Factors affecting the use of Child Car Seats for nursery school travel. A study in Athens.

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Abstract

Children vulnerability as car occupants is subject to their age and physical development. The aim of this research is to identify the factors affecting the use of Child Car Seats, particularly Child Restraint Systems (CRS) or booster seats for the commute to nursery school. The study is piloted in three suburbs of Athens, Greece, with distinct differences in socioeconomic status (SES) and built environment characteristics.

A self-administered parental questionnaire, exploring the traffic safety practices for preschool children as well as the child-parent interaction and the parent’s risk perception, behaviour and knowledge of traffic safety, was completed for 734 children attending municipality nursery schools. Responses revealed that children irrespective of the area of residence travel to the nursery school mainly as car occupants. The level of use of Child Car Seats is quite low.

Regression analysis showed that socio economic status (SES) of the family as well as the area of residence, family travel patterns, family structure, traffic safety climate, particularly parent’s perceptions towards traffic safety and the use of driver seat belt, as well as child’s age and gender, affect the use of Child Car Seats for this commute. Transportation network infrastructure is also affecting the use of Child Car Seats.

Conclusions are drawn and extensions to this work are explicitly discussed, along with suggestions to overcome the limitations and complete this research with on-going and future data collection and analyses.

Keywords: Road safety; pre-school children; child restraint systems; child car seats; socio economic status; Athens, Greece
INTRODUCTION

Greece is consistently among the worst performing countries in Europe regarding motor vehicle crashes. Although the effects of the economic crisis have led to a considerable reduction of road traffic casualties in recent years, there is much room for improvement. Concerning transport related injury deaths in children and adolescents aged 0-19 years in the WHO European region, Greece came second in averaged standardized rates per 100,000 for 2003-2005, with similar performance for most recent years [1]. In this country the primary cause of fatalities among children aged 0–14 years is road traffic injuries accounting for 55% of total deaths from known causes in this age group [2]. In Greece there is a national seatbelt law, which applies to front and rear seat occupants, and a national child restrain law; however, implementation is often lacking and compliance rates are low [3]. An observational study was carried out in 2009 [4] and revealed that child restraint use in Greece is 57%, with no significant difference inside or outside urban areas. Besides, around 1 out of 4 drivers do not use seat belts, with females having higher seat belt use rates. Only 19% of rear seat passengers use seat belt inside urban areas, and 28% outside urban areas. There is evidence that Greek drivers, seem to be uninformed of the significant contribution of seat belts in minimizing the occurrence and severity of injuries [5]. Strong evidence suggests that Child Restraint Systems (CRS) are an effective measure towards the prevention of child occupant travel related injury [6, 7, and 8]. Non-use of restraints or sub-optimal restraint use increase injury risk in crashes [9]. Data from the US demonstrate that CRS when used correctly reduce the risk of death in young children aged 2–6 years by 28% compared with seatbelts alone [10].

The objective of this research is to investigate the perceptions towards and use of car seats for the commute to nursery schools, using data from a self-reporting questionnaire, distributed in nursery schools (and completed by the parents) in several locations in Athens, Greece. The underlying aim is to understand the parameters that influence the use of car seats, so that they can be used to drive policies for their increased use. Specific attention is given to socioeconomic factors, as they have been known from the literature to determine road safety behaviour in general, and car seat use in particular.

The remainder of this paper is structured as follows. Some background regarding the factors affecting the use of car seats and nursery school travel is presented in the next section. The methodology and data collection procedure is presented next, followed by an overview of the collected data. The specification of a number of econometric models is presented in the following section, followed by the interpretation of the model estimation results. A concluding section provides further insight and discusses directions of further research.

