

EVIDENCE OF CHANGES BROUGHT ABOUT BY THE MICHIGAN SAFE ROUTES TO SCHOOL PROGRAM

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Abstract

This paper describes changes in student and parent beliefs, attitudes, intentions, and behaviors resulting from participation in the Michigan Safe Routes to School program. All 50 states are receiving federal funds to implement programs and build infrastructure that encourages school-aged children to walk or bike to school. This research applies a modified model of the Theory of Planned Behavior, which aims to explain the relationship between beliefs, attitudes, intentions, and behaviors. Specifically, 20 schools were evaluated pre-program and post-program using attitudinal and behavioral data collected from students and their parents, as well as classroom tallies for daily transportation behaviors. Findings show positive changes in student and parent attitudes and beliefs, while changes in intentions or behaviors were minimal. These results represent an early step forward in improving the ability of school-age students to walk and bike to school safely. We believe that affecting intentions and behaviors is a long-term process that requires the continued collaboration of students, parents, school officials, and community leaders.

1.0 Introduction

Childhood obesity is on the brink of becoming an epidemic in the United States and around the world. As a result of poor diet and lack of physical activity, health professionals are seeing serious weight-related health and social problems in today's youth including diabetes, high blood pressure, depression, and anxiety (Ludwig 2007). Studies have recommended that an increase in physical activity, along with implementation of a healthy diet, could help reduce the risk of obesity in school-aged children (Steinbeck 2001). Despite this fact, there has been a steady decline in the percentage of students walking and biking to school in the United States over the past 40 years. In 1969, 48% of students in grades kindergarten through 8th grade walked or biked to school, while 13% of K-8 students walked or biked to school in 2009 (McDonald et al. In Press).

A national movement is currently underway to facilitate school-age kids' use of non-motorized transportation such as walking and biking to school. The Michigan Safe Routes to School Program (SRTS), administered by the U.S. Department of Transportation and National Highway Traffic Safety Administration, is currently in its sixth year of federal funding in Michigan. The Michigan SRTS program brings together officials from transportation, public health, and education organizations as well as parents, students, teachers, school administrators, and other community leaders to work toward making walking and biking to school safe, convenient, and fun for children. When routes are safe, walking or biking to and from school is an easy way to achieve the regular physical activity children need for good health. Empirical research has shown that children who walk or bike to school are significantly more active in their everyday lives than those who do not (Cooper et al. 2005). Despite the national nature of the SRTS movement, little analysis of program effectiveness exists (McDonald & Aalborg 2009). Pilot research resulting from the Michigan SRTS showed that barriers to and attitudes toward walking to school affected students' propensity toward walking or biking to school (Rodriguez & Vogt 2009). The purpose of this paper is to describe changes in student and parent beliefs, attitudes, intentions, and behaviors as a result of participation in the Michigan SRTS program.

This research is based upon a modified model of the theory of planned behavior, which aims to explain the relationship between beliefs, attitudes, intentions, and behaviors (Ajzen 1985). The modified model posits that attitudes toward walking and biking to school as well as beliefs about barriers to these behaviors affect intention to walk or bike to school. Intentions in turn affect behaviors of getting to and from school (Figure 1). The key factor in the theory of planned behavior is intention, as it is believed that if an individual intends to engage in a certain behavior they will exert more effort to actually engage in the behavior. As the ultimate goal of the SRTS program is to improve the ability of school age students to walk and bike to school safely, the model indicates that the way to affect that change would be through first changing attitudes and beliefs about barriers. The resulting change in attitudes and beliefs will then theoretically lead to a change in intention and, finally, a change in behavior.

<Insert figure 1 about here>

Affecting walking and biking behavior of students is unique in that the SRTS program not only has to change attitudes and beliefs of students, but also attitudes and beliefs of parents. In cases involving minors, a student may intend to walk or bike to school only to be prevented from doing so by a parent who may hold negative attitudes and beliefs about those methods of

transportation to school. Therefore, the SRTS program targets students and parents as well as the greater community in which each school resides.

