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Omani school and university students' opinions about public transport: incentives and disincentives

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Abstract: The global shift to private transport is impacting on the environment in a number of ways, including increases in vehicle emissions that, in turn, contribute to the major problem of global warming and potential climate change. This suggests a need to improve strategies to encourage greater use of public transport. The aim of this study is to explore which aspects of public transport might be perceived as reducing its popularity, and which might act as motivators to increase its use. In order to act as a motivator, a positive characteristic must be both believed to be true of public transport and viewed as an important issue by individuals. In contrast, negative characteristics that are viewed as important are likely to act as deterrents to the use of public transport. A questionnaire was used to determine the views of Omani school and university students about such characteristics. Comfort, safety and short journey time were viewed as important, but these characteristics were believed to be inferior for public transport. Surprisingly in a country where new, large and expensive private vehicles are common, the social status associated with using different forms of transport was seen as less important, and few respondents believed that using public transport was socially embarrassing. There were some differences in the responses of male and female respondents, with more females than males viewing comfort, safety and convenience in terms of travelling at preferred times as important. From an eco-centric perspective, although many respondents viewed it as important that personal transport should not exacerbate global warming, only half believed that public transport could make a contribution here. Many of Oman's public transport issues are structural, but education may still have a part to play in encouraging the use of public transport. (Throughout the article we use 'private transport' to mean cars and 'personal transport' to mean transport of persons (i.e. buses or cars)).

Keywords: Beliefs, climate change, environmental education, global warming, Oman, private transport, public transport, views

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1. Introduction

There is now little doubt that the world is facing environmental problems of unprecedented magnitude. A prime example is global warming[1], resulting in changes to the world's climate (IPCC, 1997; 2001; 2007). It is now accepted by most authoritative sources that global warming is a real phenomenon, and that it is likely to have serious negative consequences on a global scale in terms of environmental integrity, human well-being (IPCC, 1997; 2001), economic security (Stern, 2006) and political stability (Solana, 2008). Furthermore, some of the consequences of global warming are already occurring (IPCC, 2007). In view of this, mechanisms to help to persuade individuals to adopt more pro-environmental actions need to be sought with increasing urgency (Stern, 2006), and the contribution that environmental education may make to this needs to be as effective as possible.

A major contributor to global warming is personal transport, in particular car usage (Ambusaidi et al., 2012; Beirao and Cabral, 2007; Eriksson, 2009). Although motor manufacturers have improved engine technology and vehicle aerodynamics to reduce emissions, car usage still has a substantial impact on the environment (Leeson, Stanisstreet, and Boyes, 1997b). In contrast, public transport as an alternative to private cars is generally viewed as more environmentally friendly (Hunecke et al., 2001; Van vugt, Van lange, and Meertens, 1996). Clearly, then, it would be helpful in terms of ameliorating global warming to encourage the use of public transport in place of private vehicles.

2. Influences on decision-making about personal transport

Decision-making about personal transport is complex. For example, there is a variety of psychological theories of relevance to decision-making in this area (Beirao and Cabral, 2007; Gardner and Abraham, 2007). Furthermore, a number of demographic factors such as gender

[1] In this paper, for economy of words, we use the term 'global warming' to refer to the exacerbation of the natural greenhouse effect by the addition of anthropogenic pollutants to the atmosphere leading to a warming of the planet, resulting in climate change.

(Boyes and Stanisstreet, 1998), age (Golob and Hensher, 1998), income (Flamm, 2009), cost (Hunecke et al., 2001) and educational qualifications (Golob and Hensher, 1998) appear to influence choices about personal transport. In addition, variables such as environmental knowledge, values, beliefs, and attitudes (Nordlund and Garvill, 2003) would seem to be some of the predictors of personal decisions concerning personal transport.

As well as these factors, the perceived characteristics of different modes of transport act as conflicting incentives and disincentives to using public or private transport. For example, amongst adults the major advantages of public transport can be viewed as reduced stress, the ability to relax during travel, an opportunity to read or talk to other people (Beirao and Cabral, 2007). On the other hand, unreliable or inadequate service, loss of personal space, long travel time, lack of flexibility, lack of control, and lack of comfort may be seen as significant disadvantages of public transport (Beirao and Cabral, 2007; Gardner and Abraham, 2007; Stradling et al., 2000). Furthermore, practical reasons for choosing cars instead of public transport include factors such as time, cost, flexibility, safety, and comfort. In addition, the car is often considered as a status symbol (Golob and Hensher, 1998) and driving as an adventurous and pleasurable experience (Eriksson, 2009). Conversely, the use of public transport is sometimes viewed as involving a loss of control (Gardner and Abraham, 2007).

3. Strategies for behaviour change

Two kinds of strategy have been used to attempt to encourage people to use public rather than private transport, so-called 'pull' and 'push' measures. 'Push' measures generally involve modification of physical and legal structures in an attempt to decrease the attractiveness of personal car use and/or increase the attractiveness of using public transport. Such measures include prohibition of car use in certain areas, road pricing, and bus priority lanes making public transport more efficient (Eriksson, 2009; Graham-Rowe et al., 2011). On the other hand, 'pull' measures often employ psychological interventions designed to motivate voluntarily change in transport choices (Gardner and Abraham, 2008; Graham-Rowe et al., 2011). 'Pull' strategies may include education, for example about environmental pollution by cars and its consequences

(Böhler et al., 2006). ‘Pull’ policies are generally more popular with the public than ‘push’ strategies, because the latter are perceived as restricting freedom (Boyes and Stanisstreet, 1998; Graham-Rowe et al., 2011; Gardner and Abraham, 2007, 2008).