BACKGROUND

CRS and booster seat use

Several studies explore the use and misuse of CRS. Many factors seem to be related to the use of CRS for young children. Parent’s attitudes, knowledge and behaviours towards road safety in general, and CRS safety knowledge are significant [11]. Also a common reason for children not to be appropriately restrained in vehicles is parental false impression about the size and safety of regular restraint equipment [7]. There is a positive relationship between driver seat belt use and CRS use [12, 13, and 14]; also when a parent is the driver of the car, CRS use seems to be higher [15]. High driver socioeconomic status (SES) (education and income) is linked to frequent use of CRS [16]. CRS use is also higher for younger children.
and for children from smaller families [17]. There is also evidence that large and low-income families are less likely to use an age appropriate restraint indicating economic and logistic barriers of child restraint use [18]. Booster seat use seems to be decreasing when there are 3 or more passengers in the vehicle [7]. Parental perceptions about the danger associated with the type of trips they take may influence in the restraint use of children [19]. Research on this topic has suggested that parents identify certain types of trips such as short trips, to be safer than others, and thus, change the usual pattern of restraint use [20]. Figure 1 outlines the main factors influencing child car seat use.

Traffic safety climate is defined as an individual’s attitudes and perceptions of the traffic in a context (e.g. country or area) and is a surface component of safety culture [21]. Previous research showed a correlation between traffic safety climate and secondary tasks while driving and traffic violations. In this context by examining parents’ attitudes and behaviour in a specific area we could portray the traffic safety climate for these users and examine possible associations with CRS use.

![Factors affecting child car seat use](image)

**FIGURE 1. Factors affecting child car seat use**

**POSITIVE FACTORS FOR CHILD CAR SEAT USE**
- young children
- driver seat belt use
- parent driver
- small families

**NEGATIVE FACTORS FOR CHILD CAR SEAT USE**
- parental false impression about safety equipment
- low SES
- 3 or more passengers in vehicle
- parental risk perception

**Nursery School travel**

Many studies around the world examine aspects of school travel. School travel behaviour, is closely related to the specific conditions that affect parents’ travel choices. Research on this subject has identified both environmental (i.e. distance to school) and personal factors [22, 23]. Other studies show that in cases where distance to school is short, attitudes and psychosocial parameters might influence these decisions more than the built environment characteristics [24]. As far as the use of restraints is concerned, children arriving at school are less likely to be restrained than those observed at intersections according to previous research [15, 22]. Nursery school travel has received little attention comparing with school age travel. Pre-schoolers are infants and young children less than five years old. Although there are similarities with school travel there are some major differences too. First, pre-schoolers are completely dependent on their care-givers for this commute, as they cannot travel unaccompanied. In the case of walking or biking to nursery school, children’s age, distance to pre-school, weather and other travel commitments independently seem to predict active travel [25]. In the case of travelling as car occupants, their body structures are much more immature.
than older children and restraint over larger and sometimes different body areas is necessary [8].

**Synthesis and Discussion**

This study aims to identify the factors linked with the use of Child Car Seats for the daily trip to nursery school. Several studies approach aspects of school travel, but only a few focus particularly on pre-school children. We examine whether the factors affecting CRS and booster seat use in other studies worldwide also apply in Athens and whether or not there are area-specific factors. We define the SES of the area of residence using as indicators the educational level, the occupation of the residents and the property zone price. We focus on three suburbs of Athens with eminent differences on SES; a low SES suburb (Fyli), a middle one (Ilioupoli) and a high SES suburb (Kifissia).

**METHODOLOGIC AND DATA COLLECTION**

A questionnaire was developed and administered to a sample of parents living in three suburbs of Athens Greece and having at least one child attending the municipality nursery school. The following key elements are examined: (a) the family travel patterns (b) nursery school trip characteristics (c) the child-parent interaction (d) the traffic safety climate and (e) family structure and SES.

**Questionnaire design**

At the first page of the questionnaire the parent was asked to provide details about the number of children of their family attending the particular nursery school, their gender and age. Then three discrete sections follow, with questions regarding the following:

1. Travel to and from nursery school;
2. Child-parent interaction and traffic safety; and
3. Parent demographics.

Parents were requested to answer all questions. The questionnaire was piloted with three parents for assessment of clarity, and took approximately 10 minutes to complete. Therefore, it was suitable for distribution, in terms of its length and effort required for completion. Approval was requested and given by each local authority for distribution of the questionnaires. Subsequently, the principal of each nursery school was contacted by an experienced researcher (in this case the first author of this paper). The researcher explained the aims of this study and the procedure to be followed. The teachers of the schools provided all parents with a package, which included an invitation letter, the questionnaire and an envelope. Teachers informed the parents that the participation is voluntary and that all data would be given anonymously and the answered questionnaires would be sealed in the envelopes. The number of packages prepared was equal to the number of children attending the municipality nursery schools.

