Children's Safe and Sustainable Independent Mobility

A Comparison of International Practices and the Situation in Greece

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Abstract. Children's independent mobility (CIM), especially regarding their everyday travel to and from school, is an essential component of an equilibrated childhood. It affects positively many aspects of their lives: physical health, social and cognitive skills, and overall sense of wellbeing. In the postwar period the percentage of children travelling independently to school declined dramatically in developed countries, especially due to traffic danger. An urban environment that does not provide for safe routes to school intensifies the use of cars for short rides, creates congestion in school zones, renders streets even more prone to traffic accidents and it is certainly unsustainable, from a climate-change point of view. Due to its multilayered importance, research on CIM, originally a subject of environmental psychology, has lately been expanding in many other fields, such as public health, transport design, urban design, and planning, thus providing valuable qualitative and quantitative data that have steered changes in policies and practices around the world. In Greece, children as pedestrians are killed or injured in road accidents in numbers that continue to be tragically high; at the same time, children are being chauffeured to and back from school by their parents on an everyday basis, in what we could call "ridiculous car trips". However, CIM has so far been quite an overlooked area of research. The paper presents findings from studies and selected examples of good practices that have promoted children's independent mobility around the world and compares them with existent situation in Greece.

Keywords: Children's independent mobility · Children's safety from traffic · Children's wellbeing · School travel · Good practices · Greece

1 Introduction

From the late 1990's onwards, research on children's everyday lives and on how the quality of the urban environment intersects with the wellbeing of children has much advanced as an interdisciplinary field of inquiry. While until then it was primarily examined through the lens of environmental psychology and sociology [1], it is

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currently recognized as an important area of research also for urban design, urban planning and transport design [2]. Children's Independent Mobility (CIM) is an overall concept to describe, analyze and design for safe and sustainable ways for children to travel independently, that is, without being driven at the back seat of a car. In this paper, we will mostly discuss the spatial aspects that frame children's everyday mobility patterns, and particularly the role of urban design and urban policies in shaping – and changing – these patterns, through: a) a review of the key findings of studies on CIM around the world; b) a presentation of successful cases of positive change towards safety for children using the streets; and c) an attempt to compare these theoretical and practical approaches with the existing situation in Greece.

To our knowledge, no comprehensive quantitative or qualitative studies exist about how children travel to and from school in Greek cities and towns, how the design of urban streets affects their safety and shapes their mobility patterns, or how these patterns differ from neighborhood to neighborhood; nor has there been any evaluation of the many repercussions of the phenomenon related to public health, the economy and the environment. A field study contacted by the author [3] regarding the child-city relationship in middle childhood, based on ethnographic methodology,[1] revealed how negatively the "threat of the car" influences children's mobility. Through their field observations, the participants emphasized how unfriendly open public space is for them: absence of sidewalks, sidewalks blocked by cars, cars blocking crossings, motorcycles in pedestrian streets, lines of cars creating a visual barrier between the child walking on the sidewalk and the street (see Fig. 1). Unfortunately, such experiences constitute the norm in Greek cities and towns; like "canaries in a coalmine",[2] children's experiences showcase the level of wellness of a society. It seems that in the Greek context, the lack of research on CIM is strongly related to an overall disregard of children as users of urban space and citizens, in a broader sense.

[1] The study took place between 2009–2011 in the town of Veria in northern Greece (population 47,000), and involved eighty-one children participants, aged from 9 to 12 years old, living in five different districts of the town, who were asked to photograph the places of their everyday lives and then write their comments about them, creating a photo diary.

[2] For the pioneer 'geographer of children' William Bunge [4], children are like "canaries in a coalmine", meaning that they reflect the pressures of the urban environment with greater sensitivity due exactly to their vulnerability. Bunge was the first to introduce the concept of "geographical expedition" for doing research on the everyday spaces of children.

Fig. 1. Two photos taken by children participants in ethnographic study on the use of urban space during middle childhood. Captions given by the children who took them are "Cars flood the sidewalks" (l) and "This is a play space in my neighborhood, but it is so full of cars" (r).

