



## In the driving seat: psychosocial benefits from private motor vehicle transport compared to public transport

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### Abstract

The aim of current transport policy in the UK and many other developed countries is to reduce reliance on private motor vehicle transport in order to promote public health and reduce environmental degradation. Despite the emphasis in these policies on the unhealthiness of private motor car use, epidemiological studies have consistently shown that car access is associated with longevity and better health. We examine this paradox using a postal survey of adults in the West of Scotland ( $n = 2043$ ,  $m = 896$ ,  $f = 1147$ ) to investigate the psychosocial benefits associated with private and public motor vehicle transport. Those with access to a car appear to gain more psychosocial benefits (mastery, self esteem, and feelings of autonomy, protection, and prestige) than public transport users from their habitual mode of transport. Being a car driver conferred more benefits than being a passenger, except for self esteem which was only associated with driving among men. Self-esteem was also associated with type of car among men but not women. This study suggests that if people are to be encouraged to reduce private motor vehicle use, policies need to take into account some of the psychosocial benefits people might derive from such use.

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## 1. Introduction

### 1.1. *The car—health paradox*

There is a paradox in the relationship between private motor vehicle use and health. In transport and health promotion policy it is widely accepted that using cars for private transport is detrimental to the health both of the car user and to other people, leading for example to increased levels of obesity, road traffic accidents and pollution (Department of the Environment Transport & the Regions, 1998; McCarthy, 1999; Scottish Office, 1998).

However, in the field of social epidemiology it is consistently reported that access to a car is associated with lower mortality rates and better health (Davey Smith, Shipley, & Rose, 1990; Smith & Harding, 1997). A common response to such findings is that car ownership has no direct bearing on health, but is simply a marker for other characteristics related to health, in particular a proxy for material advantage or disadvantage, e.g.:

“For example, car ownership. . . is perhaps the best social correlate of health status. But no one would suggest that the reality of owning a car has much direct effect on health. Car ownership principally reflects income and this in turn a whole range of factors relating to access to resources and power” (Carr-Hill, Sheldon, & Thunhurst, 1992, p. 27).

It is true that car ownership is strongly associated with other measures of social or material advantage such as social class. For example, at the 1991 UK census, access to a car by the household was reported by 97% of those in occupational Social Class 1, decreasing to 59% in Social Class V. However, car ownership still predicts health within social class or other socio-economic strata. Studies have shown that after controlling for age, sex and socio-economic circumstances (such as housing tenure, social class or employment grade) people in car owning households have lower overall mortality (Smith & Harding, 1997), lower rates of long term illness, fewer symptoms, and better mental health (Gould & Jones, 1996; Macintyre, Ellaway, Der, Ford, & Hunt, 1998; Macintyre, Hiscock, Kearns, & Ellaway, 2001). Car ownership has also been shown to perform as well if not better than current income in predicting health (Benzeval, Judge, & Shouls, 2001).

Thus, on the one hand, transport and public health policy takes it as axiomatic that the health of car users and others might benefit from reducing car use, but on the other hand, epidemiological studies have shown that access to a car seems be associated with better health.

### 1.2. *Attachment to the car*

Despite a number of strategies in the UK to reduce car use and promote health enhancing and environment protecting public transport (Dora & Phillips, 2000), levels of car ownership are rising, and the number of trips made by car increasing (Department of the Environment Transport & the Regions, 2000). In Scotland, where the study reported here was conducted, between 1990 and 2000 road traffic on motorways and A roads (freeways and other major roads) increased

by 16%, the number of private cars licensed increased by 21%, and the number of local bus passenger journeys fell by around 30% (Scottish Executive, 2001).

The apparent reluctance of the population to give up car use, and the observed association between car access and better health and longer life expectancy, raises the question of what benefits people could derive from access to cars that could make them resistant to abandoning car use, and which might enhance health in some way. What could such benefits be?

Car use is seen to confer status (Jensen, 1999), provide the opportunity for personal control and autonomy (Marsh & Collett, 1986), and to display 'symbolic capital' (Farrington, Gray, & Martin, 1998). In comparison, public transport is often seen as lacking status, comfort and convenience (Hamilton, Jenkins, & Gregory, 1991; Root, Boardman, & Fielding, 1996; Stokes & Hallett, 1992). In a paper based on in-depth interviews with 43 adults in the West of Scotland, we have shown that although experiences of and attitudes towards car and public transport use varied by lifestyle and local circumstances, cars were seen to provide more physical and social protection, comfort, convenience, flexibility, self-actualisation, and affirmation of self-worth, than public transport (Hiscock, Macintyre, Ellaway, & Kearns, 2002). Since one barrier to reducing car use suggested by studies such as these might be the psychosocial benefits derived from car use, it seems important to try to understand more about how car use might benefit users. As has recently been noted, symbolic-affective motivation for car use has rarely been the focus of research (Steg, Vlek, & Slotegraaf, 2001).

