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Vehicles for education: Turkish students' beliefs and views about public transport

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The increasing use of private rather than public transport is impacting on the environment in a number of ways, including contributing to the major problem of global warming. It is necessary, therefore, to improve strategies to encourage greater use of public transport. The aim of this study is to explore which perceived aspects of public transport might be acting as deterrents to the use of public transport, and which might act as motivators to increase its use. To act as a motivator a positive characteristic must be both seen as true for public transport and felt to be important by individuals. In contrast, negative characteristics that fulfil these criteria are likely to act as deterrents to the use of public transport. A questionnaire was used to determine the beliefs and views of Turkish students (n=980) about such characteristics. Some characteristics, such as comfort, journey time, and timetable frequency and reliability were viewed as important and also believed to be inferior for public transport. We suggest that there are opportunities for education for behaviour change in terms of increasing student's appreciation of the importance of reducing global warming and their understanding of the role that public transport could play in this, and in terms of increasing students' understanding of the full economic cost of private transport.

Keywords: students' opinions, public transport, Turkey, educational implications

Introduction

Cars play an important role in contemporary society. Although rapid transport, safety, comfort, personal freedom and independence are attractive characteristics of private transport, car usage does contribute to environmental problems such as global warming and local air pollution and,

consequently, to health problems (Beirao & Cabral, 2007; Eriksson, 2009; Gardner & Abraham, 2007; WHO, 2003). Motor manufacturers have made considerable efforts to attenuate such problems by introducing more fuel-efficient engines and post-combustion devices such as catalytic convertors, to reduce or capture emissions (Leeson et al., 1997a). Despite these efforts at technological solutions, however, car usage still has a substantial impact on the environment (Leeson, et al., 1997b). So, to reduce such environmental problems it will be necessary to decrease the extent of personal car use and encourage other, more environmentally-sympathetic modes of personal transport such as walking, cycling and, for longer distances, greater use of public transport (Graham-Rowe, et al., 2011).

Public transport, as one of the alternatives to private cars, seems to help to reduce a number of the environmental problems caused by motoring and is commonly perceived as more environmentally friendly (Hunecke et al., 2001; Van vugt et al., 1996). In the light of this, the environmental psychology literature in this area has concentrated on how to persuade car users to choose more environmentally sympathetic modes of transport such as public transport. Two broad approaches have been used. Descriptive psychological research explores the profiles of car users, potential car owners, and public transport users. Intervention studies employ quasi-experimental designs in which variables are manipulated in an attempt to enhance the attractiveness of public transport, although such studies are not always based heavily on educational theory. The present study is an attempt to combine psychological and educational approaches. Here we endeavour to explore how educational approaches might be used for students, who are the next generation of potential car users, in order to encourage them to select public transport instead of private cars.

Psychology and Personal Transport

The psychology of choice concerning travel behaviour is immensely complex, and can change with time and according to context (Beirao & Cabral, 2007). A number of general psychological theories are likely to bear upon such decision-making, including the theory of planned behaviour (Nilsson & Küller, 2000), the theory of cognitive dissonance (Tertoolen et al., 1998), habitual behaviours (Gardner & Abraham, 2008; Verplanken et al., 1998), psychological reactance (Tertoolen et al., 1998), and social dilemmas (Nordlund & Garvill, 2003; Van vugt et al., 1996). Despite this complexity, a number of predictors of travel behaviour have been identified; these may be considered as instrumental, psychological and demographic factors (Eriksson, 2009).

Instrumental factors include safety (Gardner & Abraham, 2007), comfort (Beirao & Cabral, 2007), financial cost (Eriksson, 2009), travel time (Beirao & Cabral, 2007), the presence of situational factors (Collins & Chambers, 2005), driving distance (Nilsson & Küller, 2000), and reliability (Van vugt et al., 1996). Thus, reduced stress and the ability to relax during travel, with an opportunity to read or talk to other people, are seen as advantages of public transport (Beirao & Cabral, 2007). Similarly, low cost seems to be associated with choosing public transport (Hunecke et al., 2001). In contrast, unreliable or inadequate service, loss of personal space, long travel time, lack of flexibility, lack of control, and lack of comfort are perceived as being disadvantages of public transport (Beirao & Cabral, 2007; Gardner & Abraham, 2007; Stradling et al., 2000).

At an individual level a number of psychological factors have been identified. These include: perceived behavioural control (Eriksson & Foward, 2011); personal experience (Fujii, 2007); pro-environmental attitudes (Flamm, 2009; Noblet et al., 2006; Nordlund & Garvill, 2003); the symbolic structure of transport in terms of social status (Golob & Hensher, 1998); knowledge about the positive and negative environmental impacts of different transport modes (Flamm, 2009); and personal and social norms (Tertoolen et al., 1998); attachment to and/or

dependence on a particular transport mode (Stradling et al., 2000). Thus, some individuals exhibit a strong psychological attachment to cars (Anable, 2005; Stradling et al., 2000), whereas the use of public transport is viewed as a loss of control and an acceptance of the helplessness experienced in the passenger role (Gardner & Abraham, 2007). In addition, attitudes to private cars as opposed to public vehicles may influence the choice of private rather than public transport (Nilsson & Küller, 2000).

For example, the car may be considered as a status symbol (Golob & Hensher, 1998) and perceived not only as convenient (Tertoolen et al., 1998), but also as adventurous and pleasurable (Eriksson, 2009). On the other hand, variables such as pro-environmental values, beliefs, and attitudes (Nordlund & Garvill, 2003) seem to be predictors of choosing public transport. Finally, demographic factors such as gender (Boyes & Stanisstreet, 1998), age (Golob & Hensher, 1998), income (Flamm, 2009), the degree of access to a car (Boyes & Stanisstreet, 1998; Eriksson & Foward, 2011) and educational qualifications (Golob & Hensher, 1998) appear to play a role in choices about modes of personal transport.

