

## Cycling and walking to school. A case study for Brasov, Romania

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**Abstract.** The paper investigates the transportation modes of high school students to school in Brasov city and the attitude towards cycling and walking. A questionnaire was designed and filled in by 492 respondents, examining the influencing factors on active travel modes. The obstacles against cycling to school are sedentarism, too long distances from home, the feeling of insecurity and lack of appropriate facilities; similarly, the obstacles to walking to school for those respondents living at less than 30 minutes far from school are sedentarism and lack of time. The conclusions drawn revealed the high potential of changing attitudes of high school students towards less pollutant means of transportation, from actual 3% of respondents who are cycling and walking to school to maximum predicted 73%, indicating also the need for coherent local policies in terms of health education and promotion of cycling.  
**Key Words:** cycling, walking, travel to school, survey.

**Introduction.** There is an increasing tendency nowadays to shift from motorized transportation modes to individual, active transportation modes, such as cycling and walking (Xing et al 2010). By including cycling and walking (C & W) in daily travel pattern, the demand for transportation is reduced, the use of passenger cars and public buses decreases, as well as local emissions (carbon monoxide, hydrocarbons, nitrogen oxides and smoke), limiting also the green-house effect (Stan 2011). Several studies revealed that motorized transportation mode of the children is strongly reflected in the travel habit of the future adults (Johansson 2005), posing them to a higher risk of becoming obese (Mackett & Brown 2011; Butland et al 2007).

Even the bicycle production in Romania was in 2014 of 820 000 pieces (CONEBI 2014), only 7% were sold on internal market. The bicycle ownership is only 30% of number of inhabitants and just 5.2% of population admits that cycling is the main transportation mode (Gândul 2013).

According to EMTA (2013), a study performed in 25 European metropolitan areas with more than 500 000 inhabitants indicated that around one third of the total number of journeys were done in active modes, i.e. walking or cycling. The official data on C & W in Romania is rather scarce, the results of a person trip survey performed in January 2008 on 31,768 people in the capital Bucharest showed that 22% from the total trips were done by walking and only 1% by cycling (EPOMM 2013), so the sum of the active modes is lower with 10% than the average European estimation.

A survey performed in 2012 in Bucharest on cycling behavior indicates that 30.5% of the respondents rode a bike in previous three months and the main obstacles in the promotion of cycling could be expressed as follows: preference for other transport modes, too long distances, lack of lanes, too dangerous, too crowded, conflicting interaction with drivers, according to shares illustrated in Figure 1 (Daedalus 2012).

In the absence of a reliable cultural heritage towards cycling in Romania, a sustainable action could change attitudes on active travel modes. The most sensitive groups to change are teenagers, mainly high school students, who are nowadays more aware of environmental matters.

The literature on cycling (Edmond & Handy 2012; Winters et al 2011; Nkurunziza et al 2012; Rabl & Nazelle 2012; Pulcher et al 2010) revealed a series of factors influencing the decision of people to cycle: distance from home, safety and comfort, weather and lane condition, environmental concern, parental and community attitude.

In order to increase the share of school trips in C & W modes, a better understanding of local motivators and barriers is needed; this paper presents a particular analysis on this topic facilitated by a survey on the target group of high school students in Brasov city, Romania.

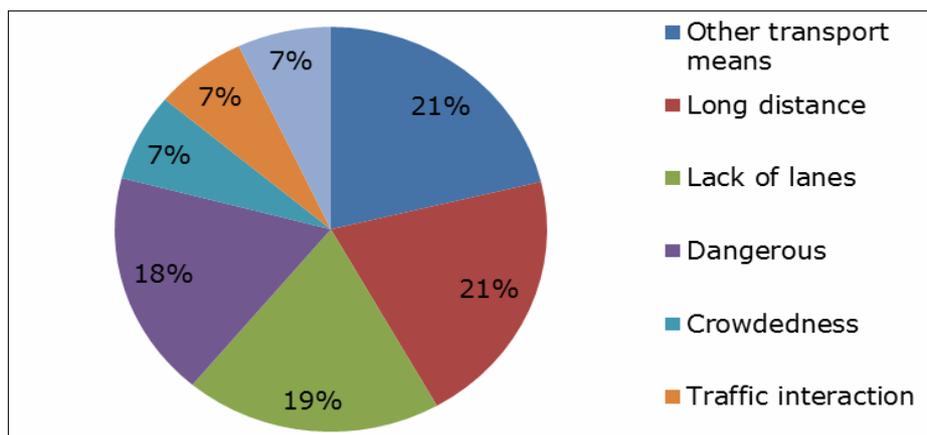


Figure 1. Main obstacles in cycling promotion as alternative transportation (Daedalus 2012).

**City particularities.** Brasov is placed in the center area of Romania, having around 290,000 inhabitants distributed on 267.32 km<sup>2</sup>. The climate is temperate continental, with an average of the annual temperatures of 8°C and the average winter temperatures of – 3°C. Being situated between hills at an average altitude of 600-800m, Brasov can have snow falls from November to March. The street network consists of 551 streets, having a total length of 260 km and only 12 km of bicycling lanes (INSSE 2014).