Although there is much speculation in the literature about possible psychosocial benefits of car use, there is a lack of empirical data on this topic. This paper aims to redress this lack of information by examining what types of psychosocial benefits people might derive from different modes of transport. If those with access to a car do derive psychosocial benefits from car access and use, this might help to explain the observed association between access to cars and better health, since it is now widely accepted that psychosocial factors can contribute to physical health and longevity (Ceria et al., 2001; Hemingway, Malik, & Marmot, 2001; Marmot, 1999; Timio et al., 2001). If people do derive certain benefits from access to or use of private vehicle transport that they do not derive from public transport, a better understanding of these benefits and how they are achieved and distributed might help in the design of more successful strategies to promote public transport use.

The study on which this paper is based, a postal survey of adults in the West of Scotland, was specifically designed to examine relationships between housing tenure and car access on one hand, and health on the other. We have reported elsewhere on the associations in this study between car access and health (briefly, after controlling for age and social class, access to a car was significantly associated with fewer recent symptoms, better general health and less depression among men and women, and with limiting long standing illness among men but not women) (Macintyre et al., 2001).

Our aim in this paper is to extend this work by examining systematically the patterning of, and relationships between, measures of psychosocial advantage and use of private and public motor vehicle transport. (In the postal questionnaire constraints on space meant we were unable to include many details of walking, cycling or motor cycling as modes of transport, so we exclude consideration of those modes and only compare private car use with public vehicle transport use.) We also collected data on other issues connected with transport and daily life, such as mode of transport and time taken to get to work, health appointments and leisure pursuits, and these will be the focus of another paper.

We test the hypothesis that access to private motor vehicle transport is associated with more psychosocial benefits, which have been shown (or might be hypothesised) to promote health, than use of public transport (trains and buses).

Three subsidiary aims of this paper are, firstly, to assess whether any observed associations between car access and psychosocial characteristics differ between men and women. This is because some previous research suggests that there may be differences between the sexes in the social meaning and significance of cars and public transport, and also because we have found in this study that car access was associated with a lower probability of limiting longstanding illness in men but not women. There is a substantial body of evidence across a range of disciplines showing that not only do men use cars more than women (CarlssonKanyama & Linden, 1999), but they seem to find them more intrinsically interesting (CarlssonKanyama & Linden, 1999; Jones, Howe, & Rua, 2000; Suitor & Reavis, 1995; Worthy, Moorman, & Turner, 1999), and advertising for cars tends to target men and women differently (Wright & Egan, 2000).

Secondly, we wish to assess whether the individual tends to be the driver or passenger and if this has any effect on any observed associations between car access and psychosocial characteristics. Thirdly, we wish to assess whether the type of car has any effect on any observed associations between car access and psychosocial characteristics, since much advertising for particular makes and models of cars appeals to issues such as safety and/or status and 'image' (Wright & Egan, 2000).

## **2. Design and measures**

In 1997 a random sample of 6500 adults (17 and over) was drawn from the electoral roll in the eight local authority areas which comprise the Glasgow and Clyde Valley Structure Plan area in the West of Scotland. The estimated population in this area in 1998 was 1,918,380. The postal questionnaire generated 2838 completed responses, a response rate, after taking into account deaths and movers, of 50%, which is typical for this type of general population survey (Roberts & Pearson, 1993). 62.6% of respondents reported that they had access to a car or van in their household, a similar proportion to the 62% in the 1999 Scottish Household Survey (Scottish Executive, 1999). The question on household car access (which was identical to the 1991 and 2001 UK census question) was as follows: 'How many cars or vans are owned, or available for use, by one or more members of your household? Include company cars/vans if private use allowed and exclude vans used solely for carrying goods'.

As noted earlier, we asked respondents to state the mode of transport they mostly used in their daily lives to get to work, health appointments and leisure pursuits and 87.4% of those who reported having car access reported travel by car to these destinations (only 2.6% reported that they used public transport). Of those without household car access, only 3.5% reported car use to these destinations (49.2% reported using public transport).