2.0 Methods

Over the past six years, data have been collected at two time periods from 20 schools. The SRTS program was evaluated using a longitudinal XOX experimental research design with no control group. The XOX design includes a pre-test (X), treatment (O), and a post-test (X). Pre-test data were collected before schools had engaged in any SRTS-related activities in order to establish a baseline. After pre-testing, each school and its community undertook the SRTS planning process in order to identify potential barriers to children utilizing non-motorized methods of transportation to go to and from school. After the planning process, schools applied for and received federal funding to implement both infrastructure and non-infrastructure treatments to remove the barriers identified during the planning process. Post-testing was conducted after both infrastructure and non-infrastructure programs were implemented in order to measure change in attitudes, beliefs, intentions, and behaviors as a result of the implementation of the SRTS program. Results presented in this paper are from data that were collected between fall 2005 and spring 2010. Attempts were made to collect pre- and post-test data during the same season in consecutive years. However, this was not always feasible for various reasons including infrastructure construction and administration of standardized testing.

Four categories of treatments for which schools could use federal funds were created: engineering (infrastructure), encouragement, education, and enforcement. The federal SRTS program specifies that 70-90% of grant funds are to be applied to infrastructure improvements; the remaining 10-30% may be used for non-infrastructure activities. Infrastructure improvements could focus on sidewalks, traffic calming measures, construction of raised crosswalks, installation of bike racks, and other physical improvements. Encouragement efforts included incentive programs to promote walking and biking to school, materials for walk/bike to school days, walking clubs, bike rodeos, and other programs aimed at promoting walking and biking to school. Education efforts included programs to teach students and parents pedestrian safety, SRTS newsletters, and town hall meetings. Enforcement efforts were generally in the form of increased patrols by local police officers during the hours that students commuted to and from school in the morning and afternoon.

A pilot study of SRTS in Michigan used a panel design where responses from individual students were matched across years. Matching was attempted for three schools in the full SRTS program and only a handful of students were able to be matched; therefore matching same-student responses over time was abandoned for the remaining schools.

Quantitative data collection was accomplished through student surveys, parent surveys, and classroom observation tallies. The surveys were used to gain a better understanding of beliefs, attitudes, intentions, and behaviors related to walking and biking to school. The student survey consisted of questions about beliefs, attitudes, behaviors, and physical geography. The parent survey consisted of questions about beliefs and attitudes regarding walking and biking to school, including safety, plus methods of transportation to and from school. Observation tallies of how students arrived at school in the morning and returned home were also recorded. Data collected using these instruments were used to establish a baseline and to assess change over time. Students completed web-based surveys in computer labs at each school under the supervision of a teacher. Parent surveys were available in paper format as well as on the web. Teachers collected classroom observation tallies recording how students arrived and left school every day for one week.

Research results are reported on data collected from 20 schools in various types of communities (urban, suburban, and rural) from a range of geographically-distributed communities throughout the state of Michigan. The early phases of this program targeted low-income urban schools and are reflected in the results presented here. These schools walked at rates above the national average, and the focus of the SRTS program was to improve safety for these urban children. A total of 43 schools were funded in the first two rounds of federal grant funding, resulting in a response rate of 47% of schools fulfilling the evaluation requirement at the time of this analysis. The student sample consisted of 5,758 students (3,392 pre-test; 2,891 post-test). The parent sample consisted of 3,499 parents (1,567 pre-test; 1,791 post-test). The classroom observation sample consisted of 325 classrooms with a total of 7,474 students (140 classrooms with 3,021 students pre-test; 185 classrooms with 4,453 students post-test). Each of the schools included in this research have completed the SRTS program and evaluation. Significance testing was not done to compare pre- and post-test data due to the oversensitivity of significance tests when analyzing large samples. Behavior data collected from students, parents, and classroom observations differed slightly. For example, during the post-test period, 19% of students reported walking to school on the student survey, while parents said 27% of their oldest/only children walked to school, and 23% of students reported walking to school in the classroom observations (Table 1). It was determined that classroom observation tally data most reflected actual behaviors, and where possible, these data are reported.