4. Education and behaviour change in the context of personal transport

In the context of personal transport, educational research in the cognitive domain has attempted to explore people’s knowledge about issues associated with transport. For example, most school students are aware that vehicle emissions contribute to global warming and to acid rain (Boyes and Stanisstreet, 1997; Hillman, Stanisstreet, and Boyes, 1996; Leeson et al., 1997a). Many students are aware that emissions can contribute to respiratory problems such as asthma (Boyes and Stanisstreet, 2001). However, there are also common misconceptions such as the notion that vehicle emissions damage the ozone layer and, as a consequence, increase the incidence of skin cancer (Darçın and Darçın, 2009; Hillman et al., 1996; Leeson et al., 1997a, 1997b).

Research in the affective and behavioural domains has explored variables such as environmental attitudes and values, and the impact of conceptual and emotional understanding on behavioural intentions and decisions. There has also been limited research on attitudes to private cars and public vehicles and the way in which these may influence the use of public rather than private personal transport (Nilsson and Kuller, 2000). A recent study has examined possible links between students’ beliefs about the extent to which a range of actions, including the use of public or private transport, would help to alleviate global warming, and students' willingness to undertake those actions (Kilinç, Boyes, and Stanisstreet, 2011).

5. The Oman context

Oman is a developing country reliant mainly on oil for its annual income, although some time ago the government realised potential problems in being over-dependent on one resource for

national income and has tried to explore other resources. For example, an international conference, "Economic Vision 2020" held in Muscat in 1995 called for the development of a vision for the Omani economy (Ambusaidi and Al-Zain, 2008) and suggested that different resources be adopted by the government to diverse its national income. Thus, in the past ten years, Oman has benefited from investment, from within and from outside the country, in many different sectors, particularly in the petrochemical and industrial sectors. As a consequence, over recent years Oman, like many other countries in the Gulf and Middle East, has undergone rapid economic and social change. One effect of this has been an increase in population, especially in large cities such as Muscat, Sohar, Nizwa and Salalah. As a consequence of economic development and population growth, there has been a rise in the number of vehicles on the road and, consequently, an increase in traffic congestion, greenhouse gas emissions, health problems and traffic accidents (Belwal and Belwal, 2010; Haldenbilen and Ceylan, 2005).

In order to ameliorate the problems associated with increased private car use, the Omani government, like other countries in the Gulf, has adopted a range of solutions. One strategy has been to attempt to accommodate the increase in traffic by constructing new roads within and between cities. In each annual budget the Omani government allocates substantial financial resources for road building. For example, in the 2012 budget the government allocated over 800 million Omani Rial (approximately 2080 million US$) for the transport and communication sector, and approximately one third of this money was to build new roads and extend existing ones (Ministry of Legal Affairs, 2012).

The other solution has been to encourage people to use public transport. In Oman, there are two forms of public transport. One is buses that operate under the auspices of the National Transport Company, established by the government in 1984 to provide a network of buses connecting all cities in Oman; the other is private buses that work as taxis. The cost of public transport in Oman is not expensive and most people can easily afford it. Despite this, however, few Omanis use public transport. There are many reasons for this reluctance. A recent study by Belwal and Belwal (2010) about public transport in Oman found that services are minimal and do not match demand, and that socio-cultural and physical factors, such as lack of comfort and long journey times, act as disincentives. Furthermore, journey time is an important aspect for travellers. In addition, the cost of buying and running private cars in Oman is low as there are no

taxes on fuels, and manufacturers offer discounts on new vehicles to encourage sales. As a consequence, there has been an excessive reliance on private cars, and this has embedded the habit of car use in the majority of the Omani population. This is true even of Omani young adults; in a study centred on attitudes to Global Warming, only about a third of the respondents were willing to use public transport to reduce Global Warming (Ambusaidi et al., 2012). Therefore, in Oman as in other countries, there is a need to reduce personal car use by persuading people to shift from private to public transport (Soylu, 2007). The present study concentrates on Omani school and university students, since they are the up-coming generation of car users, and because it might be easier to establish pro-environmental attitudes before excessive car use becomes habitual.

6. Aims of the study

The present study was undertaken to explore factors that might affect students' decisions about using public or private transport, in order to inform the design of educational strategies and other 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 could act as motivators to the use of 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 Omani school and university students' beliefs about various suggested characteristics of public transport?
2. What are Omani school and university students' views about the importance of various suggested 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 addition to these basic questions, the data were explored to determine whether there were differences between the distribution of the responses of male and female respondents, and between the school and the university students.

7. Methods - Characteristics of the respondent group

The study was based in Muscat, the capital city of Oman. The respondent sample comprised secondary school students selected randomly from eight schools in the Muscat Governorate, and undergraduate students at a local university. The eight schools provided a good representation of socio-economic spectrum within the Muscat Governorate and offered a good gender balance for the study.

