



# Northfield Middle School Transportation Study

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# Introduction

In 2009, the city of Northfield conducted a study on safe routes to school. The purpose of this study was to examine transportation practices at four schools to better understand reasons why students do not utilize alternative methods of transportation, specifically biking and walking. This study, however, only examined the responses of parents, not the students themselves. Incorporation of student input is key to providing new school transportation policy. It can tell us why students prefer certain modes of transportation over other, and what external factors influence these preferences. So, by understanding student preferences, we can better shape the external factors that influence their routines and social practices, in an effort to improve their transportation experiences. The following studies used three different methodologies to better assess Northfield Middle School students' opinions, preferences, and practices when it comes to transportation home from school. We distributed surveys, led focus groups, and conducted interviews with middle school students to collect information on student perspectives on transportation home from school.

The studies on Northfield Middle School were limited by sample size. The survey study had the highest number of participants, 91, while the focus group and interview studies relied on information from 4-14 students. The small sample size renders the data less applicable on a larger scale. Although we can draw conclusions about the specific groups interviewed, we cannot necessarily apply those same findings to the larger middle school community. Further research on student preferences and behavior should be conducted before any policy or infrastructure is implemented.

The data collected from all three studies yielded several main findings. These findings were:

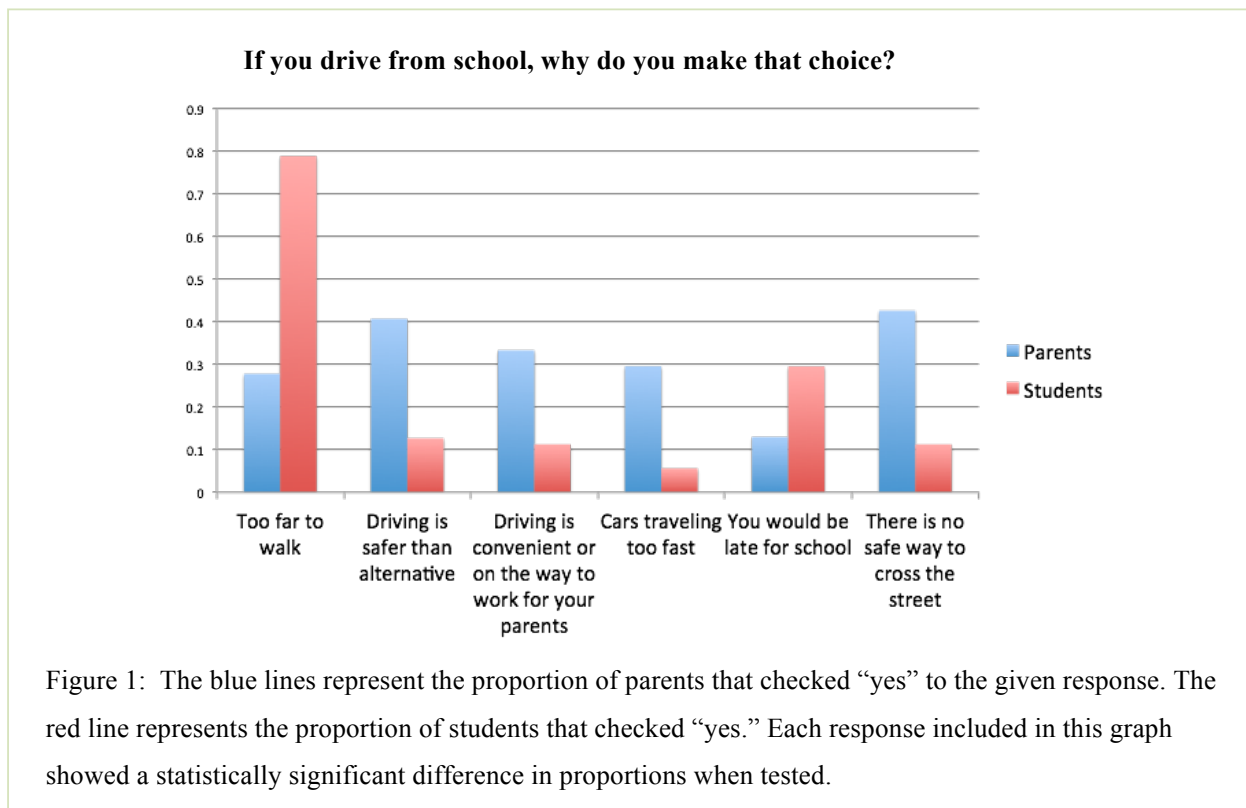
- Students are not very concerned about safety (especially when compared to their parents)
- Distance matters
- Students prefer to be driven home from school
- Understanding biking as a social practice can help us understand why students do not bike, and figure out ways to encourage more students to bike in the future