Strategies for Behaviour Change

In the context of these complex psychological and other influences, two types of strategy are used to attempt to modify behaviour, so-called 'pull' and 'push' measures. 'Push' measures endeavour to exploit structural interventions, whereas 'pull' measures are centred on psychological interventions (Graham-Rowe et al., 2011). Structural interventions involve modification of the physical and legislative structures regulating travel behaviours in order to decrease the attractiveness of personal car use and/or to offer positive motivators for using alternative transport modes such as public transport. Prohibition of car use in some areas, road pricing to provide financial incentives to reduce car use, and bus priority lanes that seek to make public transport more efficient are examples of structural interventions (Eriksson, 2009; Graham-Rowe et al., 2011). On the other hand, psychological interventions are designed to modify an individual's existing knowledge, perceptions, and attitudes, and so in turn motivate voluntarily change in transport choices (Gardner & Abraham, 2008; Graham-Rowe et al., 2011). Education about environmental pollution by cars and consequent health issues (Böhler et al., 2006), and more increasing awareness of bus lanes are some examples of this approach (Beirao & Cabral, 2007; Stradling et al., 2000). In general, 'pull' policies are more popular than 'push' strategies, since the latter are perceived as restricting freedom (Boyes & Stanisstreet, 1998; Gardner & Abraham, 2008; Graham-Rowe et al., 2011).

Education and Behaviour Change

We now consider the role that education might have in effecting behaviour change. Traditionally, environmental education research has focused on three domains, cognition, affect and behaviour, although these domains are not fully independent (Wals & Dillon, 2013). In the context of personal transport, this translates into an exploration of what people know about the concepts related to transport, their affective factors such as pro-environmental attitudes and values, and the impact of conceptual and emotional understanding on behavioural intentions and decisions. Even though research about the relationship between education and transport behaviour is limited, there are some studies in this area. In the cognitive domain, for example, it has been shown that most school students are aware that vehicle emissions contribute to global warming and to acid rain (Boyes & Stanisstreet, 1997; Hillman et al., 1996; Leeson et al., 1997a). However, many students also harbour some misconceptions such as the notion that vehicle emissions damage the ozone layer and, as a consequence, cause skin cancer (Darçın & Darçın, 2009; Hillman et al., 1996;

Leeson et al., 1997a, 1997b). In terms of the effect of cars on health, many students affirm that emissions can contribute to respiratory problems such as asthma. An interesting finding is that a belief about the link between exhaust emissions and cancer was a predictor of whether the introduction of more restrictive legislation would be acceptable (Boyes & Stanisstreet, 1998).

More recently there has been some research into the behavioural domain, at least in terms of intended behaviour patterns. A study was devised to explore possible links between students' beliefs about the extent to which a range of actions would help to alleviate global warming, and their willingness to undertake those actions (Kılınç et al., 2011). In the case of Turkish students, a reasonably strong association was found in the case of using public rather than private transport; suggesting that education to persuade students about the environmental benefits of using public transport might contribute to their willingness to use this mode of personal transport.

In addition to personal knowledge and attitudes, social learning opportunities can play a central role in creating behavioural change in the case of transport modes since social learning approaches (van der Wals, Hoeven, & Blanken, 2009) form a fundamental part of the environmental education literature. Van der Wals and Dillon (2013), for example, consider that people need to become capable of overcoming uncertainty, ill-defined situations, and conflicting norms, interests, beliefs and values. This requires an emancipatory perspective supported by a deliberative communication in school environments (Englund, 2006, van Weelie & van der Wals, 1999; 2002). In such emancipatory perspectives, learners develop a critical stance towards the world and themselves by promoting discourse, debate and reflection. By deliberative communication in the classroom, students are confronted with a variety of different views. In other words, by sharing their motives, ideas and ideologies with others, students find themselves faced with different ways of thinking. This confrontation can lead to dissonance towards one's own way of thinking and so encourage a revision of it. Such dissonance may also lead to sympathy or respect for someone else's ideas, which may be beneficial to the learning process later on.

Aims of the Study

The present study was undertaken to extend our appreciation of the beliefs and views of Turkish young adults about public transport which may influence decisions about whether or not to use such transport. The Turkish economy has been experiencing a rapid growth since 1980s and this has led to a concomitant increase in ownership of private vehicles. Such increase in car ownership leads to a rise in car usage, with a consequent increase in traffic congestion, traffic collisions, greenhouse gas emissions and health problems (Haldenbilen & Ceylan, 2005). Therefore, in Turkey as in other countries, there is a need to reduce personal car use by shifting to public transport (Soylu, 2007). The main aim of the present study was to explore Turkish young students' ideas about the characteristics of public transport, in order to inform the design of policies that might encourage greater use of public transport. The basis of the study was that it is reasonable to assume that positive characteristics that are both believed to be true of public transport and deemed to be important by students could act as motivators to use public transport. In a complementary fashion, negative characteristics that are both believed to be true and viewed as important may act as deterrents to the use of public transport. Thus, the study was directed at addressing the following research questions:

1. What are Turkish students' beliefs about various possible characteristics of public transport?
2. What are Turkish students' views about the importance of various possible characteristics of personal transport?

3. Combining these two parameters, what incentives and disincentives are there for the use of public transport, and how might these factors be used for educational purposes?

In order to explore possible differences between the beliefs and views of older and younger students, male and female respondents and those with and without access to private transport, three additional research questions were addressed.

4. Are there significant differences between the beliefs and views of school and university students?
5. Are there significant differences between the beliefs and views of students from families that do and do not own cars?
6. Are there significant differences between the beliefs and views of male and female students?

Students beliefs and views about public transport were explored in the context of use of public transport being able to contribute to a reduction in global warming. For this reason, students' general concerns about, their perceived knowledge of and their belief in the imminence or otherwise of global warming were explored.

Methods

Study Sample

Respondents were based in Ankara, the capital city of Turkey. Ankara is the second biggest city in Turkey, with a population of approximately five million, and has a variety of local public transport systems including buses, metro, minibuses and taxis. Students who were over 16 years of age were selected for the study, because at this age students are able to make decisions about personal transport in a manner that is reasonably free of parental control. The High School and University from which the respondents were drawn were located near the centre of Ankara, with Metro and bus stations nearby. The School was a 'normal' High School, as opposed to the more academic Science High Schools or Anatolian High Schools that have higher academic entry requirements. The school drew its students largely from local residents and this catchment area represented 'middle income' families. Questionnaires were distributed to students in Grades 11 (n=164) and 12 (n=157), the final two years of High School. The university is one of the most highly regarded universities in Turkey, and demands higher entrance grades than many other Turkish universities. The university sample included both social sciences and science students. The social sciences students includes those on degree courses for Turkish language teaching (n=269) and social sciences teaching (n=87) in the Faculty of Education. The science students included students on physics (n=47), chemistry (n=26) and biology (n=78) degree courses. A total of 1,010 questionnaires were distributed to the participants, although 30 questionnaires were excluded because a relatively large number of items had missing responses, leaving 980 respondents in the final cohort.

