School Choice and Children's School Commuting

Final Report

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Executive Summary

Some school districts allow parents to choose which school their child attends, a policy known as school choice. We study the impact of school choice on school transportation behavior. To do this, we examine the extent to which children's commute mode and parental attitudes toward school selection and school travel differ by magnet versus neighborhood schools and by race. We conducted a survey of elementary-school parents to assess how children travel to school and identify underlying parental attitudes.

Compared to national data, our sample of K-6 students had fewer children walking and traveling by personal vehicle, and more riding the school bus. Magnet (i.e. school choice) schools, which draw from broader geographic regions than neighborhood schools, have fewer students walking or biking to school and more students riding the bus rather than using a private automobile. Overall, walking is less prevalent (from 2 to 29% less) in the local data than in the national data, for all distances except those greater than 4.8 kilometers. Only 12% of our sample walked or bicycled to school in the previous week.

Studies have indicated that travel mode differs between to-school and from-school commutes (Schlossberg, Phillips et al. 2005). Results from our data suggest similar findings. Walking is most common for short distances and in from-school (afternoon) commutes. Bussing is more common than automobile in trips from-school, especially at distances between 1.6 and 4.8 kilometers. Additionally, we found that (1) many students relied on different modes going to and from school (35%) and (2) generally 40% of students used at least two different modes during the week. Further, transportation attitudes and actions differ by school type and race. For example, compared to white parents, non-white parents are more concerned about availability and safety of school buses, and also are more likely to use school buses.

The interplay between educational policy and school transportation affects the travel patterns of children and parents and the transportation budgets of school districts. Our sample of K-6 students had fewer students walking and traveling by personal vehicle, and more taking the bus, than do the national data we compared against. Distance to school is important for determining child travel behavior. Magnet (i.e. school choice) schools, which draw from broader geographic regions than neighborhood schools, are less able to engage in active school transportation (walk or bicycle), not because of any difference in parental attitudes toward mode choice, but simply because they live too far from their schools to walk or bike. Additionally, the higher proportion of magnet school students riding the bus than private automobile results in a greater transportation cost for the district.

Our analyses capture only the first-order effects of school choice; the total impacts may be larger and must be viewed within a larger context of school and individual child performance. As service cost becomes an increasingly important issue, school choice policy could be further evaluated in light of different transportation demands. Efforts to minimize bus miles traveled and maximize active transportation to school can be integrated into school choice planning efforts. Tackling issues of children's school transportation highlights the need to evaluate school policy on transportation and safe routes to school initiatives in light of policies about school choice.

Chapter 1
Introduction

Children's school commuting has come under increasing research and policy attention, owing mainly to concerns about children's health and safety, but also to traffic congestion, environmental impacts of transportation, and parents' time chauffeuring children. A popular response is to attempt to make biking and walking to school more attractive. In the U.S., for example, the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) has helped create various local programs under the banner of "Safe Routes to School." Such programs often include investments in physical infrastructure, improvements to street design, volunteer opportunities, and educational activities, with the goal of ensuring attractive and safe environments for children of different ages so that they can more easily and safely walk or bicycle to school. Secondary motivations underlying such initiatives include reducing dependence on automobiles and fossil fuels, decreasing emissions of greenhouse gases and urban air toxics, lowering transportation costs for families and school districts, fostering childhood independence, enhancing social capital, and providing safer environments for travel.

It is difficult to know how well programs such as "Safe Routes to School," satisfy their goals. School travel is intricately tied to geography (urban versus suburban versus rural environments), state and district school bus policy, school quality, extra-curricular activities of children, and other, sometimes immeasurable, factors. School travel policies differ among states; for example, some but not all require that districts provide bus service.

Traditionally, children attended the school closest to their home (i.e., the "neighborhood school"). With school choice, a child may attend a "magnet school" instead of the closest neighborhood school. An important research question is how school travel differs between neighborhood and magnet schools, especially in light of "safe routes to school" programs. Given the increasing prominence of both types of initiatives (school choice; safe-routes-to-school), improved understanding on this topic is important for researchers, practitioners, government officials, and the general public.

To our knowledge, only one previous effort (Wilson, Wilson, and Krizek, 2007) has explicitly studied school travel in light of school choice. This study highlighted that school choice yields greater commute distances (as children attend schools across the district rather than in their neighborhood), and also reduced levels of walking and cycling to school (because longer commutes are less amenable to walking or bicycling). The present research refines this past work in several important ways. While past research used summary results from a national transportation survey, our current work employs a mail survey regarding school choice and school commute mode. As a result, we are able to explore reasons and preferences underlying parent decisions, and investigate the degree to which travel patterns in our case study location differ from national data. Because we surveyed an urban and a suburban school district, we can also explore how issues of school choice and school commute play out differently in these two contexts. Finally, we investigate how parents' choices and attitudes differ by ethnicity, school type, and income.

This paper is divided into five parts. We have introduced the topic (part 1). Next, (background; part 2) we provide context and briefly review relevant literature. We then describe the study location and the mail survey (part 3), present survey results (part 4), and discuss implications for school policy (part 5).

Chapter 2
Background

School choice allows a child to attend a school other than the one closest to home. A single school district may include school-choice (magnet) and non-school-choice (neighborhood) schools—as is the case for both of the cities we surveyed—and choice can be solely within-district (as with the two cities we surveyed) or between-districts.