The following report will elaborate on each study's methodology and findings, and will make recommendations based those findings.

# Survey Study

Our study gathered students' opinions through a survey and compared them to those of their parents. We hypothesized that middle school students have different experiences and opinions about after-school transportation than their parents.

We modified the survey conducted in the original Safe Routes study to make it more accessible to middle school students. We kept the questions as similar as possible so as to avoid bias and best compare responses between students and parents. Our survey was distributed online to a random sample of 200 students and accessed through iPads during school. We had a response rate of 97 (46%). After our data was collected, we analyzed the results to see if there was a significant difference between responses.



We found that there is a significant discrepancy between students' and parents' preferences surrounding safety. As seen in Figure 1,

- Most of the responses that parents selected more than students were concerned with safety.

- Options that students selected more than parents are generally more related to convenience.

This pattern holds true for many other questions on the survey (Appendix A). When participants were asked why they didn't walk or bike to school, parents chose safety related responses (e.g. broken sidewalks and bad lighting) significantly more often and students were much more likely to say they were comfortable to walk to school. Even though students tend to value safety less than parents, this doesn't mean we should disregard safety in policy decisions, but it does show that to create incentive for kids to walk or bike, we should consider other factors like students' preferences. The next steps in this research are to look at whether or not students act on these differing preferences--how much autonomy do students have in deciding how they get home from school?

## Focus Group Study

Focus groups of middle school students were used to assess student preferences about methods of transportation from school and to determine how much autonomy students have to act on those preferences. Based on the survey results that student preferences differ from those of their parents, our questions focused on identifying the transportation options available to students, their preferences, and whether or not their actual method of transportation home from school reflects their indicated preferences.

In focus group discussions, questions are open-ended which allows students to fully explain their opinions. Focus groups were separated by grade so we could compare potential differences in the degree of autonomy children exercise as they get older. We ran three focus groups with 4-14 students of 6th, 7th, and 8th graders, respectively. We used the following five categories to code focus group transcripts: (1) Methods of transportation home from school; (2) Student preferences; (3) Physical constraints; (4) Parental constraints; (5) Factors influencing student transportation.

We found that most students (18 out of 23) took the bus home from school. Students who lived close to school often walked or biked home. Some students also got picked up by a family member or carpooled.

Students were then asked to indicate their preferences regarding transportation from school. Most said that they would prefer to be driven home because driving is faster and more convenient. Several students indicated that they would walk or bike if they lived closer to school, which suggests that distance limits their transportation choices. When asked specifically about constraints in after-school transportation, distance also arose as a main problem. Although students expressed that their parents did not enforce rules on how they got home from school, students often could not get home by their preferred method - getting pick up by their parents - due to their parents' schedules.

When there were multiple after-school transportation options, students exercised their autonomy to choose their preferred method. Convenience largely influenced these preferences. For example, due to problems with the bus system, students preferred other methods of transportation such as getting a ride home from school.