<Insert Table 1 about here>

3.0 Results

The experimental nature and design of this research make it difficult to determine whether changes in attitudes, beliefs, intentions and behaviors can be attributed to the SRTS program or other factors. Researchers attempted to hold as many variables constant as possible (i.e., season, grades, survey techniques). However, it is likely that some of the changes observed are due to random

variability or events that could not be controlled. It is important to remember that this research is not being conducted in a lab, but rather in the real world where it is challenging to account for a variety of variables.

3.1 Beliefs/Barriers

Student beliefs about barriers were measured by the question “What would make walking or biking to school better?” with the option to select any or all of the responses. Students and parents were given the same list of barriers. Barriers that were found to be the most important to students were: having friends to walk or bike with, having sidewalks all the way to school, more bike racks at school, no strangers on the route to school, sidewalks clear of snow in the winter, and having safe places to cross the road. The percentage of students who believed that these were barriers to walking and biking to school decreased in all categories between the pre-test and post-test (Table 2).

<Insert Table 2 about here>

Overall, a smaller percentage of students in the post-test than the pre-test indicated that barriers existed. While nearly 50% of students thought having no strangers on the route to school would make walking and biking better during the pre-test, that percentage declined to 40% at the time of the post-test. The percentage of students who thought having friends to walk or bike with and having more bike racks both declined from 42% during the pre-test to 36% on the post-test.

Parent beliefs about barriers were measured by the question “What makes your child’s walk or bike to school unsafe?” with the option to select any or all of the responses. Barriers that were found to be the most important to parents were similar to those indicated by students with the exception of ‘scary dogs on the route to school’, which was high on parents’ list of concerns but was not as much of a concern for students. The percentage of parents who believed that these barriers made their child’s walk or bike to school unsafe decreased in all categories between the pre-test and the post-test (Table 3).

<Insert Table 3 about here>

Traffic speed on the route to school was the number one concern of parents during the pre-test, with 62% of parents indicating that it made the route to school unsafe. That percentage decreased dramatically to 49% on the post-test. The other barrier that most concerned parents was strangers along the route to school. The percentage of parents who believed strangers made the route to school unsafe decreased from 61% on the pre-test to 58% on the post test.

Parents were asked if they thought their child’s route to school was safe. During the pre-test, 24% of parents indicated they thought their child’s route was safe (Table 4); this increased to 34% of parents on the post-test.

<Insert Table 4 about here>

3.2 Attitudes

Student attitudes were measured with the question “How do you feel about walking and biking?” Students could choose between the dichotomous variables fun/boring, safe/not safe, healthy/not healthy, cool/not cool, and time saving/does not save time. The percentage of students who thought walking was fun and cool increased from pre-test to post-test. The percentage of students who thought walking was safe and healthy remained the same between pre-test and post-test. The percentage of students who thought walking to school saved time decreased from pre-test to post-test. Changes in attitudes towards biking were similar. The percentage of students who thought biking was safe, healthy, and cool increased from pre-test to post-test, while the percentage of students who thought biking was fun remained the same and the percentage of students who thought biking saved time decreased (Table 5).

<Insert Table 5 about here>

Overall, changes in student attitudes were small but generally positive. The greatest change in attitudes was an increase in the percentage of students who thought that walking to school was fun, 66% during the pre-test to 69% at the time of the post-test. This was the only attitude that increased across both walking and biking. However, the percentage of students who thought that walking and biking to school saved time decreased across both modes of transportation.

Parent attitudes were measured with the question “What are your feelings about your children walking or biking to/from school?” Parents could respond using a five-point Likert-type scale (-2 to 2) with -2 and -1 as negative attitudes, 0 as a neutral attitude, and 1 and 2 as positive attitudes. Anchors for the parent question scales were safe/unsafe, healthy/unhealthy, convenient/not convenient, and exciting/boring. It was determined that using scales for measurement of student attitudes may be too complex for children to understand; therefore, parents who answered positively (1 or 2) were aggregated in order for their responses to be comparable with student data. The percentage of parents who thought walking and biking to school were safe, healthy, convenient, and exciting increased from the pre-test to the post-test with one exception: the percentage of parents who thought that biking was safe declined from pre-test to post-test (Table 6).

