School Commuting and the Impact of Cultural Differences: The Israeli Case

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Abstract

This paper's focus is on school commuting and related activity patterns in Israel. This topic of school travel is a relatively neglected area in the transportation literature. It may contribute only little to today's most envisaged transport problems but it generates its own insights which may impact the transport system policy and management. The study presented here incorporates data from the main two cultures in Israel: the Jewish and the Arab population. The basic hypothesis is that cultural aspects-perceptions influence commuting to school and related travel behavior. These cultural perceptions, coupled with other factors such as differences in actual and cognitive distance to school, family size, number of cars and driving licenses per household, and parents working hours may determine the commuting behavior of students/pupils to school. This study, still in progress, aims at understanding and comparing school commuting behavior of Arab and Jewish students in various cities and villages in Israel. It includes students of primary and secondary schools. The data collection was held in different locations in Israel. The methodology includes a questionnaire that was filled by the students in class and a questionnaire filled by the parents at home. It compiled data concerning the school commuting and includes some general information regarding other travel activities. The analyses are performed separately for the two study populations. We will describe the input data used for the comparison and discuss home-to-school commuting distances/time and modal-splits for the Arab and Jewish populations. Among the main results it was found that there are differences in terms of home to school commuting but a striking difference exist in the school to home commuting. This is certainly accounted for differences between the two populations.

Keywords: travel behavior; activity patterns; urban planning; school commuting

1. Introduction

Children travelling behaviour is known to be an important component in the household travelling patterns. Despite this recognized connection, children's travel behavior had previously received little research attention and actually children were understudied population in terms of travel behavior. We can tie this limited attention in

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children travel behavior to the fact that the trip to school is often poorly planned, particularly for bicyclist and pedestrians. Only in last decades, there is a growing interest in studying children travel behavior. Lately, different studies refer to the connection between the travel behavior/activities of children and the travel of households' adults (Zwets et al. 2010, for example), taking into account that school travelling is the children's primary transport activity.

This growing interest in children travelling happened in parallel to a significant change in children travelling behavior, where the private vehicle has become the predominant mode, even for distances of less than one mile see McMillen (2005, 2007), for example. Schlossberg et al. (2006) pointed out that from the mid 70th to the beginning of this century, the cycling and walking percentage of elementary and secondary school students dropped from 49% to 14% in the United States. This change in travelling behavior, coupled with the huge increase in the number of school students in the last decades, presents a growing transportation problem, and school commuting became a significant generator of localized congestion with morning (especially) and afternoon peaks. Black et al. (2001) showed that journeys of parents driving their children to school contribute approximately 20% of all UK car journeys on weekday morning rush-hour.

It is believed that part of this decline in the extent of walking to school is related to an overall decrease in children's independent spatial mobility. That is, parents change their definition on when it is safe to let a child walk to school unaccompanied. This assumption is based on data of various studies, which looked at the change of children's commuting activities across time or children's commuting options in various urban areas. Hillman et al. (1990), for example, showed that English school children had less travel freedom in 1990 than in 1971. O'Brien et al. (2000), focused on the possibility that different urban context may influence children freedom. For example they looked at children's freedom in low density neighbourhoods compared to high density areas.

Various city form aspects: distances, building density, mixed land use, intersections density, employment density, block size, land use barriers and commercial density, as well as other aspects: pedestrian friendly design of the urban environment (increasing sidewalks and shade trees for example), presence of bike lanes, speed humps near school, a parking problem at the school, neighbourhood safety, traffic safety, household transportation options, caregiver attitudes, child attitude, social/cultural norm, ethnic characteristics, organized leisure activities (that leave less time for children independent travel), gender, and socio-demographics, were found to influence the students travelling mode (to mention just a few of these studies: Black et al. 2001, Schlossberg et al, 2006, McMillan 2005, 2007, McDonald, 2008, Muller et al., 2008, Yarlagadda and Srinivasan, 2008, Lin and Chang 2010 Wilson et al., 2010, Zwerts et al, 2010, and Nicitopoulos et al., 2011).

In addition, to these findings, McDonalds (2008), pointed out that the commute patterns of the mother is significantly associated with extent of walking and bicycling to school of children of ages 4-15. These suggest that parental time constrains need to be addressed if policy-makers wish to increase rate of children self-school-travel. This is especially important, as it adds to previous common and conservative suggestions programs for bringing back children to walk and bike to school.

Based on the understanding that parent's perception of the built environment is an important component in the overall cause for children walking and cycling decrease, recently, different policies concentrated on educational programs. One example is the Safe Route to School (SR2S) (McMillan, 2007). However it is agreed by researcher that parents perceptions concerning children self-travelling freedom, although have significant influence on children school commuting, can not explain the full extent of decreased trend of walking and bicycling to school, and those programs which were found to influence and encourage children to walk to and from school, still needs to accompanied by other changes and aspects in order to increase their influence. Hence, in order to bring children back to walk or cycle to school different environmental as well as behavioural aspects should be examined and treated.