Two main aims of school choice are (1) increased educational performance (e.g., as measured by standardized test scores or graduation rates), spurred by school competition to obtain students and (2) racial and socio-economic diversity in each school, owing to greater mixing among segregated neighborhoods ("voluntary desegregation") (Gorard, Fitz, and Taylor, 2001, Schellenberg and Porter, 2003, Schneider and others, 1997, Whitty, 1998). A study in St. Paul, Minnesota, found that the dominant motivation for school choice has shifted over time, from voluntary desegregation to improved educational performance (Schellenberg and Porter, 2003). School choice advocates further note that parent satisfaction is higher among parents who choose their child's school (Goldring and Shapira, 1993, Powers and Cookson, 1999, Witte and Thorn, 1996). The 2002 "No Child Left Behind" Act encourages school choice by (1) allowing students whose school has not maintained adequate progress for two years to attend a school with better test scores and (2) encouraging the funding of magnet schools (Part B, Voluntary Public School Choice Program 115 Stat. 1803 (2002)). Here, we do not take a position in favor or against school choice – there are legitimate arguments on both sides of this contentious debate – and instead note that support and criticism for school choice is generally found throughout the political spectrum (Gorard, Fitz, and Taylor, 2001), and such programs are significantly more common today than 20 years ago. As discussed next, school choice may have important implications for school commuting, especially for active travel modes like walking and biking.

School location is a critical factor influencing child travel behavior (McDonald, 2005, McDonald, 2007, McMillan, 2006, McMillan, 2005). McDonald documents sharp decreases in the percentage of children walking and biking to school from 1969-2001, and found that 47% of the decline was explained by the increased distance between home and school (McDonald, 2007). Write McMillan *et al*., "living within one mile of a school appears to have the most significant effect on active travel to school. The odds ratios indicate a distance of less that one mile between home and school makes it almost three times more likely that a child will walk/bike to school," ((McMillan, 2006, McMillan, 2005), p. 84). A study of K-12 students in Florida supports this result, finding students with shorter walk and bicycle travel times had a higher probability of walking (Ewing, Schroeer, and Greene, 2004). Fewer children now walk to school than 35 years ago, decreasing from 41% in 1969 to 13% in 2003, with the largest decreases among non-white elementary students (McDonald, 2007). Factors contributing to this shift include changes in school-commute distance, car ownership rates, mothers' employment outside the home, and other social factors. (McDonald, 2005). Traffic, pedestrian infrastructure, and 'stranger danger' are all identified parental concerns (McDonald, 2007). Income, car ownership, and number of drivers in a household are negatively correlated with school-commute walking and biking rates (Ewing, Schroeer, and Greene, 2004, McDonald, 2007).

Excluding mandatory in-school physical education, many children are not engaging in sufficient physical activity (Trost and others, 2002). Driven largely by concern about childhood obesity, several federal (Centers for Disease Control, 2005, Federal Highway Administration, 2006) and state (Boarnet and others, 2005, Butcher, 2006, Staunton, Hubsmith, and Kallins, 2003) initiatives aim to raise children's daily activity levels by increasing rates of walking-to-school (Krizek, Birnbaum, and Levinson, 2004). The national Safe Routes to School Program, funded through SAFETEA-LU (Sec. 1404), is a well-known example and source of funding (2005).

Available research confirms declining activity levels for children (Trost and others, 2002) and adolescents (Sallis, 2000). However, studies have not generated robust, widespread evidence that walking to school yields a statistically significant increase in children's daily activity level (Dietz and Gortmaker, 2001, Krizek, Birnbaum, and Levinson, 2004). For example, one study found no effect on total activity for five-year olds driven to school (Metcalf and others, 2004); another found increased total activity correlated with walking to school, yet with statistical significance only in boys (Cooper and others, 2003). Possible explanations as to why this seemingly obvious association (walking to school increases activity levels) has not been robustly supported by empirical evidence include the following: (1) statistical issues (insufficient sample size; large among-individual variability; walk-commuting yields only a minor percent increase in activity level; sample bias), (2) compensating behaviors, whereby walk-commuting leads to reductions in non-commuting activity level, and (3) use of cross-sectional rather than time-series survey design. Furthermore, most of the research on this topic was not conducted in the U.S. Additional research on U.S. populations is crucial before substantive conclusions can be drawn as to whether (1) altering neighborhood design will increase walking to school, and (2) increasing walking to school would yield a significant increase in daily activity level.

Vehicle miles traveled (VMT) in the U.S. has been increasing steadily at an estimated 2.5% per year, placing further concern on rising congestion, air pollution and greenhouse gas emissions from the transportation sector (Pickrell and Schimek, 1998). If children do not walk or bicycle to school, they are typically driven by car or bus. Approximately 55% of school trips were by automobile in 2001, up from 16% in 1969 (McDonald, 2005). This increase has implications for environmental emissions and traffic. Traffic and busy roadways near schools may decrease child's safety, especially for those who walk or bike to school, a reason many walk-to-school programs include traffic calming (Staunton, Hubsmith, and Kallins, 2003). A number of states require districts to provide bussing to school at great cost, often a significant and contested portion of school district budgets, especially with current fuel prices (Belden, 2006). Approximately five percent of the St. Paul school district budget is spent on transportation (School Choice Taskforce, 2005), and bus service is provided to all children who live more than 1.6 kilometers from school. Other states do not require bussing, thereby increasing children's commuting by private automobile.

Chapter 3
Research Approach

We administered a household survey to residents in two communities. We briefly describe the nature of the survey, its administration, and resulting sample next.

