Abstract—During the school year 2010/2011, 1146 parental questionnaires of children attending schools were completed. Usual mode of transportation and frequency of regular car trips to school were assessed. Associations with several factors were evaluated. Results show that far fewer children are cycling or walking to school than expected, and that more and more are being driven to school by car. Major traffic conditions, environmental factors, distance to school, road’s infrastructures, walking or biking with groups, schools efforts to educate children about active travel, preferences of parents to accompany children to school were significantly perceived as important. The absence of active travel culture in the community was seen as a significant factor. Parent’s gender, child’s gender, child’s grade level, number of cars owned by the family, nationality and number of children were significantly associated with parents’ decisions to allow active travel to school. Results show that Abu Dhabi as a City needs to put in place aggressive strategies plans to promote active commuting to school as main mode of transport.

Keywords—Abu Dhabi, biking to school, mode of transportation, and walking to school.

I. INTRODUCTION

No study to date have examined factors associated with travel to school among Abu Dhabi children. Abu Dhabi is the capital of the United Arab Emirates (UAE) with a population of 1,967,659 according to the 2011 census. Abu Dhabi City accounts for 60.1% of the total population in the Emirate. With over (174,639) students (64% in public schools, and 36% in private schools) and (248) public and private schools (49% public schools, 51% private schools), Abu Dhabi is the largest Emirate in the UAE.

Results from this research could strengthen existing evidence and enhance efforts to promote active travel to school. Understanding the factors that influence children’s travel patterns is an essential first step in devising appropriate strategies to ensure their safety on the road, and the road environs.

II. TRAVEL TO SCHOOL FACTORS

A. Review Stage

The research designed a complete questionnaire derived from relevant previous work, it was deemed appropriate to present the literature background of the items used. Research to date fails to consider the potentially complex role parents’ decision making play in controlling their children’s travel behaviors and how environmental characteristics interact with these processes.

B. Travel to School Factors

In a number of Western countries, dependency on car use or biking is evident in research into modes of school travel. This trend has been noted with concern by environmental groups, health authorities and schools across many of these countries. Research in the UK [1], USA [2], Australia [3] and Canada [4] has indicated that the proportion of children being chauffeured to school by parents has increased over the past few decades. The proportion of children walking and cycling to school varies considerably across countries [5]. However, Data from Australia, the US and the United Kingdom suggest active commuting to school to be on the decrease [6]. Active commuting to school is an opportunity for children to achieve regular daily physical activity [7]; and that if more children walked or biked, it might be possible to lower children’s health risks [8].

McMillan [9, 10] developed a conceptual framework to highlight factors that may influence parents’ decisions about how school children travel to school. Parents are assumed to make the ultimate decision about whether their child can walk to school or not. The decision may be influenced by perceptions of the physical and social environments which combine with attitudes, beliefs, and perceptions of social norms about their child using active school travel. Within the framework, he identified an extensive array of correlates including demographic, individual and family factors, school factors, and social and physical environmental factors.

Distance is shown to be a critical factor in children’s travel walk [11-14]. Other factors include perceived neighborhood aesthetics and characteristics, related to the presence of traffic lights, pedestrian crossing improvements, and walking or bicycle paths [15]. Others, [16, 17], found a positive association between the presence and condition of sidewalks.

Masood Badri. Professor of Production and Supply Chain Management, UAE University. He is now seconded to the Abu Dhabi Education Council as Head of Research and Planning, P. O. Box 36005, Abu Dhabi, UAE. (MasoodBadri@adec.ac.ae)

Tarek Elmourad is Head of Strategy at the Abu Dhabi Education Council (TarekElmourad@adec.ac.ae)
and children’s physical activity, while [18] found no association. Factors negatively influencing walking or biking to school include parental perceptions of heavy traffic within their neighborhood [19]. The studies have shown that distance, traffic, and crime are three key factors preventing students from walking/biking to school [17, 20]. Lack of pedestrian infrastructure such as sidewalks was sighted in many studies [8, 17]. Others noted reduced schools’ roles have traditionally played in communities not accepting active travel to school by parents [21].

The built environment appears to exert a significant effect on mode of travel to school [22]. Around schools, car congestion during peak arrival and departure times creates a dangerous environment for those children who walk, cycle or catch public transport [23, 24]. Research shows that in many countries, traffic jams connected to the school journey have created serious problems [1]. Driving children to school contributes to air pollution at a greater rate than longer urban trips [24].

