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Travelling to school: transportation selection by parents and awareness towards sustainable transportation

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Abstract

This study examined the factors that motivated parents to choose the mode of transportation for their children to travel to school besides investigated parents' attitudes about their awareness towards sustainable transportation. The study found that the majority of parents used private vehicles to send their children to school were primarily influenced by the level of safety (crime and traffic). Security problems caused parents to be less interested in the campaign for sustainable transport. Despite the fact that the majority of parents were aware of the dangers of motor vehicles towards the environment and the positive effects of encouraging their children to walk and cycle to school, safety and security issues discouraged parents to support the use of sustainable transportation. The results of this study gave the true picture of urban lifestyles in terms of school transportation. In addition, parental views and concerns about safety showed the need for the improvement of public security, which was the main factor that encouraged parents to let their children walk or cycle to school.

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Keywords: Traveling to school, Safety, Sustainable Transportation

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1. Introduction

School areas congested with vehicles are a common scenario in Malaysian urban areas. This usually occurs at peak times during the start and end of a school day. School buses and cars are the most common modes of transport for children to go to school. In the past, children walked and cycled in groups. At present, children doing the same thing are a rarity, especially in urban areas. This scenario would constrain the success in realizing a sustainable transportation development system in Malaysia.

McMillan [1] and Pooley et al. [2] mentioned several factors that contribute to choice of student transport in urban areas. These include distance between home and school, car ownership, the increasing number of working mothers, urban form, and complex family schedules.

Survey results from Georgia households in 2000 found that children aged 5 to 15 years, living within a mile from school, were driven by their parents (Bricker et al. [3]). Based on the study from the Department for Transport in London, England, the number of primary school children walking to school decreased from 61% in 1992 to 1994 to 52% in 2002 to 2003. Meanwhile, traveling by car has increased from 30% to 40% (McMillan [4]).

Other studies also found a diminution in the freedom to walk to school. O'Brien et al. [5] found that children's freedom was higher in towns with lower densities than London. Similarly, Kytta [6] showed that Finnish children in rural areas had more traveling freedom than peers in towns and small cities did. The decreased level of walking freedom can be associated with parental fears of the dangers of ongoing traffic and kidnapping or harassment (Martin and Carlson [7]and McMillan[4]).

In addition, factors that affect the mode of transport are also influenced by the gender of children. The study by Fyhri and Hjorthol [8] showed that males are more mobile than female children are. However, parental perception is very important in determining the mode of transport. This was significantly associated with parental perception of safety (Fyhri and Hjorthol [8]), which occurs due to deteriorating urban area security.

Travel safety is always linked to the quality of pedestrian and bicycle track facilities. Complex pedestrian structures that are not sustainable are considered threats to children's safety. Dark pedestrian areas with loitering delinquents would also threaten children's safety. Extortion, rape, kidnapping, and murder are the most feared crimes that threaten children who are walking alone to school. A report on relative risks of school travel found that pedestrians and cyclists traveling to school are at highest risk of injury and fatality on a per mile basis (Transportation research Board [9]). Therefore, the parents do not allow their children to walk or cycle to school. Instead, these parents let their children take the school bus or they drive the children to and from school.

However, parents driving children would cause traffic congestion at peak times. Congestion also leads to environmental problems and traffic jams along streets near schools, which create hazardous conditions for people walking or cycling. Encouraging children to walk to school will be more beneficial to parents and children. By avoiding traffic jams, parents will save time and gas. Similarly, the children benefit by developing responsibility and independence (Pooley et al. [2]). Familiarity within the neighborhood induced by habitual walking and cycling to school will encourage social interactions, as well as mutual recognition and respect between residents. This can improve the quality of life in the community (Kaplan [10]).

2. Methodology and Data Collection

From a population of 37,415 in Section 7, Shah Alam, Selangor, Malaysia, 98 questionnaires (with a 10% margin error and 95% confidence level) were randomly distributed to obtain parental responses. Questionnaires were equally distributed between low and middle income respondents to identify differences based on demographic background. In addition, the home address, school location, distance to school, and mode of transport used by children were some of the information required by the

questionnaires. We also asked respondents to analyze reasons that affected decisions in choosing the modes for transportation, as factors that influence mode selection.

Respondents were also asked to assess the pedestrian facilities, security level, and surrounding traffic along the way to school, to compare the level of satisfaction towards public facilities and the vehicle mode selection. Furthermore, respondents were also tested regarding their awareness on the importance of using sustainable vehicles as a way to prevent environmental pollution. Moreover, they were asked about their knowledge on motor vehicles as sources of environmental problems.