Muscat is the biggest of the four Governorates in Oman, with a population of approximately 775,000 inhabitants according to 2010 Census (Ministry of National Economics, 2010). The selected group of students were from Grades 10 (15-16 years old) and 11 (16-17 years old), because at this age students are starting to make decisions about personal transport in a manner that is reasonably free of parental control. A total of 420 questionnaires were distributed to school students, although 20 questionnaires were excluded because a relatively large number of items had missing responses. The final sample of 400 school students consisted of 47% male and 53% female students. Some 51% of the sample was in Grade 10, and 49% were in Grade 11. The sample of undergraduate students was undertaking different Programmes of Study at a university near Muscat. This is the only public university in Oman, and is where the first author s employed. There were 764 respondents, comprising 42% males and female 58% females. Of these, 58% were in Year 1 of study and 42% were in Year 4 (their final year). Some 49% were studying the humanities and 51% were studying in science.

8. Structure of the questionnaire

The original questionnaire was written in English, but for use in Oman, the questionnaire was translated into Arabic and then back-translated, independently, into English to check for fidelity of translation. In addition, the content of the instrument was validated by seven Omani teacher educators from the College of Education at the Sultan Qaboos University and one secondary school teacher. The teacher educators were all formerly secondary school teacher and they assisted with the translations process. On the basis of their comments, a few changes were made slightly to take account of the local context. For example, the word "bus" was used instead of the phrase "public transport" in the questionnaire because this is the only form of public transport in Oman. The questionnaire had been used previously, after translation, in other countries, (e.g. Kilinç et al, in press).

The questionnaire consisted of a cover sheet, a section containing items to probe students' beliefs about the characteristics of public and private transport (research question 1), a section to explore students' views about the importance of such characteristics (research question 2), and a shorter final section to investigate students' ideas about global warming (Table 1). The cover sheet of the questionnaire introduced the study, explained the response procedure and asked respondents to record demographic data such as their gender. 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, based on earlier research in the literature, and on a small-scale pilot study undertaken in the UK. These 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 'It's cheaper for one person to travel by public transportation than by car'. In order to avoid bias, some of these items were expressed in terms of possible advantages of public transport, while others were expressed in terms of possible disadvantages of public transport. The five available responses to items in this section of the questionnaire 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 viewed each of the characteristics to be. In this section, the items took the form of, e.g. 'How important is it to you when you travel around that you are safe?'. Here, the four available responses were 'Very important', 'Quite 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 and the way in which they were scored for data analysis are shown in Table 2.

The questionnaire concluded with a short section containing four items designed to elicit background information about students' concern about and knowledge of environmental issues, global warming in particular. The first item in this final section asked students how worried they were about the effects of global warming on the environment. The four available responses here were 'I am very worried', 'I am quite worried', 'I am a little bit worried' and 'I am not worried at all'. The second item asked students how much they considered they knew about global warming, with the four 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 in this section asked students how environmentally friendly they considered themselves to be, with 'I am very environmentally friendly', 'I am quite environmentally friendly', 'I am a bit environmentally friendly', and 'I am not at all environmentally friendly' as the four available responses. Finally, students were asked whether they believed that global warming is really happening now; here the five 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.

9. Administration of the questionnaire

Students completed the questionnaire independently and anonymously, under the supervision of their normal school and university teachers. The students were assured that the questionnaire was not a test and that no information about individuals' responses could be

gained. At both the school level and the tertiary level, a response rate in excess of 90% was achieved.

Table 1. Wording and pairing of the questionnaire items

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

Source: authors' own elaboration

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 of the questionnaire.

Table 2. Scoring of responses 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	Quite 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		

Source: authors' own elaboration

10. Analyses of the responses

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. Following this, differences between the responses of male versus female students, and of school students versus university students were explored using Analysis of Variance (ANOVA), with $p<0.05$ being considered the critical value for statistical significance. In the descriptions below, only statistically significant differences between sub-sets of respondents, as obtained from ANOVA tests, are reported. Finally, the data were explored using Cluster Analysis to determine whether covert subsets of students were present in the overall cohort.

11. Results - Omani school and university students' general ideas about global warming

More than half of the respondents (59%) were 'sure' that global warming is happening now, with an additional 27% 'thinking' this to be true (86% in total). Approximately a third of the respondents (34%) reported that they were 'very worried' about global warming, and about a further two fifths (42%) reported being 'quite worried'; thus, about three quarters (76%) of the participants had at least some concerns about the environmental impact of global warming. In terms of their perceptions of their own knowledge about global warming, less than a third of the

respondents (29%) thought that they knew ‘a lot’ about global warming, although nearly half (49%) felt that they knew ‘something’ about global warming. Thus three quarters of the respondents (77%) claimed to know at least ‘something’ about this issue. With respect to environmental friendliness, about a third of the respondents (30%) considered themselves ‘very’ environmentally friendly, although a further 57% thought that they were ‘quite’ environmentally friendly (87% in all).

More of the university students (83%) than the school students (67%) thought that they knew at least something about global warming, possibly reflecting a greater exposure to information of the older respondents. Perhaps linked to this, a higher proportion of the university students (92%) than school students (75%) ‘thought’ or were ‘sure’ that global warming is happening.