<Insert Table 6 about here>

Overall, parent attitudes increased dramatically from pre-test to post-test. The greatest change was in the percentage of parents who thought walking and biking to school was healthy. The percentage of parents who thought *walking* to school was healthy increased from 61% to 77% from the pre-test to the post-test, while the percentage of parents who thought *biking* to school was healthy increased from 39% to 56%. While the percentage of parents who thought *walking* to school was safe increased from 36% on the pre-test to 40% on the post-test, the percentage of parents who thought *biking* to school was safe declined from 30% to 25%.

3.3 Intentions

Student intentions were measured with the question "If you had a choice, how would you most like to get to school?" with the option to select any or all of the responses. The highest percentage of students indicated that their preferred method of transportation was by car in both the pre-test (43% of students) and post-test (44% of students) (Table 7). Walking and biking were the next most popular methods of transportation. On the pre-test, 38% of students indicated they would prefer to walk to school, while that percentage decreased to 30% on the post-test. The percentage of students who said they'd like to arrive at school by bike was 37% on both the pre-test and post-test.

<Insert Table 7 about here>

Parent intentions were measured with the question "If your child's route to school were improved, would you allow them to walk or bike to school?" During the pre-test period, 32% of parents said they would allow their child to walk or bike if the route were improved, but that percentage decreased to 23% at the time of the post-test (Table 8). The percentage of parents who said they would not or might allow their child to walk or bike to school remained fairly constant between pre-test and post-test (between 25% and 30%). The percentage of parents who indicated that their child already walked or biked to school increased from 15% on the pre-test to 21% on the post-test.

<Insert Table 8 about here>

3.4 Behaviors

The student behaviors reported in this paper are from classroom tallies of student behavior. Every morning and afternoon for one week, teachers asked students how they arrived at school and how they were traveling home. The largest portion of students reported that they traveled in a parent's car, 42% of students on the pre-test and 43% on the post-test. The second most popular method of transportation to and from school, the school bus, decreased between the pre-test (26%) and the post-test (23%). There was a slight increase in the percentage of students who reported walking to school, 22% of students on the pre-test and 23% on the post-test. The percentage of students who rode bikes to school remained constant at 1% on both the pre-test and post-test.

<Insert Table 9 about here>

4.0 Discussion and Conclusions

The purpose of this paper was to describe changes in student and parent beliefs, attitudes, intentions, and behaviors who had participated in the Michigan SRTS program. The model used in this research, modified from the Theory of Planned Behavior, posits that attitudes toward walking and biking to school as well as beliefs about barriers to walking and biking to school affect intention to walk or bike to school, which in turn affects school transportation behaviors. Research results indicate a movement toward change in behaviors as a result of the SRTS program in Michigan. However, positive changes at this stage of the program have been limited to beliefs and attitudes; intentions and behaviors have changed very little at schools that have completed the SRTS program and finished the evaluation process.

Student and parent beliefs about barriers to walking and biking to school showed positive change in every category. It is encouraging that the barriers students and parents indicated as being the most problematic in the pre-test showed some of the greatest decreases between pre-test and post-test. Additionally, the percentage of parents who thought their child's route to school was safe increased dramatically between pre-test and post-test.

Research results indicate a positive change in attitudes for both students and parents. The percentage of students who thought that walking was fun and cool increased from the pre-test to the post-test. The positive change in parents' attitudes about the health and safety of walking is an important first step in affecting intentions and eventually behaviors. However, results did not show positive changes across all attitudes; the percentage of students and parents who thought that walking and biking to school were time savers decreased.

Despite some positive changes in beliefs about barriers and attitudes towards walking and biking, intentions overall did not show positive change from pre-test to post-test. The percentage of students who indicated that they would most like to walk to school decreased, while the percentage of students who responded they would most like to ride in a car to school increased. The percentage of parents who indicated that they would allow their child to walk or bike to school if the route to school were

improved also decreased. An explanation for this decrease may be found in the increased percentage of parents who indicated on the post-test that their child already walked or biked to school. These results show that, while there have been some positive changes to attitudes and beliefs about barriers, intentions have changed little. However, students' intentions toward participating in physically active transportation, particularly biking, are already at high levels.

