

CHAPTER 1

INTRODUCTION

1.1 Introduction

The methods of children travel to and from school are poorly understood by urban planners and transportation policymakers in all parts of the world and especially in developing countries. Children like adults need transportation, particularly for their travel to school. Many of us remember a time when walking to school was part of everyday life. However, in recent decade, one of the most difficult things for many parents is allowing their children to walk to school on their own, that cause them to become more dependent on adults to provide transportation for them. Concurrently, for many parents driving their children or walking with them to and from school every day may not be feasible. Therefore, walking autonomously to and from school is an opportunity to shift a portion of motorized trips to active travel trips if accessibility, safety and the social benefits of the experience is addressed.

Declining in children walking to and from school in recent two decades has also great impact on public health (McDonald, 2007). Walking to school is the cheapest travel mode and can decrease the number of household daily trips. It is also source of physical activity for children and beneficial for their health. Walking to and from school helps children to feel more connected to their environment, and enhance the social

interaction of children and promotes independent mobility. However, in recent decade children are restricted without being able to move freely around the city and occupy the public open spaces (Cooper et al., 2003; Collins & Kearns, 2001; Marchetti et al., 2007; Ahmadi & Taniguchi, 2007).

Although walking with parents provides a healthy, non-polluting and economical travel mode for both parents and children it does not present an opportunity for children to explore the environment and be independent and mature. Chauffeuring children limits their opportunity to learn how to function safely in an urban environment (Mitchell et al., 2007). As such, children should be encouraged to be active citizens, moving around the city spaces, occupying them, walking on the streets and forcing the city to adapt to their needs. A city that is friendly to children is friendly to all (Corsi, 2002). Considering children as frequent pedestrians means changing the living conditions in the city, starting with the street layout and traffic regulations, and also covering community life to improve the perception of safety (Cooper et al., 2003).

Patterns of children's travel also affect their future travel behaviour as an adult and have a long-term negative impact on transportation and public health (McDonald, 2005; McMillan, 2003). Several studies also showed that people stick to their habitual travel mode pattern, and habits cultivated at an early age are hard to break (McMillan, 2007). Therefore, it is vital to target a change of travel pattern for children.

For all aforementioned, children were identified as a priority group; and efforts to increase their daily walking were highlighted as key areas for research. Efforts to promote physical activity have included campaigns to promote walking to and from school. The most popular of these, is Safe Routes to School, a programme to seek walking and cycling to school through infrastructure improvements, traffic safety education and enforcements (Beck & Greenspan, 2008). The evaluation of this

programme shows built environment elements are not the only influential factors on modes of a child's travel to school; personal safety factors also correlates to children's trip to school (McMillan, 2005). It emphasizes the programmes focus on promoting children walking to and from school need to address all barriers is faced by primary school children on their trip to and from school.

1.2 Barriers to children in their walking to and from school in developed countries

Although the importance of children walking to school is obvious, the precise reasons for the changes in children's travel pattern are not yet clear. A large body of literature has examined factors correlated with walking over the last two decades. They found the reasons have been due to concerns about safety in the neighbourhood; land use, environmental effects of increasing car use, and more recently with increasing rates of obesity in the population (Sehatazadeh et al., 2011). Concepts, such as Smart Growth, have developed hypotheses to change the travel pattern (for everybody not only for children) by improving the built environment. The hypotheses suggest that increasing the block length and street width and the lack of pavements in a neighbourhood have led to a decrease in the rate of walking.