12. Omani school and university students’ beliefs about the characteristics of public transport

In Table 3 the Omani respondents’ beliefs about public transport are presented. When statistically significant differences between the responses of males and females are shown, the data for males are given first. When differences between the responses of school and university students are reported, the data for school students are given first. In the descriptions below, the percentages given are the combined percentages for school and university students who either ‘strongly agreed’ or ‘agreed’ with the statement in the questionnaire items.

The most frequent positive belief about public transport (61%) was that it is cheaper than using a private car. Many respondents (41%) also believed that public transport was an economic way to travel for the whole family. A similar proportion (46%) believed that it was difficult to find parking space for private cars, which might be considered an advantage of public transport. However, rather few respondents believed that public transport was more comfortable (16%) or safer (16%) than private transport. From a more eco-centric perspective, half of the respondents (50%) believed that the use of public rather than private transport helped to reduce global warming and, perhaps linked to this, a third (32%) believed that public transport uses less fuel.

More of the respondents believed the negative characteristics of public transport. Dominant amongst these were the beliefs that journeys by public transport take longer than by car (87%), that travel on public transport is less convenient because buses do not go frequently (72%), and that public transport is crowded (68%). A majority of the respondents believed that a private car is better for transporting a family and their belongings (72%) and equipment needed for hobbies (60%). Public transport timetables were believed by more than half of the respondents (59%) to be unreliable, and a similar proportion of respondents (55%) believed that there is a safety issue in having to walk to public transport locations. In contrast, rather few of the respondents (20%) believed public transport was for less fortunate people and, perhaps as a consequence, few (22%) believed that it was socially embarrassing to use public transport.

Table 3. Omani respondents' beliefs about public transport.

	All (%)	M (%)	F (%)	Sch (%)	Uni (%)	Car (%)	No car (%)
Travel by PT is cheaper for one person than by car	61						
Use of PT reduces Global Warming	50	46	**53				
It is hard to find a car parking space	46						
Travel by PT is cheaper for the whole family than by car	41						
PT uses less fuel than private transport	32			38	**29		
Travel by PT is more comfortable than by car	16			26	***10	14	**23
Travel by PT is safer than by car	16						
Journeys by PT take longer than by car	87						
I prefer a car to transport my family and their belongings	72						
PT vehicles do not go very often	72						
You feel crowded on PT	68						
I prefer using a car to transport equipment for my hobbies	60			61	*60	61	*56
PT timetables are not reliable	59						
You have to walk to PT stations which may not be safe	55			64	***50		
I feel embarrassed using PT	22						
PT is for less fortunate people	20	23	*18				

Source: authors' own elaboration

Items are arranged with the most frequently believed positive characteristics of public transport at the top of the upper section of the table, and the most frequently believed negative characteristics at the top of the lower section. Key: M = male, F = female, Sch = school students, Uni = university students, Car = respondents who own a car, No car = student who do not own a car, PT = public transport. Figures show combined percentages of respondents who "strongly agreed" or "agreed" that public transport had the characteristics. * $p<0.05$, ** $p<0.01$, *** $p<0.001$ by Analysis of Variance.

For some of the items in this section of the questionnaire there were statistically significant differences between the responses of the male and female respondents. In two cases, more of the females believed in characteristics of public transport. Thus, more females believed that public transport helps to reduce global warming (46%, 53%), and that it is difficult to find car parking (42%, 50%). In other cases, more of the males believed in characteristics of public transport. Thus, more of the males believed that public transport is safer than travel by car (23%, 11%) and that public transport is for less fortunate people (23%, 18%). More males also believed that they would need a car to transport their family (73%, 70%) and to carry equipment for hobbies (64%, 57%).

There were also differences between the responses of school and university students for some items. More of the school students believed in some advantages of public transport, that it is more comfortable (26%, 10%) and uses less fuel (38%, 29%). However, more school students also believed some negative characteristics of public transport, that a car is preferable for carrying a family and their belongings (74%, 71%) and that it is not safe to have to walk to locations to catch public transport (63%, 50%). In one case, more of the university students believed a characteristic of public transport; more believed that public transport contributes less to global warming (45%, 53%).

13. Omani school and university students' views about the importance of characteristics of personal transport

In Table 4 the Omani respondents' views about importance of characteristics of personal transport are presented. When statistically significant differences were found between the responses of males and females, or between the responses of school and university students, the data are given as described above. In the following descriptions, the percentages given are the combined percentages for school and university students who viewed the characteristic as either 'very important' or 'important'.

The characteristics of personal transport viewed as being most important were that it is comfortable (98%), safe (97%), that bus timings were convenient (90%) that journey times were short (84%), and that such transport was cheap (82%). Rather fewer of the respondents, but still a majority, held the view that personal transport should facilitate the carrying of personal belongings (67%), and that the form of personal transport should not cause embarrassment (59%). From and eco-centric perspective, more than three quarters of the respondents (80%) held the view that personal transport should not increase global warming.

Table 4. Omani respondents' views about importance of characteristics of personal transport.