3.1 Survey Administration and Survey Area:

The survey[1] consisted of over 30 questions to measure the school transportation modes used by non-high school (grades K to 8) students, the route taken to school, and their parents' attitudes about school and transportation choices. Our study focuses on two Minnesota communities which were selected based on a number of factors including variation in type of urban form (urban versus suburban), the presence of school choice, and most importantly, school district willingness to facilitate survey administration. We studied, as described in Table 1(Appendix A-1): St. Paul (the capital of Minnesota) and Roseville (a group of neighboring suburbs to the north) Area Schools.[2] In Minnesota, school districts are required to provide bus service to students living more than 1.6 kilometers from the school they attend. Figure 1(Appendix B-1) shows the school district boundaries and the location and type of each elementary school.

Roseville's post-WWII development pattern is typical of U.S. suburban development. In contrast, St. Paul was largely developed before WWII, and enjoys many attributes of a walkable community (e.g., sidewalks, local streets, relatively high density). In St. Paul, 95% of elementary school students live within 1.6 kilometers of an elementary school. This fact suggests that the theoretical minimum bussing is near-zero.

To increase diversity in neighborhood and choice schools, geographic boundaries for St. Paul's neighborhood schools are not always contiguous, and socio-economic status (specifically, whether a student qualifies for reduced-cost or free lunch programs) is used for selection to increase magnet school diversity (Schellenberg and Porter, 2003). In 1974, almost all students in the St. Paul school district attended a school located in or near their neighborhood. Today, any public school student in St. Paul is eligible to attend a "choice" school, and an estimated 67% attended a school that is not their neighborhood school (School Choice Taskforce, 2005).

In late May 2007, we mailed surveys to 8,744 households with children in grade K-8, 6,000 in St. Paul and 2,744 in Roseville. School districts provided home addresses for mailings. We maintained confidentiality by using an off-site mailing service and never saw home

[1] The survey was developed in concert with the Saint Paul Public School District and the Roseville Area School District. Our survey questions were informed by the Marin County Safe Routes to School Parent Survey (http://www.marinbike.org/Campaigns/SafeRoutes/PlanningSRTS.shtml), the New York City Walk to School Parent/Guardian Survey (http://www.nyc.gov/html/dot/downloads/pdf/wts_psurvey.pdf), and the Michigan Fitness Walk to School Day Parent Survey (www.michiganfitness.org/WalkToSchool/documents/parentsurvey.doc).

[2] The Roseville Area School District serves Roseville plus the municipalities of Arden Hills, Falcon Heights, Lauderdale, Little Canada, Maplewood and Shoreview (all of which are too small to have their own school districts).

addresses. The survey was translated into Hmong, Somali, and Spanish for households with dominant languages other than English. One week later, we followed up with reminder post cards.[3] We received 2,185 completed surveys, for a 25% response rate, 215 surveys were returned as undeliverable. Among the 2,185 completed surveys, 84% provided the prerequisite information necessary to calculate an important variable for this analysis: distance to school.[4] The analysis focuses on elementary grades (excluding grades 7 and 8), resulting in a final sample of 1,444. We calculated distance to school as the shortest road network travel distance using ArcGIS v.9.2.

Table 2 (Appendix A-2) compares our sample and community statistics of the general population (retrieved from Census 2000). Our sample is both whiter and wealthier than the overall population, an occurrence similar to previous surveys conducted in these districts (Schellenberg, 2007). While the difference in percent white/non-white is marginal, the overall school population is less white than the city population at-large: 30% and 75% of all students are non-white in Roseville (Kennedy, 2007) and St. Paul, respectively (St. Paul Public Schools, 2005). The greater affluence in our sample may represent a response bias (i.e., higher-income parents were more likely to respond to the survey) and/or a reflection of the sampled populations (i.e., parents could be more affluent than the general public, as college students and retirees, with lower than population average incomes are included in Census data but not heavily represented in our survey population (U.S. Census Bureau, 2006)). The results reveal that the Roseville magnet school has a higher median household income ($84,838) than Roseville neighborhood schools ($70,539) and both Saint Paul neighborhood schools ($61,386) and Saint Paul magnet schools ($58,828). The household size of the sample (4 people per household) was also larger than the Census average (2.2 and 2.5 people per household in Roseville and St. Paul respectively). Survey respondents were overwhelmingly female (78 and 81% in Roseville and St. Paul).

[3] Of the 2,744 surveys sent in Roseville, the representation of household languages included 108 Spanish, 118 Hmong, 21 Somali, and 2497 were English. Of the 6,000 surveys sent in Saint Paul, 665 were Spanish, 1,063 were Hmong, 107 were Somali, and 4165 were English.

[4] Roughly 400 respondents did not provide information on where their child attends school and/or complete home addresses that could be located using geographic information systems.

Chapter 4
Results

4.1 Comparison with National Data

Table 3 (Appendix A-3) compares our survey results against national survey data, showing travel mode versus travel distance.[5] For this table, we converted the survey data into school commuter person-trips (ten person-trips per week per survey respondent). General trends between national and local data are similar: walking dominates for short travel distances (under 0.8 kilometers) only,[6] and is infrequent for greater-than-0.8-kilomter school commutes. Overall, walking is less prevalent (from 2 to 29% less) in the local data than in the national data, for all distances except those greater than 4.8 kilometers. Only 12% of our sample walked or bicycled to school in the previous week. Local data exhibit higher bus use and lower auto use for all distances than do national data. This difference may reflect the state's mandatory policy that bus service be provided for children living more than 1.6 kilometers from school. [7]

4.2 Comparison of To-school and From-school Trips

Studies have indicated that travel mode differs between to-school and from-school commutes (Schlossberg, Phillips et al. 2005). Results from our data suggest similar findings. Walking is most common for short distances and in from-school (afternoon) commutes. Bussing is more common than automobile in trips from-school, especially at distances between 1.6 and 4.8 kilometers.