In the final sample, approximately one third of the students (34%) were male and two-thirds (66%) were female. A third of the study group (33%) were high school students and the remainder (67%) were university undergraduates. A quarter of the students (25%) reported having no access to any form of private transport, although the majority (65%) did have access to a private car. A few (5%) had access to a motorbike; rather more (25%) had access to a pedal cycle. For background information, in terms of the distances between respondents' homes and

their places of study, about a fifth (18%) reported living within one kilometre, just over a quarter (28%) between one and five kilometres, and the remainder at more than five kilometres. About half of the respondents (52%) lived with five kilometres of the place that they considered to be the centre for their main hobbies; the rest lived further away.

Design of the Questionnaire

The cover sheet of the questionnaire introduced the study, explained the response procedure and then asked respondents to record demographic data such as gender, year of study (and Programme of Study for the undergraduate students), access to personal transport vehicles, and estimates of the distances between place of residence and place of study and recreational centres, and the frequency of using public transport.

In order to explore possible motivators or inhibitors for the use of public transport, eight possible characteristics, which might be considered important to different extents, were selected. These were based on earlier research reported in the literature (see above), and informed by a small-scale pilot study undertaken in the UK. The attributes were comfort, safety, journey duration, impact on global warming, timetable convenience, cost, social status and the ability to take luggage. The first main section of the questionnaire was designed to determine the extent to which respondents believed these characteristics applied to public transport, with two items for each characteristic. In this section the questions took the form of 'Travelling by public transport is more comfortable than travelling by car'. In order to avoid bias, some of these items were expressed in terms of possible advantages of public transport, others were expressed in terms of possible disadvantages of public transport. The available responses were 'I strongly agree', 'I agree', 'I neither agree nor disagree', 'I disagree' and 'I strongly disagree'. The second main section of the questionnaire was designed to explore how important respondents considered each of the characteristics to be. In this section, the items took the form of 'How important is it to you when you travel around that you are comfortable?'. Here, the available responses were 'Very important', 'Moderately important', 'Not very important' and 'Not at all important'. The wording of the questionnaire items and the ways in which they were paired are shown in Table 1, and the available responses are shown in Table 2. The responses to each set of items were scored so that neutral beliefs and views scored zero, and extreme beliefs and views unitary (+1 or- 1). Although the scales were strictly ordinal, this allowed population means to be discussed as an estimate of the beliefs and views of the overall cohort.

The questionnaire concluded with a short section containing four items designed to elicit background information about students' concern about environmental issues, global warming in particular. As shown in Table 3, the first item asked students how worried they were about the effects of global warming on the environment. The available responses here were 'I am very worried', 'I am moderately worried', 'I am a little bit worried' and 'I am not worried at all'. The second item in this final section asked students how much they considered they knew about global warming, with the responses being 'I know a lot about Global Warming', 'I know something about Global Warming', 'I know a little about Global Warming' and 'I know almost nothing about Global Warming'. The third question asked students how environmentally friendly they considered themselves to be, with 'I am very environmentally friendly', 'I am moderately environmentally friendly', 'I am a bit environmentally friendly', and 'I am not at all environmentally friendly' as available responses.

Table 1. Wording of the main questionnaire items

Theme	Possible characteristics of public transport	Importance of characteristics of transport
Safety	Public transport is safer than cars If I take public transport I have to walk to the bus stop and this may not be safe	How important is it to you that when you travel around you feel safe?
Travel duration	Journeys take longer by public transport than by car When I travel by car it takes a long time to find a car park	How important is it to you that when you travel around it doesn't take too much time to get there?
Comfort	Travelling by public transport is more comfortable than travelling by car You often feel crowded in public transport vehicles	How important is it to you that when you travel around you are comfortable?
Global warming	I believe that public transport helps in reducing global warming I prefer to take public transport so I do not use so much fuel	How important is it to you that when you travel around it doesn't make Global Warming worse?
Timetable	Public transport timetables aren't reliable and you can't depend on buses to come when you expect them Public transport doesn't go very often, so if you use buses rather than a car you can't always go when you want to go	How important is it to you that when you travel around you can go exactly when you want to go?
Cost	It's cheaper for a whole family to travel by public transport than by car It's cheaper for one person to travel by public transport than by car	How important is it to you that when you travel around it doesn't cost too much?
Social Status	I would feel embarrassed if I travelled by public transport and my friends and the people I knew travelled by car Only people who are less fortunate travel by public transport	How important is it to you that your friends do not look down on you?
Take lots of things	I would have to travel by car rather than by public transport to transport my family and their things around I would have to travel by car rather than by public transport because I need to carry equipment for sports and my hobbies	How important is it to you that when you travel around you can take lots of things with you?

The items of the questionnaire are displayed so that the 'pairing' of the items can be seen. In the actual questionnaire, the items were in random order, and paired items were in different orders in the two main sections.

Table 2. Scoring of responses to main questionnaire items for use in analyses

Responses to items concerning possible characteristics of public transport	Score	Responses to items concerning importance of characteristics of personal transport	Score
I strongly agree	1.00	Very important	1.00
I agree	0.50	Moderately important	0.66
I neither agree nor disagree	0.00	Not very important	0.33
I disagree	-0.50	Not important at all	0.00
I strongly disagree	-1.00		

Finally, students were asked whether they believed that global warming is really happening now; here the available responses were 'I am sure Global Warming is happening', 'I think Global Warming is happening', 'I don't know whether Global Warming is happening or not', 'I think Global Warming is not happening' and 'I am sure Global Warming is not happening. Students were told that the questionnaire was not a test and that no information about individuals' responses could be gained. Students completed the questionnaire independently, under the supervision of their normal classroom teachers and one of the authors.

Analysis of the Data

The responses were encoded into, and analysed using, the Statistical Package for the Social Sciences (SPSS). Initially, descriptive statistics such as means, frequencies and percentages were calculated. Then, possible differences between the responses of male and female students, between the responses of school and university students and between the responses of students whose families owned cars and those that did not, were explored using Analysis of Variance, with $p<0.05$ being considered the critical value for statistical significance.

Results

Turkish Students' Beliefs about the Characteristics of Personal Transport

In the descriptions below, the percentages given are the combined percentages for students who either 'strongly agreed' or 'agreed' with the statement in the questionnaire items. In addition, Figure 1 displays the distributions of responses, arranged in descending order of the proportions of respondents who believed that the characteristic applied to public transport.