**Survey methods.** The survey was conducted in April 2014 on 492 subjects aged 15-19 years from Titulescu high-school, the sample fraction from the total population (urban high school students in Brasov) being of 4%. The questionnaire was initially designed in 2004 in the frame of the project "For a cleaner atmosphere" (IPIMEA 2004), the actual form presented in Table 1 being improved and adapted for high school students.

The questionnaire included 8 questions on regular travel mode to and from school, being distributed, filled in and collected in class, by paper and pencil, the respondents being kept anonymous. A short explanatory text accompanied the questionnaires.

Table 1

Questionnaire structure	
No.	Question
1	Where do you live in Brasov area? a. in Brasov city b. in neighbourhood areas
2	How long does it take to come to school by walking (in minutes)?
3	How do you usually travel to school? a. by conventional bus b. by trolley bus c. cycling d. walking e. other (please specify)
4	Can you ride a bike?
5	Do you have your own bike?
6	Would you like to come to school by bike? Why?
7	If the answer to question 2 is less than 30 minutes, do you regularly come to school by walking? Why?
8	Any suggestions for a change in your travel to school?

**Data processing.** The answers to the first question indicates that most of the pupils live in Brasov city (91 %) and the rest 9% live in nearby rural areas (Sânpetru, Săcele, Ghimbav, Feldioara, Teliu, Budila, Bran) implying the use of train or extraurban bus and limiting the possibility of travelling in active modes. For the second question which

evaluates the distance from home to school in the hypothesis of walking, the answers were processed and divided on six time intervals (0-15 minutes, 16-30, 31-45, 46-60, 61-90 and over 90 minutes), being illustrated in Figure 2.

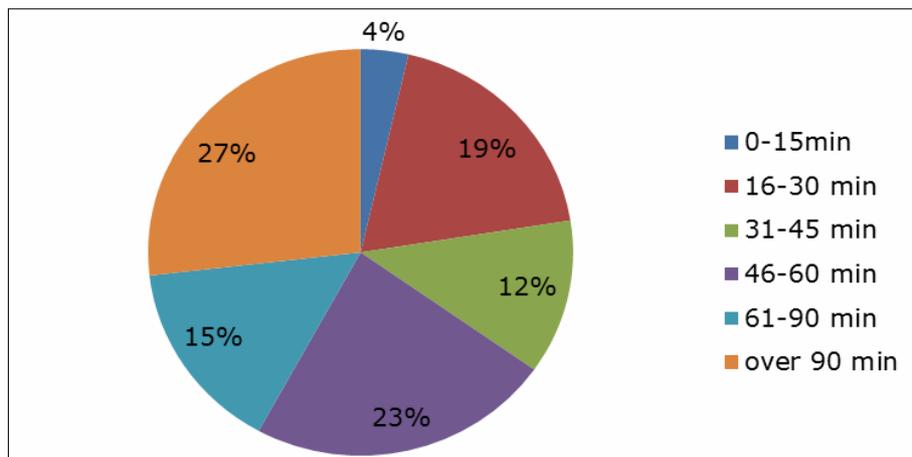


Figure 2. Percentages of students ordered on estimated walking time.

It can be noticed that in the first and second time interval are included around 23% of the students who declared a time interval to get to school lower than 30 minutes, being potential walkers to school. By summing up the percentages corresponding to the subsequent three time intervals (31-90 minutes) results 50% of the sample who represent the group of potential bicyclists. It was assumed that the bicyclist's mean speed is 3-5 times greater than the mean pedestrian speed, so the estimated time of cycling to school is within 7-23 minutes, a very reasonable time.

The third question aimed to make a clear distinction between the options for motorized and non-motorized journeys. The results described in Figure 3 indicate that 71% of the high school students travel by trolleybus, involving a low level of local air pollution; nevertheless, there is an unprecised contribution to the green house effect as the nature of the primary energy which was converted to electric power is not known. The means of transportation with the highest local pollution, the conventional bus fitted with internal combustion engine, is used by 18% of respondents.

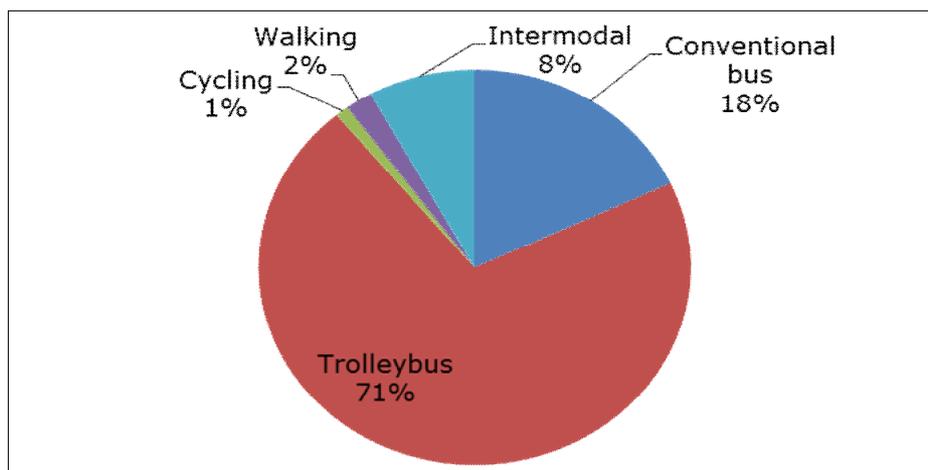


Figure 3. The journeys share on modal transport.