2 The Shrinking of Children's Independent Mobility and Its Repercussions

Colin Ward, the British sociologist and author of the seminal book *The Child in the City* [5], includes a passage of a childhood memory of the author Alfred Parr, who grew up in Bergen, Norway, at the turn of the twentieth century. When his mother sent him on an errand to buy fish, little Alfred would walk from home to the train station for fine to ten minutes, buy a ticket, watch the coal-powered train pull in, board the train, go across the bridge separating the fishboat harbor from the sail harbor, then go through a tunnel, arrive at the terminal and get off, walk past the central park of the town (where he would stop to watch the band playing), stroll by the central shopping district, pass by the fire station and look inside through the open gates, pass by the "ancient" buildings of the Town Hall square, enter the fish market, explore, select the fish, haggle about the price, pay and then take the same route back home. The extraordinary thing, and what makes such a trip quite unimaginable to be done by a child on his/her own in our times, is that he was four years old.

This passage already shows us two very important aspects related to CIM: first, that childhood is a social construction [6], meaning that the child is capable of what the society, at a given time and space, believes he/she is capable of, and secondly, that children's everyday travel exceeds the utilitarian movement from point A to point B and in reality includes a complex set of experiences – sensory, social, emotional. Programmed as he/she is, in early years, to absorb as much new knowledge as his/her brain is capable of, the child transforms travel into an opportunity to get a rich array of valuable input – especially when this travel is done unaccompanied. It is worth noting that when adults remember their childhoods, usually the most intense memories are from places outdoors, while being on their own or with friends – that is, without adult supervision [7]. In a global study [8], responses on what is a "good" environment by children in eight different countries, living in neighborhoods with a variety of characteristics, coincided: affordability of places to play and safe and independent mobility were the main aspects of "city-friendliness".

Nonetheless, studies across cultures and countries have shown that over the past 50 years there is a significant decrease in freedom of children to travel on their own, compared to previous generations [9]. Historical research has shown that the generations of children living in the United States have experienced a significant shrinking in the range of independent mobility (how far away from their homes they, or their parents, consider safe to roam about) and an increase in the age thresholds they attain these ranges [10]. While in 1969 eighty-nine percent of children aged five to fourteen, living within a mile from school, walked or biked, in 2009, this percentage fell to a mere thirty-one percent [11]. High percentage of children being driven to school is a common pattern in most Western countries, across continents and cultures, from Australia [12] to Italy [13] and from Canada [14] to Hong Kong [15].

The case of Australia is typical of this shift. In a similar way to the United States, only with a time difference in the occurrence of change, the percentage of children who travel independently to school has decreased from sixty-one present in the 1990's to thirty-two percent in 2012 [16]. In a field study of children aged between nine and thirteen, living in Perth, Western Australia, researchers applied a mixture of methods (GPS tracking, activity diaries kept by the children, surveys, and photo/pictorial collages) in order to understand the connection between affordances and mobility patterns [12]. Despite a wide range of spaces in the vicinity, the shrinking of independent mobility inhibited children from using them. Instead, they were being chauffeured in places for play and recreation located much farther from their homes.

The obstacles and restrictions in children's mobility (admittedly, not only because of traffic danger, but also due to security concerns from the parents' part, especially in large cities) have a negative impact on their mental and emotional health, for example their social skills and behavior [17]. They also greatly affect the level of their physical activity, of which active travel to and from school is a big part. From a health perspective, walking is the simplest and easiest form of physical exercise, and the most readily incorporated in everyday activities [18]. Thus, an environment that provides good conditions for walking is a positive contributor to people's health, in terms of reducing the risk of obesity and other related health conditions.

3 Children's Safety from Traffic as a Social Imperative

According to Pooley [19], there are seven main factors that influence CIM. The first four are related to the child: age, gender, socioeconomic status and family structure; the other three are external influences: the prevailing transport technology, the urban structure, and transport networks available. Likewise, the matrix of parameters related to the acute decline in CIM is cross-sectional. Social perceptions about childhood have changed drastically through the twentieth century and parental patterns have shifted towards over-protection [20]; family relations, extended work schedules for adults and a continuous decrease of free time of children have also influenced how, where to, and for how long children travel in their neighborhood. But, if we take all these social parameters on one side, the other side – i.e. the physical characteristics of the urban environment and the prevailing means of transport – seems to weigh much more. In a reciprocal way, what the social sciences classify as "domestication" of childhood has

its origins in how cities and towns in the postwar era became dramatically dangerous for children as pedestrians, due to the domination of the private car.