Built environment has also impact on travel time and distance that has always been the preliminary impediment for children in their walking to and from school. In last two decades, due to changes in land use, the distance between schools and home has increased in local areas (McMillan, 2007). Consequently, children are more likely to use motorized modes of travel to go to and from school (being driven by parents or using school bus). Additionally, some parents are in a rush to get to work in the morning or other appointments on time and most of them do not pay enough attention to other road users (children). As a result, the streets closest to the school are often the most dangerous places for those children who travel to school on foot due to high traffic

volume at the commencement and finishing times of the school (Ahlport et al., 2008). Other studies have also confirmed this finding and indicated that child casualties largely occur during the times that children travel and leave school (Dissanayake et al., 2009). Statistics show that although walking to school has recently decreased; the injuries of children pedestrians have increased (Ulfarsson & Shankar, 2008; Moudon et al., 2002).

The concern of parents about the safety of their children (i.e. traffic, road conditions and lack of supervision), often result in them not allowing their children to walk to and from school on their own. Policies and programmes such as, Home Zone and Kids Streets Scan (KISS) were quickly created in response to the hypothesized relationship between the built environment and children's safety as a pedestrian in a neighbourhood. Home Zone is popular in Germany, the Netherlands, the UK and Denmark; try to provide traffic calming zones in the neighbourhood to decrease the risk of injury or death for child pedestrians. KISS is a tool to test the child friendliness of street layouts, especially in providing safe playing areas for children (Zargar, et al., 2003, Ulfarsson & Shankar, 2008, Moudon et al., 2002).

The most famous programme on this issue is Safe Routes to School (SR2S) that is aimed at making the school journey safer and healthier for children. This programme attempts to improve the built environment to increase the number of children walking to and from school as well as educating children in traffic safety (Corsi, 2002, Boarnet et al., 2005). An evaluation of SR2S showed that a lack of personal safety in a neighbourhood may decrease a child's walking to and from school (Corsi, 2002; Boarnet et al., 2005). Research conducted to study walking as a mode of travel to school, has also shown that physical environmental factors are less important than social factors for primary school-aged children. Parents are more worried about their children being abducted rather than being physically injured (Granville et al., 2002;

Yeung et al., 2008; McNeill et al., 2006). Although, research indicates that the actual level of crime in a neighbourhood is not always the same as is perceived by parents; the physical elements in the built environment might affect the parental perception of traffic safety and personal safety in a neighbourhood (McMillan, 2003 Jensen, 2008; Black, et al., 2001).

All aforementioned shows, making a policy in urban design is a process of communal decision-making (Owen et al., 2004). However, exploring the relationships between environmental safety and the travel pattern of children is often complex. Therefore, to achieve a desired environment, people must share their opinions, and all the viewpoints should be collected in a pattern language format (UNICEF 2005). As a result, to achieve an effective goal, such as increasing the rate of children's walking to and from school autonomously, the fundamental question must be answered: Whether and what factors of traffic safety and neighbourhood safety affect a child's walking to and from school.

The majority of research concerning active travel mode of children to and from school has been conducted in developed countries. However, factors impacting children's active transportation need to be considered in the context of the study (Pont et al., 2009). Therefore, the findings of those researches cannot be generalized to developing nations. Moreover, few of them have focused on exploring the differences in the children's mode of transportation by income group (McDonald, 2008). In addition, most of the studies relied on parental perceptions and ignored the perspective of children on this matter. Although parents are the final decision-makers in choosing the children's school travel mode, the desire for a particular travel mode by children would also affect parental decision-making (Falb et al., 2007). Finally, although the influential factors limited studies have examined the modes of transportation to and from school separately (Hume et al., 2009).

This study is the first known attempt to present an analysis of the set of variables that affect the trip to school of children in a hitherto unexplored setting – a developing country (Iran). Second, all objective and subjective data are integrated to understand the problem better and data has been collected directly from children not through their parents (Napier et al., 2011). Third, the result of this study is examined across different socio-economic areas. Finally, this study is among the first to prospectively examine the predictors of increased walking autonomously to and from school among children (Fyhri et al., 2009).