There are no statistics in Abu Dhabi that directly categorizes sources of pollution in the morning or during other times of the day. There are many research studies that correlate mode of travel to school to personal or familial variables of children’s commuting behavior to school [14, 25]. Research results have been inconsistent showing that boys are more likely to walk to school in comparison to girls [26], but not always [27]. Some found that girls are less likely to walk than boys with the differences being most prominent at younger ages [27, 28].

Literature review results also show that students’ travel behavior to school is affected by many potential factors such as household income and location [26, 29]. Household factors such as car ownership and parents driving to work also affect mode choice [30].

With regard to children’s age, some findings show that younger children are more likely to walk to school [31]; while others show that older children are more likely to walk to school [6, 32, 33]. With regard to ethnic background, some research in the US noted that Hispanic and/or Black children are more likely to walk to school [34-37]. (Note: in this study we use nationality as a proxy to ethnic background). Household factors such as car ownership and parents driving to work also affect mode choice [30]. With regard to household income, studies show that mode of transportation is affected by household income [38]. There is evidence that the work status of parents is also associated with walking and biking to school [34, 35].

The current study will be the first attempt to better understand the determinants of active travel to school in Abu Dhabi. In spite of referring to “community culture” indirectly in many studies relative to active travel to school [14, 39], none of the research reviewed isolated the factor directly as a determinant of active travel to school. In addition, none tried to test the contribution of each of the different factors to the decision of parents of allowing children to actively travel to school. The current research will strictly take the views of parents with regard to mode of travel to school and the decision to allow children to walk or bike to school.

III. METHODS

From extensive review of literature related to children travel to school, a survey consisting of 38 items were designed. The items were related to preference of parents to accompany the child to school, the culture of walking and biking to school, the environmental factors, the distance factors (minimum distance and actual distance), the safety factors (community conditions, traffic conditions, and road conditions), safety factors, the infrastructure of roads and lands to school, the school efforts in teaching about walking and biking to school, the form of walking and biking (walking or biking in a group), child’s peers attitude towards walking or biking, and parents’ beliefs of the benefits of walking and biking. Two items were also added to reflect the decision of parents to allow their children to walk or bike to schools.

A focus group of 14 members were called for a meeting that took 3 hours of discussions. The results of the literature searches were presented to the group. Each item was discussed for its suitability in the Abu Dhabi study. The group suggested to add items related to the culture of walking and the culture of biking to school in Abu Dhabi. And the children’s’ feelings that their peers might make fun of them if they walked or biked to school. A total of 28 items remained in the final draft of the survey. Parents were asked to state their opinion as to level of agreement with each statement on a 5 point Likert scale ranging from (1 = strongly disagree to 5 = strongly agree).

Face validity of the survey was established by developing the survey based on a comprehensive review of the current literature. After designing the final instrument, a panel of researchers and the ADEC School Guardian Committee reviewed the survey and determined content validity.

To establish stability and reliability, the hard copy instrument was conducted with 32 parents from one district in the Emirate of Abu Dhabi (Al Karama) and then repeated one week later. The results yielded a mean correlation of .927. Scale reliability was measured using the Cronbach alpha coefficient of reliability for the scales in the survey. Results of these analyses showed that the alphas for the different scales were acceptable.

The questionnaire further included some demographic and travel to school habits of children. The participants for this study were parents of children of public and private schools in the City of Abu Dhabi. A total of 1344 parents participated in the study. However, many questionnaires were not completed fully. A total of 1145 usable questionnaires were utilized for this study. For each scale, the summated score will be used in further analysis. Simple descriptive statistics will be computed for all constructs. To answer the questions raised by this study and related to factors affecting the mode of transportation to use to travel school, several hypotheses are proposed. To test the hypotheses a series of ANOVA runs will be performed for
each of the scales with regard to mode of transportation to school.

IV. RESULTS

Two most commonly used mode of transportation to school are by car (45%) and by the school bus (38.1%). Walking (6.8%) or biking (2.5%) to school combined, account for (9.4%) only. There are also portions of children that use public transportation such as taxis (2.3%) and buses (5.2%). For those who walk or bike to school, 85% of them take less than 30 minutes to get to school, and some of them (14%) live further than 5 kilometers from the school. In addition, 54% of them are UAE nationals, 14% are from other Arab nationalities, while 13.1% are westerners. We also note that 73.6% of them are boys.

There is no obvious pattern as to which age (grade level) walks or bikes more often; however, more kids from grade 1, 2 and 3 walk or bike to school. Most of these children live in closed residential compounds not too far from their schools with less traffic encountered during the travel to school. It is noted that 55.1% of this category of children attend private schools.

