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**The Commuting Profiles of the Principals: Their Views on the Surrounding Built Environment and Infrastructure of their Schools and the Factors that Affect the Active Commuting of Students to and From School**

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**The Commuting Profiles of the Principals: Their Views on the Surrounding Built Environment and Infrastructure of their Schools and the Factors that Affect the Active Commuting of Students to and From School**

**Abstract**

This study assesses the commuting profiles of the principals of the schools, their views on the built environment and infrastructure around schools and active commuting (non motorized transport) of students to and from school. 369 principals voluntarily participated in this survey. All principals held a position from either elementary, junior high schools or senior high schools, in the most populous prefectures of Greece (Attica and Thessaloniki) during the school year 2012-2013. The results confirm that there is inadequate safety of infrastructure such as dangerous intersections-roads, lack of pedestrian roads with limited car access in front of the school entrance etc. for the active commuting of students around schools. The majority of principals consider that it is important for students to walk or cycle for commuting to and from school but on the other hand, they do not apply it to themselves. Although half of them reside in a walkable or cycle-able distance within 2000m from their work, they commute to school by motorized means and do not set a good example for the students. Principals believe that is necessary to conduct courses or programs on road safety education in schools and suggest methods to enhance the active means of commuting. In this context they reacted positively in organizing an annual event day of active commuting to and from school. Future research will be able to use geographical information systems to assist in the implementation of targeted and safety networks around the school.

**Keywords:** Active commuting, school principals, built environment, traffic education

## **The Commuting Profiles of the Principals: Their Views on the Surrounding Built Environment and Infrastructure of their Schools and the Factors that Affect the Active Commuting of Students to and From School**

### **Introduction**

There is an ever increasing percentage of children who dismiss an active lifestyle by following the standards of common sedentary life and automated technology. Physical activity plays an important role in the prevention of overweight and obese children (Fulton, McGuire, Caspersen & Dietz, 2001). Obesity rates have continually risen over the past few decades (Fulton et al., 2001). The study of Deforche, De Bourdeaudhuij and Tanghe (2006), proves that overweight and obese adolescents have less participation in sports and show a less positive attitude towards physical activity. Therefore, overweight and obese children require a more tempting and entertaining approach in order to motivate and increase their participation in physical activities. According to the International Consensus Conference on Physical Activity Guidelines for Adolescents (Sallis & Patrick, 1994), all adolescents should be physically active daily or nearly every day and should engage in a minimum of three sessions per week of activities that require moderate to vigorous levels of exertion over 20 minutes. The sense of safety, ample space for activities and parental involvement with their children is strongly associated with physical leisure activities (Heitzler, Martin, Duke and Huhman, 2006). Promoting active commuting to and from school is an opportunity for both students and their elders (parents/teachers) to improve their level of physical activity. The student average for active commuting to school totals 27.5 minutes of moderate to vigorous physical activity per day (Kuhnis, Hurschler and Pfister, 2009), and represents 1.3% of their energy expenditure (Harten and Olds, 2004). Apart from the benefits associated with physical health the research of Sirard et al. (2008), other contributing factors and benefits stemmed from the local context, this included less congestion and emissions and improved safety of the neighborhood. The latter improved via more frequent social interaction among neighbors thus creating cohesion and stronger bonding within the community.

The most influential factors affecting children to commute actively to and from school in accordance with Bungum, Lounsbery, Moonie and Gast (2009) are, distance, safety and the connectivity of roads. According to Yeung, Wearing and Hills (2008), the

most commonly reported factors influencing parental decisions regarding the use of active commuting for their children were: a) the age of the child, b) the provision of safe sidewalks, c) adult supervision, d) the level of fitness of the child and e) the distance of commuting. Distance is an important factor and is often a barrier to active commuting. From distance we can forecast the choice of commuting mode among teenagers according to Nelson, Foley, O'Gorman, Moyna and Woods (2008). The distances within 2.5 miles is feasible for teenagers who walk and cycle. The same conclusion is drawn from the results of Rojas-Guylar, Sparks and King (2007). In their study the principals of schools were asked about their perceptions about active commuting. They indicated that students would consider walking and cycling if they resided within a one mile distance from school and if there was a more favorable and a less restrictive environment. McDonald (2008), investigated family factors related to the commuting of children and especially the employment status of parents. The results showed that young children aged 5-14 years whose mothers commuted to work in the morning were less likely to walk or cycle to school. On the other hand, Babey, Hastert, Huang and Brown (2009), investigated the socio-demographic, family and environmental characteristics associated with active commuting to and from school. The results proved that, boys in general, children from lower income families attending public schools and those who lived in urban areas and lived closer to school, were more likely to commute actively. Furthermore, those more likely to commute were active teens who had no adult present at home after school and younger latchkey kids whose parents knew little about where their children were after school.