This study modifies the conceptual framework of the relationship between perceived traffic safety, personal safety, built environment, socio-demographic, socio-economic, cultural norm and modes of children's travel to and from school, which presented by the previous studies. The research explores the environmental barriers to an autonomous child's walking to and from school by examining the relationship between traffic safety, personal safety, built environment factors, and a child's walking to and from school. Then, it examines whether the relationships are modified by socio-demographic, socio-economic and cultural norms. Furthermore, this study investigates if the environmental barriers for children in their walking to and from school vary across different socio-economic status areas. The research adds to the literature on individual and household travel patterns and children's walking to and from school. The parental and children's perception of barriers for children on their trip to school are examined carefully to reveal how variables are associated with each other and the travel pattern.

1.3 Multidisciplinary issues

Since past two decades, walking and cycling to school has become a concern for public health, transportation planners and policymakers around the world (Ahlport et al., 2008;

Hinckson et al., 2011; Cui et al., 2011). While children's travel to school is obviously a transportation issue, it is also a health issue. It is perhaps surprising that an activity such as walking to school is relating to public health agenda. However, research shows that a child's trip to school may relate to car accidents, children's obesity and even air pollution (Moayeri et al., 2006; Zeedyk et al., 2002; Zargar et al., 2003). However, not all these health issues are at the same level of significance across different countries. This shows the importance of exploring the influential factors concerning a child's walking to and from school with a strong link to policymakers in context.

Bringolf-Isler et al., (2008), a study in Switzerland found that, in contrast to the UK, parental concerns about safety are mostly related to traffic dangers and less often to violence. In developing countries (Iran is included), economic growth, rising incomes and urbanization contribute to a rapid increase in vehicle ownership and use (Atash, 2007). Motorized vehicles are the primary means of transporting passengers throughout the developing world because of their flexibility, and low initial cost compared to other transport modes. Over the last two decades, motor vehicles have emerged as a critical source of urban air pollution in most of the developing world (Madanipur, 1999; Atash, 2007). Per capita traffic volume is projected to double by 2020 and most of that growth will occur in the developing world (Schafer, 1998). Therefore, in a developing country, such as Iran, the most important issue is improving traffic jams and decreasing the use of private cars. Although obesity is also increasing among children in Iran due to the new life style, has not been epidemic among children yet. As such, all the policies concerning transportation focus on improving traffic safety as the most important factor (Jazayeri, 2005). However, it is not examined whether traffic safety is the only influential factor on choosing modes of travel to and from school for children.

Examining the topic with a multi-disciplinary approach helps to clarify its significance and also helps policymakers better understand the issue. This approach shows how children walking to and from school can have impact on their health by increasing in level of their physical activities and decreasing their obesity. Children active commuting to school also affects public health by decreasing in using motorized modes and improving the air pollution and it can also decrease children injuries in car accidents if we made the neighbourhood safer (Stewart, 2011). It is necessary to develop a comprehensive conceptual framework which is able to consider all perceived traffic safety factors, perceived personal safety factors and elements in built environment affect a child's trip to school to make neighbourhoods safe for children to walk to and from school.

1.3.1 Public health

1.3.1.1 Air pollution

More than a decade ago, the Government of the Islamic Republic of Iran identified Tehran's air pollution problem as a high priority environmental and health issue. As such, improving air pollution is the main concern for citizens, urban planners and decision makers concerning the future growth and development in Tehran (Sohrabinia & Khorshiddoust, 2007). Approximately 71% of Tehran's air pollution is related to mobile sources. About 20% of the morning traffic jam is related to education related travel. In the last five years, the air pollution level occasionally reached such dangerous levels that the officials of Tehran had to close primary schools and impose traffic restrictions (Atash, 2007). #

In last decade, city officials started implementing certain programmes with primary aged children to improve traffic and air pollution as well. The 2006 national transportation survey (Department of Traffic and Transportation in Tehran, 2006)

indicated that more than 50% of educational travel is made by motorized transportation. It also showed that the majority of primary school students take a school bus, use private cars or walk to school with an adult.