In addition to this basic census question the postal questionnaire also included a number of questions about usual mode of transport (e.g., for work, shopping, leisure, socialising), time taken to travel to work, time spent in cars or public transport in a typical week, and about car access and use. We asked the number, value, age and make of cars in the household, and whether, if the respondent did have access to a car, he/she was usually the driver, usually a passenger, or about half and half the time driver and passenger. The makes and models of cars were coded using the

1998 MVRIS Market Segments, obtained from the Society of Motor Manufacturers and Traders Ltd. This classification is the industry standard in the UK and includes all makes and models available through dealers. Cars were grouped into nine segments: mini, supermini, lower medium, upper medium, executive, luxury saloon, specialist sports, dual purpose and multi purpose vehicle. We subsequently collapsed these nine categories into four groups (see Table 7) as numbers were very small in some instances (for example only two respondents reported having a luxury saloon car).

The postal questionnaire covered standard socio-demographic information such as household composition, occupation, age, and gender. In this analysis we focus only on those aged 70 or under, since after this age drivers have to certify that they are medically fit to drive. This left 2043 respondents (for whom we had no missing values on age, sex, social class and car access variables), of whom 70.7% ( $n = 1444$ ) reported access to a car or van in their household and 29.3% ( $n = 599$ ) reported no car access. Social class was based on the occupation of the respondent; or, if the respondent was not currently working, on the occupation of his/her spouse or on his/her last occupation. The Registrar General's classification of occupations was used (OPCS, 1990), and for the purposes of this paper these were grouped into social classes I and II; III non-manual; III manual; and IV and V.

We decided to use two existing measures of psychosocial advantage, self esteem (Rosenberg, 1965) and mastery (Pearlin, Lieberman, Menaghan, & Mullan, 1981), since these have been shown to be positively related to health (Dew et al., 1994; Rosenberg, Schooler, Schoenbach, & Rosenberg, 1995), and can on the basis of previous research be hypothesised to be related to car access and/or use.

We used the ten item Rosenberg's self-esteem scale (Rosenberg, 1965). The scale measures feelings about self worth and includes items such as: "I feel I am a person of worth, at least equal to others", "I feel I do not have much to be proud of", "all in all I'm inclined to think I'm a failure". Respondents are asked to respond to each item by ticking whether they strongly agree, agree, disagree or strongly disagree. Responses were scored 1–4, with higher scores always indicating higher self-esteem, and then summed (among our respondents the self-esteem scores ranged from 12 to 40 with a mean of 30.7 ( $SD = 5.2$ )).

We used the seven item measure of mastery (Pearlin et al., 1981) which measures an individual's self perceived capacity to control events, and includes items such as: "there is really no way I can solve some of the problems I have", "I often feel helpless in dealing with the problems of my life", "I can do just about any thing I really set my mind to do". Respondents were asked whether they strongly agree, agree, disagree or strongly disagree with each item. Responses were scored 1–4 so that higher scores always indicate higher mastery and then summed (among our respondents the mastery score ranged from 8 to 28 with a mean of 20.0 ( $SD = 3.4$ )).

The innovative measures we developed relate to the concept of ontological security, defined as "a long term tendency to believe that things are reliable and secure as opposed to threatening", and derived from the writings of Laing (1960) and Giddens (1991). For the purposes of the study we developed a measure of ontological security in relation to modes of transport. Previous work on ontological security has suggested that this may be enhanced through feelings of protection, control, and prestige (Dupuis & Thorns, 1998; Giddens, 1991; Laing, 1960). We developed a nine item scale informed by a literature review on the potential benefits of different housing tenures and (Hiscock, 2001) with four items relating to concepts of protection, three to control and two to

prestige (see Table 2 for a list of the statements and the way they are grouped into these three domains).

Respondents were invited to state whether they strongly agreed, agreed, neither agreed nor disagreed, disagreed, or strongly disagreed with each item. The scale was presented to respondents twice—once in relation to cars ('I feel I have privacy when I'm in a car or van', see Table 2) and once in relation to public transport ('I feel I have privacy when I travel by public transport', see Table 3). Responses to each item were scored 1–5 with higher scores indicating more benefit, and summed both within each domain, and across domains for overall ontological security scores. The internal consistency of the two overall security scales was reasonable (Cronbach's Alpha for security from cars = 0.80; security from public transport = 0.82).

Because we are interested in gender differences we present multivariate analysis separately for men and women. Because car access is patterned by age and social class (see below) we control for age and social class in multivariate models.