The high school students declared that 90% can ride a bike (question no. 4) and only 39% possess their own bicycle (question no. 5). The reasons for such a small number of personal bikes can be either the relative low standard of life or the lack of interest in cycling.

The sixth question received 61% positive answers showing a fair attitude towards cycling. For those 39% who have given negative answers, they were asked to explain the reasons, which would indirectly indicate the barriers towards cycling. The reasons were very dissimilar, being classified in several categories, according to Figure 4.

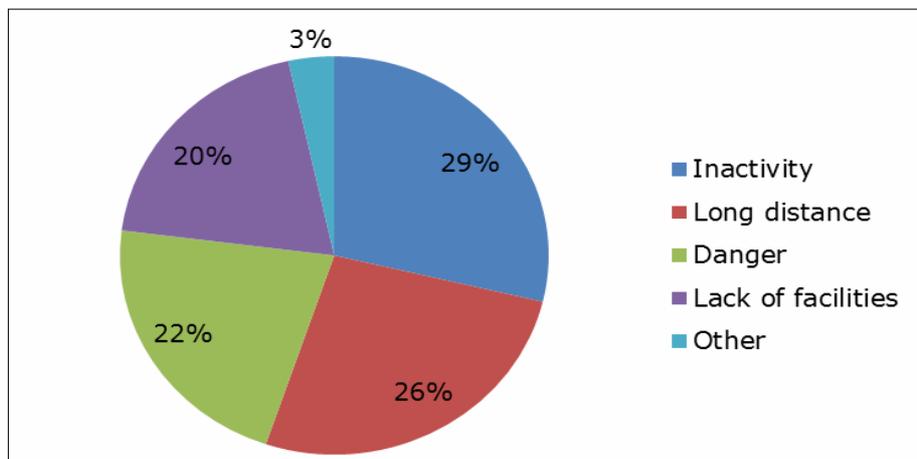


Figure 4. The barriers towards cycling.

The dominant reason for avoiding cycling (29%) is a negative attitude towards physical activity marked with **Inactivity** resulting from assertions like: "It is too tiresome", "It is not my kind of activity", "My body is not fit for it", being emphasized the findings from De Meester et al (2009) indicating a sedentary behaviour and a continuous decline of European teenagers involvement in sports and physical activities; according to WHO (2004) an hour per day of moderate physical activity provides substantial health benefits.

The reason of a too **Long distance** can be accepted for students living in rural areas (9%), but the respondents up to 26% can be suspected either by an unconfessed sedentarism (**Inactivity**) or a feeling of insecurity (**Danger**). The risk of traffic accidents (**Danger**) is ranked with 22% being known that the bicyclists are the most exposed group, the motivations being "It is dangerous" or "I am scared". This reason is correlated with **Lack of** (appropriate) **facilities** (20%), "There are no proper cycling lanes", "I would not have a bicycle rack". Among **Other** reasons there are two very important ones: "I cannot ride in winter" showing that the climate is an objective obstacle and "It would upset the teachers", denoting some conflicting attitudes of school staff towards bicyclists.

The answers to the seventh question have identified the attitude towards walking to school for those living at less than 30 minutes far away. Only 40% of respondents answered this question, 30% with positive answer, motivating that "It makes me healthy". The reasons for avoiding walking were, in a certain extent, similar to avoiding cycling in terms of **Inactivity** (88%): "It is too tiresome", "I do not enjoy walking", "It is more convenient by bus", "I get bored" and **Lack of time** (12%).

To the last question, which asked for changes in travel to school, the favorites are in order: the bicycle (51%), the roller skaters (24%), electrically-assisted bicycles (14%), walking (3.5%) and family car (3.5%).

**Conclusions.** According to the present survey, the rate of active travel modes performed by high school students, namely C & W, is low, of 3%. The potential of non motorized trips to school is 73% (23% walking and 50% cycling) showing that a high number of students may change their attitudes towards C & W.

Some barriers towards cycling can be removed by urban planners ( extension of bicycle lanes, rent a bike facilities, bicycle racks in schools,) who may reduce the feeling of insecurity in traffic, providing access and comfort to the bicyclists. The main obstacle in walking is physical inactivity, so health educators may promote the daily hour of physical activity in form of C & W.

The factors influencing the people's decision to cycle found in previous literature were confirmed by the results of the current survey, mainly the following ones: distance from home, feeling of safety and comfort, weather condition and appropriate infrastructure.

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