1.3.1.2 Car accident

The research by Department of Traffic and Transportation (2006) also revealed that the distance and lack of traffic safety are the main barriers for children walking to school independently. Pedestrian injuries involving car accidents are a serious problem in Iran (Rasouli et al., 2008). More than 40% of those who are injured in car accidents are pedestrians while 15.1% of them are below 10 years old (Atash, 2007). Studies have repeatedly shown that increasing car speeds might be the cause of the severe injuries in accidents, especially for children (Miller et al., 2004). While in some countries (e.g. Denmark, UK, etc.) there is policy to have speed limit zone (e.g. less than 30 km/hr) around primary schools, there is no speed limit around the school sites in Tehran and only the presence of speed bumps force drivers to reduce their speed. Therefore, increasing traffic safety is the most important concern for all urban planners and transportation policymakers in Tehran.

1.3.1.3 Physical activities and increasing obesity

Decreasing the rate of walking to school may contribute to the overall reduction of physical activities and health in children. Studies show that the overall prevalence of overweight and obesity in 11-17 year old students in Tehran is 17.9% and 7.1%, respectively. It also shows that obesity and the prevalence of overweight cause a higher prevalence of Metabolism syndrome (MS) among 10-19 year old children in Iran (Moayeri et al., 2006). In addition, studies found a relationship between the level of physical activities of students and their weight. To achieve good health the accumulation of 30 minutes moderate physical activities per day for most days in a

week is vital. This activity can be conducted for as little as 10 minutes but three times in a day. Therefore, they suggest implementing policies to increase the children's level of physical activity, such as promoting children walking to school (Moayeri et al., 2006; Pucher & Buehler, 2010).

1.4 Problem statement in Tehran

School travels accounts for 10.5% of daily trips in Tehran and over 50% of these trips are made by private cars. Since year 2002, the Tehran city government has invested heavily to improve the infrastructure of neighbourhoods to encourage walking. Their assumption is that the lack of traffic safety is the major barrier for active modes of children travel to and from school. Making the immediate environment around the primary schools safer for children to walk and decreasing the distance between home and school is the direct reaction to reply to this hypothesis. The following key factors show the focus of the current policies:

- 1- Imposing some restrictions on the regulations for enrolling students in government primary schools to decrease the distance between home and school.
- 2- Educating children about traffic safety at schools and in Educational Traffic Parks.
- 3- Improving the infrastructure in front of the main gate of the schools (i.e. adding speed bumps).

These programs failed after two years due to being a wide gap between policy and practice in Tehran that can be listed as following:

- 1- Inadequate support and encouragement from government officials;
- 2- Financial problems;
- 3- The absence of a cultural perspective of team work;

- 4- Lack of data about social and community issues;
- 5- Lack of recognition of the works being done by the NGOs (Namazi, 2000).

There are some other reasons that made this program unsuccessful: First, the programme aimed at decreasing the motorized modes of children's travel to and from school, but not focused on promoting children's walking to school autonomously. Although walking to and from school with an adult can decrease using motorized modes of travel and traffic jam as well, walking to and from school autonomously would affect the overall quality of life by decreasing trips and making the work schedule of parents more flexible (Briggs et al., 2008). The primary schools in Tehran are half-day schools, and children's walking autonomously from school has a lot of impact on parent's work schedule.

Second, although improving the built environment around the schools is necessary; it is not the sole influential factor, especially when it is limited to the area in front of the main gate of the schools. Third, as Zeedyk et al. (2001) in her study showed the education of children about traffic safety will not improve their performance in a real traffic environment. Iranian parents also did not feel comfortable to put their children at risk, especially those whose child was appointed as a cross-guard to help younger children to cross the roads in front of the school. Therefore, educating children on traffic safety cannot guarantee increasing the rate of children walking to and from school autonomously.