In sum, student autonomy is limited by physical and parental constraints. Distance played the largest role in determining the transportation available to students. Therefore, students who lived within walking distance exercised the most autonomy over their transportation decisions. Given the available options defined by distance and parental constraints, students preferred and often chose the method that they found most convenient, reinforcing the survey group's finding that student preferences were mostly determined by convenience rather than safety. Most students said that they would prefer to be driven because driving is faster and more convenient, while a few students who preferred to walk or bike to school raised concerns about safety. These findings provide insight into ways the existing facilities can be improved to meet student demand. Increasing the convenience of the bus system could shift students preferences. In the future, finding a way of encouraging alternative methods of transportation might alter student preferences and make them more inclined to walk, bike, or take the bus.

## Interview Study

We interviewed eight middle school students, six of whom identified as bikers, and two of whom identified as non-bikers, on the social practice of biking home from school. Social practice theory depicts the very act of “biking” as a practice that is shaped by a set of social, cultural and environmental circumstances. The students are not individually, rational decision makers, but rather “carriers” of the social practice. The students’ practice of biking is not shaped by their own decisions, but rather their exposure to these external circumstances which shape the social practice. In other words, under social practice theory, a student does not make a rational choice to bike to school, but rather does so because they adopt a social practice that exists because of the social, cultural and environmental circumstances that shape it.

In the interviews, we asked our participants the same general questions and afterwards coded our answers to find trends. Through our interviews, we were able to assemble a detailed description of the social practice of biking home from school. The practice consists of physical factors like the equipment itself, including the bike and helmet, the weather, the time actually spent biking, mobility with large objects such as musical instruments and influence of cars on the route; and social factors such as parental and peer pressure, social interaction, and the student’s day to day schedule. Take the hypothetical student, Chuck, for example.

Chuck is a student who bikes to and from school on a regular basis. His experience is shaped by the above listed factors. He begins by leaving home in the morning. As he passes by his friend Paul's driveway, his friend joins him and they bike together. The two jump over potholes on the way, make jokes and talk about school, and after a few minutes, they arrive. They lock their bikes up on the bike rack behind the school. At the end of the school day, Chuck goes straight home while carrying his trumpet in one arm, and Paul stays for lacrosse practice. The previous week, Chuck waited for Paul to pump up his rear tire before they continued on from Paul's house. The next day, it snows about two inches, so school remains open but Chuck and Paul carpool to school because they don't bike in the snow. These actions that make up Chuck and Paul's social practice are not rational decisions, they are simply parts of their routine that they don't rationally think about. He doesn't say "Now I'm going to pass Paul's house." It just happens, because it is part of the practice.

The non-bikers each identified a set of obstacles that they say contribute to their choice not to bike. These obstacles did not, however, seem to present any hindrance to the biking practice of any of the bikers. Specifically, the bikers had no significant issues with potholes, interference from cars, or even distance, while these were some of the factors identified by non-bikers as reasons why they do not bike. Consider another hypothetical student, Joey. Joey does not bike to school, but rather gets driven every morning by a parent. He knows how to bike, he has his own bike, and sometimes bikes for fun. When asked about biking for school transportation, he says that he has simply never thought about it, but now that he does think about it, he thinks it's something he could try. He doesn't say that it would be too dangerous because of cars, or that he's worried about falling. It really just comes down to the fact that he's never considered trying it. He starts to think about "what will I do with my saxophone?" and "where will I leave my bike while in school." He can get these questions answered by talking to his peers, and simply adapting to the practice. The bike racks are there, so he'll use them, and he'll get the hang of riding while carrying an instrument. This will become a routine social practice.

One of the non-bikers we interviewed suggested an incentive system for encouraging students to walk or bike (or any type of alternative transportation) to school. She suggested a reward be given to students who at least *try* the new transportation, and rewards greater in value to students who bike sometimes, and students who bike every day. She thinks that if the reward system persisted for a few weeks, students who decided to start biking would continue doing so anyway even after the rewards ceased to be distributed. When interviewing the other non-biker, we asked if that reward system would cause her to try biking, and she said it would. Possible rewards would not have to be expensive or even of any great substance. Suggestions included "budge" passes (to cut in the lunch line), free popcorn, recess passes, candy or coupons. Of these, budge passes and recess passes would be free for the school to distribute, and free

popcorn and candy would likely not present any serious cost. Coupons could potentially be donated by area businesses as a contribution to the effort to encourage biking.