3. Findings

Approximately 44% of the respondents were male and 56% were female. Within the total, approximately 55% were in the range of 36 to 45 years old, 32% were between the ages of 25 to 35 years, and the remaining 13% were between 46 to 55 years old. The majority of these groups were earning between MYR 1,000 to MYR 3,500; 19% were earning between MYR 3,501 to MYR 5,500; 15% had an income between MYR 5,501 to MYR 7,500; and 8% earned between MYR 7,500 to MYR 10,000. Only 3% of the total respondents had an income of more than MYR 10,000 per month. In terms of distance to school, most of respondents stated that the distance to the primary school is 500 meter to1kilometer (61%), followed by 1.5 to 2 kilometer (6%). For secondary schools, majority stated the distance to the secondary school is 500 meter to 1kilometer (42%), followed by 2.5 kilometer to 3 kilometer (16%).

3.1 Selection of Transportation Mode to School and Reasons for Mode Selection

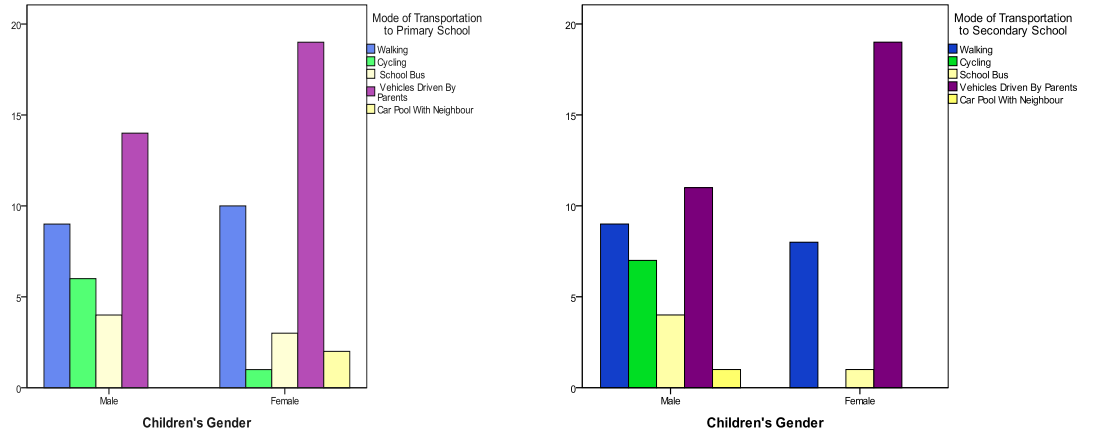

Figure 1. Mode of transportation to primary school and secondary school by children's gender

The most common mode of transport comprises vehicles driven by parents to school. Driving to school was the most common selection for both primary and secondary school students at 50% and 48.5%, respectively. The analysis was divided into groups of primary and secondary school students to find the difference in mode choice based on age. Several studies (Evenson et al.[11], McMillan et al. [12],Ogden et al. [5]) show that the level of individual factors, especially age and gender, also influences the rate of children walking. The number of girls walking was lower than that of boys; the difference is

most prominent at younger ages. However, no significant difference was observed in the selection of transportation modes to school among children in primary or secondary school (Figure 1).

Table 1. Reasons for the selection of transportation mode to (a) primary school and (b) secondary school

REASON FOR THE SELECTION OF TRANSPORTATION MODE	MODE OF TRANSPORTATION TO PRIMARY SCHOOL					Total
	Walking	Cycling	School Bus	VehiclesDriven By Parents	Car Pool With Neighbour	
School location near to residential area	18 72%	7 28%	-	-	-	25
Expensive school bus fees	1 25%	3 75%	-	-	-	4
No time to send children to school	3 100%	-	-	-	-	3
Walking habit will maintain a good health	2 100%	-	-	-	-	2
Bicycle routes are safe to use	-	1 100%	-	-	-	1
School location is too far for children to walk or cycle	-	-	1 16.7%	4 66.7%	1 16.7%	6
Convenience and quick	-	-	6 17.6%	27 79.4%	1 2.9%	34
Reasonable school bus fees	-	-	5 71.4%	2 28.6%	-	7
Child safety guaranteed	-	-	1 4.5%	19 86.4%	2 9.1%	22
Bus driver negligence is worrisome	-	-		2 100%		2
Total	19	7	7	32	2	67