Further analysis show that for those that take taxis to school, more than 46% of them live 30 minutes or more away from the school. For those children that have to travel less than 3 kilometers to get to the school, (24.1%) of them walk or bike to school, while 49.8% of them ride a car to school, and 20.6% take the school bus. It is noted also that 94.9% of those children reach school in less than 30 minutes. It should be noted too that all of the families in this category own 1 car at least.

About 54.2% of the children are UAE nationals, and 59.9% of them are boys. In addition, 49.3% of them attend grades 1, 2 or 3 and about 20% attend grade 9 or above. It should be noted also that 62.8% of them attend private schools. About 65.3 percent of the children travel less than 10 kilometers. Travel to school takes at least 20 minutes for (51.9%) of the children. It takes less than 30 minutes for 73.4% of the children. On average, most families have 1 or 2 cars (61.8%). Most parents have bachelor degrees (43.4%), while (38.2%) hold less than a college degree.

Male parents account for (51%) of the respondents; and male children account for (58.3%) of the total children. Parents, whose children attend private schools, account for 69.1 percent of the total number of parents. Most parents participating in the survey are from the UAE (45.3%), and from other Arab countries (29.9%). Only (7.5%) parents come from Europe, North America or other Western countries.

For those parents that drive their children to school, about 74.6% prefer doing so since the school is on his/her way to work. More than 87.5% of parents note that the culture of walking or biking to schools in Abu Dhabi is not strong. In addition, 79.8% of them feel that the driving public (traffic) are not used to slowing down during student crossings. A large percentage of parents (78.8%) point out to environmental factors such as the weather and smog/pollution. Even though, 81.7% of parents refer to actual distance to school for being too far for walking to school, a large percentage believe that the option to walk to school (80.9%) or bike to school (75.8%) should be a favorable option if the child is within 1 kilometer (or 0.621 miles) of the school.

With regard to route to school safety, parents feel that a traffic condition is the most serious concern (busy traffic (86.2%) and crossing signal lights (98.7%). On the other hand, the least severe condition is noted to be community related variables such as local community (71.8%), violence/ harassment (71.3%), and location of the school (71.4%). Road conditions are also considered of concerns to parents (unsafe route to school (82%), and dangerous roads to cross (73.4%)). It should be taken as a point of concern that parents attribute mode of transportation to other factors other than infrastructure of roads on route to the school. Only 49.6% feel that they would allow the child to bike to school if bicycle lanes are provided. Meanwhile, only 65.5% of the parents feel that if sidewalks are improved, they might consider allowing their children to walk to school.

Most parents agree that the schools do not encourage children to walk or bike to school (81.7%), and schools do not have plans to educate students on the benefits of walking or biking (79.8%). Parents also do not feel strongly that their children’s friends might make fun of them if they walked (55.2%) or biked (69%) to school. Results also show that walking in group might not be reason for their decision to allow their children to walk to school, as only (52.2%) agree with that statement. However, more parents feel that the kids peers might make fun of them if instead they biked to school (69%). In other words, walking is more acceptable than biking.

With regard to the physical activity benefits, 75.9% parents believe that the health of children could be improved by encouraging more walking or biking. In addition, 75.3% parents believe that if conditions are right, walking to school is specifically good for the health of the child. With regard to the direct questions relating to the decision of allowing the child to walk or bike to school, 77.9% of parents feel that under the current circumstances, they won’t be happy allowing their children to walk or bike to school. However, only 60.8% of parents insist that they would not let their children to walk to school under any circumstances.

Table 1 provides the one way analysis of variance (ANOVA) results of testing the effect of parent perception with regard to factors of active to travel to school on the mode of transportation to school. The decision to allow the child to walk or bike to school has a significant effect on the mode of travel selected (F = 15.66). For the 13 factors, the calculated F values are significant at the (0.05) level with regard to 9 of them. Thus, the related hypotheses are supported. The highest significance (highest F values) is observed with regard to actual distance to school (F = 24.919); preference of parents to accompany their children to school (F = 15.06) because the school is on their way to work, or other reasons; and safety
related issues with traffic conditions ($F = 11.828$). Other factors that have significant effect on the mode of travel to school include the absence of culture of walking or biking to school ($F = 8.940$), environmental factors ($F = 4.733$), school efforts in teaching about walking or biking to school ($F = 4.155$), infrastructure of the route to school ($F = 11.286$), and walking or biking in a group. On the other hand, the safety issue related to road conditions, the minimum distance to school necessary for the option to walk or bike to school, parent’s belief about the benefits of walking or biking to school, safety factors related to community conditions, and the child’s peer’s attitude to walking or biking to school.