In the case of the duration of a journey, most of the participants (90%) believed that travel by public transport took longer than by a car. On the other hand, nearly two-thirds (65%) of the participants believed that it took time to find parking spaces for cars, which is an advantage of public transport. Perhaps related to this in terms of convenience of the timing of travel, most of the respondents (81%) believed that public transport vehicles did not go very often and so people could not always travel when at times they wished to travel. In addition, a similar proportion (73%) believed that public transport timetables were unreliable, and buses and trains did not come according to schedules.

Table 3. Wording of the final four questionnaire items

Wording of items	Wording of possible responses
How worried are you about what Global Warming might do to the environment?	I am very worried I am moderately worried I am a little bit worried I am not at all worried
How much do you think you know about Global Warming?	I know a lot about Global Warming I know something about Global Warming I know a little about Global Warming I know almost nothing about Global Warming
How 'environmentally friendly' do you think you are? (How much do you think you 'take care of' the environment by the things you do?)	I am very environmentally friendly I am moderately environmentally friendly I am a bit environmentally friendly I am not at all environmentally friendly
Do you think that Global Warming is really happening now?	I am sure Global Warming is happening I think Global Warming is happening I don't know whether Global Warming is happening I think Global Warming is not happening I am sure Global Warming is not happening

Most of the participants (89%) agreed that they felt crowded in public transport vehicles. When asked directly about the comfort of public transport vehicles, only a small proportion (5%) believed that public transport vehicles were more comfortable than cars. With respect to transporting luggage, almost two-thirds of the respondents (61%) would choose cars rather than public transport for carrying equipment for sports and hobbies. Even more of the participants (87%) indicated that they would prefer cars when transporting their families. Regarding the cost of travel, almost three-quarters of the respondents (72%) believed that travel by public transport was cheaper than by cars for one person. However, for a whole family, only a small portion (34 %) believed that travel by public transport is cheaper than by car. In the case of safety, only about a quarter of the respondents (24%) believed that travel by public transport was safer than by private car. In some cases, this might be because nearly a third of the respondents (30%) believed that it could be unsafe walking from their homes to place where public transport can be used.

In terms of the global warming theme, about three-quarters of the participants (75%) believed that using public rather than private transport reduced global warming. In addition, and perhaps related to this perceived environmental advantage, somewhat less than half (43%) affirmed that they preferred to use public transport in order not to consume so much fuel. In terms of the social status associated with using public transport, only a small proportion of the participants (11%) of the participants believed that public transport was only for less fortunate people, and a similar percentage (9%) believed that they felt embarrassed while using public transport. In summary, most of the beliefs about public transport were rather negative, although there did not appear to be any social stigma associated with public transport among this group of respondents. Public transport was believed by many to be a more economical form of personal transport, but only for individuals rather than families.

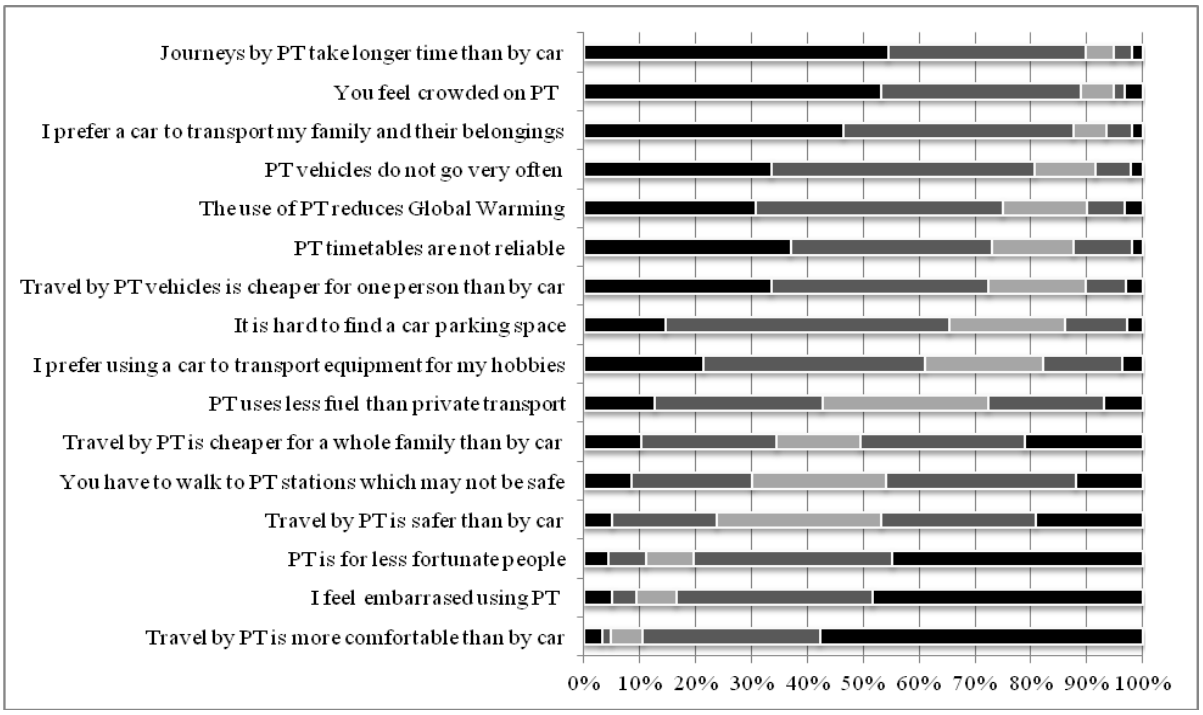

Figure 1. Turkish school students' ideas about the characteristics of public transport. PT = Public transport. The left hand, darkly shaded area of each bar shows the proportion of students who 'strongly agreed' with the statement; the next, lighter shaded area represents the percentage of participants who 'agreed' with the statement; the central white area identifies the proportion of those who 'neither agreed nor disagreed'; the right hand lightly shaded area denotes the percentage of those who 'disagreed' with the statement; the right hand, heavily shaded area represents the fraction of students who 'strongly disagreed' with the statement.

For some of the items in this section of the questionnaire there were statistically significant differences between the responses of different subsets of respondents (Table 4). More of the male than female students believed that public transport safer and more economical, at least for individual travellers. However, more of the male students also believed that public transport was more appropriate for those on a lower income. More females than males believed in certain disadvantages of public transport, that is, overcrowding and the risk of having to walk to places where public transport could be joined. In general then, females tended to belief in the disadvantageous characteristics of public transport.