Considering the facts presented above, it is safe to claim that the Department of Traffic and Transportation in Tehran, and other related departments in general, are unaware of all the contributing factors in a child's trip to and from school in Tehran. Therefore, a rapid assessment is needed that would describe the latest approaches and research findings about children's trips to school in other countries. In addition, there is

a need to understand the institutional arrangements, programmes and projects about children's travel patterns that are available in other countries (Lang et al., 2011).

This study attempts to address this knowledge gap by providing facts based on the current mode of children travel to and from school in Tehran. It also identifies the barriers preventing children from walking autonomously to and from school across different socio-economic areas using a participatory method, which is considered the best way to improve people concerns about safety.

1.5 Research aim and scope

The aim of this study is to seek clarity on children's walking to and from school autonomously and to investigate the environmental constraints across different socio-economic status areas in Tehran. This research identifies the phenomena by answering the following questions:

- 1- What factors, including the built environment and non-urban form variables, influence parental decision-making about a primary-aged child's modes of transport to and from school?
- 2- What factors in the built environment impact on perceived traffic safety and personal safety in a neighbourhood?
- 3- Do socio-economic, socio-demographics, parental attitude and cultural norms modify the relationship between traffic and personal safety and parental decision making about a child's independent trip to school?
- 4- Do the perceived constraints for children in their walking to and from school vary across different socio-economic areas?

There is a general hypothesis in Tehran that the most important barrier for children in their walking is lack of traffic safety. However, other studies show that a lack of personal safety is more important for primary-aged children or that lack of

traffic safety and personal safety are of equal importance (Johansson, 2003; Dissanayake et al., 2009; Pont et al., 2009). These research questions lead directly to the following two hypotheses:

- 1- The traffic safety and personal safety factors influence parental decisions about modes of children's travel to and from school.
- 2- The barriers in the built environment for children in their walking to and from school vary across different socio-economic status areas.

The following specific objectives help to test the hypotheses:

- 1- To provide much needed basic information about children's travel to school.
 - 1.1- To point out the current modes of children travel to and from school and the rates of walking
 - 1.2- Moreover, to better understand the barriers the preferred modes of children travel to and from school and the reasons if they do not meet their desire was presented
 - 1.3- Finally, how children transportation to and from school vary with socio-demographic and socio-economic factors as well as neighbourhood characteristics was shown.
- 2- To understand the role of traffic safety and personal safety factors in respect of a child walking to and from school independently over other transportation alternatives.
 - 2.1- To examine the relationship between perceived traffic safety factors (parental perception and children's perception) with choosing children walking autonomously to and from school over other alternatives.
 - 2.2- Further, the relationship between physical elements in built environment that represent traffic safety with choosing children walking

autonomously to and from school over other alternatives were examined

- 2.3- The relationship between physical elements in built environment that represent personal safety with choosing children walking autonomously to and from school over other alternatives were also examined.
 - 2.4- Finally, the relationship between perceived personal safety factors (parental perception and children's perception) with choosing children walking autonomously to and from school over other alternatives were tested.
- 3- To determine the factors which modify the relationships of traffic safety and personal safety with parental decisions about their children travel to and from school autonomously.
- 3.1- To identify socio-demographic factors (child, parent and household's characteristics) that modify the level of influence of traffic safety and personal safety on parental decision making about a child's travel to and from school
 - 3.2- Further socio-economic factors (household's characteristics e.g. household income) that modify the level of influence of traffic safety and personal safety on parental decision making about a child's travel to and from school were recognized
 - 3.3- Finally, cultural norms and parental attitude factors (modes of parent's travel to work) that modify the level of influence of traffic safety and personal safety on parental decision making about a child's travel to and from school were identified
- 4- To examine the barriers (both physically and perceived) affecting children walking to and from school on their own across different income groups.