All above described aspects found in school travelling research are important for policy makers and urban planners to point out how a sustainable built environment can be created to support children walking and bicycling to school. Lately an increasing body of literature is attempting to examine different variables and try to understand their effect on school mode choice, different methods are used (for example: Ewing et al., 2004; Jonnalagadda et al., 2001).

This study aims at understanding the Israeli school student commuting behavior with the focus on school travelling of Jewish and Arab students and to examine the relationship between the demographic and socio-economic characteristics on school student commuting behavior. The basic hypothesis is that due to various
differences between these two groups, especially differences in socio-economic, cultural and the built environment, there are differences in various aspects of school commuting. This comparison will provide among other aspects, deeper insights into how socio-economic characteristics, which indicate in many cases, the inequity in investment distribution among different groups in society, affect school student commuting behavior. We will concentrate here on associated aspects which are relevant to Israel with the focus on children commuting to school and compare commuting patterns of Arab and Jewish students of ages 9-15, in Israel. Based on that, conclusions may be reached concerning the relevant Israeli, Arabs and Jewish environment that can support walking and bicycling to school. This research is the first to study the relationship between modes of travel to school and a range of factors that might affect mode choice in the Arab and Jewish student population an Israel.

The paper is organized as follows: we first describe the methodology of the research and the survey, this is followed by the analysis of the data accumulated and finally conclusions are presented.

2. Methodology

This research is part of a nation-wide survey that aims at studying the Israeli children (9-15 years old) travel behavior. Here we show our results based on a comparison between Jewish and Arab students. The study's data is obtained by a questionnaire, filled in class, by the students. This questionnaire aims at obtaining information on school commuting as well as some general information concerning the way the students commute to different afternoon or weekend activities. In addition to the child questionnaire a parent questionnaire was also included. This second questionnaire was sent home with the child. The parent questionnaire, deals with information concerning the child (the specific child that filled the questionnaire in school) school commuting, and parent attitude concerning school commuting options. The use of data from parents concerning different aspects of the children commuting is well documented in the literature. Wilson et al (2010), for example, used a questionnaire filled up by parents in their study in Minnesota.

In order to include in the analysis a comparison between the way children and their parent account for children commuting, the questionnaires for the child and for the parent were marked with the same identification notation of school, class, and number within the class.

3. The Israeli Arab population

At the end of 2008 the Arab population in Israel numbered 1.488 million people, that is 20% of the total population. By 2030 the Arab population is expected to number 2.362 million (24%). This big growth, according to the Central Bureau of Statistics (2007), is mainly due to a relatively high fertility.

About 82.6% of the Arab population in Israel is Muslim (including Bedouins), another 9% is Druze, and around 9% is Christian. An Arab family has 4.8 persons on average, compared with 3.5 in a Jewish family. Its median age is 20, compared to a median age of 31 of the Jewish population in Israel, that is, the Israeli Arab population is comparably very young.

Most Israeli Arab communities, suffer from a low socio-economic status, (Socio-Economic Level 1 to 3, on the Central Bureau of Statistics scale which is from 1 to 10), in addition a low level of education and a low motorization rate (187 cars per 1000 population) (Elias et al, 2008) compared to the Jewish (300 cars per 1000 population) (Central Bureau of Statistics, 2007).

The Israeli Arab towns, suffer from low level of road system is and limited public transportation reflected by low frequency and a limited distribution, (Stern, 2007). These described conditions lead to traffic congestion and high rate of involvement in road crashes, in the Arab villages in Israel.

Women's participation in the workforce is only half that of the men. More than a third of the women are housewives and the percentage of women that have a driving license is lower than in the Jewish population (Central Bureau of Statistics, 2010).

4. The sample

As mentioned previously, the built environment in the different cities and villages, the difference in socio-economic level and cultural aspects are believed to influence student commuting to school. Traffic safety, household
transportation options, caregiver attitudes, social/cultural norms, ethnic characteristics, and socio-demographics are all aspects that may differ between Arab and Jewish population in Israel and can influence students school commuting. In addition, other aspects as differences in actual and cognitive distance to school, and parents working hours which also may differ between these two groups, possibly will determine the commuting behavior of students /pupils to school.

This study is based on about 1800 Jewish and Arab students in total, half of each, studying in 4th to 9th grades that is age 9 to 15 years old. The questionnaire was held in Feb -Mar of 2011, in different schools. The schools were chosen so that the sample includes children from the northern part of Israel down to the southern part (up to Beer-Sheva). It includes schools in various cities and settlement size and different ethnics and religion. In each school a random class was chosen, one from each age relevant to the study grades 4th to 9th. The sample is described in Figs. 1 and 2 in terms of gender and age. We will now move to describe some of our main results.