Finally, behaviors remained largely unchanged between pre-test and post-test. There was a slight increase in the percentage of students who walked to school. A decrease in the percentage of students who rode the bus is not surprising considering that many Michigan schools have reduced their bussing programs over the past few years due to a lack of funds in a poor economy. The percentage of students who arrived at school by car increased between pre-test and post-test, perhaps indicating that some of the students who used to be bussed to school are now traveling by car.

These research results show that there have been some positive changes in students' and parents' attitudes and beliefs about barriers to walking and biking to school. Results indicate that the changes in attitudes and beliefs have not yet affected intentions or behaviors. We believe that changing intentions and behaviors is something that will take place over a long period of time. The positive change in attitudes and beliefs is encouraging, and has taken place in the first five years of the SRTS program. Continued positive changes will only take place with the continued support of parents, school employees, law enforcement, community officials, and the community at large.

5.0 Citations

Ajzen, I. 1985. **From intentions to actions: A theory of planned behavior.** In: Kuhl, J.; Beckmann, J., eds. *Action-control: From cognition to behavior.* Heidelberg: Springer: 11-39.

Cooper, A.R.; Anderson, L.B.; Wedderkopp, N.; Page, A.S.; Froberg, K. 2005. **Physical activity levels of children who walk, cycle or are driven to school.** *American Journal of Preventative Medicine.* 29(3): 179-184.

Ludwig, D.S. 2007. **Childhood obesity: The shape of things to come.** *The New England Journal of Medicine.* 357: 2325-2327.

McDonald, N.; Brown, A.; Marchetti, L.; Pedroso, M. (In press). **U.S. school travel 2009: An assessment of trends.** *American Journal of Preventive Medicine.*

McDonald, N.C.; Aalborg, A.E. 2009. **Why parents drive children to school: Implications for Safe Routes to School programs.** *Journal of the American Planning Association.* 75(3): 331-342.

Rodriguez, A.; Vogt, C.A. 2009. **Demographic, environmental, and attitude factors that influence walking to school by elementary school-aged children.** *Journal of School Health.* 79(6): 255-261.

Steinbeck, K.S. 2001. **The importance of physical activity in the prevention of overweight and obesity in childhood: A review and opinion.** *Obesity Reviews,* 2(2): 117-130.

Figure 1. Modified Theory of Planned Behavior (Ajzen 1985)

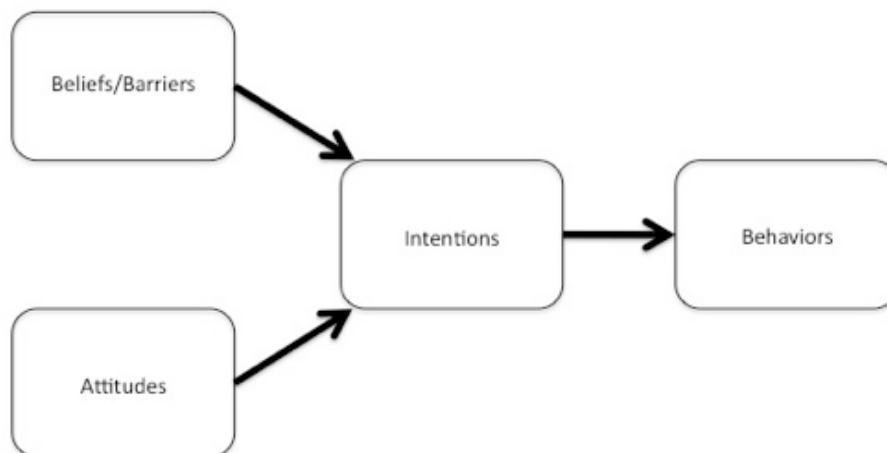


Table 1. Comparison of behaviors across data sources

| | Walk | Bike | School bus | Parent's car | Other car | Other |
|---|------|------|------------|--------------|-----------|-------|
| Pre-Test Student Survey (N=3,392 students) | 27% | 1% | 16% | 41% | 14% | 1% |
| Post-Test Student Survey (N=2,891 students) | 19% | 1% | 20% | 47% | 12% | 1% |
| Pre-Test Parent Survey (N=1,567 parents) | 32% | 1% | 19% | 40% | 6% | 1% |
| Post-Test Parent Survey (N=1,791 parents) | 27% | 1% | 19% | 45% | 7% | 1% |
| Pre-Test Classroom Observation (N=3,023 students) | 22% | 1% | 26% | 42% | 8% | 1% |
| Post-Test Classroom Observations (N=4,453 students) | 23% | 1% | 23% | 43% | 10% | 0% |