Our findings suggest that perhaps the greatest obstacle to biking becoming a common form of transportation is the lack of awareness of biking as an option among students. Despite the non-bikers' claims that inadequate infrastructure and physical barriers prevent them from biking, bikers did not seem hindered by these barriers and infrastructural inadequacies. However, we still must consider that there may be barriers for students who do not take part in the social practice. There is a certain level of skill required to participate in this social practice, and students who know how to bike, but are still uncomfortable riding in traffic and maneuvering potholes may be set back by these barriers. If biking is approached in this way, new solutions can be considered that treat biking as a social practice. A possible solution would be to encourage bicycling when students are at a younger age. All of the bikers we interviewed learned how to bike before kindergarten, and all but one started biking to school by 4th grade. If we can get school or town officials to implement programs or incentives to get elementary school children to bike to school, they may develop sustainable transportation habits that would continue through middle school. Other similar solutions aimed to any student age group would focus on encouraging students to adopt the social practice, rather than simply trying to shape the set of physical barriers around them.

## Conclusion

The studies conducted at the Northfield Middle School indicated that students do have preferences, complaints, and recommendations when it comes to transportation home from school, and that their opinions should be considered in improving students' commuting environment. By considering student opinions, resources can be used more effectively to solve the actual identified problems, rather than to attempt to fix physical infrastructure that may not actually act as a significant barrier in the first place.

The population of students sampled indicated that, even if alternative methods of transportation were more readily available, most students would prefer to be picked up from school by a family member. This finding illustrates that, in addition to implementing policy or infrastructure to improve walkability and encourage students to bike, Northfield Middle School should focus on shifting student preferences towards alternative modes of transportation. When done in this order, infrastructure improvements can be made to fit students' needs. This approach would be more effective than constructing infrastructure under the assumption that students are already inclined to use alternative modes of transportation.

Appendix A: Difference in proportions and test for significance results

How do you usually get home from school?							
	Proportion of Parents	Proportion of Students	Difference in Proportion (parents-students)	Standard Error	Z-Score	p-value	
School Bus	0.46	0.66	-0.21	0.08	-2.70	0.0035	
Car	0.25	0.23	0.02	0.07	0.27	0.394	
Carpool	0.07	0.00	0.07	0.03	2.31	0	
Walk	0.14	0.06	0.08	0.05	1.74	0.05	
Bike	0.07	0.02	0.04	0.03	1.25	0.092	
City Bus	0.00	0.02	-0.02	0.02	-1.43	0.5	

Why do you choose to drive from school?							
	Proportion of Parents	Proportion of Students	Difference in Proportion (parents-students)	Standard Error	Z-Score	p-value	
Too far to walk	0.28	0.79	-0.51	0.08	-6.56	0.00	
Driving is Safer	0.41	0.13	0.28	0.08	3.61	0.00	
It is convenient	0.33	0.11	0.22	0.07	2.97	0.00	
Cars are too fast	0.30	0.06	0.24	0.07	3.53	0.00	
Child is not old enough	0.02	0.06	-0.04	0.03	-1.13	0.50	
Bad weather	0.24	0.30	-0.05	0.08	-0.69	0.25	
Backpack is too heavy	0.24	0.25	-0.01	0.08	-0.16	0.44	
Student is carrying project or instrument	0.30	0.23	0.07	0.08	0.89	0.19	
Student would be late for school	0.13	0.30	-0.17	0.07	-2.34	0.50	
There is no safe way to cross the street	0.43	0.11	0.31	0.08	4.07	0.00	
There is no safe place to store bikes	0.07	0.07	0.00	0.05	0.08	0.68	
There are insufficient maps	0.06	0.04	0.01	0.04	0.35	1.00	
Crime concerns	0.06	0.07	-0.01	0.04	-0.33	1.00	