![Figure 1. Population sample, by gender](image1)

![Figure 2. The sample, in terms of age, for the Arab (left) and Jewish (right) populations](image2)

5. Results

Table 1 presents the distribution of the travel mode used by the children on the morning commuting to school and on the afternoon to-home mode. It is important to point out that as the questionnaire was held in different days of the week, the answer to this question provides us data on all school week-days.

As shown in the table there is a big difference in the morning commuting behavior between the Jewish and Arab students. The Jewish students are more likely to be driven to school (42.6%) than the Arab ones (27.7%). When
looking at the walking mode the results show that while 57.8% Arab kids walk to school only 40% of the Jewish ones use this mode for the morning school commuting. Although there is a significant difference in the morning car use, in the afternoon school-home commuting there is almost no difference in the use of car between the two groups. The difference between the two groups in local bus use in both commuting ways is interesting while only 0.8-1% of the Arab students use the local bus, 11.8% of their Jewish counterparts indicated using this mode in the morning commuting and 17% in the afternoon. The low percentage of using the local buses in the Arab communities is due to the lack of developed public transportation system (Elias et al., 2008). In an overall view, the differences in the distribution of the travel mode between the Arab and Jewish population, as reflected in Table 1, are statistically significant at 0.05 level.

<table>
<thead>
<tr>
<th>Mode</th>
<th>Home-school*</th>
<th>School-home*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Population group</td>
<td>Population group</td>
</tr>
<tr>
<td></td>
<td>Arabs</td>
<td>Jewish</td>
</tr>
<tr>
<td>Walked most or all the way</td>
<td>Frequency 498</td>
<td>356</td>
</tr>
<tr>
<td></td>
<td>% 57.8%</td>
<td>40.0%</td>
</tr>
<tr>
<td>Cycled</td>
<td>Frequency 1</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>% 0.1%</td>
<td>0.8%</td>
</tr>
<tr>
<td>School bus</td>
<td>Frequency 117</td>
<td>43</td>
</tr>
<tr>
<td></td>
<td>% 13.6%</td>
<td>4.8%</td>
</tr>
<tr>
<td>Local bus or train</td>
<td>Frequency 7</td>
<td>105</td>
</tr>
<tr>
<td></td>
<td>% 0.8%</td>
<td>11.8%</td>
</tr>
<tr>
<td>Car</td>
<td>Frequency 239</td>
<td>379</td>
</tr>
<tr>
<td></td>
<td>% 27.7%</td>
<td>42.6%</td>
</tr>
</tbody>
</table>

In contrast to the first aspect which deals with the actual mode use, Fig. 3 presents the children preferences concerning the traveling mode. While almost 46% of the Jewish children indicated preference of being driven, that car mode option was indicated by only 29.2% of the Arab ones. When looking at the walking mode option almost 40% of the Arab children prefer this mode while only 25.9% Jewish kids indicated this preference. These differences in mode preference are statistically significant. All other modes are much less preferred and the differences between the two groups are small hence we do not discuss them. Comparing the indicated preferences and the actual mode used by the students, there are similarities between the percentage of students using the car mode (being driven) and the indicated preferences. The walking mode is preferred less than it is actually used, that is, some of the children in both groups which are walking to school prefer using a different mode. This understanding of the differences between walking preferences and actual commuting by walking is important for dealing with the question of how to make children walk to school.
The next two figures (Figs. 4 and 5) deal with the partners for the morning and afternoon school/home commuting. As portrayed in these graphs, there is a big difference in parental escorting between the morning commuting and the afternoon commuting, for both groups. While in the morning commuting 38% of the Arab students and 24% of the Jewish ones are escorted by parents, on the way home the numbers drop drastically and there is almost no difference between the two groups. There is also a difference in the percentage of self commuting while in the morning commuting 22% of the Jewish students and 29% of the Arab students are traveling to school alone. The afternoon pattern is different as more Jewish students (34%) than Arab students (18%) walk home alone. The differences in the commuting partners between the two groups are statistically significant.
Figure 5. Afternoon travel accompanying