Additionally, we found that (1) many students relied on different modes going to and from school (35%) and (2) generally 40% of students used at least two different modes during the week. Examining all five to-school trips, 77% of respondents used one travel mode. A similar value, 78%, applies to from-school trips. While 40% of students used at least two modes, students tend to have a dominant travel mode: 99 percent have a dominant (between three and five trips per week) mode for to-school and a dominant mode for from-school commutes; furthermore, 89 percent have a dominant mode when considering all 10 weekly trips (i.e., 6 or more trips by one mode). We conclude that for many (not all) research questions employing dominant mode per individual is a useful simplification.

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[5] Student grade levels differ between our sample (K-6) and the national data (K-12). On average, we expect that school commutes are shorter for younger than for older students, because elementary schools typically are smaller and closer to home than schools for older children. Thus, the lower level of active travel locally compared to nationally is likely explained in part by differences in targeted population (elementary school students locally; all grades nationally).

[6] Walking and cycling are combined in the national data; our survey differentiated these two modes but for simplicity we combined them for the analyses presented here. In our survey, walkers outnumbered bikers 35 to 1.

[7] Students busing at distances of less than 1.6 kilometers may live on a bus route, and if the bus passes by a student's home the child may be added to the route. Additionally, children with special needs are also provided bus service.

4.3 Travel for magnet schools versus neighborhood schools

We examined relationships between dominant travel mode and distance, separated by school type and school district (Table 4 – Appendix A-3). For illustrative purposes, we focus our discussion on St. Paul. Figure 2 (Appendix B-2) displays the locations of one neighborhood and one magnet school in St. Paul and the home locations of respondents who attend the respective schools. The data show similarities in travel mode between magnet and neighborhood schools, for similar distances to school. The percentage of St. Paul children that walk or bike is similar for neighborhood and magnet schools at distances less than 0.8 kilometers and begins to decrease sharply after 0.8 kilometers, though the percentage of students walking is nearly two times greater at neighborhood schools in the 0.8-1.6 kilometer interval. For commute distances greater than 1.6 kilometer, bussing is more common than automobile, and the proportion of students being bussed is greater at magnet than at neighborhood schools. As St. Paul only offers bus service at distances greater than 1.6 kilometer, the former finding appears to reflect school policy.

When comparing commutes in terms of total number of trips (i.e., not stratifying on travel distance, as was done above), walking and driving are less common for magnet than for neighborhood schools. Compared to neighborhood schools, mode share at magnet schools is three times lower for walking (27% neighborhood; 9% magnet), 30% lower for driving (42%; 30%), and two times higher for bussing (30%; 61%). For both types of school, driving represents the largest share for the 0.8-1.6 kilometer distance (50 and 54% of trips for neighborhood and magnet schools, respectively), highlighting the low number of elementary school children that walk this distance.

Attending a magnet school often increases commute distance. A graph comparing distance to neighborhood and magnet schools in St. Paul (Figure 3 Appendix B-3) explains this finding; a greater percent of neighborhood school students live closer to school. The data indicate that median travel distance is a factor of 2.7 greater for magnet than neighborhood schools (4.3 km versus 1.6 km). The portion of students commuting more than 3.2 kilometers is 2.5 times greater for magnet than for neighborhood schools (43% versus 17%). Increasing commute distance lowers rates of walking (McDonald, 2007).

4.4 Explaining School Selection and Travel

This section explores (1) reasons parents chose magnet schools and (2) differences by race, sex and income.

Table 5 (Appendix A-3) compares survey respondent attitudes on neighborhood and magnet school attributes. When parents were queried about the primary reasons behind what school their child attended, three criteria (of ten offered in the survey) were very or somewhat important for most parents: quality of teachers, size of class and curriculum. Among magnet school parents, 88% ranked curriculum as very or somewhat important compared to 76% of neighborhood school parents (statistically significant at $p < 0.01$). As most magnet schools offer a specialized curriculum (language, math and science, arts, and others) this is not surprising. Other differences include the importance of being close to home, higher among neighborhood

parents, and the importance of bus service, higher among magnet parents. A greater percentage of magnet parents also identified diversity as an important attribute ($p < 0.01$).

When analyzed by race, a notable difference between white and non-white parents emerge, as shown in Table 6. Our non-white respondents were generally poorer than the median income level and lived farther from school [$p < 0.01$]. Seventy-two percent of non-white parents ranked the availability of school bus service as very important as opposed to 42% of white parents ($p<0.01$). There were also some differences between white and non-white parents' responses to important factors in determining whether their child rides the bus. Eighty one percent of non-white parents placed bus stop safety—child safety waiting for the bus—as 'very important' compared with only 66% of white parents ($p<0.05$). Non-white parents were more concerned about cold temperatures at the bus stop ('very important' 63%) than white parents ('very important' 25%) ($p<0.01$). Non-white parents also placed greater importance on the school being close to home and diversity.

Overall, among the eight offered reasons why children did *not* recently walk or bicycle to school, distance was primary reason (61% of the sample) and difficult crossings, at 44%, the second. This finding suggests that school district policy and magnet school popularity is strongly affecting children's ability to walk or bike to school.