The research of Loukaitou-Sideris (2006), focused on a particular variable, safety in the neighborhood environment and examined how it affects physical activity. She concluded that the built environment should not impede the trend for walking and physical activity. If the state wishes to encourage walking, the first necessary step is to intervene in network design in order to enhance the safety of the neighborhood. If we wish to promote physical activity in urban areas, particularly in low-income ones, we must firstly address the concerns about the physical and social environment (Gielen et al., 2004). Exploring the barriers and facilitation of walking and cycling to school, Ahlport, Linnan, Vaughn, Evenson and Ward (2008), concluded that a supportive environment is a necessary but insufficient condition for increasing walking and cycling to school. Initiatives to increase active commuting to school may need to include multiple levels of intervention to be effective. The latter would certainly included the change of the

surrounding built environment, infrastructure and educational campaigns, Kerr et al. (2006).

Certainly, State and Municipal physical activity policy planners and sport managers, must consider that active commuting to school is a low cost policy for enhancing students physical activity. Once infrastructure has been established and the context of active commuting to school is gradually implemented, this habit can be maintained as part of their lifestyles into adulthood when in turn they will be more likely to commute actively to work. According to Young (2007), Principals can have a strong influence on students health status and provide programs for health prevention. Schools must work with the municipality officials to provide an environment and infrastructure that optimally supports physical activity. By the same token, having establish safer commuting infrastructure, students will be better able to commute, therefore participating more easily in the recreational after school extra-curricular physical activities.

The purpose of this study was to investigate the principals commuting profile, their views on the surrounding built environment and infrastructure of their schools and the factors that affect the active commuting of students to and from school.

## Methodology

### Sample

The survey involved 369 principals of schools, elementary and high schools (122 elementary, 125 junior high schools και 122 senior high schools) (table 1), of the prefectures of Attica (246) and Thessaloniki (123) (table 2) which are the two most populous prefectures of Greece. The research was conducted during the school year of 2012-2013. 98.36% of the principals of elementary schools (primary education) were teachers. In junior high schools and in senior high schools (secondary education), 21.86% were specialists UE04 (physicists, chemists, biologists, geologists) 20.24% were mathematicians UE03, 19.02% were philologists UE02, 11.74% were theologians UE01. The sample was selected by applying “stratified random sampling”.

**Table 1.** Totals of principals at each school in relation to the district.

Prefectures	District	Elementary	J. high schools	S. high schools
Attica	A´ Athens	14	18	21
	B´ Athens	10	13	14

	C´ Athens	12	13	11
	D´ Athens	9	10	11
	East Attica	15	11	15
	West Attica	6	5	4
	Piraeus	7	14	13
Thessaloniki	East Thessaloniki	21	19	15
	West Thessaloniki	28	22	18
Totals	Total Attica	73	84	89
	Total Thessaloniki	49	41	33
	Total	122 (33.06%)	125 (33.88%)	122 (33.06%)

**Table 2.** Totals and percentages of gender for each prefecture

<b>Νομός</b>	<b>Men</b>	<b>Women</b>	<b>Total</b>
Attica	150 (60.98%)	96 (39.02%)	246
Thessaloniki	84 (68.29%)	39 (31.71%)	123
Total	234 (63.41%)	135 (36.59%)	369

**Questionnaire**

The questionnaire included questions related to demographic characteristics of the principals, the issues of the structured school environment, the neighborhood environment, the safety in commuting of students, their views on the importance of active commuting and ways to enhance and motivate students to safe and active commuting. After collecting the final set of responses, the data was converted into Likert scale .

**Data collection process**

After having approval of research by curriculum designers from the Ministry of Education in Greece, the principals of schools voluntarily participated in a fifteen-minute interview at their school which remained anonymous. All the participating principals

worked in the prefectures of Attica and Thessaloniki and were interviewed during the school year of 2012-2013,

### ***Statistical analysis***

Conducted analysis of variance for one factor (One Way Anova) and analysis (t-test) for independent samples to assess Principals commuting way, the necessity for a course or program on traffic education in schools, how to reinforce the students active commuting to and from school. Conducted descriptive statistics to assess a) Principals means of commuting and distance from school, b) the surrounding built environment and infrastructure of their school, c) methods of reinforcing and facilitating the active commuting of students to and from school and d) if they would organize an annual event day of active commuting to school.