Indeed, many advanced Western European countries began to face the problem of child mortality due to traffic already in the 1960's. For example, from 1955 to 1971, Denmark, today a bulwark of sustainable mobility, had the highest percentage in children's deaths due to traffic accidents in Western Europe. Schools in Odense became the pioneer in changing this, by drawing maps of children's routes and mapping the dangers along these routes. Data were then used by the city to make the urban environment safer for children, through the designation of slow-speed areas, creation of traffic islands, and separate bike paths. Since then, there has been an impressive increase in the percentage of students walking and/or cycling to school, while decreasing the total number of crashes by eighty-two percent. The Odense example became the inspiration for the Safe Routes to School Program in the United States [11].

Similarly, back in 1972, in Dutch cities, nowadays considered among the most pedestrian- and bicycle-friendly in the world, pedestrian deaths by motor vehicles had reached record levels, with more than 3,300 people dead, 500 of whom were children. A year before, the six-year-old daughter of journalist Vic Langenhoff had died in such an accident, hit by a speeding car while walking on her way to school. After this tragic death, her father ran a series of articles on the national newspaper *De Tijd*, entitled "Stop de Kindermoord" – or "Stop the Child Murder". He emphasized that a society in not just until a child is free to run to meet his or her father without risking being hit by a car [21]. This polemical article became a national sensation and raised awareness in Dutch society that allowing cars to take over urban streets meant allowing children to be murdered. People's reaction took the form of active protest, picket marches, and activist demonstrations, demanding a safer and more children-friendly environment (see Fig. 2). In response to this citizens' movement, a national official committee was formed to examine the problem. A few years later, in 1976, Dutch legislation on street design integrated the principles and specific design requirements of the *woonerf*, which has by now become a standard type of street in many countries around the world, known as "home zone", "complete street" or "calmed-traffic street".

Fig. 2. "Stop the Child Murder" protests in the Netherlands in 1972. Source: https://lcc.org.uk//pages/holland-in-the-1970s

Another example of synergy between citizens' movements and public administration is that of the Safe Routes to School (SRTS) Program in the United States [11]. The SRTS program is based on the same principle with the Odense initiative: when it comes to CIM, it is the local school community who should act as the main agent and coordinator. The program started as a community initiative in the Bronx, NY, in 1997 and as grassroots efforts intensified, it was adopted by the Federal Government in 2005; as a recognition of the importance of CIM, the SRTS program has received a federal budget of 1.2 billion dollars over seven years. The program is locally based and includes the "4 E's": Education, Encouragement, Enforcement, Engineering:

1. Education: the philosophy of the program is that adults should be educated on the issue of CIM as much as students. Adults, as drivers, are responsible for abiding to road safety rules, but also, as the ones making decisions about their children's mobility choices, they need to be educated about the benefits of walking and cycling for their children's health. They also need to become aware of the negative impact driving has on the environment – at a local and at the global level.[3]
2. Encouragement: students and the local community become aware of the positive effects of walking and biking through student contests, school activities, and via organizing special days and events, such as the "Walk to School Day", an idea that started in Great Britain in 1994 and is now internationally celebrated.
3. Enforcement: sometimes it is difficult to enforce the obvious, that is, abiding to the speed limits and yielding to pedestrians. An innovative concept called Pedestrian Safety Enforcement (PSE) was first tried in Redmond, Washington in 1998. Based on people's complaints about violations by drivers, special PSE operations by the police department are held on specific sites. A plainclothes officer attempts to cross and officers document if motorists yields – if not, citations are issued. The program has significantly increased police officer awareness of the problem.
4. Engineering: last but not least, walking and biking to and from school largely depends on whether the urban design along the child's route is human-centered, with streets providing for ample space to walk, separate bike paths, and sufficient traffic-calming measures – such as speed bumps, raised crossings, traffic islands etc.