Differences in income and sex are as follows. When a child was driven to school, 66% of all drivers were female in both neighborhood and magnet schools. Roughly 42-47% of children (neighborhood-magnet) who were driven to school, did so as part of a parent's trip to work, while 42-45% of children (neighborhood-magnet) were driven in a separate trip. Only 12% of neighborhood and 7% of magnet school children travel to school in a carpool. The sex of the child did not have any significant effect on mode choice. Those with an income below the county median level lived slightly farther away from school: at a median distance of 2.8 kilometers, compared to above median income median families at a distance of 2.4 kilometers.

4.5 Comparison of Results in Roseville

This section highlights results in Roseville and contrasts them to those in St. Paul, first examining travel mode between magnet and neighborhood schools, and second school selection and travel by school type, race, and income. Compared to St. Paul, Roseville has greater bussing and auto use and less walking at short distance, and greater bussing and lower driving at distances between 0.8 and 4.8 kilometers. Fewer students attending the magnet school walked at all distance intervals, especially at distances less than 0.8 kilometers). Considering total trips, mode share at Roseville magnet schools is nine times lower for walking (9.7% for neighborhood; 1.1% magnet) and 13.6% higher for bussing (63.4%; 55.5%), and only one percent different for auto use (35.5%, 34.5%). Similar to St. Paul, a graph of distance to school shows a greater percentage of Roseville neighborhood school students live closer to their school.

Comparing Roseville survey respondent attitudes between neighborhood and magnet school parents, the same three reasons behind what school their child attended—quality of teachers, size of class, and curriculum—were somewhat or very important for most parents. Unlike St. Paul, however, the differences were not statistically different. Neighborhood parents

value closeness to home and closeness to work more than magnet parents. Examining differences by race, 60% of non-white parents ranked school bus availability as very important compared to 42.8% of white parents (statistically significant at $p < 0.05$). Other differences include the importance of class size and school start time, higher among white parents (both at $p < 0.05$), and diversity and closeness to work, higher among non-white parents (both at $p < 0.05$). Distance to school and difficult crossings were again the primary reasons for not walking to school recently. Differences in respondent behavior are similar to those in St. Paul. Among children who were driven to school, approximately 47-56% (neighborhood-magnet) did so as part of a parent's trip to work and 42-44% (neighborhood-magnet) did so in a separate trip. A much lower percentage carpooled, only 1.9% in neighborhood schools and 2.2% in magnet schools.

Chapter 5
Conclusions and Policy Implications

The interplay between educational policy and school transportation affects the travel patterns of children and parents and the transportation budgets of school districts. Our sample of K-6 students had fewer students walking and traveling by personal vehicle, and more taking the bus, than do the national data we compared against. Distance to school is important for determining child travel behavior. Magnet (i.e. school choice) schools, which draw from broader geographic regions than neighborhood schools, are less able to engage in active school transportation (walk or bicycle), not because of any difference in parental attitudes toward mode choice, but simply because they live too far from their schools to walk or bike. Additionally, the higher proportion of magnet school students riding the bus than private automobile results in a greater transportation cost for the district.

Transportation and mode choice concerns between white and non-white parents may be markedly different. Our data suggest that non-white parents (who are more likely to attend a magnet school and were generally poorer than the median income level) are more concerned than white parents about availability of bus service and safety while both waiting for the bus and riding on the bus. Families below the poverty line also lived farther away from school than wealthier ones, though this may be a function of school choice.

Our analyses capture only the first-order effects of school choice; the total impacts may be larger and must be viewed within a larger context of school and individual child performance. We cannot, for example, quantify net travel implications of school choice for children whose neighborhood school was converted into a magnet school. For children in this position, commute distance would increase, and therefore likelihood of active travel would decrease (unless they seek and obtain admission to the converted school). Because many magnet schools attempted to transform substandard schools in poorer neighborhoods, this neighborhood-to-magnet-school effect might be larger for poorer populations; further investigation would be required to make an evaluation.

Not surprisingly, a greater proportion of magnet school students rely on school bus service. As service cost becomes an increasingly important issue, school choice policy could be further evaluated in light of different transportation demands. Efforts to minimize bus miles traveled and maximize active transportation to school can be integrated into school choice planning efforts.

Tackling issues of children's school transportation highlights the need to evaluate school policy on transportation and safe routes to school initiatives in light of policies about school choice. This is an area where school districts and parents are both engaged and passionate (as evidenced by the 48% of our surveys with additional written comments). Our study only begins to uncover some of the complex and difficult issues facing parents when deciding where to send their child to school and how to get them there.

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Appendix A
Tables

Table 1: Description of Case Study Locations

Characteristic	St. Paul[a]	Roseville Area[a]
Dominant urban form	Urban	Suburban
Year(s) incorporated	1854	1948 - 1974
Year-2000 population	287,151	52,143
Population density (residents/square mile)	5,442	2,544
Number of children in public schools	40,543	6,396
Number of children in public elementary schools	21,766	3,222
Number of “neighborhood” elementary schools	21	6
Number of ”magnet” public elementary schools	34	1

[a] The first five rows refer to the municipalities; remaining rows refer to the school district. Roseville is similar in urban form to the other cities in the Roseville Area district.