### 3. Results

Table 1 shows car access by socio-demographic characteristics of the sample (age is divided into quartiles for ease of presentation only). A higher proportion of males than females reported household access to a car (the percentages here are in both cases higher than the overall figure we described in the first paragraph of the methods section, because here they relate to those aged 70 or under). As one might expect, access to a car decreases with increasing age and with each successively lower social class group.

Mean scores for both mastery and self-esteem were statistically significantly higher for those with car access, for males as compared to females, and for higher social classes; mastery scores

Table 1  
Socio-demographic characteristics of the sample

	<i>n</i>	Car access (%)
<i>Gender</i>		
Males	896	73
Females	1147	69
<i>Age quartiles</i>		
18–34	499	77
35–43	486	76
44–56	511	73
57–70	547	57
<i>Social class</i>		
I/II	634	86
III non-manual	536	72
III manual	404	66
IV/V	469	52
All respondents	2043	71

were significantly higher among younger age groups, but self-esteem did not vary by age (data not shown). Controlling for age and social class, the mean mastery score among men was 20.5 (SE=0.2) for those with access to car, and 19.5 (SE=0.2) for those with no car access ( $F(1, 867) = 12.4, p < 0.001$ ); and among women the scores were 20.0 (SE=0.1) for those with access to car, and 18.9 (SE=0.2) for those with no car access ( $F(1, 1109) = 19.6, p < 0.001$ ).

Again controlling for age and social class, among men the mean self esteem score was 32.0 (SE=0.2) for those with access to car, and 29.6 (SE=0.3) for those with no car access ( $F(1, 845) = 35.4, p < 0.001$ ); and among women in the mean scores were 30.5 (SE=0.2) for those access to car, and 29.2 (SE=0.3) for those with no car access ( $F(1, 1078) = 12.6, p < 0.001$ ). Thus even taking into account socio-demographic characteristics that might be related both to car access and to mastery and self-esteem, scores on both psychosocial characteristics were higher among those with access to a car compared to those without access to a car. The strength of the association differed between men and women, being stronger among men for self-esteem and among women for mastery.

Table 2 shows the proportion of all respondents reporting that they strongly agreed or agreed with statements about deriving psychosocial benefits from travel by car, divided into those reporting access and those not reporting car access. For all items, those with car access were more likely to agree than were those without car access (though note that the difference was not

Table 2

Proportion of respondents reporting 'strongly agree/agree' with statements re car (or van) travel—all respondents

	Car access (%)	No car access (%)	Chi-square	df	$P^* <$
<i>Protection</i>					
I feel I have privacy when I'm in a car or van	79	60	68.7	4	0.001
I feel I can get away from stresses as I travel by car or van	49	43	6.1	4	0.193
I feel safe when I travel by car or van	71	52	55.5	4	0.001
I worry about the car or van I use having to be sold	13	7	71.4	4	0.001
<i>Autonomy</i>					
I can travel where I want, when I want by car or van	87	56	252.2	4	0.001
I feel in control when I travel by car or van	71	31	203.4	4	0.001
Travelling by car or van fits in well with the routine of my daily life	78	22	381.8	4	0.001
<i>Prestige</i>					
Most people would like a car or van like the one I usually use	36	23	27.9	4	0.001
When I travel by car or van it makes me feel I'm doing well in life	30	15	40.0	4	0.001

\* The  $p$  value here is given for the Chi-square statistic comparing those with and without car access across all five response categories.

statistically significant for getting away from stresses). Highest levels of agreement were registered for privacy, safety, and the three autonomy items.

Table 3 shows the proportion of respondents strongly agreeing or agreeing with the statements in relation to public transport. Two main observations are firstly that for those without car access, levels of agreement regarding these statements were lower in relation to public transport than in relation to private transport; and secondly that those without household car access, (and who travelled more frequently by public transport), were more likely to be positive about public transport than those with car access. Thus, although overall respondents report themselves as obtaining more of these psychosocial benefits from cars than from public transport, those who are regular users of a particular mode (private or public) are more likely than non-habitual users to be positive about it.