Nonetheless, trips on foot or by bike continue to be a risk for children in the US: the leading cause of death in the US between 2010–2014 for children and adolescents (aged five to nineteen) was unintentional injuries, of which sixty percent were from traffic-related accidents. In a study of travel behavior during school drop-off in one hundred Toronto elementary schools, it was found that risky behavior around schools, in the so-called "drop-off zones", was pervasive [14]. A much more successful strategy has been lately applied in Norway: the "heart zone" [22]. The measure was first implemented in 2016 in seventy-seven schools in Bergen (the same town where little Alfred Parr grew up), and, having positive results, it has been adopted in school areas in the capital, Oslo. The "heart zone" is a completely car free zone around a school,

[3] For example, data shows that car engines idling at the perimeter of schools is a major source of pollution (idling engines consume 3.5 L of gasoline an hour; 12% of urban smog is attributable to idling vehicles). A "No Idling" campaign in Toronto, Ontario, was organized as a social marketing effort, using posters, stickers, printed material, and involving volunteer parents and school staff.

where it is not permitted to drop off or pick up pupils by car. Dropping-off takes place outside of such a zone, in designated spaces. With this, and other strategies, Norway achieved its "Vision Zero" in 2019 – that is, zero pedestrian or bicyclist deaths.

4 The State of Children's Safety and Mobility in Greece

Despite a significant reduction in road accidents and fatalities between 2010 and 2017, Greece continues to have one of the worst scores in the European Union, with sixty-nine deaths per million inhabitants, while the EU median is forty-nine [23]. On the issue of pedestrians' safety, an analysis of the annual statistical reports on the number of victims in road accidents paints a very grim picture regarding pedestrian casualties: between 2010 and 2018, a total of 1389 people died while walking in Greek streets. On average, about nine percent of the casualties were children and young people (ages 0–24): in the period 2010–2018, 117 lost their lives, 238 were severely injured and 3833 suffered minor injuries (see Table 1).

Table 1. Pedestrians' casualties in traffic accidents in Greece.

	Ages 0–24			All ages		
Year	Deaths	Severe injuries	Minor injuries	Deaths	Severe injuries	Minor injuries
2010	9	37	503	179	265	2350
2011	21	37	493	223	210	2175
2012	18	40	447	170	208	2057
2013	13	24	417	151	159	1895
2014	9	24	403	125	141	1929
2015	9	30	394	128	139	1833
2016	15	16	407	149	111	1810
2017	12	16	376	118	108	1894
2018	11	14	393	146	101	1818
2010–2018	117	238	3833	1389	1442	17761

Source: Hellenic Statistical Authority (https://www.statistics.gr/), author.

As far as independent mobility goes, again due to lack of data, all we know, simply by watching any elementary school entrance of any Greek city or town in the morning, is that many students are driven to school by a parent/guardian. Given the fact that urban districts in Greece fall into the compact city typology [24] and that in most urban schools the radius of the school district is less than one and a half kilometer, this kind of trip can be called both unnecessary and unsustainable.

Children's safe and sustainable mobility doesn't seem to be a pressing issue in Greek public conscience, either. It arises as such only momentarily, for instance whenever there is a fatal road accident involving a child – who was trying to cross the street, or waiting at a bus stop, or running onto street to catch a ball. Even then, in the

coverage of such tragic accidents, the media and public discussion platforms often put the blame on the "lack of education on road safety at schools". In pedagogical terms, Greek society teaches children to be fearful and always careful with cars instead of finding a solution to the harmful impacts of traffic. Similarly, school activities regarding CIM usually involve talks by police officers, informing children about road rules and signage etc. But "why is it the child who is burdened with the responsibility of road safety when they are not the ones creating it?" [2, p. 47].

In Greece there is a tendency to present traffic danger as a *problem of the children*, separate from the physical parameters of the urban environment (absence of substantial sidewalk, lack of pedestrian crossings etc.) and the tragic incompetence of drivers. Policy makers evade the real problem: that the built environment allows for harmful and risky behavior from the part of the adults. Instead of "educating" the child to adjust himself/herself to the patterns of motor traffic, examples around the world show that the best practices entail a modification of the environment where children grow up, through changes in traffic rules and a pedestrian-friendly street design [25].