REASON FOR THE SELECTION OF TRANSPORTATION MODE	MODE OF TRANSPORTATION TO SECONDARY SCHOOL					Total
	Walking	Cycling	School Bus	VehiclesDriven By Parents	Car Pool With Neighbour	
School location near to residential area	15 65.2%	7 30.4%	-	1 4.3%	-	23
Expensive school bus fees	1 50%	1 50%	-		-	2
No time to send children to school	1 100%	-	-	-	-	1
Walking habit will maintain a good health	2 100%	-	-	-	-	2
School location is too far for children to walk or cycle	-	-	4 25%	12 75%	-	16
Convenience and quick	-	-	1 4.3%	21 91.3%	1 4.3%	23
Reasonable school bus fees	-		1 100%	-		1
Child safety guaranteed	-	-		4 100%	-	4
Bus driver negligence is worrisome	-	-	-	1 100%	-	1
Total	17	7	5	30	1	60

As shown in the two tables, most modes of transport used by primary and secondary school children are vehicles driven by their parents. Most of the reasons given by the parents of children in the primary school were convenience, quickness, and safety, with parents also citing mistrust in bus drivers. The parents of children in secondary school indicated similar reasons, in addition to the conduciveness of the school's distance to walking or cycling.

As shown in Table 1, the most common mode of transport was vehicles driven by parents. Most of the reasons given involved convenience and quickness; parents perceive their personal vehicles as efficient for mobility.

Table 2: Matters to be considered to allow children to walk and cycle to school

Statements	Percentage (%)
Pedestrian walkways improved	33
Surrounding safety	90
Distance to the school less than 1 mile	84
Friends or relatives accompany the journey to school	41

In this study, parents were asked about the elements they would consider before allowing their children to walk or cycle to school. The majority of the respondents stated that safety of the surroundings was the main factor. Furthermore, a distance of less than one mile was also a factor. Nevertheless, parents prefer having their friends or relatives accompany their children to school more than the idea of having pedestrian walkways improved. This clearly shows that parents consider safety their highest priority. Negative perceptions towards safety have become obstacles in encouraging children to walk or cycle to school. This negative perception should be eradicated. Therefore, several studies on children's perceptions towards transportation modes should be actively conducted. A study conducted by Enid Zwerts et al. [13] is one of many studies focusing on this issue. The study concluded that most children see that the use of

their family vehicles facilitates all their daily activities; walking and cycling is considered a difficult and exhausting task.

Several children have a positive outlook on walking and cycling. However, the established, regular use of family vehicles has caused children to feel that the car is the best mode of transport. This was supplemented by the present study; the majority of parents who use their own vehicles for school transport indicated that do so because of convenience and quickness (Table 1). This mindset will reflect upon their children as well. Awareness of children about vehicles in terms of road safety and environmental effects is very minimal. Kopnina [14] explored the importance of feelings and perceptions of children towards vehicles in reflecting their future behavior towards vehicles and the environment.

Table 3: Percentage of 'feelings' when driving a car

Statements	Percentage (%)
Relaxing	34.9
Safety	34.4
Practicality	28.6
Freedom	28.1
Tiring	6.5
Boredom	4.2
Stressful	3.4
Troublesome	0.3

When asked how they generally feel while driving their cars, a majority of parents provided positive feedback. The majority considered driving a car 'relaxing' and 'safe'. They also stated that driving a car is practical and gives them freedom. Pro-car attitudes cause parental lack of awareness about the importance of encouraging children to use more sustainable vehicles to school. This kind of attitude and outlook will be indirectly inherited by their children if the importance of using sustainable vehicles is not propagated.

3.2 Parents awareness on the importance of walking and cycling to school

The increase of obese children in Malaysia has elicited considerable attention. Various parties have blamed eating habits among children as the root of the problem. Thus, many people associate 'nasi lemak' (rice cooked in coconut milk) as a source of obesity. However, since ancient times, 'nasi lemak' has been an essential breakfast, especially for the Malay community, and child obesity did not exist in the past.

Obesity should not be perceived as only a nutritional issue, but also one that affects the lifestyle and daily routines of children. In the past, children walked and cycled to school. Thus, obesity was a rare condition in children even if 'nasi lemak' was part of their daily meals.