How often do you walk or bike home from school?						
	Proportion of Parents	Proportion of Students	Difference in Proportion (parents-students)	Standard Error	Z-Score	p-value
P Seldom	0.70	0.82	-0.12	0.07	-1.76	0.03
P Sometimes	0.05	0.12	-0.07	0.04	-1.56	0.06
P Frequently	0.09	0.01	0.08	0.03	2.26	0.05
P Consistently	0.16	0.05	0.11	0.05	2.27	0.01

If you walk or bike from school, how cold does it have to be to change your decision?						
	Proportion of Parents	Proportion of Students	Difference in Proportion (parents-students)	Standard Error	Z-Score	p-value
0°	0.01	0.02	-0.01	0.03	-0.45	0.23
15°	0.00	0.00	0.00	0.01	-0.25	0.47
32°	0.00	0.00	0.00	0.01	0.19	0.13
50°	0.00	0.00	0.00	0.01	0.11	0.20

Which of these statements are true for your neighborhood? (choose as many as apply)						
	Proportion of Parents	Proportion of Students	Difference in Proportion (parents-students)	Standard Error	Z-Score	p-value
There are too many high speed cars.	0.81	0.11	0.70	0.06	11.98	0.00
There are high amounts of car traffic.	0.87	0.11	0.76	0.05	14.36	0.00
There are broken sidewalks.	0.25	0.16	0.08	0.07	1.26	0.10
There are gaps in the sidewalk network.	0.42	0.11	0.31	0.07	4.57	0.00
There is bad lighting (your street is very dark at night).	0.36	0.18	0.19	0.07	2.62	0.00
There is a crime problem.	0.08	0.04	0.04	0.04	0.96	0.09
There are not enough cross walks and / or school signage.	0.70	0.15	0.55	0.07	8.23	0.00
It is dangerous to walk or bike to school via sidewalks and roads.	0.81	0.10	0.71	0.06	12.49	0.00
Even with marked crosswalks, some roads are too dangerous to cross without an adult	0.87	0.11	0.76	0.05	14.36	0.00
I feel comfortable walking or biking to school.	0.36	0.53	-0.17	0.08	-2.13	0.02

Which of the following statements would affect your decision to walk or bike to school?						
	Proportion of parents who said "No"	Proportion of students who said "No"	Difference in Proportion (parents-students)	Standard Error	Z-Score	p-value
If you were with an adult	0.34	0.57	-0.23	0.08	-2.98	0.00
If you were with other kids the same age	0.43	0.44	-0.01	0.08	-0.13	0.99
If you were with an older student	0.51	0.58	-0.07	0.08	-0.87	0.38
If new sidewalks and crossings were installed	0.31	0.54	-0.23	0.08	-3.02	0.00
If you received walking and bicycle safety education from the school	0.57	0.83	-0.26	0.07	-3.64	0.00
If you lived closer to the school	0.46	0.20	0.25	0.07	3.48	0.00
	Proportion of parents who said "yes"	Proportion of students who said "Yes"	Difference in Proportion	Standard Error	Z-Score	p-value
If you were with an adult	0.44	0.16	0.28	0.07	4.04	0.00
If you were with other kids the same age	0.35	0.39	-0.04	0.08	-0.51	0.61
If you were with an older student	0.23	0.23	0.01	0.07	0.13	0.89
If new sidewalks and crossings were installed	0.60	0.20	0.40	0.07	5.60	0.00
If you received walking and bicycle safety education from the school	0.27	0.06	0.21	0.06	3.70	0.00
If you lived closer to the school	0.40	0.66	-0.26	0.08	-3.40	0.01

	Proportion of parents who said "maybe"	Proportion of students who said "Maybe"	Difference in Proportion (parents-students)	Standard Error	Z-Score	p-value
If you were with an adult	0.22	0.27	-0.05	0.07	-0.74	0.46
If you were with other kids the same age	0.22	0.17	0.05	0.06	0.80	0.42
If you were with an older student	0.26	0.20	0.06	0.07	0.89	0.37
If new sidewalks and crossings were installed	0.09	0.26	-0.17	0.06	-2.87	0.01
If you received walking and bicycle safety education from the school	0.16	0.11	0.04	0.05	0.83	0.03
If you lived closer to the school	0.14	0.13	0.01	0.05	0.19	0.85