These findings were confirmed by an analysis using scores for total security from cars and public transport, and each sub-score, controlling for age and social class and looking at men and women separately (see Table 4). The highest security from transport scores are for those with access to a car about car transport; the lowest are about public transport by those with access to a car. Overall (data not shown) men tended to report higher security from cars than women, but scores for security from public transport did not differ between men and women with the

Table 3

Proportion of respondents reporting 'strongly agree/agree' with statements re public transport—all respondents

	Car access (%)	No car access (%)	Chi-square	df	$P^* <$
<i>Protection</i>					
I feel I have privacy when I travel by public transport	5	16	96.6	4	0.001
I feel I can get away from stresses as I travel by public transport	18	21	5.0	4	0.418
I feel safe when I travel by public transport	25	43	61.3	4	0.001
I worry about bus/train services being changed or dropped	31	46	41.2	4	0.001
<i>Autonomy</i>					
I can travel where I want, when I want by public transport	20	57	273.7	4	0.001
I feel in control when use public transport	6	24	123.5	4	0.001
Public transport times fit in well with the routine of my daily life	20	51	198.7	4	0.001
<i>Prestige</i>					
Most people would like to travel by the public transport that I use	10	26	65.1	4	0.001
When I travel by public transport it makes me feel I'm doing well in life	2	9	54.5	4	0.001

\*The  $p$  value here is given for the Chi-square statistic comparing those with and without car access across all five response categories.



Table 4

Mean scores (and standard errors) of ontological security from cars and from public transport by car access (controlling for age and social class) separately for males and females

Ontological security from cars	Car access (Mean, SE)	No car access (Mean, SE)	df	F	P <	Ontological security from public transport	Car access (Mean, SE)	No car access (Mean, SE)	df	F	P <
<i>Overall ontological security from cars</i>						<i>Overall ontological security from public transport</i>					
Males	33.7 (0.2)	28.8 (0.4)	1731	105.8	0.001	Males	23.8 (0.2)	26.2 (0.3)	1711	36.1	0.001
Females	33.1 (0.2)	29.7 (0.3)	1921	81.3	0.001	Females	23.6 (0.2)	25.6 (0.3)	1987	34.4	0.001
<i>Protection</i>											
Males	14.9 (0.2)	13.6 (0.2)	1739	32.1	0.001	Males	11.0 (0.1)	11.4 (0.2)	1722	4.1	0.042
Females	14.8 (0.2)	14.0 (0.2)	1935	21.7	0.001	Females	10.7 (0.1)	11.0 (0.1)	1997	2.0	0.157
<i>Autonomy</i>											
Males	12.2 (0.2)	9.4 (0.2)	1740	196.1	0.001	Males	7.6 (0.1)	9.3 (0.2)	1722	80.9	0.001
Females	11.8 (0.1)	9.7 (0.1)	1940	183.3	0.001	Females	7.7 (0.1)	9.3 (0.1)	1998	101.8	0.001
<i>Prestige</i>											
Males	6.6 (0.1)	5.9 (0.1)	1742	25.7	0.001	Males	5.2 (0.1)	5.6 (0.1)	1724	14.4	0.001
Females	6.4 (0.1)	6.0 (0.1)	1941	13.2	0.001	Females	5.2 (0.1)	5.4 (0.1)	1999	7.3	0.001

exception of the protection domain, on which women had lower scores than men (i.e., felt less protected).

Does it matter whether or not the respondent is usually the driver of any car to which he/she has access, as compared with usually being a passenger? Among those who ever used a car (which might include a hired car, or a lift provided by a friend or a relative), those who reported usually driving the car reported more benefits than the others on all items except worrying about the car or van having to be sold (Table 5). This suggests that it may not simply be the fact that the household owns private transport that may confer psychosocial rewards, but that being a driver confers more of these rewards (particularly in relation to privacy and autonomy). This is confirmed by an analysis (Table 6) which found that controlling for age and social class, those who were usually the driver had higher scores on the total ontological security from cars scale and each sub scale (protection, autonomy and prestige). This was found among both sexes but there was only an association between driver status and self-esteem for men, and there was no association between driver status and mastery for either sex.

Table 5

Proportion of respondents reporting 'strongly agree/agree' with statement re car or van travel by driving status

	Driver ( <i>n</i> = 884) (%)	Half and Half ( <i>n</i> = 223) (%)	Passenger ( <i>n</i> = 615) (%)	Chi-square	df	<i>P</i> * <
<i>Protection</i>						
I feel I have privacy when I'm in a car or van	82	68	68	77.5	8	0.001
I feel I can get away from stresses as I travel by car or van	51	39	46	52.4	8	0.001
I feel safe when I travel by car or van	73	64	60	91.1	8	0.001
I worry about the car or van I use having to be sold	14	8	11	53.2	8	0.001
<i>Autonomy</i>						
I can travel where I want, when I want by car or van	94	85	66	240.3	8	0.001
I feel in control when I travel by car or van	81	70	38	347.0	8	0.001
Travelling by car or van fits in well with the routine of my daily life	86	70	39	422.4	8	0.001
<i>Protection</i>						
Most people would like a car or van like the one I usually use	39	30	28	43.9	8	0.001
When I travel by car or van it makes me feel I'm doing well in life	30	24	24	30.2	8	0.001

\*The *p* value here is given for the Chi-square statistic comparing the three categories of driver status across all five response categories.