Table 2 provides results of ANOVA tests of the effects of familial and demographic features on the decision of parents to allow the children to walk or bike to school. There is no statistical evidence that academic attainment of parents or their family income have any significant effect on the decision of parents to allow the child to walk or bike to school. In addition, the schools being public or private have no significant effect either. The five factors of minimum distance to for deciding to allow to walk or bike, road conditions, infrastructure of roads and lands, children’s peer’s attitude towards walking of biking to school, and parent’s belief about the benefits of walking or biking to school are not significant.

V. DISCUSSIONS AND CONCLUSIONS

In the city of Abu Dhabi, like many other metropolitan areas, there has been an increasing trend towards vehicular modes for home-school travel, and the school journey by car has become a significant feature of daily life for many families. Meanwhile the city suffers from an air pollution crisis, traffic congestion, and most of its districts are involved in the mal distribution of schools. A variety of barriers exist for children navigating to school by foot or bike. The desire of parents to protect their children from unsafe roads by driving them to school. Other results show parents’ concerns with regard to increased air pollution from car emissions and greater traffic congestion around the schools. In addition, the increasing parental fear of danger from strangers and assault is placing even more restrictions on children's mobility.

Only 9.4 percent of children walk or bike to school. Nearly 45 percent of all school-aged children are driven to school by their parents. This contrasts sharply with ADEC’s vision and expectation of letting children attend close by schools to encourage walking or biking to school. ADEC has put expectations where almost 90 percent of kids living within two kilometers of their school walked or biked to school. However, results show that less than 15 percent of school children living within two kilometers of school walk or bike. The reliance on school bus for transportation has also peaked with more than 38.1% of parents pointing to that mode. In spite of all the efforts to improve public transportation, the percentage of students who used public transportation was significantly lower compared to any mode of transportation (only 2.2%).

Compared to countries like the US [25], Australia [32, 33], Switzerland [7], and other Scandinavian countries [5, 40] the number of children walking or cycling to school in Abu Dhabi is relatively low. The vast majority of Abu Dhabi children attend schools that are not easily accessible from home via active transport. Consequently, the median straight-line distance between home and school in this study was about 3-5 kilometers and considerably longer than reported, for example, by other studies from other countries [30] or Australia [33].

This low reliance in active travel to school coincides with results from several studies that pointed to the rise in childhood obesity among children. Many reports from health authorities in Abu Dhabi show that Abu Dhabi children are not getting the recommended amount of physical activity. In addition to health concerns, the increase in the number of children being driven to school by their parents directly affects traffic congestion. Figures from the Health Legislation and School Health in the UAE point out that more than 50 percent of the children in the UAE are considered obese.

According to a report by the Health Authority in Abu Dhabi (HAAD), in 2010, it noted that 30 per cent of school children in Abu Dhabi were overweight or obese and 70 per cent of them are likely to stay overweight or obese as adults. There are no statistics on how much school-related traffic accounts for pollution of all morning peak hour traffic. Both ADEC and ADRT believe that by reducing the number of parents driving children to school, one could expect to relieve morning peak hour delays and congestion.

There is evidence of the effect of work status of parents as it is also associated with walking and biking to school [29, 34, 35]. About 74.6% of the parents prefer driving their children to school because it is on his/her way to work.

More than 87.5% of parents note that the culture of walking or biking to schools in Abu Dhabi is not strong. In addition, 79.8% of them feel that the driving public (traffic) are not used to slowing down during student crossings. The factor had the highest mean (3.837) compared to the means of all other thirteen factors affecting parent’s decision to allow their children to walk or bike to school. In many countries, a school zone speed limit is applied and has become a culture.

It should be noted that restricted speed limits for school zones is a new concept in the city of Abu Dhabi. However, looking at the fine categories for motorists in Abu Dhabi (on the Abu Dhabi traffic website: http://adpolics.gov.ae), there are no mention of fines related to exceeding speed limits in school zones. In addition, most school zones got no signs to identify the area as school zones. There are no speed limit signs for most of these areas or zones.