Table 2. Commuting time per mode

<table>
<thead>
<tr>
<th>Mode</th>
<th>Population group</th>
<th>Less than 5 minutes</th>
<th>5 to 15 minutes</th>
<th>16 to 30 minutes</th>
<th>31 to 45 minutes</th>
<th>46 minutes or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walked most or all the way</td>
<td>Arab</td>
<td>28%</td>
<td>57%</td>
<td>11%</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td></td>
<td>Jewish</td>
<td>40%</td>
<td>49%</td>
<td>9%</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>Cycled</td>
<td>Arab</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>Jewish</td>
<td>29%</td>
<td>71%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>School bus</td>
<td>Arab</td>
<td>14%</td>
<td>53%</td>
<td>18%</td>
<td>12%</td>
<td>3%</td>
</tr>
<tr>
<td></td>
<td>Jewish</td>
<td>2%</td>
<td>49%</td>
<td>33%</td>
<td>16%</td>
<td>0%</td>
</tr>
<tr>
<td>Local bus</td>
<td>Arab</td>
<td>0%</td>
<td>50%</td>
<td>33%</td>
<td>17%</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>Jewish</td>
<td>5%</td>
<td>57%</td>
<td>19%</td>
<td>17%</td>
<td>0%</td>
</tr>
<tr>
<td>Car</td>
<td>Arab</td>
<td>54%</td>
<td>40%</td>
<td>5%</td>
<td>1%</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>Jewish</td>
<td>45%</td>
<td>52%</td>
<td>3%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

The results of the commuting time show that more than 40% of the Jewish kids which walk to school spend less than 5 minutes where for the Arab students this number is low as 28%, which means that the Arab student walk longer distances. When comparing the driving time that spent on the way to school for those coming by car, the results show that 54% of the Arabs and 45% of the Jewish kids spend less than 5 minutes on travelling to school by car, and more than 90% of the travellers by car in both populations spend up to 15 minutes on the way to school. The differences in commuting time using one of the three modes: walking, cycling and travelling by car, between the two groups are statistically significant.

The parents’ questionnaire gives us more information concerning children commuting mode and especially light shade on the reasons for these commuting patterns. Looking at the number of times an adult collects the kids home from school (Fig. 6) the results show that 49% of the Arab parents and 48% of the Jewish parents indicated that their kids are never collected from school by an adult during the week. On the other side, it is interesting to see that 20%
of the Arab parents and 10% of the Jewish parents indicated that their kids are collected from school by an adult 5 or 6 days a week, respectively.

When parents are asked how worried they are about the risk concerning child injured in a car accident when crossing roads. The results show that 64% of the Arab parents compared to 47% of the Jewish parents indicated they are very worried. This result is expected because the Israeli Arab children are exposed to high level of pedestrian crash risks (Elais et al., 2010) and children aged 0-14 account for 60% of the total pedestrian fatalities - eight times higher than for Jewish children (Shiftan and Elias, 2011). 28% and 20% of the Jewish parents indicated they are quite worried or not very worried (respectively) while the Arab parents indicated 19% and 12% respectively. The differences in adult collecting the kids from school and their thoughts concerning the risk of being injured in car accident are found to be significant.

6. Conclusions

This study analyzes the commuting characteristics of children to school and back home on two ethnic-groups basis in Israel. The data was collected recently by employing a survey among Jewish and Arab students in the age group of 9-15, and their parents.

In general most of the differences between the Arabs and Jewish students in their commuting behaviour to school and back home and their preferences concerning these commuting patterns are statistically significant at 0.05 level. Same outcome is for the parents’ responses concerning their thoughts about the safety of this commuting.

The analysis shows that a large percentage of the students reach school in 5 minutes or less (walking or travelling by car), and many marked “walking” as main travel mode. This reflects a suitable location of schools with respect to housing areas in general. It is also found that Jewish children reach school by car with an adult much more frequently than Arab ones. This is reflected by both the children and parents questionnaires. It is coincides with our assumption that more mothers in the Jewish population are working outside home and arrange their working hours so that they will be able to drive their children to school, a trend that was also found in the literature (as described earlier).

About 46% of the Jewish kids prefer to be driven to and picked up from school while the corresponding number in the Arab population is only 29%. Hence, in the case of the Jewish kids, based on educational aspects, we see a potential for bringing them back to walk more to school.

As mentioned, recent studies point out the decrease in the use of cycling to school in general. Indeed a low percent in that respect is also found here. Almost none of the children of the sample actually use this mode in both
populations, although about 13% of them (in both populations) wish to do so. Hence, more research is needed to establish a plan for encouraging kids to use bicycles for getting to school.

As for safety concerns, adding to the findings described in the literature and presented in the introduction, more Arab parents are concerned with the safety of reaching school than the Jewish ones, and this is because they consider the roads/paths to school in their neighbourhood as not so safe in terms of traffic accidents. An improvement in terms of the road safety is likely to increase the rate of those walking to school.

The study shows the main conclusions arising so far from an ongoing survey, aiming at understanding the travel/transportation modes of children to school among Arab and Jewish populations in Israel. A following stage is planned to include further analysis of the coupling between transportation behavior and cultural differences, as well as differences in socio-economic status, car ownership, driving licence, and more. The overall study will serve for better transportation planning and spatial land-use distribution in Arab and Jewish areas.

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