The SES of the family is defined using a set of suitable indicators: the level of education of both parents and the annual family income found in the parent demographics section. Traffic safety climate for pre-schoolers’ parents is defined using 6 items of the questionnaire found in the first two sections. Participants were asked to indicate to what degree they feel their child is safe during this commute, how safe is the route they follow, and how possible it is for a child and an adult to be involved in a traffic accident, on a five point scale from 1 = ‘not at all’ to 5 = ‘certain/absolutely’. They were also asked to indicate their estimate regarding the number of traffic fatalities in this country every year, using a number
of intervals ranging from 1 = ‘100-500’ to 7 = ‘2500 +’. There is one question examining the
difficulties parents would face if they chose to walk to nursery school, in which the parents
are presented with 8 difficulties to choose from, with traffic safety being one of them. The
last question, regarding traffic safety climate, asks participants to choose the most concerning
danger children face every day, among 6 possible options, with traffic accident being one of
them. In this last question parents tend to give more than one answer.

Recruitment and participation rate

All municipality nursery schools in Fyli, Ilioupoli and Kifissia participated in this survey.
There was no financial incentive for the parents to undertake the survey. The distribution and
collection of the questionnaires took place during 2014. We received complete and usable
replies for 734 children attending these nursery schools.

Study areas selection

Fyli, Ilioupoli and Kifissia are suburban municipalities of Athens. Fyli is located in the west
part, Ilioupoli in the south-eastern and Kifissia in the north of the Athens metropolitan area.
In Figure 2 we can see the occupational structure of Athens [27]. Fyli belongs to the working
class suburbs, Ilioupoli is a socially mixed main urban area surrounded by clerical, sales and
service workers areas and the municipality of Kifissia has a socially mixed area along with
professional occupations area, as well as managerial and top level occupations area. The
above settings were chosen as they have socioeconomic and built environment characteristics
of a typical low, medium, and high SES suburb of Athens, respectively. In terms of properties
values the price zone for Fyli spans between 650 and 800 Euros/m², for Ilioupoli, it is 1400 to
1900 Euros/m², while the range for Kifissia is 1250 to 4000 Euros/m². To determine the
educational level we take into consideration the percentage of residents over 19 years of age,
with tertiary education. For Fyli this percentage is 11.0%, for Ilioupoli it is 28.8% and for
Kifissia it is 48.3%. Also in these three areas there are differences in the built environment.

By identifying the type of road network in these areas we tried to find a possible link between
the road type and the use of CRS.
FIGURE 2. Occupational structure of Athens [27]

OVERVIEW OF THE DATA

In total, responses about 734 children were considered eligible for analysis, and have been the basis for all subsequent results. Table 1 shows a summary of the participant’s demographic characteristics, compared also with the latest census results for these municipalities. Most parents are aged between 26 and 45 years; the most popular family size is 4 persons. The age and gender of children in this sample are shown in Table 2. Although in all locations municipality nursery schools accept children as young as 9 months old, the vast majority of children attending the nursery school is between 3 and 5 years old. This age group is particularly interesting as many children graduate from forward facing CRS to booster seats. It is found that children often move to larger restraints too early [13, 14, and 16].
1 **TABLE 1. Demographic data of respondents and general population census data**