The relatively high mean scores of parents’ responses with regard to children’s way to school to be unsafe is likely to further contribute to the low levels of active commuting. Safety concerns of parents were mostly related to road conditions (71.4% and 63.3%), community conditions (46.1%, 58.5%, and 45.3%) and traffic conditions (68.2% and 48.2%). This is relatively in line to other studies (e.g. from the UK,
where 90% of the parents of 6- to 10-year-old children were worried about safety issues and 89% because of traffic [30]; also from UK, where over 40% of parents restricted schoolchildren aged 7–11 years from coming home alone from school because of traffic danger, while around 20% of parents enforced this restriction due to other safety issues [41].

Even though, the most significant determinants of mode of travel to school are perceived ‘stranger danger’, or danger of assault by other studies [14, 24], the summed score of community safety in Abu Dhabi received a favorable score from parents. In addition, community score related to safety was not seen as a determining factor in parents’ decision. Consistent with results from other studies, [42], the environment (weather conditions, car pollution, smog) appears to exert a significant effect on mode of travel to school. Abu Dhabi research is consistent with other studies that distance is a critical factor in children’s travel walk [11, 13, 36].

Most children live 5 to 15 kilometers from their schools; taking them more than 30 minutes to get there. Such a distance might not encourage any parent to allow their children to walk or bike to school. Many land authorities in Abu Dhabi argue the lack of space available in the Abu Dhabi Island to build schools. On the other hand, many education strategists in ADEC argue that “community” schooling would not be effective if the land authorities do not take the initiatives to convert many business or residential blocks of lands to be used as schools in the future.

Consistent with other studies [15, 17], neighborhood aesthetics and characteristics, related to walking or bicycle lanes, and sidewalks have significant effect on the mode of travel. Regardless of whether sidewalks are improved, or bicycle lanes are provided, parents do not feel too enthusiastic about letting their children walk or bike to school. If we isolate the sample of parents that use family car as mode of transportation to school, we note that 87.6% of them gave a score of “strongly disagree” or “disagree” on their decision to allow the child to walk or bike to school. In addition, for this group only, the correlation between their infrastructure score and the culture of walking score or biking score is 94.5%. This might suggests that the fact of absence of culture of walking or biking might have a strong biasing effect on other factors such as infrastructure of route to school.

Research results have been inconsistent showing that boys are more likely to walk to school in comparison to girls [26, 32], but not always [27, 43]. In Abu Dhabi, both parent’s gender and children’s gender are significant determinants of the decision to allow children to walk or bike to schools. For those walking or biking to schools, boys constitute (73.8%). With regard to children’s age, Abu Dhabi findings show that younger children are more likely to walk to school. Such results are consistent with other findings [12, 31]. In Abu Dhabi, results show that about 62.3% of those that walk or bike to school are from grade 1 to grade 5.

Inconsistent with other studies, household income appears insignificant in the decision to allow the child to walk or bike to school. Others found household income to be a potential factor [26, 29, 44]. Nevertheless, if we isolate the children that walk or bike to school, we note that for those with a household monthly income below (4,000$), about 12.4% walk or bike to school. However, for those with a household monthly income around (11,000$), only 3.9% walk or bike to school. Meanwhile, if we isolate those that use a car to school, we note that for those with a household monthly income below (4,000$), about 40.2% use a car. However, for those with a household monthly income around (11,000$), about 53.1% use a car.

Results verify McDonald [34, 35] results obtained showing how household interactions affect walking and biking to school; and how parental employment status and commute patterns affect school travel. He found out that parents who commute to work in the morning are less likely to walk or bike to school after controlling for individual, household, and neighborhood factors.

The Abu Dhabi study also suggests that 69.5% of the parents are willing to allow their child to walk to school if they are in a group or accompanied by an adult. In such instances, [36, 36] suggests that policymakers may therefore want to create programs that allow parents to share chaperoning responsibilities for the school trip to address parental time constraints.

In regard to children’s walking or biking skills and the school’s efforts to teach those skills to children, the researcher of this study found that the majority of parents believe that the schools do not offer such teaching skills. Many studies have recognized the responsibility of schools for providing adequate walking or biking to school skills to children along teaching them the benefits of those functions [9-12, 44].