According to Ogden et al. [15], the number of obese children in the United States between the ages of 6 to 19 years tripled from 1980 to 2002. In order to combat this trend, US policymakers set a goal that 50% of the students must travel distances less than one mile daily in 2010 (Ogden et al. [15]). This goal also included upgrading all pedestrian and cycling tracks along the way to school. In addition, the policy recommended that children be educated to choose a non-motorized mode of transport.

In Malaysia, the increase in obesity among children aged 7 to 10 years was 6.6% to 13.8%. Furthermore, 12.8% of obese children are male. Obesity is also rising among teenagers aged 13 to 17 years. Malaysia has second highest obesity rate in Southeast Asia. A study from the Division of Disease Control, Ministry of Health, Malaysia in 2008 [16] showed that nearly 20% of the local adult population

and 21% of children are obese. The issue of obesity can be addressed by encouraging children to walk or cycle to school.

The reduction in the number of children who actively walk or cycle to school indicates a loss of physical activity. Proper health habits are important in preventing chronic diseases (Transportation Research Board [17]. The rate of overweight children in the United States for children aged 6 to 11 (boys and girls) was more than 15% in 1999, approximately 10.5% from 1988 to 1994, and less than 5% in the early 1960s (Flegal [18] and Ogden et al. [15]). A U.S. national survey conducted in 2002 found that among the 3,120 children aged 9 to 13 who participated in the survey, more than 61.5% did not participate in organized physical activity and 22.6% did not engage in any physical activity within seven days prior to the survey (Flegal [18]).

This study also aimed to identify the degree of awareness among parents on the importance of preserving the environment.

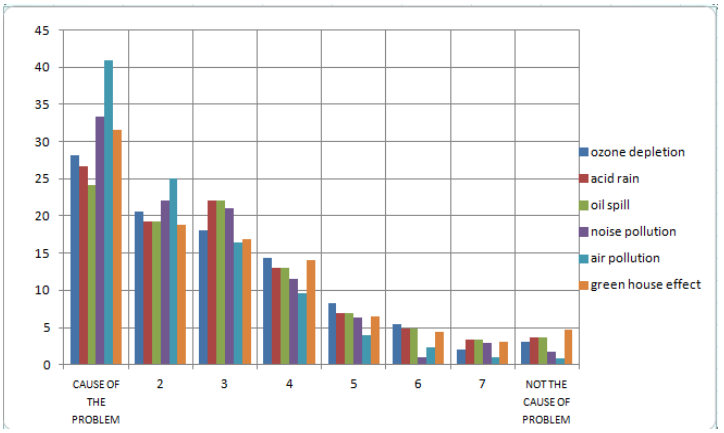

Figure 2: Percentage of parental knowledge about motor vehicles as a cause of environmental problems

Table 4: Mean of parental knowledge on motor vehicles as a cause of environmental problems

Problems caused by motor vehicles	Minimum	Maximum	Mean	Std. Deviation
Ozone depletion	1	8	2.95	1.849
Acid rain	1	8	3.01	1.891
Oil spill	1	8	3.23	2.055
Noise pollution	1	8	2.59	1.663
Green house	1	8	2.26	1.472
Green house effect	1	8	2.95	1.982

Figure 2 and Table 4 shows the views and opinions of parents about the effects of motor vehicles on environmental issues. When parents were asked about their knowledge on this subject, the answers from the majority of respondents indicated that they knew about ozone depletion, acid rain, oil spills, noise pollution, air pollution, and the greenhouse effect. This indicated that the majority of these parents are aware of the impact of motor vehicles towards the environment. This result is consistent with that in several studies. Anable [19] and Hagman [20] suggested that although information about the negative environmental effects of car usage raises some awareness, this awareness is usually insufficient to change behaviour.

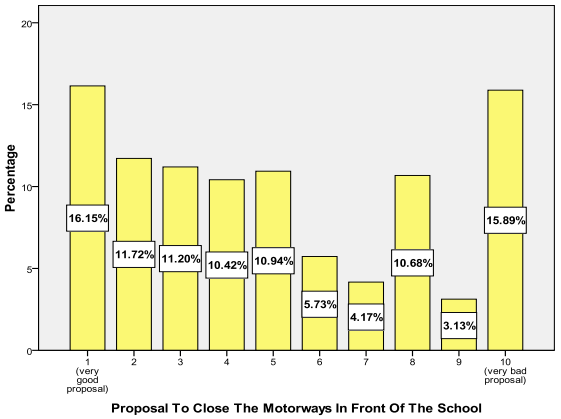

Figure 3: Percentage of people who agreed on the proposal to close the motorways in front of the school

Figure 3 shows the percentage of individuals who agreed with the proposal to close motorways in front of schools. As showed in the diagram, the percentage of parents who support the proposal was almost the same as the percentage of people who are against the proposal. This indicated that many parents were unwilling to change their mode of transport to school.