Table 2: Comparison of Census 2000 and Survey Respondent Demographics

	Roseville Area, MN[b]		St. Paul, MN[b]	
Characteristic	**Census 2000** (%)	**Survey** (%)[a]	**Census 2000** (%)	**Survey** (%)[a]
Child Sex[c]		99.2		98.5
Female	49.8	52.9	47.9	47.1
Male	50.2	46.3	52.1	51.4
Respondent Sex		98.4		99.1
Female	52.8	78.5	51.6	80.7
Male	47.2	20.0	48.4	19.3
Race		99.6		99.6
White	86.4	84.5	64.0	68.3
African American	3.2	2.5	11.4	8.6
Asian	7.1	7.0	12.3	10.6
American Indian	0.4	1.2	1.0	1.4
Hispanic or Latino	2.3	3.1	7.9	7.6
Other	0.6	1.4	3.3	3.1
Income		96.1		96.2
0 - 19,999	15.2	3.3	23.3	9.6
20,000 - 39,999	23.5	9.3	28.0	15.5
40,000 - 59,999	20.3	13.4	20.1	16.9
60,000 - 79,999	14.4	19.0	12.0	17.0
80,000 - 99,999	11.1	18.2	7.3	13.8
100,000 - 119,000	5.2	14.1	3.4	10.3
120,000 - 150,000	10.2	18.8	5.9	13.1
	Median	Median	Median	Median
Respondent Age	38.2	41	31.8	40
Household Income	50 573	80 000	38 774	65 000
Family Size	2.9	4.0	3.3	4.0

[a] Percentages may not add up to 100% due to missing values

[b] n = 516 in Roseville and 917 in St. Paul

[c] Census imputed for children in public elementary school, grades K thru 6

Table 3: Comparison of National[a] and Local Student Travel Mode Data[b]

Distance to School (km)		< 0.4		0.4 - 0.8		0.8 - 1.6		1.6 - 3.2		3.2 - 4.8		>4.8		% of Total	Total Trips
		%	n	%	n	%	n	%	n	%	n	%	n	%	n
National	Bus	5.1	-	3.3	-	10.2	-	25.3	-	34	-	42.6	-	20.1	-
Data	Auto	15.5	-	42.6	-	54.5	-	64	-	60.9	-	56.8	-	49.1	-
School	Walk/Bike	79.4	-	54.1	-	35.3	-	10.7	-	5.1	-	0.6	-	30.9	-
	Bus	10.3	79	17.3	246	42.6	1 044	60.0	2 016	70.7	1 838	61.9	2 378	52.6	7 601
Local	Auto	18.7	144	29.9	424	40.1	983	37.4	1 257	28.5	740	36.6	1 404	34.3	4 952
Survey	Walk	69.5	535	50.8	721	14.9	364	0.9	31	0.5	14	1.1	41	11.8	1 706
Data	Bike	1.3	10	1.3	19	1.3	33	1.2	40	0.2	4	0.0	1	0.7	107
	Other	0.3	2	0.7	10	1.1	26	0.5	16	0.2	4	0.4	16	0.5	74
	Total	100	770	100	1 420	100	2 450	100	3 360	100	2 600	100	3 840	100	14 440
Difference	Bus	5.2	-	14.0	-	32.4	-	34.7	-	36.7	-	19.3	-	32.6	-
(Local -	Auto	3.2	-	-12.7	-	-14.4	-	-26.6	-	-32.4	-	-20.2	-	-14.8	-
National)	Walk/Bike	-8.6	-	-2.0	-	-19.1	-	-8.6	-	-4.4	-	0.5	-	-18.3	-

a: Source: Adapted from Table 28 (McDonald, 2005)
b: National data for K-12, local data for K-6

Table 4: Comparison of Neighborhood and Magnet Student Travel Mode to School Data in St. Paul

Distance to School (km)		< 0.4		0.4 - 0.8		0.8 - 1.6		1.6 - 3.2		3.2 - 4.8		>4.8		% of Total	Total Trips
		%	n	%	n	%	n	%	n	%	n	%	n	%	n
St. Paul	Bus	6.9	18	3.7	21	16.2	114	40.3	289	51.4	200	60.7	318	30.3	960
Neighborhood	Auto	15.8	41	28.3	163	50.8	358	55.6	399	48.6	189	37.2	195	42.4	1 345
School	Walk/Bike	77.3	201	68.0	391	33.0	233	4.2	30	0.0		2.1	11	27.3	866
St. Paul	Bus	6.4	16	10.1	31	29.5	143	67.3	766	74.2	955	69.0	1 773	61.0	3 684
Magnet	Auto	21.6	54	20.6	63	53.8	261	30.5	347	24.6	316	30.2	776	30.1	1 817
School	Walk/Bike	72.0	180	69.3	212	16.7	81	2.2	25	1.2	16	0.8	21	8.9	535
Difference[a]	Bus	-0.5	-	6.5	-	13.3	-	27.1	-	22.8	-	8.3	-	30.8	-
(Magnet -	Auto	5.8	-	-7.8	-	3.0	-	-25.1	-	-24.0	-	-7.0	-	-12.3	-
Neighborhood)	Walk/Bike	-5.3	-	1.3	-	-16.3	-	-2.0	-	1.2	-	-1.3	-	-18.4	-

a: Difference in bus significant at 0.5-1.0 ($p<0.05$) and 1.0-2.0 and 2.0-3.0 ($p<0.01$). Difference in auto significant at 1.0-2.0 and 2.0-3.0 ($p<0.01$). Difference in walk/bike significant at 0.5-1.0 ($p<0.01$) and > 3.0 ($p<0.01$).