Table 6

Driver status and psychological benefit (means adjusted for age and social class) separately for males and females

	Usually the driver ( <i>n</i> = 884) (Mean, SE)	About half and half ( <i>n</i> = 223) (Mean, SE)	Usually a passen- ger ( <i>n</i> = 615) (Mean, SE)	df	<i>F</i>	<i>P</i> <
<i>Self-esteem</i>						
Males	32.2 (0.2)	31.2 (0.6)	30.1 (0.4)	2710	11.5	0.001
Females	30.7 (0.3)	30.2 (0.4)	30.0 (0.3)	2911	1.5	0.221
<i>Mastery</i>						
Males	20.6 (0.2)	20.4 (0.4)	20.0 (0.2)	2721	1.8	0.164
Females	20.1 (0.2)	20.1 (0.3)	19.7 (0.2)	2934	2.1	0.119
<i>Ontological security from cars</i>						
Total score						
Males	34.0 (0.2)	32.0 (0.6)	29.9 (0.4)	2721	46.9	0.001
Females	34.7 (0.3)	32.2 (0.4)	30.8 (0.2)	2912	71.6	0.001
<i>Protection</i>						
Males	15.0 (0.1)	14.5 (0.3)	14.0 (0.2)	2729	9.4	0.001
Females	15.3 (0.1)	14.3 (0.2)	14.2 (0.1)	2926	24.1	0.001
<i>Autonomy</i>						
Males	12.4 (0.1)	11.4 (0.2)	9.8 (0.2)	2730	111.5	0.001
Females	12.8 (0.1)	11.6 (0.2)	10.4 (0.1)	2931	147.9	0.001
<i>Prestige</i>						
Males	6.6 (0.1)	6.1 (0.2)	6.1 (0.1)	2732	11.2	0.001
Females	6.6 (0.1)	6.3 (0.1)	6.2 (0.1)	2932	11.8	0.001

Finally, for those with car access we examined type of car and whether that was associated with psychological benefit (Table 7). For all the psychosocial characteristics (except for mastery), men had higher mean scores the higher the prestige and more expensive the car. For women, however, type of car made no difference to mastery or self-esteem and although ontological security benefits were higher with higher prestige cars, these differences were not statistically significant.

#### 4. Discussion

This paper examined what types of psychosocial benefits people might derive from different modes of motor vehicle transport. Results indicated that those with household access to a car gain more psychosocial benefits from their habitual mode of transport than do those who are public transport users. This association remained after controlling for socio-demographic characteristics such as gender, age and social class known to be associated with these psychosocial variables.

Respondents who have access to a car or van were more likely to agree with statements relating to protection, autonomy and prestige gained from car travel than did users of public transport about the benefits of public transport. Most striking were those items relating to control, which may have some bearing on the better health reported by car owners, as it has been shown that having a sense of efficacy and power over one's environment is related to enhanced well-being (Bostock & Beck, 1993).

Table 7

Car type and psychological benefit (means adjusted for age and social class) separately for females

	A/B mini/super-mini (Mean, SE)	Lower medium (Mean, SE)	Upper medium (Mean, SE)	Executive/luxury (Mean, SE)	df	<i>F</i>	<i>P</i> <
<i>Mastery</i>							
Males	20.0 (0.3)	20.7 (0.2)	20.8 (0.3)	21.2 (0.5)	3559	1.8	0.137
Females	20.0 (0.3)	19.8 (0.2)	20.3 (0.3)	20.3 (0.5)	3657	0.7	0.566
<i>Self-esteem</i>							
Males	31.3 (0.4)	31.9 (0.3)	32.5 (0.4)	33.2 (0.6)	3550	2.7	0.046
Females	30.3 (0.4)	30.2 (0.4)	30.6 (0.4)	30.1 (0.7)	3640	0.3	0.823
<i>Ontological security from cars</i>							
Total scores							
Males	32.5 (0.4)	33.6 (0.3)	34.1 (0.4)	35.5 (0.6)	3558	6.1	0.001
Females	33.0 (0.3)	33.0 (0.29)	33.0 (0.4)	34.2 (0.6)	3647	1.2	0.306
<i>Protection</i>							
Males	14.5 (0.2)	14.9 (0.2)	15.1 (0.2)	15.4 (0.3)	3562	2.7	0.045
Females	14.6 (0.2)	14.8 (0.2)	14.7 (0.2)	15.4 (0.3)	3654	1.7	0.160
<i>Autonomy</i>							
Males	11.7 (0.2)	12.1 (0.1)	12.2 (0.1)	12.9 (0.2)	3562	5.4	0.001
Females	12.0 (0.1)	11.8 (0.1)	11.8 (0.2)	12.3 (0.3)	3656	1.7	0.174
<i>Prestige</i>							
Males	6.3 (0.1)	6.5 (0.1)	6.7 (0.1)	7.2 (0.2)	3563	5.3	0.001
Females	6.3 (0.1)	6.4 (0.1)	6.5 (0.1)	6.6 (0.2)	3656	0.9	0.398
<i>No. males</i>	123	221	185	56			
<i>No. females</i>	197	261	175	51			