As a matter of fact, in a separate survey of principles in

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**TABLE 1. ANOVA AND FACTORS OF MODE OF TRANSPORTATION**

<table>
<thead>
<tr>
<th>Variables (Factors)</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1. Decision to allow children to walk or bike to school</td>
<td>15.66</td>
<td>0.000</td>
</tr>
<tr>
<td>H2. Safety - Road conditions</td>
<td>1.281</td>
<td>0.263</td>
</tr>
<tr>
<td>H3. Safety - Community conditions</td>
<td>1.619</td>
<td>0.109</td>
</tr>
<tr>
<td>H4. Safety - Traffic conditions</td>
<td>11.828</td>
<td>0.000</td>
</tr>
<tr>
<td>H5. Environmental factors</td>
<td>4.733</td>
<td>0.000</td>
</tr>
<tr>
<td>H6. Distance - Minimum distance from school</td>
<td>1.715</td>
<td>0.114</td>
</tr>
<tr>
<td>H7. Distance - Actual distance to school</td>
<td>24.919</td>
<td>0.000</td>
</tr>
<tr>
<td>H8. Parent’s belief about the benefits of walking or biking to school</td>
<td>1.775</td>
<td>0.101</td>
</tr>
<tr>
<td>H9. Infrastructure of roads (route) to school</td>
<td>11.286</td>
<td>0.000</td>
</tr>
<tr>
<td>H10. Walking or biking to school with a group</td>
<td>3.918</td>
<td>0.001</td>
</tr>
<tr>
<td>H11. School efforts to teach walking or biking to school</td>
<td>4.155</td>
<td>0.000</td>
</tr>
<tr>
<td>H12. Culture of walking or biking to school</td>
<td>8.940</td>
<td>0.000</td>
</tr>
<tr>
<td>H13. Child’s peers attitude to walking or biking to school</td>
<td>1.954</td>
<td>0.077</td>
</tr>
<tr>
<td>H14. Preference to accompany the child to school</td>
<td>15.069</td>
<td>0.000</td>
</tr>
</tbody>
</table>

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Abu Dhabi city schools, only 5.4% of principles mentioned that their schools provide some form of learning related to the benefits of walking generally.”

Current conditions in Abu Dhabi City are not conducive to active travel to school. Our main research objective was to better understand the context within which active travel to school occurs in Abu Dhabi, with a focus on the viewpoint of parents. The instrument used has largely depended on previous literature that has looked at the influence of many factors on how children travel to school. Parents are thus the focus of our analysis. Our objective was to understand how they see active travel, in particular with regard to the trip to school, and how other familial factors might interfere with their decision to allow the child to walk or bike to school.

In 2008, Abu Dhabi has embarked on an aggressive strategic plan of education reform that included the design and implementation of school facilities that incorporate the concepts of community schooling. From a transportation perspective, community schools should affect trip lengths by decreasing the distance from home to school. Therefore, to understand how a shift to community schools might affect walking behavior among children. However, many questions remain unanswered by the Abu Dhabi authorities involved in school location and allocation planning. The new schools are of the highest qualities when it comes to their design and internal layouts; however, there are still located in areas that witness challenging factors such as distances, built environment, community atmospheres, unsafe roads and crossings that might make them “half-community” schools, as phrased by a parent responding to the survey. As [36] suggests, decision makers should investigate many scenarios when it comes to walking or biking to schools in the morning. School planners should envision scenarios that could specify each student’s distance to school and the circumstances surrounding the trips. Such scenario building ideas could provide realistic and good senses of the sensitivity of walking or biking to school.

For Abu Dhabi, active travel to school will not be effective unless the walking and biking environment is radically transformed. In addition, a radical change in the culture of active travel to school is needed if parents are to trust the education decision makers, the road authorities, the community norms, and the government policies to encourage their kids to actively travel to school. The existing urban forms in Abu Dhabi City have their risks, and increasing the number of children pedestrians and cyclists will simply increase the risk of accidents unless the whole culture of travel and urban environment is radically modified. The organization of city space related to school location and allocation must be rethought to increase children’s safety. This means that a more radical approach is required. Changes must be made along the entire route children are likely to take to get to school, and this must be done in every neighborhood. A more comprehensive approach is required that will increase a neighborhood’s walk-ability for everyone (a cultural impact), not just school students. If the desire is to increase the proportion of children to walk to school, other people will have to walk more too.

A cultural change means also that there must be changes in the behavior of the entire stakeholders of the road system, the drivers, pedestrians and cyclists. Many [36, 37, 46] recommended an integrative framework of mediating factors which includes neighborhood safety (real/perceived), traffic safety (real/perceived), and household transportation options. The framework also has some moderating factors that include social/cultural norms, parental attitudes, and socio-demographics, which are affected by urban form, parental decision-making, and children travel behavior to school.

This research adds to our understanding of how different variables and familial features influence parents’ choices related to the children’s mode of travel to school.

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