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Female</td>
<td>77%</td>
<td>73%</td>
<td>50%</td>
<td>53%</td>
<td>53%</td>
<td>49%</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>23%</td>
<td>27%</td>
<td>50%</td>
<td>47%</td>
<td>47%</td>
<td>51%</td>
</tr>
<tr>
<td>Age group*</td>
<td>3% 18-25 years</td>
<td>2% 18-25 years</td>
<td>0% 18-25 years</td>
<td>14% 20-29 years</td>
<td>11% 20-29 years</td>
<td>10% 20-29 years</td>
<td>12% 20-29 years</td>
</tr>
<tr>
<td></td>
<td>35% 26-35 years</td>
<td>43% 26-35 years</td>
<td>35% 26-35 years</td>
<td>17% 30-39 years</td>
<td>16% 30-39 years</td>
<td>15% 30-39 years</td>
<td>15% 30-39 years</td>
</tr>
<tr>
<td></td>
<td>48% 36-45 years</td>
<td>49% 36-45 years</td>
<td>57% 36-45 years</td>
<td>15% 40-49 years</td>
<td>16% 40-49 years</td>
<td>16% 40-49 years</td>
<td>15% 40-49 years</td>
</tr>
<tr>
<td></td>
<td>2% 46-55 years</td>
<td>5% 46-55 years</td>
<td>5% 46-55 years</td>
<td>11% 50-59 years</td>
<td>13% 50-59 years</td>
<td>14% 50-59 years</td>
<td>13% 50-59 years</td>
</tr>
<tr>
<td></td>
<td>0% 56-65 years</td>
<td>1% 56-65 years</td>
<td>0% 56-65 years</td>
<td>8% 60-69 years</td>
<td>10% 60-69 years</td>
<td>12% 60-69 years</td>
<td>10% 60-69 years</td>
</tr>
<tr>
<td>Marital status</td>
<td>Married</td>
<td>97%</td>
<td>93%</td>
<td>89%</td>
<td>48%</td>
<td>49%</td>
<td>51%</td>
</tr>
<tr>
<td></td>
<td>Single</td>
<td>1%</td>
<td>3%</td>
<td>1%</td>
<td>44%</td>
<td>40%</td>
<td>51%</td>
</tr>
<tr>
<td></td>
<td>Divorced</td>
<td>2%</td>
<td>3%</td>
<td>7%</td>
<td>2.8%</td>
<td>4%</td>
<td>4%</td>
</tr>
<tr>
<td>Household income</td>
<td>&lt;10.000 euro</td>
<td>20%</td>
<td>15%</td>
<td>12%</td>
<td>N/A</td>
<td>Average: 23.889 euro (2010)</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>10.000-15000 Euro</td>
<td>20%</td>
<td>17%</td>
<td>13%</td>
<td>N/A</td>
<td>Average: 20.202 euro (2010)</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>15.000-25.000 Euro</td>
<td>28%</td>
<td>36%</td>
<td>22%</td>
<td>N/A</td>
<td>Average: 23.889 euro (2010)</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>25.000-50.000 Euro</td>
<td>15%</td>
<td>19%</td>
<td>30%</td>
<td>N/A</td>
<td>Average: 20.202 euro (2010)</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>&gt;50.000 Euro</td>
<td>1%</td>
<td>13%</td>
<td>12%</td>
<td>N/A</td>
<td>Average: 23.889 euro (2010)</td>
<td>N/A</td>
</tr>
<tr>
<td>Highest level of education</td>
<td>Tertiary education</td>
<td>30%</td>
<td>46%</td>
<td>67%</td>
<td>11% (of persons over 19)</td>
<td>29% (of persons over 19)</td>
<td>48% (of persons over 19)</td>
</tr>
<tr>
<td></td>
<td>mother</td>
<td>16%</td>
<td>32%</td>
<td>66%</td>
<td>N/A</td>
<td>Average: 23.889 euro (2010)</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>father</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Number of persons per household</td>
<td>2</td>
<td>2%</td>
<td>3%</td>
<td>4%</td>
<td>3.18 persons (average)</td>
<td>2.45 persons (average)</td>
<td>2.61 persons (average)</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>23%</td>
<td>22%</td>
<td>26%</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>46%</td>
<td>53%</td>
<td>53%</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>5+</td>
<td>25%</td>
<td>19%</td>
<td>14%</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

2 Note: * Hellenic Statistical Authority (Statistics.gr), ** Age ranges provided in italics, as they vary across data- sets, N/A: not available
TABLE 2. Demographic characteristics of respondents’ children