How important are the following factors in affecting your decision to walk or bike to school?						
	Proportion of parents who answered "Not Important"	Proportion of students who answered "Not Important"	Difference in Proportion	Standard Error	Z-Score	p-value
Being accompanied by an adult or other kids	0.23	0.40	-0.16	0.07	-2.27	0.01
Crossing guards at busy intersections	0.09	0.41	-0.32	0.06	-5.10	0.00
Continuous sidewalks from your house to the school	0.16	0.34	-0.19	0.07	-2.78	0.00
Clearly marked walking and bike routes (with signs)	0.12	0.36	-0.24	0.06	-3.73	0.00
Trails connecting your neighborhood to the school	0.17	0.25	-0.08	0.06	-1.31	0.10
Traffic not exceeding speed limits in neighborhoods	0.05	0.30	-0.25	0.06	-4.45	n/a
Adequate lighting	0.12	0.38	-0.27	0.07	-4.07	0.00
Presence of McGruff safe houses	0.44	0.65	-0.21	0.08	-2.67	0.00
Secure place to park bikes	0.08	0.30	-0.22	0.06	-3.69	0.00
School education programs on walking and biking safety	0.27	0.55	-0.28	0.07	-3.69	n/a

	Proportion of parents who answered "Somewhat Important"	Proportion of students who answered "Somewhat Important"	Difference in Proportion (parents-students)	Standard Error	Z-Score	p-value
Being accompanied by an adult or other kids	0.43	0.51	-0.08	0.08	-0.98	0.16
Crossing guards at busy intersections	0.10	0.43	-0.32	0.06	-4.99	0.00
Continuous sidewalks from your house to the school	0.31	0.41	-0.10	0.08	-1.35	n/a
Clearly marked walking and bike routes (with signs)	0.34	0.47	-0.13	0.08	-1.70	0.05
Trails connecting your neighborhood to the school	0.34	0.52	-0.18	0.08	-2.34	0.01
Traffic not exceeding speed limits in neighborhoods	0.20	0.45	-0.26	0.07	-3.60	0.00
Adequate lighting	0.34	0.44	-0.11	0.08	-1.38	0.08
Presence of McGruff safe houses	0.38	0.31	0.06	0.08	0.85	n/a
Secure place to park bikes	0.44	0.33	0.11	0.08	1.41	0.09
School education programs on walking and biking safety	0.47	0.39	0.08	0.08	0.99	0.16

	Proportion of parents who answered "Very Important"	Proportion of students who answered "Very Important"	Difference in Proportion (parents-students)	Standard Error	Z-Score	p-value
Being accompanied by an adult or other kids	0.34	0.10	0.14	0.06	2.37	0.00
Crossing guards at busy intersections	0.81	0.16	-0.07	0.05	-1.30	0.00
Continuous sidewalks from your house to the school	0.53	0.24	-0.09	0.06	-1.40	0.00
Clearly marked walking and bike routes (with signs)	0.55	0.17	-0.06	0.06	-1.00	n/a
Trails connecting your neighborhood to the school	0.49	0.23	-0.06	0.06	-0.95	0.00
Traffic not exceeding speed limits in neighborhoods	0.75	0.24	-0.19	0.05	-3.57	0.00
Adequate lighting	0.55	0.17	-0.06	0.06	-1.00	0.00
Presence of McGruff safe houses	0.18	0.04	0.40	0.06	6.69	0.00
Secure place to park bikes	0.48	0.37	-0.29	0.06	-4.73	0.08
School education programs on walking and biking safety	0.26	0.06	0.21	0.06	3.70	0.00

\*Rows highlighted in green indicate significant differences in proportion between responses.