	All (%)	M (%)	F (%)	Sch (%)	Uni (%)	Car (%)	No car (%)
Comfortable	98	97	**99				
Safe	97	95	***99	95	**99		
Go on time	90	88	***92	84	**94		
Short journey time	84	81	**87				
Cheap	82						
Does not increase GW	80						
Ability to take lots of things	67	61	***72	72	**64		
Do not feel embarrassed	59						

Source: authors' own elaboration

Items are arranged with those viewed as most important at the top of the table. Key: M = male, F = female, Sch = school students, Uni = university students, Car = respondents who own a car, No car = respondents who do not own a car, PT = public transport. Figures show combined percentages of students who viewed the characteristic as "very important' or "quite important". * $p<0.05$, ** $p<0.01$, *** $p<0.001$ by Analysis of Variance.

For five of the eight items in this section of the questionnaire there were differences in the responses of the male and female respondents, as determined by ANOVA, with more females viewing characteristics as important. Thus, slightly more females than males viewed comfort (97%, 99%), safety (95%, 99%), convenient departure time (88%, 92%), short journey time (80%, 87%) and ability to carry possessions (61%, 72%) as important.

There were also some differences between the responses of school and university students. In most cases more of the university students viewed a characteristic as important. Thus, more of the university students viewed safety (95%, 99%), convenient timings (84%, 94%), shorter journey time (78%, 87%) and economical fares (75%, 86%) are important, although fewer viewed the ability to carry luggage (72%, 64%) as important.

14. Cluster Analysis to reveal covert groupings within the overall cohort

Cluster Analysis is an exploratory statistical tool that groups (clusters) respondents according to their responses. Two sets of Cluster Analyses were undertaken, one using the responses to questionnaire items concerning students' beliefs about the characteristics of public transport, the other using the items concerning students' views about the importance of the various characteristics.

The former analysis, concerning respondents' beliefs about the characteristics of public transport, produced two reasonably clear Cluster Groups. *Belief Cluster Group 1* contained 728 respondents; *Belief Cluster Group 2* contained 344 respondents (92 respondents could not be allocated to cluster groups because of missing data). The percentages for the top two responses for each item, given by respondents in the two belief groups, were compared using Chi^2 analysis. There were no differences in the demographics of the two belief cluster groups in terms of gender or stage of education. More of the respondents in *Belief Cluster Group 1* believed that public transport had advantages, and fewer believed that it had disadvantages. Thus, statistically significantly more members of *Belief Cluster Group 1* believed that public transport is more comfortable (21%, 3%), safer (20%, 7%), cheaper for family travel (47%, 26%), uses less fuel (39%, 16%) and contributes less to global warming (54%, 42%), compared with private cars. In a complementary fashion, fewer respondents in *Belief Cluster Group 1* believed that public transport was suited for less fortunate people (16%, 27%) or that it was embarrassing to use public transport (14%, 37%), and that private cars were better for transporting a family and their belongings (63%, 91%) or individuals and their recreational equipment (53%, 76%). Similarly, fewer respondents in *Belief Cluster Group 1* believed that public transport was crowded (61%, 84%), that timetables are unreliable (53%, 70%), that public transport is infrequent (67%, 84%), or that journeys by this mode of transport take longer (83%, 96%). Finally, fewer respondents in *Belief Cluster Group 1* held the belief that the need to walk to places to catch public transport presented problems of safety (48%, 68%). Thus, within the general cohort of respondents there appears to be two otherwise covert groups of respondents, one of which tends to see public transport in a positive light in more than the other.

Cluster Analysis using responses from the items concerned with respondents' views about the importance of various characteristics also produced two reasonably clear, but different, cluster groups. *Importance Cluster Group 1* contained 646 respondents; *Importance Cluster Group 2* contained 452 respondents, and there were 66 respondents unallocated. The responses of the respondents in the two belief groups were compared using Chi^2 analysis. As above, there were no differences in the demographics of the two importance cluster groups in terms of gender or stage of education. *Importance Cluster Group 1* contained respondents who tended to view characteristics as more important. Thus, more members of *Importance Cluster Group 1* than *Importance Cluster Group 2* viewed it as important that personal transport was cheap (85%, 77%), not embarrassing to use (97%, 4%), provides short journey times (87%, 81%), enables a traveller to carry lots of things (70%, 63%), and does not make global warming worse (83%, 76%). Thus, within the general cohort there appears to be two covert groups of respondents, one of which has a tendency to be more discerning in terms of personal transport.