In spite of the overall remarkable economic growth rate of Iran, and notwithstanding the considerable investment in the infrastructure (especially in Tehran), the conditions of low-income areas have become worse (Department of Traffic and Transportation in Tehran, 2006). The uneven distribution of the benefits of economic growth may be explained by the polarization of society. The Tehran comprehensive plan (1968) had suggested that by 1974 there would be no poverty in this city. Therefore, the urban development plans in Tehran did not make provision for the development of low-income areas (Zebardast, 2006). In addition, the criteria and standards used for land use and zoning regulations only considered the characteristics of middle-income residents. Thus, it is necessary to explore the difference between constraints for children in the built environment across different areas in Tehran.

Only 9-12 year old children (grade three to five) from Tehran and their parents are involved in this study. The main reasons to choose this age group is children below 9 are not considered as pedestrian. Iranian children after 12 years old go to secondary school which often locates further to their house, and they cannot walk to and from school anymore due to long distance between home and school. In addition, the study focuses on government and Muslim schools (will be discussed in detail in chapter 4). Private schools, smart schools and those schools with a special educational system were excluded due to register students who stay further from school.

Using quantitative and qualitative in gathering data enables an examination of the complexity of influential factors concerning children walking to school. A cross-sectional survey was carried out, which included self-reported parental questionnaires as well as children's writing activities, they were asked to write an essay about journey to school. In addition, ad hoc interviews were conducted with children and parents for a deeper understanding. Furthermore, the urban design elements of the neighbourhood

around the school sites were measured (It is discussed in detail in chapter 4). Finally, some photos were taken and some movies were recorded to support the quantitative results of the research.

1.6 Structure of the thesis

The present chapter has provided the background to this research. The school trip is the most common and regular of all children's trips. It has also been the recent concerns of policy makers who believe walking to and from school is an effective way to promote physical activity for children to control the childhood obesity. The trip is important because it affect on their travel habit in future as an adult and a better understanding of the trip is needed to make effective and comprehensive policy.

Although there is very little previous work on primary school children's walking to and from school, in chapter two the research is informed by the literature on travel behaviour, particularly for families and by research into neighbourhood effects. Most of the previous research only explores the relationship between one factor and children's active commuting to school and did not study a child's travel to and from school separately. Most of the sociology literature relating to neighbourhood effects shows the necessity for an ecological model to consider how these factors affect the children's school travel mode at multiple layers. It also explores the existing policies and approaches to study children's trip to school on foot. Lastly, it provides an introduction to an analytical framework and previous research underlying this analysis. The framework recognizes the need to consider how factors at multiple levels e.g. child's characteristics, household' situation and neighbourhood condition affect modes of travel of a child to and from school.

Chapter three demonstrates the importance of doing this research in a developing country such as Iran. Children's travel to and from school is dominated by motorized

modes in high and middle income areas and walking with parents especially among children from low income areas. It shows different factors; affect a child's trip to school at different level across different countries e.g. traffic congestion and increasing in using motorized modes by children to go to and from school. It emphasizes the need to address travel congestion in developing countries by aiming at children and encouraging them to walk to and from school. In Tehran also city governance aimed at children to improve the traffic congestion by improving the infrastructure around primary schools and educating them on traffic safety. However, the programme focused on improving the traffic safety and did not consider other influential factors; e.g. socio-demographic factors and personal safety factors. Furthermore, it failed after few years for some financial problems and lack of police officers to send to schools without making any changes in modes of travel to and from school for children. It emphasizes the need to identify all influential factors on this issue to be able to convince parents to let their children to walk to and from school.

Chapter four presents an appropriate research methodology to answer the questions and suitable methods for collecting data. It shows how tools for collecting data from children are different from those being used for adults, doing survey with children is difficult and extra information in labelled questions will not help them to provide better answer. Multinomial Logistic Regression models uses to identify the relative influences of trip, child and household characteristics, physical elements in the neighbourhood and perceived safety in the neighbourhood on probability of walking to and from school over other alternatives. It emphasizes the significance of employing a mixed research approach (conducting a survey, doing some measurements of physical environment of neighbourhood and ad hoc interviews) to identify all variables and understanding the complex situation more deeply. It also highlights the importance of considering the view of children on this matter as well as their parent's point of view.