There were also a few significant differences between the responses of school and university students. More of the school students believed that cars were advantageous for carrying equipment and belongings, but more of the university students believed that journeys took longer by public transport, although they also acknowledged that it took time to find parking space for a private car. Car ownership by a family also appeared to influence the responses. More of the students with a car believed that public transport was not very frequent, and more believed that a private car was better for transporting recreational equipment. More of the students from families

without cars believed that public transport was for the less well off, that journeys by public transport take longer, but that they are cheaper.

Turkish Students' Views about the Importance of Possible Characteristics of Personal Transport

Unless otherwise stated, the percentages reported here are the combined percentages of students who thought that the characteristic was either 'very important' or 'moderately important'; for brevity these respondents are described below as viewing the characteristic as 'important', Figure 2 displays the distribution of the responses arranged in descending order of the proportions of respondents who believed that the characteristic was important.

Table 4. Turkish students' beliefs about public transport

	M (%)	F (%)	Sig	Sch (%)	Uni (%)	Sig	Car (%)	No car (%)	Sig
Travel by PT is cheaper for one person than by car	76	71	**	69	74		71	74	
Travel by PT is more comfortable than by car	6	4		6	5		4	6	*
I feel embarrassed using PT	10	9		8	10		9	10	
Travel by PT is safer than by car	31	20	**	22	25		23	25	
I prefer a car to transport my family and their belongings	87	88		90	86	**	90	82	
Travel by PT is cheaper for the whole family than by car	34	35		32	36		31	41	***
You feel crowded on PT	85	91	***	88	89		89	88	
PT timetables are not reliable	71	74		74	72		74	71	
Journeys by PT take longer than by car	90	90		86	92	**	93	85	***
I prefer using a car to transport equipment for my hobbies	59	62		66	58	***	65	53	**
PT vehicles do not go very often	80	81		78	82		83	76	**
Use of PT reduces Global Warming	71	77		70	77		76	73	
PT is for less fortunate people	14	10	**	10	12		10	14	**
You have to walk to PT stations which may not be safe	24	33	*	26	32		29	33	
It is hard to find a car parking space	61	68		57	69	***	65	66	
PT uses less fuel than private transport	41	44		42	43		41	46	*

Key: M = male, F = female, Uni = university students, Sch = school students, Car = students who own a car, No car = student who do not own a car, PT = public transport. Figures show combined percentages of students who "strongly agreed" or "agreed" that public transport had the characteristics. * $p<0.05$, ** $p<0.01$, *** $p<0.001$ by Analysis of Variance.

Almost all of the participants (97%) held the view that feeling safe while travelling was important. A large proportion (88%) attached importance to feeling comfortable while travelling. In terms of timing of their travel, a similar proportion of the participants (84 %) thought that travelling exactly when they wanted to was important. About four-fifths of the group (79%) held the view that their travel should not take too much time. Regarding the cost of travel, it was important to nearly three-quarters of the participants (74%) that their travel should not be too expensive. With respect to environmental impact, a significant majority (68%) thought it important that their travel should not exacerbate global warming, with the remainder (32%) suggesting that this was 'not very' or 'not at all' important.

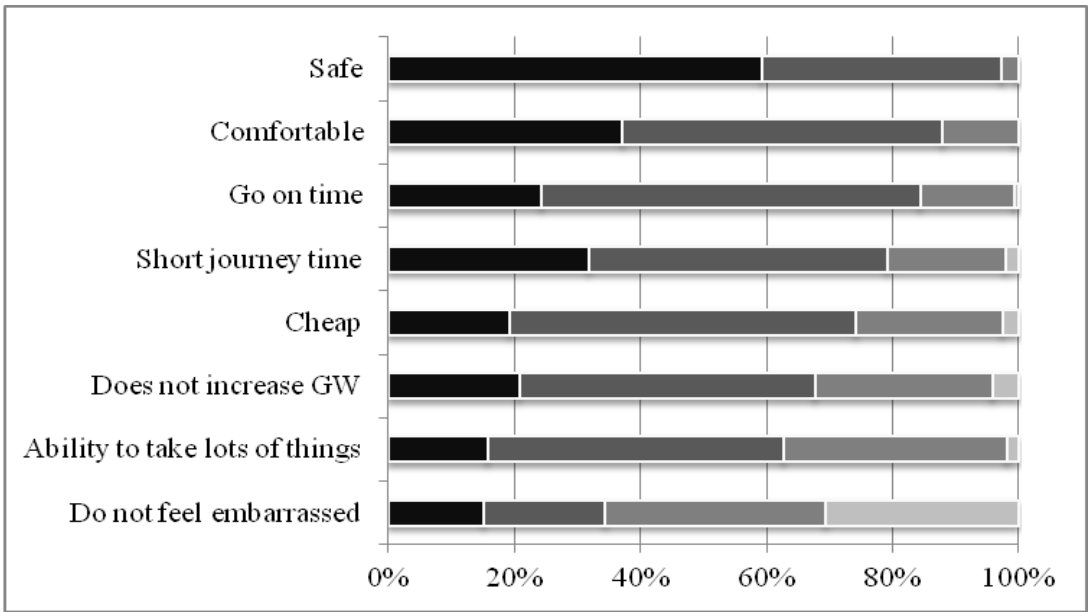

Figure 2. Turkish school students' ideas about the importance of characteristics of transport. The left hand, darkly shaded area of each bar displays the percentage of the students who considered that the characteristic was 'very important'; the next lighter shaded area identifies the proportion of the students who felt that the characteristic was 'moderately important', the next, lightly shaded area signifies the proportion of those who believed that the characteristic was 'not very important'; the lightest, right hand area denotes the percentage of those who thought that the characteristic was 'not at all important'.

A similar percentage of the participants (63%) attached importance to taking lots of things while travelling. Finally, rather fewer, about a third (34%), held the view that it was important not to be socially embarrassed in front of their friends. In summary, the majority of respondents viewed most of the positive characteristics of personal transport, particularly safety and comfort, as important. The one exception was that any embarrassment associated with using public transport was viewed as not very important.