<table>
<thead>
<tr>
<th>Gender</th>
<th>Fyli</th>
<th>Ilioupoli</th>
<th>Kifissia</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>51%</td>
<td>45%</td>
<td>44%</td>
</tr>
<tr>
<td>Female</td>
<td>49%</td>
<td>Male</td>
<td>54%</td>
</tr>
<tr>
<td>Male</td>
<td>54%</td>
<td>Male</td>
<td>56%</td>
</tr>
<tr>
<td>Age group (years)</td>
<td>1-2</td>
<td>1%</td>
<td>1-2</td>
</tr>
<tr>
<td>2-3</td>
<td>2%</td>
<td>2-3</td>
<td>12%</td>
</tr>
<tr>
<td>3-4</td>
<td>38%</td>
<td>3-4</td>
<td>27%</td>
</tr>
<tr>
<td>4-5</td>
<td>59%</td>
<td>4-5</td>
<td>38%</td>
</tr>
<tr>
<td>5+</td>
<td>0%</td>
<td>5+</td>
<td>14%</td>
</tr>
</tbody>
</table>

MODEL ESTIMATION RESULTS

Table 3 presents the estimation results of two generalized linear models, aimed at capturing the degree of use of child car seat. The two models are mostly similar, with the exception of the variables that are used to capture the heterogeneity of the areas. In the former model, area specific dummy variable are used for each of the three areas, in which data was collected. In the second model, network-related characteristics of each municipality are extracted (using the openstreetmap database) and used.

Model 1 uses simple dummy variables to distinguish between the areas, thus confounding the contribution of all factors (SES, road network, etc.). Model 2 uses specifically transportation network infrastructure variables, thus (i) relating the difference across the areas with these particular features and (ii) being presumably more transferable. In particular, the number of pedestrian ways and motorways in each municipality (divided by the area of each municipality) are used. From these variables, it becomes evident that –as expected- car seat use is higher in Kifisia, followed by Ilioupoli and lowest in Fyli. The use of the network-based measures can help attempt to generalize these findings, by suggesting that more pedestrian ways and motorways contribute to higher car seat use.

The remainder of the coefficients are common in the two models and can be interpreted as follows. When both male and female drivers escort the kids to school, increased use of car seats is observed. On the other hand, more than two children in the same car, female children and older (within the age bracket that we examine) children are put in special car seats less frequently. Socioeconomic factors also correlate with child car use; for example, father’s tertiary education is positively correlated with child seat use, while nuclear families with one child tend to use car seats more than other family structures. Safer attitudes are also reflected in increased child car seat use, as manifested by the correlation of frequent driver seat belt and car seat use. Similarly, parents who have been involved in traffic accidents tend to put their children in car seats more often.
1 **TABLE 3. Generalized linear model estimation results**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1</th>
<th></th>
<th>Model 2</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>0.285</td>
<td>2.787</td>
<td>0.169</td>
<td>1.411</td>
</tr>
<tr>
<td>Area base (Fyli)</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Area dummy (Ilioupoli)</td>
<td>0.119</td>
<td>2.730</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Area dummy (Kifisia)</td>
<td>0.162</td>
<td>3.571</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Pedestrian length/area</td>
<td>---</td>
<td>---</td>
<td>2.464</td>
<td>3.644</td>
</tr>
<tr>
<td>Motorway length/area</td>
<td>---</td>
<td>---</td>
<td>1.509</td>
<td>2.429</td>
</tr>
<tr>
<td>Driver gender: both male and female</td>
<td>0.075</td>
<td>1.945</td>
<td>0.075</td>
<td>1.945</td>
</tr>
<tr>
<td>Number of children in car: &gt;2</td>
<td>-0.207</td>
<td>-3.245</td>
<td>-0.207</td>
<td>-3.245</td>
</tr>
<tr>
<td>Child gender dummy: female</td>
<td>-0.076</td>
<td>-2.292</td>
<td>-0.076</td>
<td>-2.292</td>
</tr>
<tr>
<td>Child age</td>
<td>-0.044</td>
<td>-2.084</td>
<td>-0.044</td>
<td>-2.084</td>
</tr>
<tr>
<td>Father tertiary education dummy</td>
<td>0.058</td>
<td>1.612</td>
<td>0.058</td>
<td>1.612</td>
</tr>
<tr>
<td>Family size dummy: couple with one child</td>
<td>0.083</td>
<td>2.098</td>
<td>0.083</td>
<td>2.098</td>
</tr>
<tr>
<td>Use of driver seat belt: frequently</td>
<td>0.499</td>
<td>8.227</td>
<td>0.499</td>
<td>8.227</td>
</tr>
<tr>
<td>Use of driver seat belt: always</td>
<td>0.598</td>
<td>9.311</td>
<td>0.598</td>
<td>9.311</td>
</tr>
<tr>
<td>Parent involved in traffic accidents dummy</td>
<td>0.060</td>
<td>1.797</td>
<td>0.060</td>
<td>1.797</td>
</tr>
<tr>
<td>Null deviance</td>
<td>91.93</td>
<td>d.o.f.</td>
<td>91.93</td>
<td>d.o.f.</td>
</tr>
<tr>
<td>Residual deviance</td>
<td>68.778</td>
<td>d.o.f.</td>
<td>68.778</td>
<td>d.o.f.</td>
</tr>
<tr>
<td>AIC</td>
<td>451.02</td>
<td></td>
<td>451.02</td>
<td></td>
</tr>
</tbody>
</table>