For the statistical analysis of the survey the Statistical Package of Social Science (SPSS) (version 10.0) was implemented.

### **Results**

Findings from the descriptive statistic analysis confirmed: of the 369 principals of the schools that participated in the survey, 184 lived less than 2000m from school while 185 over a distance of 2000m. Of all the principals only 67 (18.16%) commuted actively (non motorized) to and from school while 302 (81.84%) passive (using motorized). As for the infrastructure of the schools, in Attica only 29 (11.79%) had infrastructure for safe bicycle parking in Thessaloniki only 16 (13.00%). In Attica, 76 (30.89%) had a pedestrian road in front of the school entrance whereas in Thessaloniki 33 (26.83%). The 209 (56.64%) of the principals indicated that there are dangerous intersections and streets around the school whereas 160 (43.36%) said they were not dangerous. According to the principals of the schools the majority supported the importance of the students and teachers to commute actively to and from school. When asked the question of whether there is a need for a course or program of road safety education and at which levels of education is best, 171 (46.34%) responded positively that there is a need at all levels, 79 (21.41%) responded in elementary and junior high school, 6 (1.63%) only in junior high schools, 83 (22.49%) only in elementary and 30 (8.13%) that there is no necessity. For the question, which methods could facilitate reinforcing the active commuting of students to and from school, 73 (19.78%) responded that it is pointless or nothing is necessary as the majority of students already walk, whereas 296 (80.22%) needed assistance. The majority suggested that improvement of infrastructure was needed and secondly more

information about the benefits of active commuting was needed. When asked whether they would organize an annual event day of active commuting to school, 292 (79.13%) responded positively, 18 (4.88%) agreed to it only if there were certain pre-conditions, 14 (3.79%) had a neutral opinion and 45 (12.20%) would not take on the responsibility.

Analysis of variance for one factor (One Way Anova) was applied and: a) significant differences were found between the different levels of education (elementary, junior high school, senior high school) as how principals of schools commute to and from school ( $F_{(2,368)}=3.793$ ,  $p<.05$ ). Specifically, the Scheffe multiple comparison test was applied and found statistically significant differences between principals of elementary and high school. The principals of elementary schools showed lower rates (Mean=1.76, SD=0.42), commuted more actively to and from school, compared with the principals of senior high schools (Mean=1.89, SD=0.30). b) significant differences were found between the different districts of education (A' Athens, B' Athens, C' Athens, D' Athens, East Attica, West Attica, Piraeus, East Thessaloniki, West Thessaloniki) as how principals of schools commute to and from school ( $F_{(8,368)}=3.903$ ,  $p<.05$ ). Specifically, the Scheffe multiple comparison test was applied and found statistically significant differences between the principals of the districts of Eastern Attica and Eastern Thessaloniki. The principals of Eastern Thessaloniki showed lower rates (Mean=1.65, SD=0.47), commuted more actively to and from school, compared with the principals of Eastern Attica (Mean=1.97, SD=0.15). c) significant differences were found between the different levels of education (elementary, junior high schools, senior high school) as to the necessity for a course or program on traffic education in schools ( $F_{(2,368)}=20.835$ ,  $p<.05$ ). Specifically, the Scheffe multiple comparison test was applied and found statistically significant differences between the principal grades of elementary school and high school. The principals of elementary schools showed lower rates (Mean=3.11, SD=1.47), said that there is more necessity for a course or program on traffic education in schools, compared with principals of junior high schools (Mean=3.96, SD=1.20) and senior high schools (Mean=4.18, SD=1.39). d) significant differences were found between the different levels of educational (elementary, junior high schools, senior high school) as how to reinforce the students active commuting to and from school ( $F_{(2,368)}=6.001$ ,  $p<.05$ ). Specifically, the Scheffe multiple comparison test was applied and found statistically significant differences between principals of elementary and senior high schools. The principals of elementary schools showed higher rates (Mean=4.68, SD=2.75), (believe that with proper education using hands on experience approach,

proper safety and infrastructure, can enhance the active commuting of students), compared with the principals of senior high schools (Mean=3.53, SD=2.28) who believe that they will have positive results via programs and informative talks .