For many of the items in this, more affective, section of the questionnaire there were statistically significant differences between the responses of different subsets of respondents (Table 5). For example, more of the male than female students held the view that it was important

not to feel embarrassed by using certain forms of personal transport. In contrast, more of the females viewed safety and the ability to take luggage important, and more held the view that personal transport should not contribute to global warming. More of the school students than university undergraduates viewed comfort as important, and more school students thought it important that personal transport does not increase global warming. Finally, more of those respondents whose family owned a car viewed a shorter journey time as important, whereas more of those without a car held the view that not to be embarrassed by the mode of transport was important.

Table 5. Turkish students' views about importance of characteristics of personal transport

	M (%)	F (%)	Sig	Sch (%)	Uni (%)	Sig	Car (%)	No car (%)	Sig
Cheap	76	73	*	69	77		71	81	
Comfortable	85	89		92	86	***	88	87	
Does not increase GW	58	73	***	73	65	**	67	70	
Safe	95	98	**	97	97	*	98	96	
Do not feel embarrassed	42	31	***	39	32		32	39	**
Ability to take lots of things	52	68	***	61	64		64	60	
Go on time	79	87	*	80	86		85	83	
Short journey time	80	79		76	80		81	76	*

Key: M = male, F = female, Uni = university students, Sch = school students, Car = students who own a car, No car = student who do not own a car, PT = public transport. Figures show combined percentages of students who viewed the characteristic as "very important' or "moderately important". * $p<0.05$, ** $p<0.01$, *** $p<0.001$ by Analysis of Variance.

Turkish Students' General Ideas about Global Warming

Data from the final four items in the questionnaire are shown in Table 6. Overall, two-fifths of the cohort (40%) were 'sure' that global warming is happening now, with an additional 52% 'thinking' this to be true (92% in total). Approximately a third of the participants (36%) reported that they were 'very worried' about global warming, with about a further half (46%) reporting being 'moderately worried'; thus, 82 % of the participants had at least some concerns about the environmental impact of global warming. More of the female students believed that global warming was a real phenomenon, and more were concerned about it. In terms of their perceptions of their own knowledge about global warming, relatively few of the participants (14%) thought that they knew 'a lot' about global warming, although nearly three-quarters (74 %) thought that they knew 'something' about global warming. So, almost all of the participants (88%) felt they knew at least something about this environmental problem.

More of the university undergraduates than school students thought that they were informed about global warming. With respect to environmental friendliness, only 17% of the respondents considered themselves as 'very' environmentally friendly, although a further 59% thought that they were 'moderately' environmentally friendly (76% in all). More of the female students considered themselves environmentally friendly, as did more of the respondents from non-car-owing families.

Table 6. Turkish students' general ideas about Global Warming

	M (%)	F (%)	Sig	Sch (%)	Uni (%)	Sig	Car (%)	No car (%)	Sig
How worried are you about environmental effects of GW?	75	86	***	81	83		82	83	
How much do you know about GW?	86	88		84	89	**	88	86	
How environmentally friendly are you?	71	79	*	73	78		74	80	*
Do you think GW is really happening now?	87	95	***	90	93		92	94	

Key: M = male, F = female, Uni = university students, Sch = school students, Car = students who own a car, No car = student who do not own a car, PT = public transport. Figures show combined percentages of students who were "very" or "moderately" worried, who thought they knew "a lot" or "something" about Global Warming, who claimed to be "very" or "moderately" environmentally friendly, and who were "sure" or "thought" Global Warming is really happening. * $p<0.05$, ** $p<0.01$, *** $p<0.001$ by Analysis of Variance

Possible Incentives and Disincentives for Using Public Transport

In order to illustrate the possible role of each characteristic in terms of it acting as an incentive or disincentive, a scatter gram (Figure 3) was plotted using the mean scores of the responses to questionnaire items about the perceived truth of the characteristic (Table 2) against the mean scores of the responses to the items concerning the perceived importance (Table 2) of that same characteristic. There were fewer items concerning the importance of various characteristics than there were about the perceived application of these characteristics to public transport, but all the characteristics could be mapped in the two dimensions (see Table 1 for pairing of items). In the scattergram in Figure 3 characteristics that are located in the upper part of the plot (those with a higher mean score) are those that are viewed as important by many students, whereas characteristics that appear in the lower part are those that are viewed as less important. Similarly, characteristics that are located to the left of the plot are those that are generally not believed to be applicable to the mode of transport, whereas those that appear to the right are those that are considered applicable. Observing the positions of the various possible characteristics on the plot, it can be seen that safety during travel was generally viewed as important, but is unlikely to act as a motivator or deterrent because respondents did not believe that public and private transport differed much in this aspect. The social status associated with using different forms of transport was viewed as less important; environmental issues were viewed as being of medium importance. However, other characteristics, were both viewed as being important and believed to be inferior for public transport; these characteristics may well be acting as significant disincentives for using public transport. These characteristics were comfort and journey time; negative beliefs about these may play a role in dissuading people from using public transport. Similarly, timetable issues may well be acting as disincentives to using public transport because public transport is believed to travel only infrequently, and timetables are believed to be unreliable, and respondents viewed these characteristics of frequency and reliability were viewed as important. The items of the questionnaire are displayed so that the 'pairing' of the items can be seen. In the actual questionnaire, the items were in random order, and paired items were in different orders in the two main sections.