A positive step towards this direction was made in Greek national legislation in 2013, with the publication of the Ministerial Decision entitled "Technical Guidelines for traffic interventions in urban environment for application in school zones and in areas with heavy traffic in the context of improving road safety" (TG) [26]. In its first part, it outlines the list of documentation data needed to be collected, on accidents (categorized by age of victims and by cause and circumstances of the accident), traffic (load, flows, pedestrian behavior, etc.), geometric/physical and environmental attributes of the streets around the school; and economic data. However, there is no obligatory analytical phase, since, according to the TG, local municipality "is knowledgeable of the local conditions and traffic problems, at any case." In the second part, there are detailed descriptions of the existing various types of traffic-calming measures, such as speed-stoppers, noise-making strips, reflectors ('cat's eyes'), anti-parking pollards and snake-shaped street design. Finally, there are examples of how the retrofitting of streets in the perimeter of schools should be done, using a mix of the mentioned measures, such as vertical signs, raised pedestrian crossings, railings in front of the school entrance, as well as the introduction of a "children's movement guide", mimicking the "blind people's guide", a mandatory element in sidewalks in Greece.

To this day, almost seven years after becoming mandatory, these guidelines have not been applied in their entirety in any school district, probably since no budget has been provided to municipalities to cover implementation costs, but also because they are not easily applicable in the constrained geometric characteristics of streets in compact and/or historic cores of Greek cities and towns. And, perhaps most importantly, the issuing of the Technical Guidelines has not been supported by any education, encouragement or enforcement on CIM, which should accompany changes in the engineering of the environment. Nonetheless, the Sustainable Urban Mobility Plans (SUMP) which are currently in process in many Municipalities in Greece present an excellent opportunity for including and promoting the concept of CIM.

5 Conclusion

The implications of the shrinking of CIM worldwide cannot be overstated. In terms of physical health, the decline in everyday physical activity is associated with obesity and diabetes in children. From a psychological point of view, travelling around the city by one's self, being aware of the environment, encountering many different other people, is crucial for a child's emotional growth and sense of independence. Cognitively, the experience of walking on one's own is invaluable in gathering information about "how the world works"; especially for the growing mind that absorbs new knowledge like a sponge, daily travel offers a wealth of new experiences. And lastly, from a pedagogical point of view, active travel at a young age, in the form of walking, cycling and using public transport, shapes lifelong sustainable mobility patterns.

Although CIM is of great importance for children's wellbeing, there is hardly any research on the subject in the Greek context. Existent legislation and practices in Greece are rudimentary and haphazard, and interventions are sporadic and without an overall strategy. There is a great discrepancy between how CIM is approached in Greece and in countries where practices have been successful (see Table 2).

Table 2. Differences between successful practices on CIM and existent practices in Greece.

Successful practices	Existent situation in Greece
The problem of CIM came to the forefront by bottom-up movements and media coverage; change becomes a social imperative	No existent bottom-up movements; haphazard and misleading media coverage; no coordinated collective effort towards change
Generous public funding of CIM as a field of research and practice	No public funding for research and/or physical implementation of CIM
Data collection on CIM (including maps, routes, drawn in the scale of each school) as important and necessary step for action	Data available is only of statistical nature and about accidents; no data, quantitative and qualitative, on children's mobility patterns
Strategic approach towards CIM, based on data, using participatory methodology and defining specific goals	No overall strategy; Legislation on "how-to" technical specifications without preliminary analysis or people's involvement
Holistic approach of intervention: raising community awareness, physical improvements, education, enforcement	Interventions on the physical environment only, in a "public works" mentality
Regarding education: informing all actors involved, and raising awareness on adults (parents, school staff, police officers)	Regarding education: police officers informing children of road safety rules to abide to

Best practices around the world show us that safety for pedestrians – including children – is improved through education, encouragement, good street design, lowering of speed limits, ample sidewalks, and, ultimately, reducing the number of cars in urban streets. These practices are based on concrete scientific data and on quantitative and

qualitative studies. They are most successful when social awareness is raised through education: when the society is well-informed about the causes of the problem and the possible solutions. There must be a systematic effort in the Greek academic world to bring the issue of children's safe and sustainable independent mobility to the forefront, through interdisciplinary research, based on synergies between the social sciences on one hand and urban and transport design on the other.

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