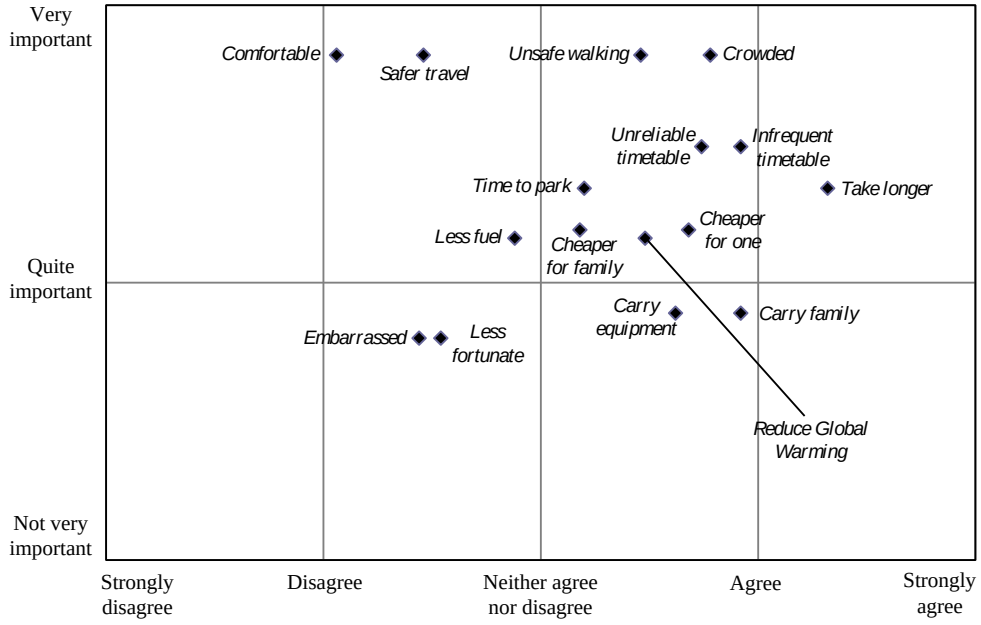
Finally, it was possible to examine the composition of the overall cohort in terms of the membership of the two pairs of cluster groups. Somewhat over a third of the overall cohort (39%) might be termed *More discerning, more positive* about public transport, and a little under a third (29%) were *Less discerning, more positive*. A fifth of the cohort (20%) were *More discerning, more negative*, and the remainder (12%) were *Less discerning, more negative* about public transport.

15. Possible incentives and disincentives for using public transport

The basis of the study was that it is a reasonable assumption that positive characteristics that are both believed to be true of public transport and viewed as important may act as motivators to use public transport, and that negative characteristics that are both believed to be true and viewed as important may act as deterrents to the use of public transport. In order to illustrate the possible role of each characteristic in terms of it acting as an incentive or disincentive, a scattergram was plotted using the mean scores of the responses to questionnaire items about the believed truth of the characteristic against the mean scores of the responses to the

items concerning the perceived importance of that same characteristic (see Table 1 for the pairing of the items). The scattergram is shown in Figure 1. In such a graphic 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 so. Similarly, characteristics that are located to the left of the plot are those that are generally not believed to apply to the mode of transport, whereas those that appear to the right are those that are. Thus, for positive characteristics, those that plot in the upper right of the graph are those that might act as incentives to using public transport. In a complementary fashion, negative characteristics that plot in the upper left of the graph are those that might act as disincentives.

Figure 1. The scattergram



Source: authors' own elaboration

Scattergraph showing, by plotting mean scores of pairs of items, Omani respondents' beliefs about the characteristics of public transport and their views about the importance of the characteristics of transport. 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 viewed. Thus, positive characteristics positioned towards the upper right hand section of the plot are those that are both believed to be true and that are viewed as being important, and so are those that may act as incentives to using public transport. In a complementary fashion, positive characteristics positioned towards the upper left hand section of the plot are those that are believed to be wrong and that are held to be important and so are those that may act as disincentives.

Observing the positions of the various possible characteristics on the plot in Figure 1, it can be seen that safety during travel was generally viewed as important by the respondents, but is unlikely to act as a major incentive or disincentive to using public transport because respondents did not believe that public and private transport differed much in this aspect. Environmental issues in the form of global warming were seen as being of medium importance but, again respondents did not believe that public and private transport differed greatly in this respect. The social status associated with using different forms of transport was viewed as less important and so this characteristic too is unlikely to act as an incentive or disincentive to using public transport. However, other characteristics, such as comfort, journey time, and the facility to travel at desired times were viewed both as being important and believed to be inferior for public transport. As a consequence, these characteristics may well be acting as disincentives for using public transport.

16. Discussion

The aims of the present study were to investigate school and university students' beliefs about the extent to which public transport showed certain characteristics, and to explore respondents' views about the importance of such characteristics. These two sets of data were then combined to illustrate which characteristics were both believed to be true and viewed as important, because such characteristics might act as incentives or, in the case of negative characteristics, disincentives to using public transport.

The most commonly believed characteristics of public transport were negative. Almost all of the respondents believed that journeys take longer by public transport, although many also acknowledged that the use of private vehicles has the disadvantage that finding a parking place for private cars takes time. The perception of lack of comfort when using public transport was also common, perhaps linked to the finding that the majority of respondents believed that public transport was crowded. Lack of convenience and the unreliability of timetables were also considered problematic. Furthermore, fewer than half of each group (school and university students) and believed that the use of public transport was cheaper than the use of private

vehicles for the whole family, possibly a consequence of the extremely low fuel prices in Oman. Perhaps surprisingly public transport in Oman was viewed as less safe than private transport. This is despite evidence to the contrary indicating that Oman, has the highest fatality rate in the Middle East and North Africa. This rate is believed to be largely attributable to an over-reliance on private transport (Belwal and Belwal, 2010). On a more positive note however, there seems to be little social stigma associated with using public transport in Oman because most students rejected the suggestion that it is more appropriate for less wealthy people. In terms of respondents' views about the importance of various characteristics, comfort, safety, reliability of timetables and short journey times were all viewed as important. Furthermore, these characteristics were even more important to female respondents.