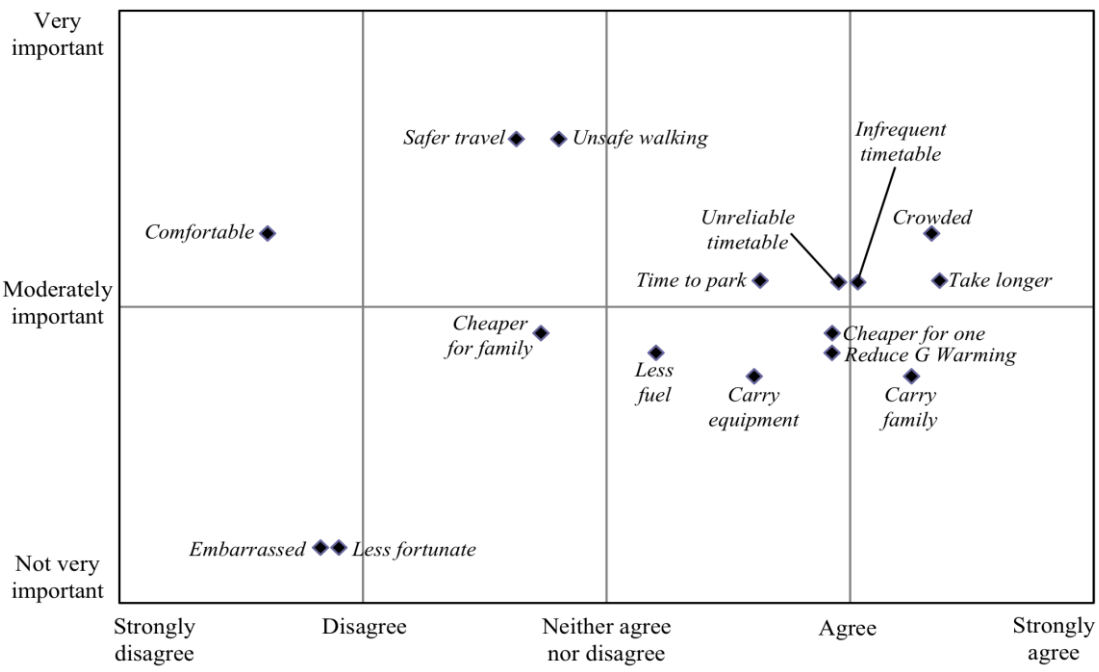

Figure 3. Scattergram showing Turkish school students' views about the characteristics of public transport and their beliefs about the importance of the characteristics of transport. Scattergram in which the mean values to pairs of questionnaire items are plotted. The abscissa represents the degree to which a characteristic is believed to be true; the ordinate represents the degree of importance with which that characteristic is held. Thus, those characteristics whose mean values are towards the upper right hand section of the plot are those which are both believed to be true and which are viewed as being important, and so are those which are likely to act as incentives. In addition, the characteristics whose mean values are towards the upper left hand section of the plot are those which are believed to be wrong and which are viewed as being important and so are those which are likely to act as disincentives

Discussion

The aim of this study was to explore possible incentives and disincentives to using public transport among Turkish young adults. For this, students' beliefs about various characteristics of public transport, and their views about the importance of these characteristics, on the assumption that negative characteristics that were both believed to be true and viewed as important would act as disincentives, and that positive beliefs would act as incentives. In addition, the beliefs and views of male and female students, of school and university students and of those with access to private transport and those without such access were compared.

This study has certain limitations. For example, gaining any absolute measure of beliefs or views is problematic (Reid, 2006). However, the questionnaire used here was designed not to supply absolute measures, but rather to provide quantitative comparisons of students' different beliefs and views about various characteristics of public transport. In addition, responses of different subsets of students about the same characteristic could be compared. A further limitation is that the pilot study was conducted in the UK, although the research team included two Turkish

researchers who knew the Turkish context.

Most of the respondents believed the negative characteristics of public transport raised in the questionnaire, such as crowded conditions, journey time, and unreliability and infrequency of timetables. In a complementary fashion, many respondents rejected positive characteristics such as comfort. Furthermore, respondents viewed most of these characteristics as important. Combining the data from the items about students' beliefs about the characteristics of public transport and their views about the importance such characteristics enabled the identification of characteristics that may act as deterrents or motivation to the use of public transport. The major factors to emerge were comfort, infrequent and unreliable timetables and journey times. Similar themes have emerged in surveys of customer satisfaction, presumably a combination, by individuals, of a perception of the characteristics of public transport and the importance attached to such characteristics. For example, Fellesson and Friman (2008) found that safety, 'system' (travel time and timetable frequency), comfort and staff behaviour were important factors in satisfaction with public transport in a study in nine European cities. Some similar themes, comfort (in terms of personal space) and journey times, were cited as motives for using private transport by car users in England (Gardner & Abraham, 2006). In Australia too, travel time, and comfort and convenience rank highly as factors that people desire in public transport (Wainwright, 1998). Car drivers' beliefs about longer travel times by public transport appear to influence choice about mode of transport in the Netherlands too (van Exel & Rietveld, 2010). Thus it appears that some factors shown as potential disincentives to using public transport in the current study with Turkish students are also found amongst adults in many other countries.

In one sense, these types of characteristic represent an egocentric perspective (Stern, Dietz, & Guagnano, 1995), concerned with the comfort and convenience of the individual. Other items on the questionnaire explored the more ecocentric perspective (Stern, Dietz, & Guagnano, 1995). Many respondents viewed it as important that personal transport did not exacerbate global warming, and the majority accepted that using public rather than private transport would help to reduce global warming.

There were also some differences in the beliefs and views of the male and female respondents. For example, fewer of the females believed public transport was safer, both in terms of actual travel and getting to centres for public transport, and more females viewed safety as important, perhaps because females feel themselves more vulnerable (Department for Transport, undated). Females also differed from males in their ecocentric perceptions, in that more females thought that global warming is a real phenomenon, were concerned about it, and held the view that it is important that personal transport does not exacerbate global warming. There is fairly consistent evidence that males and females respond somewhat differently when asked about environmental issues. For example, males tend to raise physical problems or technological 'fixes', whereas females emphasise threats to wildlife or human health (Barron, 1995; Batterham et al, 1996; Boyes & Stanisstreet, 1993; Connell et al, 1999; Myers et al, 1999; Roper Starch Worldwide, 1994). As in the present study, females also tend to express a higher awareness of risk (Riechard & Peterson, 1998; Roper Starch Worldwide, 1994) and express more concern about environmental problems (Hicks & Holden, 1995; Oscarsson, 1996). Where there were differences between the responses of school students and university undergraduates, more of the latter tended to believe in advantages of private transport. Unfortunately, fewer of the undergraduates viewed it as important that personal transport did not increase global warming. Even though developmental interpretations must be made with caution in cross-sectional research of the type reported here, this may indicate that as the people approach the age of owning a private car, the benefits of private cars become more apparent. Furthermore, this positive perception of private transport may mask the environmental benefits of public transport such as reducing global

warming. Car ownership also appeared to be related to beliefs about some of the characteristics of public transport. Predominantly, fewer car owners believed that it was cheaper for families to travel by public transport, and more car owners believed that such journeys took longer than by car, reflecting a general tendency for car owners to see the advantages of private transport (Ibrahim, 2003).