Table 5: Importance of School Attribute in Choosing School Comparison between Neighborhood and Magnet School Parents

	St. Paul Neighborhood Schools (%)[a](n=322)					St. Paul Magnet Schools (%)(n=605)					Difference
School Attribute	Very	Somewhat	Not very	Not at all	Does not apply	Very	Somewhat	Not very	Not at all	Does not apply	Statistic[bc]
School bus service available	32.9	23.6	13.7	22.7	5.6	56.0	24.6	7.9	8.6	2.1	-6.23**
Close to home	49.4	40.4	8.1	0.6	0.6	31.1	46.1	16.0	4.5	1.0	-6.01**
Quality of teachers	95.0	3.4	0.6	0.0	0.3	95.5	3.3	0.5	0.0	0.2	-0.16
Size of class	71.1	26.1	1.6	0.0	0.0	64.8	29.8	4.1	0.5	0.0	-2.16*
Diversity	33.5	46.6	13.0	2.8	1.2	45.5	40.8	9.6	2.3	0.2	-3.17**
Curriculum	75.8	19.9	1.6	0.0	0.6	85.0	13.1	0.5	0.2	0.3	-3.28**
Close to work	5.0	16.8	33.9	33.2	9.3	6.6	20.8	34.4	29.8	6.3	-0.69
School start time	20.2	38.2	29.2	10.9	0.6	20.2	37.4	28.3	12.9	0.3	-0.49
Distance from other child's school	9.6	18.9	18.6	10.2	40.4	36.4	11.7	20.2	18.5	11.6	-0.77

a: Percentages may not add up to 100% due to missing values
b: Reporting Z-statistic from Mann Whitney u-test (2-tailed significance)
c: * $p < 0.05$ ** $p < 0.01$