2 The next step was to try to approximate the safety perception of the participants and quantify it as a latent variable in the model. Table 4 summarizes the results of the resulting latent variable model. The interpretation of the model estimation results is similar to the previous models, and therefore only briefly discussed next. The latent variable “traffic safety climate” is constructed by four indicators, in particular father’s tertiary education, high use of driver seat belt, the stated perception of the parents regarding their children safety using the current transport characteristics, and stated perception of the parents regarding the (un)safety of the route, if it had to be performed on foot.

3 The regression equation relates the use of car seat with the latent variable (with which it is positively correlated) and a number of other characteristics. Infrastructure elements including length of motorways and pedestrian ways (by area) are positively correlated with the use of child car seats. The characteristics of the transported children (gender and age) behave in the same way as the previous models, and the same applies to the gender of the driver and the family structure.
Table 4. Latent variable model estimation results

<table>
<thead>
<tr>
<th>Latent variable</th>
<th>Estimate</th>
<th>Std.error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traffic safety climate</td>
<td>=~</td>
<td></td>
</tr>
<tr>
<td>Father tertiary education dummy</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Use of driver seat belt: frequently or always</td>
<td>2.248</td>
<td>2.699</td>
</tr>
<tr>
<td>How safe are transported children?</td>
<td>2.446</td>
<td>2.536</td>
</tr>
<tr>
<td>Unsafe traffic to walk dummy</td>
<td>-0.802</td>
<td>-1.889</td>
</tr>
</tbody>
</table>

Regression:

| Use of child car seat | ~ | |
| Traffic safety climate | 2.903 | 2.773 |
| Pedestrian length / area | 2.573 | 3.984 |
| Motorway length / area | 1.674 | 2.829 |
| Child gender dummy: female | -0.064 | -1.940 |
| Child age | -0.048 | -2.255 |
| Driver gender: both male and female | 0.082 | 2.120 |
| Family size dummy: couple with one child | 0.103 | 2.610 |

Measures of goodness of fit:

<table>
<thead>
<tr>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>RMSEA</td>
</tr>
<tr>
<td>SRMR</td>
</tr>
<tr>
<td>CFI</td>
</tr>
</tbody>
</table>

One big question with latent variable models is always the assessment of the goodness of fit. One general guidance is to not cherry-pick individual goodness of fit measures, but instead show several. Along this vein, we have presented the three most common measures of fit for latent variable models, the Root Mean Square Error of Approximation (RMSEA), the Standardized Root Mean Square Residual (SRMR), and the Comparative Fit Index (CFI). Regarding RMSEA, MacCallum, Browne and Sugawara (1996) have used 0.01, 0.05, and 0.08 to indicate excellent, good, and mediocre fit, respectively, while others have suggested 0.10 as the cut-off for poor fitting models [30]. Therefore, the value of 0.059 in our model is acceptable. Similarly, SRMR values of less than .08 are generally considered a good fit [31], therefore the value of 0.039 in our model is clearly indicating a good fit. Finally, regarding CFI, a general rule of thumb is to accept values higher than 0.90. However, other researchers, such as Hu & Bentler 1999 argue against the 0.90 benchmark and instead suggest using indices to compare/contrast competing models (as we did in order to come up with the finally selected model).