Environmental Educational Opportunities

Although the respondents in this study were still in full-time education, they were approaching the age group that may consider purchasing their own vehicles. Given the imminence and magnitude of some of the environmental problems faced by the world, including that of global warming, it is necessary to consider how to maximise strategies to encourage the up-coming generation to reduce actions, such as using private rather than public transport, that exacerbate such problems. Some structural strategies may be essential to encourage people to use public transport rather than private cars; the present findings suggest that, for young adults in the Turkish context at least, improvement to comfort, timetabling and journey times associated with public transport may be priorities. However, the evidence is that such, 'hard' (Richter, Friman & Gärling, 2009) structural transport policies may not provide a complete solution in encouraging use of public transport (Bamberg et al, 2011; Kitamura et al, 1997; Stopher, 2004). So, it may be that they may need to be complemented by 'soft' (Richter, Friman & Gärling, 2009) policies, such as public information and persuasion (Taniguchi et al, 2007). Indeed, it has even been argue that such policies can be more effective in encouraging use of public transport than structural changes (Stradling, Meadows & Beatty, 2000). In the case of young people, environmental education may form part of such 'soft', 'pull' strategies. Unfortunately, some previous work has shown that pro-environmental attitudes exert only a small (Anable, 2005, Collins & Chambers, 2005; Gardner & Abraham, 2008, Tertoolen et al., 1998; Walton et al., 2004) or even no influence on travel behaviour (Beirao & Cabral, 2007; Eriksson & Foward, 2011; Flamm, 2009). Given this, and the limits on educational resources and curriculum time, it might be prudent to concentrate on specific aspects of that contribute to the present overall reluctance to the use of public transport. Such targeted education for sustainability will be most effective if based on an appreciation of the pre-existing beliefs and views of those to be educated (Vosniadou, 2001). The aim of this study was to reveal such beliefs and views about specific aspects of the use of public transport.

According to the current findings, two perceptions that may be useful to explore in terms of education for behaviour change are students' beliefs about the importance of environmental protection and their views about personal financial cost. In terms of environmental protection, many of the students considered themselves to be environmentally friendly and were concerned about global warming. However, a considerable proportion of students in the present study did not view it as particularly important that personal transport should not contribute further to global warming. Information about the potential magnitude of the biological, social and financial consequences of global warming induced by transport, may persuade some such students of the importance of reducing global warming. Furthermore, some students did not believe that use of public transport was advantageous in terms of reducing global warming. It is possible that teaching in the cognitive domain about the comparative carbon costs of different modes of personal transport might influence students' beliefs here. Students were also concerned about the financial cost of their personal transport, and a proportion were not convinced that public transport was more economic than transport with private vehicles, especially for families as opposed to individuals. In part, this disincentive requires a structural solution that of keeping fares for public transport, even for families, reasonably economic. In part, however, education could play a role

in drawing students' attention to the true financial cost of private motoring, especially because motorists appear to under-estimate the true financial cost of motoring (Gardner & Abraham, 2007).

We wonder, therefore, if classroom activities might be devised under the theme of 'Full cost, not just fuel cost'. In the case of environmental impact, students could be introduced to the notion of 'carbon footprint', combined with the idea of a full life-cycle carbon cost. Thus, groups of students could calculate the environmental cost in terms of carbon emission per kilometre for each traveller. The number of factors included in such a calculation could be adapted to the educational stage and academic background of particular groups of students. In a parallel manner, students could be tasked to calculate the full economic cost of car ownership, including purchase, insurance, maintenance, taxation and running in social learning environments. Even for those negatively-perceived aspects of public transport that appear to require structural solutions, education might play some role. Project-based learning, which could be formulated to be another social learning opportunity, about the real situation of local public transport in terms of infrastructure (timetables of bus routes, the lengths of journey times when travelling by public transport, etc) could be undertaken by groups of students; by collecting such data students might change their views about the magnitude of the disincentives to using public transport. Such learning would be ideally suited to inquiry-based cooperative learning. It could also enhance a number of academic skills in students such as information acquisition, data display, analysis and interpretation, and logical argumentation, as well as deepening a range of scientific concepts.

In order to create a change in students' core beliefs about public transport, cognitive interventions such as calculations of carbon footprints and inquiry-based activities described above may need to be supported by more affective elements. The present findings suggest that these affective elements are sensitive to demographic features such as gender and age. Posner et al (1982) noted that, in order for beliefs to change, individuals must be dissatisfied with their existing beliefs. This is most likely to happen when either existing beliefs are challenged or new beliefs cannot be assimilated into existing ideas (van der Wals et al., 2009). In the case of change in beliefs about public transport, students need to be aware of their own belief systems and those of their colleagues. A peer discussion environment based on deliberative communication would provide opportunities for students to appreciate different beliefs and perspectives (Englund, 2006). Students could challenge their peers by justifiying their own positions. In addition, vicarious experiences of different modes of transport could be created so that students make comparisons of public and private transport in a planned learning environment.

Children and young people are recognised as important groups for the development of a sustainable environment (Johnson, 1993). In part, this may be because it is easier to set pro-environmental behaviour patterns early than it is to change less environmentally friendly habits once they have become entrenched. According to Dawe et al. (2005), education for sustainable development enables people to develop the knowledge, values and skills necessary for them to participate in decisions, both locally and globally, that will improve the quality of their lifestyles without damaging the planet. Regarding the contribution of education for sustainable development, Bonnet (2002) highlights two ways in which this can occur. First, developing students' critical abilities and understanding of sustainability issues can help because it can allow them to make informed decisions. Second, education can be a vehicle for actively promoting positive attitudes and pro-environmental behaviours that are requirements for sustainable development. The issues surrounding personal transport would appear to be strong candidates for exemplars in this approach, because they impinge on almost every individual in society, the use of private cars is a major contributor to some aspects of enviromental degradation, and since peer

discussion environments taking into account gender balance and different beliefs and views, could readily be created.

Following this study, some lines of future research can be suggested. For example, a methodological extension of the research to include open-form instruments such as questionnaires and semi-structured interviews could reveal some of the thinking that underpins students' beliefs and views about transport modes. Such information might be useful in challenging scientifically idiosyncratic thinking. It would also be interesting to compare whether classroom practices based on social learning environments have the potential to be more succesful in terms of behaviour change related to personal transport than learning in traditional school environments. Such research would involve intervention studies. In addition, it would be significant to explore possible changes in the responses of the students in our sample once they are in a position to afford their own car. This would require longer-term, longitudinal studies to track possible changes in individual student's views and beliefs about incentives and disincentives from a pedagogical perspective. Such longitudinal studies do require a major investment of time and other resources. However, given the magnitude and imminence of the deleterious effects of global warming, and the contribution that personal transport makes to this environmental problem, we suggest that such investment is justified.

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