school. Of the 723 total NIK participants, 307 met these criteria with complete available data.

Measures

Parents completed a survey that queried household, parent, and child demographics. Parents reported their own average physical activity over the past year using IPAQ, a validated assessment of adult physical activity behaviors¹². They also reported their usual mode of travel to work, which was categorized into whether it was active or not. Parents also reported “yes” or “no” to participation in vigorous-intensity sports or activities that cause large increases in heart rate and whether they walk or use a bicycle to get to places.

Using valid and reliable measures¹³ parents reported their child’s active transport. They responded how many days (0-5) in an average week their child walks, bicycles, goes by car or bus to and from school, for a total of ten trips. AT use was defined as at least one trip per week by either walking or bicycling¹⁴. Parents identified family rules that they enforce, such as: my child must stay close to or within sight of the house/parent, which acted as a proxy for stranger or crime danger, which is a frequently reported barrier to active transport^{14, 15}.

Analysis

Chi-squared and independent group t-test analyses were performed on all variables to determine whether factors differed between AT versus non-AT children. Logistic regression analysis examined significant bivariate variables and those historically known to influence active transport (e.g., age). Because of the NIK study design, neighborhood walkability was also included in this model.

Results

In bivariate analyses, factors significantly associated with child AT were identified. Older child age, parental use of AT to any location and specifically to work, and a parent without a driver’s license were positively related to child AT. Whereas, a parent with a rule regarding staying close to or within sight of the house/parent, and the number of hours parents work per week were negatively related to child AT. Factors not associated with child AT were the number of siblings, parental report of vigorous exercise, household income, and neighborhood walkability (Table 1).

In the multivariate model, children were more likely to use AT to school if their parent reported AT use to any location, but they were less likely to use AT if their parents had a rule requiring their child to stay close to or within sight of house/parent, or their parent worked greater than 30 hours per week (Table 2).

Discussion

Distance between the school and home is the primary determinant of children's active transport to school. School location has historically been influenced by legislation developed after the 1950s that required schools to have a minimum acreage in order to receive state funding, which pushed new schools to be built in the outskirts of communities. In 2004 these policies were revised, but the impact on distance to school remains¹⁶. However, this study suggests that even if living proximal to school, not all children actively commute to school and there exist factors that differentiate active from non-active commuters.

Current findings suggest that children's AT is most associated with their parents' use of active transport, which is the first US study to our knowledge documenting this association. Parent's journey to work was predictive of AT, although most parents still are not using AT to work. Interestingly, there was no association between parents reported vigorous exercise and their child's use of AT. There was also no association between neighborhood walkability and child AT to school among this sample of children living close to school, suggesting that parental perceptions and attitudes about active commuting may be more influential.

Generally, parents who are more concerned about the safety of their neighborhood have children who engage in less physical activity, including active transport¹⁷. This study confirmed that parents who self-report rules such as "staying close to or within sight of the house/parent" are less likely to have children who use AT to school. Despite improvements to the safety of routes to school, these routes may go unused if children are not allowed out of adult supervision or come from homes where AT is not prioritized. One targeted intervention that would alleviate parental concern for safety would be further implementation of walking school buses^{18, 19}, a group of children who walk to school together with one or more adults. It is often casually organized by parents who walk together with their own children, but can be as structured as an organized route with timetables and rotating trained volunteers. This intervention would allow children to safely travel to school and gain physical activity benefits. A pilot study of a walking school bus in a low SES neighborhood²¹ demonstrated that it helped to ameliorate parental concerns for safety on the child's walk to school.

Study limitations include the observational cohort study design, relatively affluent sample, focus on weekday behaviors, depending on parental recall for report of transport to school, although self-reports of AT have used with acceptable reliability and validity²². Six percent of eligible participants (n=21) were excluded due to missing data. Strengths of this study are a large sample size from two US locations, the use of a validated questionnaire on parental activity, the IPAQ, as well as controlling for the built environment, parental and child demographics.

In US communities where sedentary behaviors are ever becoming a component of daily life, it is important to promote AT. This study suggests that interventions to ensure children's safe transport to school such as walking school bus, in addition to improvements to the built environment, such as sidewalks and crosswalks, could ameliorate parental concerns for

safety, which is a potent barrier. Additionally encouraging AT in parents would likely impact family habits and may increase the likelihood children will actively commute to school, a proven means to increase physical activity, fitness and weight status²³.

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TABLE 1

Child, Parent and Household Characteristics associated with Child Active Transport among children who live within a 20 minute walk to school in the Neighborhood Impact on Kids Study in King County, WA and San Diego County, CA between 2007-2009

Characteristic	Children who don't use AT	Children who use AT	<i>P</i>
<i>N</i>	123	184	
Gender (% girls)	48.8%	44.6%	0.468
Age: 6-8yo	36.6%	22.8%	0.009
9-11yo	63.4%	77.2%	
Child age, mean (SD)	8.8 (1.53)	9.3 (1.54)	0.014
Number of siblings, mean (SD)	2.2 (0.81)	2.4 (0.89)	0.092
Parents report AT to work	2.5% (<i>n</i> =2)	10.7% (<i>n</i> =11)	0.034
Parents report AT to any location	24.8% (<i>n</i> =30)	44.0% (<i>n</i> =80)	0.001
Parents report vigorous exercise	66.9% (<i>n</i> =81)	67.4% (<i>n</i> =122)	0.933
Family income:			0.107
<\$39,000	8.1% (<i>n</i> =10)	16.3% (<i>n</i> =30)	
\$40,000-89,000	34.2% (<i>n</i> =42)	29.4% (<i>n</i> =54)	
>\$90,000	57.7% (<i>n</i> =71)	54.4% (<i>n</i> =100)	
Parent without driver's license	0% (<i>n</i> =0)	4.4% (<i>n</i> =8)	0.019
Parent report rule: stay within sight of parent/home	89.4% (<i>n</i> =110)	78.3% (<i>n</i> =144)	0.011
Parental hours of work per week:			0.033
0-15 hrs	43.1% (<i>n</i> =53)	49.2% (<i>n</i> =90)	
15-35 hrs	21.1% (<i>n</i> =26)	28.4% (<i>n</i> =52)	
35+ hrs	35.8% (<i>n</i> =44)	22.4% (<i>n</i> =41)	
High neighborhood walkability	44.3% (<i>n</i> =50)	53.5% (<i>n</i> =93)	0.128

TABLE 2

Adjusted odds ratios of child AT to school based on multivariable logistic regression (n=283) among children who live within a 20 minute walk to school in the Neighborhood Impact on Kids Study in King County, WA and San Diego County, CA between 2007-2009

Characteristic	Odds Ratio [95% CI]
Age group: 6-8yo	reference
9-11yo	1.47 [0.84 – 2.59]
Parents report AT to any location	2.20 [1.27 – 3.81]
Parents report rule: “stay within sight of parent/home”	0.40 [0.18 – 0.85]
Parental hours of work per week: 0-15 hrs	reference
15-35 hrs	1.04 [0.55 – 1.97]
35+ hrs	0.55 [0.30 – 0.99]
High neighborhood walkability	1.25 [0.75 – 2.08]