When these two sets of data, beliefs about characteristics and views about their importance, were combined it was possible to identify those factors that may be acting as disincentives or incentives to using public transport. Thus, safety, comfort and journey times were all viewed as important, and believed to be inferior for travel by public transport. This situation also combined with convenience of travel in terms of reliability and frequency of public transport timetables, which were both viewed as important but believed to be of lower standard in public transport. Similar utilitarian factors concerning public transport have been identified in other countries (Tertoolen, Van Kreveld, and Verstraten, 1998; Van Lange, Van Vugt, Meertens, and Ruiter, 1998; Wardman, Hine, and Stradling, 2001, inter alia). Furthermore, these findings are paralleled by those revealed in surveys of customer satisfaction, which presumably reflects an informal mental combination of a perception of the extent to various characteristics apply to public transport and the importance attached to these characteristics. For example, in major European cities, safety, comfort, travel time and timetable frequency (the last two designated 'system' factors), are important factors in satisfaction with public transport (Fellesson and Friman, 2008). Car users in England give similar themes, comfort (in terms of personal space) and journey times, as motivators for using private transport (Gardner and Abraham, 2006). In Australia too, travel time, comfort and convenience rank highly as factors that people desire in public transport (Wainwright, 1998). Furthermore, car drivers' beliefs about longer travel times by public transport seem to affect choice about mode of transport in the Netherlands too (van Exel and Rietveld, 2010). Thus it appears that the disincentives to using public transport revealed

in the present Oman-based study with younger people are similar to those found in many other countries.

The characteristics above might be described as being egocentric, representing the convenience, comfort and safety of the individual, whereas other items on the questionnaire had a more ecocentric perspective. The majority of the respondents viewed it as important that personal transport did not exacerbate global warming, but only half of them believed that the use of public rather than private transport would ameliorate this environmental problem. In fact, public transport is regarded as contributing less to carbon emissions per passenger-mile than private transport and, for environmental reasons alone, it is necessary to encourage its use (Graham-Rowe, et al., 2011).

There were some differences in the responses of male and female students, with more females tending to believe ecocentric characteristics such as public transport having a lower impact on global warming, and more males tending to believe that private transport is required for carrying families and hobby equipment. More males also believed that public transport is for less fortunate people; it may be that males are more susceptible to the status aspect of cars. Males and females also differed in their views about the importance of characteristics. The tendency here was for more females to view comfort, short journey times and, more particularly, safety, punctuality and the ability to carry possessions as important. The last of these may be because females feel themselves more vulnerable on public transport (Department for Transport, undated).

The use of Cluster Analysis revealed that within this overall cohort there were subsets of respondents, not defined by demographic factors, but by their responses to the questionnaire items. In terms of belief about characteristics, one group of students were less positive about the characteristics of public transport than the other group, although both groups tended to believe negative characteristics. In an analogous manner, in terms of views about the importance of such characteristics, one group tended to view positive characteristics as more important than did the other group, although in both groups the majority of students viewed characteristics as important. It might be important in designing strategies for education for pro-environmental behaviour to appreciate that even populations that appear demographically homogenous, there are likely to exist subsets of people with different beliefs and views.

17. Environmental educational opportunities

In parts of Oman many of the problems of public transport are clearly structural and produce situational disincentives. For example, some regions of Oman lack public transportation systems for commuters and people either struggle for the few seats in shared taxis or depend on private cars. If politicians and policy-makers could work towards making public transport more reliable, more comfortable, and more rapid, such disincentives to the use of public transport would diminish (Beirao and Cabral, 2007; Eriksson, 2009; Gardner and Abraham, 2007). These disincentives require infrastructural solutions, and there is now evidence that the Omani government is turning its attention to improving public transportation (Belwal and Belwal, 2010).

In other cases, however, it may be that education can make a contribution to behaviour change, and a number of bodies in the business and education sectors within Oman are providing learning opportunities for sustainable development (Ambusaidi, 2011; Ambusaidi and Al-Rawahi, 2010). Previous work has shown that pro-environmental attitudes exert only a small (Anable, 2005, Collins, and Chambers, 2005; Gardner and Abraham, 2008, Tertoolen et al., 1998; Walton, Thomas, and Dravitzki, 2004) or even no influence on travel behaviour (Beirao and Cabral, 2007; Eriksson and Foward, 2011; Flamm, 2009), so encouragement of more pro-environmental attitudes will not inevitably lead to behaviour change. Although the connection is weak, however, an understanding of the importance of pro-environmental actions and the ways in which they can be effected may well pre-dispose people to behaviour change (Hungerford and Volk, 1990), and education can promote positive attitudes and develop students' understanding of sustainability issues, allowing individuals to make informed decisions (Bonnet, 2002). Given limited resources and curriculum time, it might be prudent to concentrate education on those factors that contribute to the present reluctance to use public transport. Such targeted education for sustainability will be most effective if based on an appreciation of the preconceptions and views of those to be educated; the aim of the present study was to reveal such beliefs and views about specific aspects public transport.