There are several caveats relating to our findings. We do not, for example, have an overall ontological security score relating to life in general; only what people might gain from their form of transport. It may that people may gain psychosocial benefits from other areas of their lives that may ameliorate any disbenefits they might suffer in relation to transport. An important caveat is that our data are cross-sectional, and it may be that individuals with higher esteem and mastery are more likely to obtain and use cars. We did not develop ontological security scales in relation to walking or cycling and have not been able to examine here psychosocial benefits from these modes of transport.

People seem to receive ontological security benefits more from cars than from public transport and this may help to explain people's resistance to giving up private transport. Autonomy (control, flexibility, convenience) is particularly important for both sexes; protection is particularly important for women, and prestige more so for men. Thus, the study indicates that cars have a different significance for men and women, feeding into different meanings in terms of potential psychosocial benefits. Men's self-esteem is more strongly related to car access than women's; on the other hand, for women, mastery was more closely related to car access, emphasising perhaps the practical rather than the symbolic importance of cars in women's lives. This difference in the role of cars is further reflected in the findings that car type is associated with psychosocial benefits for men but not for women.

Both car type (see Table 7) and driver status (see Table 6) are more associated with psychological characteristics among men than women. It would be wrong, however, to necessarily assume that cars can benefit men more than women in terms of psychological health and overall well-being. The overall gain in ontological security to be derived from transferring from a position of 'no car access/public transport user' to 'car access' is the same for men and women (see Table 4). However, the domains in which psychosocial gains can be greatest from this change in transport status are different according to gender: the gain in autonomy is greater for men than for women, indicating the significance of cars among men for control and convenience; on the other hand, the gain in protection as one moves from reliance on public transport to car use is greater for women than men, indicating the importance of safety and privacy and perhaps how these benefits may be harder to derive from public transport in the case of women.

Our findings indicate that that one cannot simply assume that car access is associated with better health only because it reflects material assets, (Carr-Hill et al., 1992), since we have controlled for occupational social class. In our study we have shown that car ownership is associated with more favourable psychological characteristics, and there is increasing evidence that psychosocial factors are important for health (Marmot, 1999; Timio et al., 2001). In further papers we will examine whether car access and use is associated with more practical costs and benefits (financial outlay, time taken to destination, convenience, etc.).

In conclusion, the environmental imperative to decrease car usage and encourage modal shifts to public transport requires an understanding of the perceived benefits and disbenefits of different forms of transport. Our study suggests that people with car access may experience more protection, autonomy, prestige, self-esteem and mastery than do users of public transport as it is currently configured in the United Kingdom. One policy implication is that if car use is to be reduced and travel by public transport increased then public transport has to be made a more attractive, convenient and prestigious option which tries to incorporate some of the benefits that people derive from travel by car; or that car access and use has to be made less attractive or psychosocially advantageous.

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## References

- Benzeval, M., Judge, K., & Shouls, S. (2001). Understanding the relationship between income and health: how much can be gleaned from cross-sectional data? *Social Policy and Administration*, 35(4), 376–396.
- Bostock, J., & Beck, D. (1993). Participating in social enquiry and action. *Journal of Community & Applied Social Psychology*, 3, 213–224.
- CarlssonKanyama, A., & Linden, A. (1999). Travel patterns and environmental effects now and in the future: implications of differences in energy consumption among socio-economic groups. *Ecological Economics*, 30(3), 405–417.
- Carr-Hill, R., Sheldon, T., & Thunhurst, C. (1992). The politics of deprivation indices and health. In N. Spencer, & H. Janes (Eds.), *Uses and abuses of deprivation indices*. University of Warwick.