Analysis (t-test) for independent samples was applied and confirmed: a) significant differences were found between the different prefectures (Attica-Thessaloniki), as how principals of schools commute to and from school ( $t=2.07$ ,  $df=208.36$   $p < .05$ ). Specifically, the principals of schools of Thessaloniki showed lower rates (Mean=1.75, SD=0.43) commuted more actively to and from school, compared with the principals of schools in Attica (Mean=1.84, SD=0.35). b) significant differences were found between the different prefectures (Attica-Thessaloniki), as to the necessity for a course or program on road safety education at all levels of schools ( $t=-2.03$ ,  $df=367$   $p < .05$ ). Specifically, principals of schools of Thessaloniki showed higher rates (Mean=3.96, SD=1.52) said that there is lower necessity for a course or program on traffic education in schools compared with the principals of schools in Attica (Mean=3.64, SD=1.37) that there is increased necessity .

### **Discussion and Conclusion**

Of the 369 principals of the schools of all levels in the prefectures of Attica and Thessaloniki who took part in the survey only 36.41% of those who lived less than 2000m, commuting actively (walking or cycling) without the use of motorized modes. Of the total principals only 18.16% commuted actively whereas 81.84% commuted passively, using motorized modes. The travel time has a strong influence on the choice of travel mode ( McDonald, 2007). If the principals active commuting to and from work is possible, it will be a way to enhance their fitness. In turn, this is a unique opportunity for them to personally profit from the benefits of active commuting daily. The latter would also contribute to the principals perception of the surrounding neighborhood from where their students live. Furthermore, it would set a good example for their students to follow but also encourage the students' parents in this direction. In terms of infrastructure in schools for secure bicycle parking for anyone who chooses to travel by bike only 12.20% of schools had places for secure parking. If there was adequate infrastructure then this may have contributed positively to the use of bicycles as a means of travel to and from school, for both teachers and students. As regards for the built environment of the neighborhood and the school when considering the safe commuting of students to and from school, only 29.54% of schools had a pedestrian road in front of the main entrance

of the school, 56.64% stated that there are one or more dangerous intersections or dangerous roads around the school. According to the principals, 93.50% believed it is important for teachers and students to actively commute to and from school. 91.87% believed that there is a need to implement traffic education programs in schools. 19.78% believed that there is no way to support students or there is no need for any support in order to commute actively to and from school. 80.22% believed that it can reinforce both the students and their parents to commute actively through improved infrastructure, programs on health education, informative talks, education, hands on experience, safety and psychological support. In their survey O'Loghlen, Pickeett and Janssen (2011), suggest a need to make school environment more friendly to active commuting and for schools to develop more policies and programs. Finally, 84.01% would organize an annual event day of active commuting to school as part of a Panhellenic day or International day of active commuting to school in order to encourage students and teachers to actively commute. The principals are supported by the investigation of Rose and Marfurt (2007) which argue that the organization of an annual event day of active commuting would significantly influence the decision of individuals to actively commute to and from work.

From the results we find proactive ways of commuting amongst: a) principals of elementary schools in comparison to the principals of senior high schools, b) principals of eastern Thessaloniki in comparison to the principals of Eastern Attica and c) principals of Thessaloniki in comparison to the principals of Attica. Also from the results we found that there is a need for courses or programs on road safety education for younger ages from the principals of the schools in Attica in comparison to their colleagues in Thessaloniki and by the principals of elementary schools in comparison to their colleagues in higher levels of education. Finally, for the methods of reinforcing students towards active commuting the following conclusions were drawn. Principals of elementary schools believe that with proper education using hands on experience approach, proper safety and infrastructure, Dill (2009), can enhance the active commuting of students. The principals of senior high school believe that they will have positive results via programs and informative talks. The decisions and policies of municipalities to redesign infrastructure and proper connectivity of roads to improve safety, can lead to a more active way of commuting.

The school, is not only a place where we enhance spiritual, emotional, mental development and physical health during the morning period but it could also be a place

whereby use of the sports facilities could be taken advantage of during the late afternoon and evening. In order to make the aforementioned statement viable, commuting to the school should be easy and safely accessible for all school students. For some students active commuting to school may be the only chance in the day for physical activity. School Principals' cooperation with the municipal officials can have a strong influence on students' health status by providing programs and infrastructure for healthier lifestyle and well-being.

Future research using Geographical Information Systems (GIS) and Global Positioning System (GPS) to record the data, can provide solutions for a proper and complete network infrastructure in neighborhoods. Moreover, integrated courses or programs on road safety education will have to be provided in each level of education in order to facilitate positive attitudes for the students and their parents. The overall effort and the good example which parents and teachers set, enhance the students' final decision towards active commuting.

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