Children's perception of traffic safety affect on parental decision making about their modes of travel to and from school.

Chapter five provides an overview of the data used in the analysis. It deals with the primary data source: census descriptor and the Master Plan of Tehran. Then the chapter describes the characteristics of the sample population by using descriptive statistical analysis. It examines the current patterns of children's travel, addressing the first objective and sub-objectives. It reveals how many percents of children walk to and from school and who children are travelling with if there is any body. Moreover, whether the modes of travel of children are different on their trip to and from school and what the children and their parents preferred methods of transportation to and from school. It reveals children are more likely to walk back home autonomously or using school bus, while they are more likely to walk with their parents or being driven by them to go to school. It shows urban form factors are not the only contributing factors on this issue. Further, data presents how current patterns of children's travel vary with individual characteristics e.g. child's age, child's gender, household income, etc. It also shows short distance between home and school cannot guarantee students to walk more, in addition location of schools cannot fully explain the decline in walking to and from school. It also presents the descriptive results of the survey of the immediate neighbourhoods around the schools in Tehran. It shows lack of pavement connectivity and insufficient width of pavements is the common characteristics of all areas in Tehran. However, in low income areas pavements sometimes are totally absent. These areas have smaller block size with higher density to compare to other areas and mixed land use is present that decreases the perceived safety in the neighbourhood.

Chapter six presents the data from self-reported parental questionnaires, children's writing activities and ad hoc interviews with children. Furthermore, it presents data

concerning the immediate neighbourhood of the school. It provides the preliminary stages of regression analysis to show the relationships between different non-urban form as well as urban form variables with parental decisions about a child's walking to and from school. It reveals urban form factors are contributing factors in a process of making decision about a child's trip to and from school. Entering urban form factors into the model can improve it to predict the probability of children's walking to and from school over other alternatives.

Chapter seven integrates the results that were presented in chapter 5 and 6 to identify the perceived barriers regarding children's trips to school on foot across different socio-economic status areas. It also presents more detailed results by using variables at the quadrant level in analysis. The analysis reveals that a large portion of decline in walking to and from school autonomously can be explained by lack of safety in the neighbourhood. Some social forces and cultural norms such as household car ownership, mother's occupation, modes of father's travel to work and household income also affect the proportion of students walking to and from school. Furthermore, the framework is evaluated and the results compared with the findings of other studies in other countries to validate the findings of this study. It also shows the differences between Tehran and those study areas and considers what these changes mean for urban planners and policy makers. Moreover, to provide a deeper understanding of the situation, it compares the implications of the results across different socio-economic status areas to show the need to take into consideration the different policies in different areas in respect to peoples' perceptions as well as the physical environment.

Chapter eight draws conclusions and develops recommendations for transportation policymakers in Tehran and future studies as well. Children are sensitive to walk travel time which makes them unlikely to walk long distances. Policies in

Tehran focus on where school are sited as well as improving the infrastructure of immediate environment around the school. Therefore, most of children live near to school or their parent works near to school. However, not all of them walk to and from school, especially on their own. It reveals some of child's and household characteristics, are equally important as neighbourhood safety factors in making decision about a child's trip to and from school while a child's gender does not influence mode choice. It also emphasizes how patterns of children's travel might change if land use, infrastructure in the neighbourhood e.g. street's width and pavement's condition and educational facility planners coordinated their effort to increase the number of children walking to and from school. However, these policies do not affect walking rates equally. Perception of parents and children are more important barriers for children in their walking to and from school. Policy makers need to focus on improving perceived safety in the neighbourhood through educating people and improving infrastructure. Findings show the need for better integration of land use, school planning and large-scale development to improve the infrastructure in the neighbourhood not only the immediate environment around the schools.