Table 5: The opinion of parents about the impact and importance of walking and cycling to school

Statements	Agree (%)	Disagree (%)
Walking and cycling is a good habit for health	100	-
Walking and cycling can reduce obesity	90	10
Walking and cycling can reduce motorized vehicle pollution	93	7
Walking and cycling can reduce traffic congestion	96	4
Walking and cycling can disclose to the dangers of crime	99	1
Walking and cycling can disclose to the traffic hazard	96	4
Walking and cycling causes of social problems	63	37
Walking and cycling to encourage social interaction	40	60

Based on Table 5, 100% of the parents agreed that walking and cycling are healthy practices. The majority agreed that these activities could reduce obesity among children. They also agreed that this practice can reduce motor vehicle emissions (93%) and vehicle congestion in schools (96%). This showed that the parents are aware of the importance of physical activity in promoting better health and a sustainable environment. However, these parents also agreed that walking and cycling could expose their children to crime (91%) and traffic hazards (96%). This clearly showed that parents were very concerned for their children's safety, thus causing them to disallow their children from walking or cycling to school even if the distance was less than 1 mile (61% for primary school and 42% for secondary school).

Therefore, pedestrian walkways and cycle tracks should be upgraded to provide more security and comfort and to encourage parents about the safety of walking or cycling to school. One example of responses to current issues in the course of school and children's health is the development of policies and programs related to Safe Routes to School (SR2S). SR2S is a concept originally conceived in Denmark. This is a positive effort to make routes to school safer for non-motorized modes via (1) road safety education (both children and drivers), (2) traffic law enforcement around schools, and (3) environmental engineering along the route to school to control traffic flow and improve pedestrian and cycling facilities

(Transportation Alternatives [21]). The use of improvement engineering techniques elicited much public attention and influenced policy in the United States, especially in the development of the California SR2S program in 1999. Since its inception, this program has provided approximately USD 20 million in transportation funds annually to modify sections of cities around schools to improve the safety of pedestrians and cyclists. This typically includes improvements in sidewalks, pedestrian warning systems, measures in traffic control, and traffic calming (Boarnet et al. [22]). Therefore, Malaysia must intensify efforts to upgrade the routes to school to revive the practice of walking and cycling to school.

The results from this study indicated that although the location of primary and secondary schools were very close to residential areas, parents still chose to drive their children to school. Negative perceptions towards the safety of walking and cycling to school discouraged parents to let their children walk and cycle to school despite their awareness about its effects on health and the sustainable environment.

4. Conclusion

Traveling to school affects traffic flow, especially in highly dense urban areas. This study examined the factors that motivated parents to decide the mode of transport their children should use to travel to school. This study referred to the parents of primary and secondary school students in Section 7, Shah Alam, Selangor, Malaysia. The objectives of this study were to: (1) identify the modes of transportation used by children to go to school and the factors that influence parents in selecting this mode of transport and (2) examine the level of awareness among parents about the importance of sustainable vehicles as a way to prevent further environmental degradation.

The study found that the majority of parents used private vehicles to send children to school were primarily influenced by the level of safety (crime and traffic). Parents chose to use personal vehicles to send their children to school because of convenience and quickness. The results of this study gave the true picture of urban lifestyles in terms of school transportation. In addition, parental views and concerns about safety showed the need for the improvement of public security, which was the main factor that encouraged parents to let their children walk or cycle to school.

Security problems caused parents to be less interested in the campaign for sustainable transport. Despite the fact that the majority of parents were aware of the dangers of motor vehicles towards the environment and the positive effects of encouraging their children to walk and cycle to school, safety and security issues discouraged parents to support the use of sustainable transportation.

Therefore, safety issues must be resolved, efforts to reduce obesity among children must be implemented, and methods to improve air quality should be further developed to support the relationship between planning and physical activity. This can positively affect the development of a healthier society, especially among school children. This study proved that integrated urban development planning in terms of efficiency and safety was one of the factors that will encourage non-motorized travel. Targeted programs via changes in behavior and policies similar to SR2S should be established to promote a more sustainable environment.

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