DISCUSSION OF MODEL RESULTS

Due to the special value society places on children, their safety in traffic is of particular concern. Traffic accidents involving children are predictable and preventable, when suitable strategies are followed. These strategies involve legal security context and law enforcement,
education and publicity targeting parents, children and other road users, interventions to the
built environment, technological interventions, and active and passive safety measures.

Findings of this study show that child restraint system use for the everyday travel to
nursery school is influenced by several factors. These factors can be grouped in six broad
categories:

- Socioeconomic status: model results show that the SES of the area as well as
  the level of education of the father have a positive influence to the use of CRS
- Family travel patterns: when both men and women drivers are involved in this
  commute, there is a positive influence. An increasing number of children
  accompanied at the same time have a negative association.
- Traffic safety climate: among the indicators used for the characterisation of
  the traffic safety climate is the father’s level of education, which is considered
  a SES factor too. In addition the use of driver seat belt is positively associated
  with the use of CRS.
- Family structure: one parent families with one child, as well as big families,
  seem to use CRS less often than nuclear families with one child.
- Child age, gender. Older girls seem to use CRS less than younger girls and
  boys.
- Road network infrastructure: a denser road infrastructure seems to increase the
  use of car seats.

Parents might not be well informed about the correct use of the restraint systems and the
lifesaving effects of their use. They often believe that the route they follow, on the everyday
travel to school by car, is safe and therefore the use of CRS is unnecessary. On the other hand
children often experience discomfort while seated in car seats and booster seats. Parental
permissiveness, the perception that violations of the child restraint law are not enforced,
inconvenience, and situational factors are some reasons influencing parents’ decision for the
use of CRS [26].

A child restraint use law is in place in Greece since 1997, but -due to the fact that
there is no strict enforcement- it is quite common for parents not to use restraint systems,
especially for short distances. Another reason for parents not using restraint systems is that
there are no road safety cameras or other means of law enforcement in place in these suburbs.
Practically the compliance with the restraint system law is left to parents’ beliefs alone.

**Limitations of this research**

An inherent problem of surveys of this kind is that participants are more likely to be: female,
mated, more likely to have higher annual income [11]. Secondly, there are differences
between self–reported data and observational data, as demonstrated by Lennon [29] regarding
CRS use. Participants potentially report what they believe to be the most socially appropriate
response [28]. We tried to overcome this limitation by keeping the anonymity of the
participants, but we suggest that future research should validate self-reported information
with observations. Furthermore, it is probable that self-selection bias in the study is likely to
have resulted in overrepresentation of more compliant parents [29]. Nevertheless, we believe
that our results provide a close representation of reality, since the vast majority of parents
believe they travel with their children safely to school, although they do not always use
restraint systems and seat belts. Since so many parents do not use restraint systems, they feel
that their response is socially appropriate.
To overcome all the limitations mentioned above, an observational study is in progress. The
child restraint systems will be recorded and compared with the results of this study. The
observations include parents escorting their children by motorbike and child-parent
interactions, when walking to the nursery school. Potential illegal and unsafe behaviors, such
as the use of mobile phones by parents while driving, are also considered. Traffic safety
climate among parents was only partially defined in this study. Further research on this
subject is needed.

As already mentioned there is an economic barrier for the use of CRS [18]. Since this
study took place in Athens in times of economic crisis there is an additional interest of further
exploring the effect of the crisis in the use of CRS systems. Families face continuous
reductions of their income and priorities on expenses need to be re-evaluated. It would be
useful to identify any changes in the purchase of new CRS systems and booster seats.

This study will also be extended outside the Athens area. Questionnaires have already
been distributed in municipality nursery schools and observational studies are being carried
out in several locations of Greece, with different built environment and SES characteristics.
The results of each area will be used for valuable comparisons.

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