Respondents' agreements, or otherwise, as represented by the abscissa of Figure1, may be considered to be influenced by, amongst other things, the cognitive domain, whereas their views about the importance of various characteristics, represented by the ordinate of Figure 1, may be

considered to be in the affective domain. In terms of respondents' beliefs, it might be possible to persuade students that public transport offers some advantages in terms of safety and economy. In the case of the former, it might be possible to present to students evidence that public transport is a safe mode of personal transport in Oman (Belwal and Belwal, 2010). In the case of the latter, education could play a role in drawing students' attention to the full economic cost of private motoring. Even though the cost of buying and running private cars in Oman is low compared with many other countries, it may be that younger students, like adults in other countries (RAC, 2004; Wardman, Hine, and Stardling, 2001), are focused on the cost of fuel and are not immediately aware of some of the costs associated with running a car, such as depreciation and insurance. There is also an opportunity for project-based learning about the real situation concerning public transport in terms of timetables, journey times. Such enquiry-based learning could enhance a number of generally-applicable academic skills in students such as information acquisition, data display, analysis and interpretation, and logical argumentation. In more directly eco-centric terms, a proportion of students were apparently unaware that choices about personal transport impacted on global warming or perhaps had no understanding of the link between vehicle emissions and global warming. This opens possibilities of teaching exercises in which students are asked to explore, in more quantitative terms, the notion of 'carbon footprint', combined with the idea of a full life-cycle carbon cost. Thus, students could calculate the environmental cost in terms of carbon emission per kilometre for each person. The number of factors included in such a calculation could be adapted to the educational stage and academic background of particular groups of students.

Although it could be argued that formal education should be located primarily in the cognitive domain, teaching to improve students' appreciation of the serious and imminent environmental, social, financial and political consequences (IPCC, 1997, 2001, 2007) of a continuation in the rise of global warming might increase their views about the importance of reducing global warming. This might be made more specific by reference to effects related to Oman, such as the potential loss of biodiversity (Ministry of Environment and Climate Affairs, 2010). Furthermore, although such teaching must be handled with sensitivity, students could be made aware of the human and economic costs in terms of road traffic accidents involving private vehicles (Alwatan Newspaper, 2013; Belwal and Belwal, 2010).

In addition, we believe that discussion groups in which students share their existing beliefs about issues related to transport might be created. Given the different clusters revealed by this research, and the belief differences stemming from demographic factors such as gender and education levels, teachers might use this variety to engage students in meaningful discussions. For example, a small group discussion starting with the question, 'Does public transport help to reducing global warming?' and including parties such as two female more discerning public transport users and two male more discerning public transport avoiders might prove promising. The students could be asked to present their arguments using actual data, with other class members then encouraged to join the debate.

All of the respondents in this study were still in full-time education, either secondary or tertiary, and were in or approaching the age group that may consider purchasing their own vehicle. Thus they represent the up-coming generation of motorists. Children and young people are recognised as important groups for the development of a sustainable environment (Johnson, 1993), partly 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, Jucker and Martin (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. 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 public rather than private transport, that exacerbate such problems.

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Opinie omańskich uczniów i studentów dotyczące transportu publicznego: bodźce i antybodźce

Streszczenie

Globalne przesunięcie zachowań transportowych w kierunku transportu prywatnego oddziałuje na środowisko na wiele sposobów, miedzy innymi poprzez emisję spalin, która z kolei przyczynia się do ogromnego problemu globalnego ocieplenia i potencjalnych zmian klimatycznych. To sugeruje potrzebę poprawy strategii zachęcających do większego wykorzystania transportu publicznego. Celem niniejszego artykułu jest ustalenie, jakie właściwości transportu publicznego mogą powodować spadek jego popularności, a które mogą działać jako czynniki motywujące do jego większego wykorzystania. Aby jednak uwidoczniło się to zachęcające oddziaływanie, użytkownicy transportu muszą uwierzyć w pozytywne cechy transportu publicznego i uznać je za istotne. Z kolei negatywne cechy, które przeważnie są uważane za znaczące, zwykle stanowią środek odstraszający. Komfort, bezpieczeństwo i krótki czas podróży zostały przez badanych uznane za istotne, lecz także ich poziom za niski w odniesieniu do transportu publicznego. Co zaskakujące, w kraju, w którym nowe, duże i drogie samochody osobowe stanowią powszechność, status społeczny kojarzony z różnymi sposobami przemieszczania się postrzegano jako mniej ważny i tylko kilku respondentów wierzyło, że podróżowanie transportem publicznym jest społecznie kompromitujące. Pojawiły się pewne różnice w odpowiedziach respondentów płci męskiej i żeńskiej, ponieważ komfort, bezpieczeństwo oraz czas podróży liczyły się dla większej liczby kobiet aniżeli mężczyzn. Z ekocentrycznego punktu widzenia, mimo że wielu badanych potwierdzało wagę negatywnego oddziaływania transportu prywatnego na globalne ocieplenie, tylko połowa wierzyła, że transport publiczny może się w jakiś sposób przyczynić do zmniejszenia tego problemu. Wiele zagadnień dotyczących omańskiego transportu publicznego ma charakter strukturalny, jednak edukacja nadal może odgrywać dużą rolę w zachęcaniu do korzystania z transportu publicznego.

Słowa kluczowe: przekonania, zmiany klimatyczne, edukacja na rzecz środowiska, globalne ocieplenie, Oman, transport prywatny, transport publiczny, opinie