Appendix B
Figures

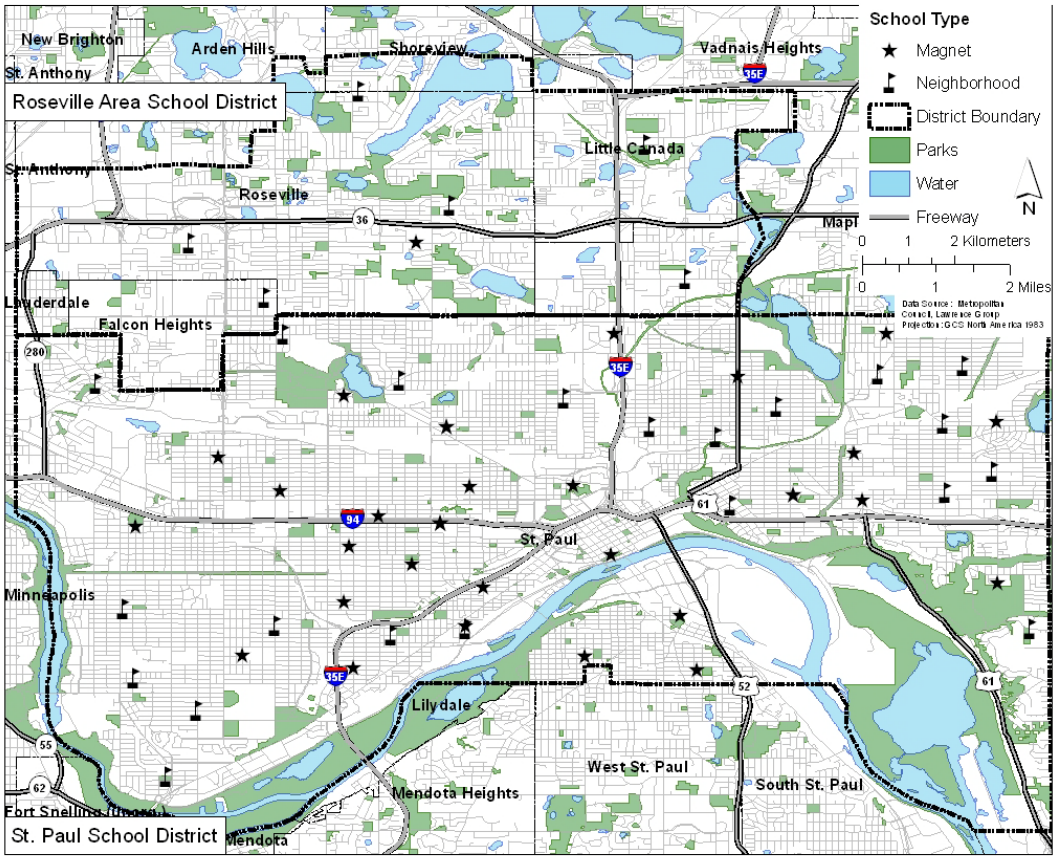

Figure 1: Location of St. Paul and Roseville area elementary schools

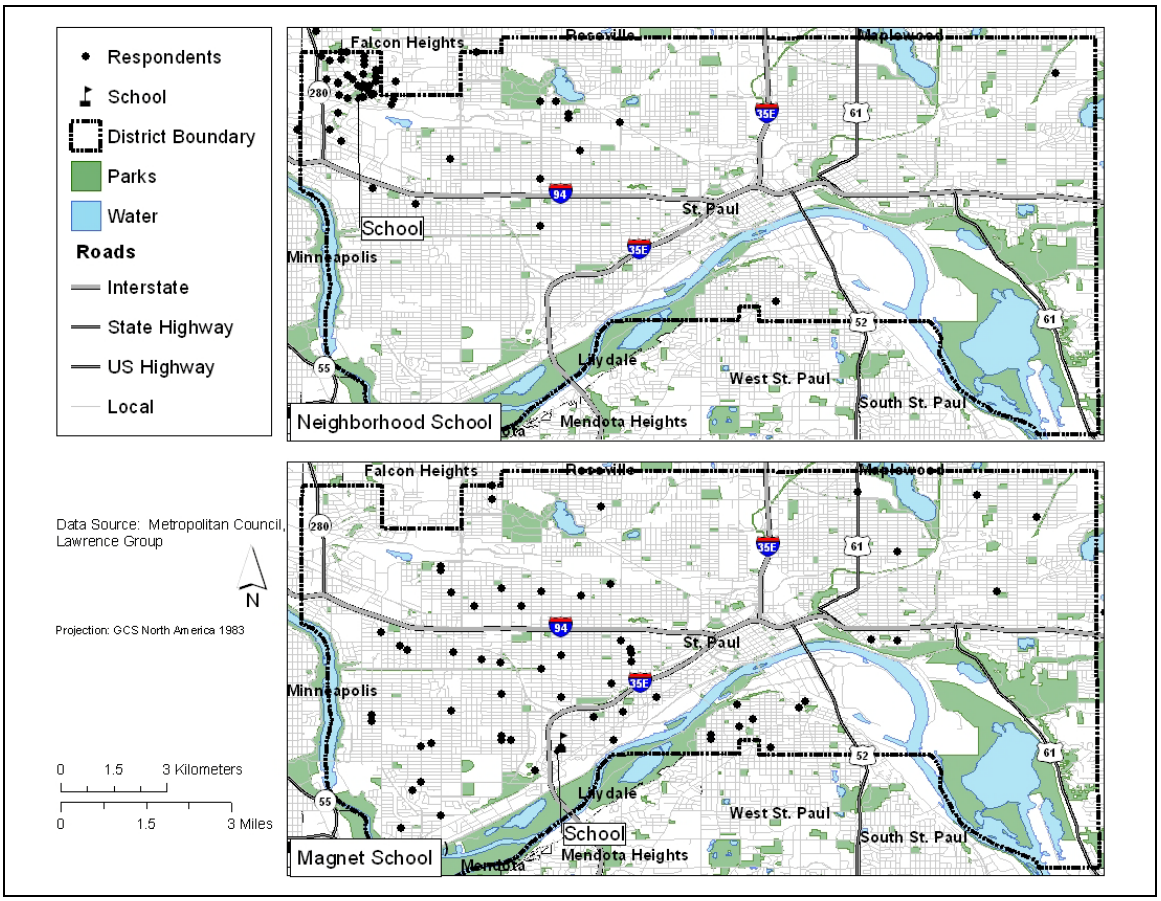

Figure 2: Locations of one neighborhood and one magnet school in St. Paul and the home locations of respondents who attend the respective schools

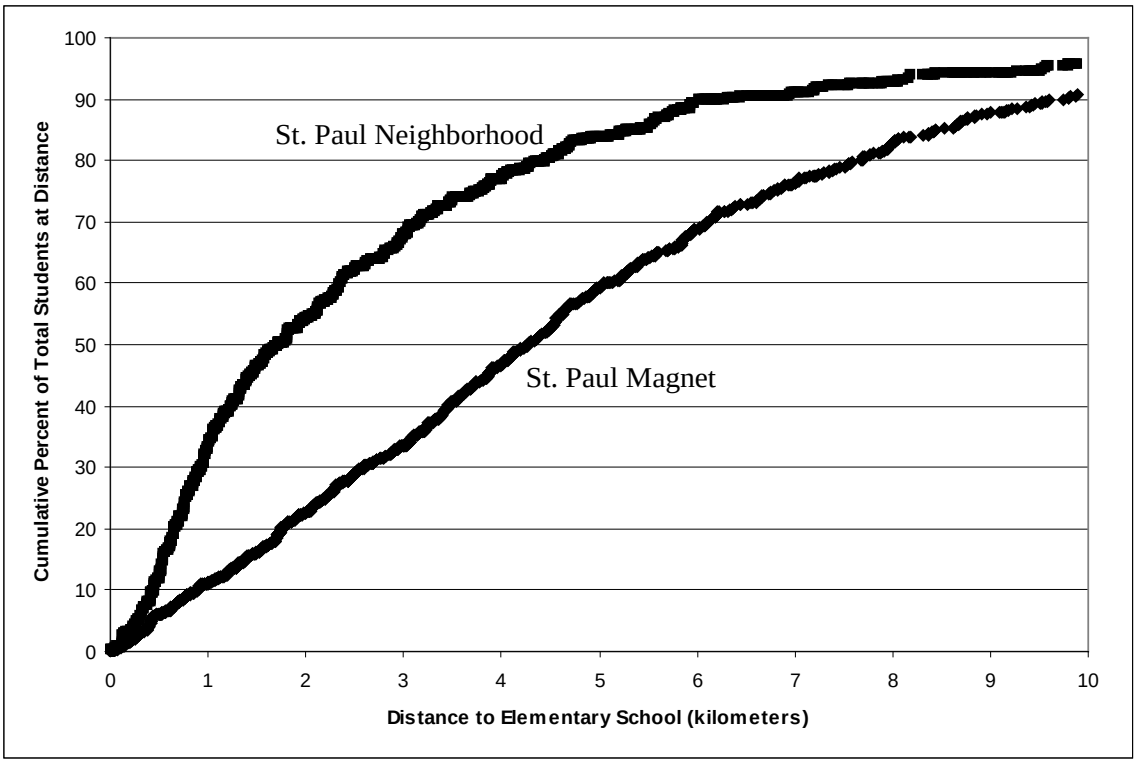

Figure 3: Travel distance by School Type and School Location Explaining School Selection and Travel