Table 2. Percentage of students who think walking and be biking to school would be better if...

| | Friends to walk/bike with | Sidewalks all the way to school | More bike racks | No strangers on route to school | Sidewalks clear of snow in winter | Safe places to cross the road |
|---------------------|---------------------------|---------------------------------|-----------------|---------------------------------|-----------------------------------|-------------------------------|
| Pre-Test (N= 3,392) | 42% | 40% | 42% | 48% | 44% | 46% |
| Post-Test (N=2,891) | 36% | 34% | 36% | 40% | 38% | 39% |

Table 3. Percentage of parents who think...makes their child's route to school unsafe

| | Speed of traffic on route | Amount of traffic on route | No crossing guards | Sidewalks not clear of snow | Strangers on route | Scary dogs on route |
|---------------------|---------------------------|----------------------------|--------------------|-----------------------------|--------------------|---------------------|
| Pre-Test (N=1,567) | 62% | 46% | 44% | 40% | 61% | 45% |
| Post-Test (N=1,791) | 49% | 44% | 37% | 32% | 58% | 38% |

Table 4. Percentage of parents who think their child(ren)'s walk/bike to school is safe

| | Yes | No |
|---------------------|-----|-----|
| Pre-Test (N=1,567) | 24% | 76% |
| Post-Test (N=1,791) | 34% | 66% |

Table 5. Percentage of students who think walking or biking is...

| | Walking | | | | | Biking | | | | |
|---------------------|---------|------|---------|-------------|------|--------|------|---------|-------------|------|
| | Fun | Safe | Healthy | Time Saving | Cool | Fun | Safe | Healthy | Time Saving | Cool |
| Pre-Test (N= 3,392) | 66% | 50% | 96% | 33% | 71% | 89% | 58% | 94% | 80% | 86% |
| Post-Test (N=2,891) | 69% | 50% | 96% | 30% | 73% | 89% | 61% | 95% | 77% | 87% |

Table 6. Percentage of parents who think walking or biking to school is...

| | Walking | | | | Biking | | | |
|--------------------|----------|------|---------|------------|----------|------|---------|------------|
| | Exciting | Safe | Healthy | Convenient | Exciting | Safe | Healthy | Convenient |
| Pre-Test (N=1,567) | 29% | 36% | 61% | 36% | 31% | 30% | 39% | 22% |

| | | | | | | | | |
|---------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| Post-Test (N=1,791) | 31% | 40% | 77% | 43% | 45% | 25% | 56% | 29% |
|---------------------|-----|-----|-----|-----|-----|-----|-----|-----|

Table 7. Percentage of students who would most like to get to school by... (Multiple answers allowed)

| | Walk | Bike | School Bus | Car | City Bus | Skateboard/ Rollerblade |
|---------------------|------|------|------------|-----|----------|----------------------------|
| Pre-Test (N= 3,392) | 38% | 37% | 15% | 43% | 4% | 20% |
| Post-Test (N=2,891) | 30% | 37% | 14% | 44% | 3% | 19% |

Table 8. Percentage of parents who would allow their child to walk or bike to school if the route were improved

| | Yes | No | Maybe | Already walks/bikes |
|---------------------|-----|-----|-------|------------------------|
| Pre-Test (N=1,567) | 32% | 28% | 26% | 15% |
| Post-Test (N=1,791) | 23% | 29% | 27% | 21% |

Table 9. Student behaviors to/from school (Classroom observation data)

| | Walk | Bike | School Bus | Parent's Car | Other Car | Other |
|---------------------|------|------|------------|--------------|-----------|-------|
| Pre-Test (N= 3,021) | 22% | 1% | 26% | 42% | 8% | 1% |
| Post-Test (N=4,453) | 23% | 1% | 23% | 43% | 10% | 0% |