- Ceria, C., Masaki, K., Rodriguez, B., Chen, R., Yano, K., & Curb, J. (2001). The relationship of psychosocial factors to total mortality among older Japanese-American men: the Honolulu heart program. *Journal of the American Geriatrics Society*, 49(6), 725–731.
- Davey Smith, G., Shipley, M., & Rose, G. (1990). Magnitude and cause of socioeconomic differentials in mortality: further evidence from the Whitehall Study. *Journal of Epidemiology and Community Health*, 44, 265–270.
- Department of the Environment Transport and the Regions. (1998). *A new deal for transport: better for everyone*.
- Department of the Environment Transport and the Regions. (2000). *National travel survey: 1997/99 update*.
- Dew, M., Simmons, R., Roth, L., Schulberg, H., Thompson, M., Armitage, J., & Griffith, B. (1994). Psychosocial predictors of vulnerability to distress in the year following heart-transplantation. *Psychological Medicine*, 24(4), 929–945.
- Dora, C., & Phillips, M. (2000). Transport, environment and health. WHO regional publications. European Series No. 89. Copenhagen, World Health Organisation.
- Dupuis, A., & Thorns, D. (1998). Home, home ownership and the search for ontological security. *Sociological Review*, 46(1), 24–47.
- Farrington, J., Gray, D., & Martin, S. (1998). Rural sustainability and the fuel price escalator. *Town and Country Planning*, 67(11), 370–371.
- Giddens, A. (1991). *Modernity and self identity: self and society in the late modern age*. Cambridge: Polity Press.
- Gould, M. I., & Jones, K. (1996). Analyzing perceived limiting long-term illness using UK census microdata. *Social Science & Medicine*, 42(6), 857–869.
- Hamilton, K., Jenkins, L., & Gregory, A. (1991). *Women and transport: bus deregulation in West Yorkshire*. Bradford: University of Bradford.
- Hemingway, H., Malik, M., & Marmot, M. (2001). Social and psychosocial influences on sudden cardiac death, ventricular arrhythmia and cardiac autonomic function. *European Heart Journal*, 22(13), 1082–1101.
- Hiscock, R. (2001). *The relationship between housing tenure and health: does ontological security play a role?* Ph.D. thesis, University of Glasgow Thesis.
- Hiscock, R., Macintyre, S., Ellaway, A., & Kearns, A. (2002). Means of transport and ontological security: do cars provide psychosocial benefits to their users? *Transportation Research D: Transport and the Environment*, 7, 119–135.
- Jensen, M. (1999). Passion and heart in transport—a sociological analysis on transport behaviour. *Transport Policy*, 6(1), 19–33.
- Jones, M., Howe, A., & Rua, M. (2000). Gender differences in students' experiences, interests, and attitudes toward science and scientists. *Science Education*, 84(2), 180–192.
- Laing, R. (1960). *The divided self*. London: Tavistock.
- Macintyre, S., Ellaway, A., Der, G., Ford, G., & Hunt, K. (1998). Are housing tenure and car access simply markers of income or self esteem? A Scottish study. *Journal of Epidemiology and Community Health*, 52(10), 657–664.
- Macintyre, S., Hiscock, R., Kearns, A., & Ellaway, A. (2001). Housing tenure and car access: further exploration of the nature of their relationships with health in a UK setting. *Journal of Epidemiology and Community Health*, 55(5), 330–331.
- Marmot, M. (1999). Importance of the psychosocial environment in epidemiologic studies. *Scandinavian Journal of Work Environment and Health*, 25, 49–53.
- Marsh, P., & Collett, P. (1986). *Driving passion: the psychology of the car*. Boston: Faber and Faber.
- McCarthy, M. (1999). Transport and health. In M. Marmot, & R. Wilkinson (Eds.), *Social determinants of health*. Oxford: Oxford University Press.
- OPCS. (1990). *Classification of occupations and coding index*. London: HMSO.
- Pearlin, L., Lieberman, M., Menaghan, E., & Mullan, J. (1981). The stress process. *Journal of Health and Social Behaviour*, 22(December), 337–356.
- Roberts, H., & Pearson, J. (1993). Impact of a postcard versus a questionnaire as a first reminder in a postal lifestyle survey. *Journal of Epidemiology and Community Health*, 47, 334–335.
- Root, A., Boardman, B., & Fielding, W. (1996). *The costs of rural travel*. University of Oxford.
- Rosenberg, M. (1965). *Society and the adolescent self image*. Princeton, NJ: Princeton University Press.
- Rosenberg, M., Schooler, C., Schoenbach, C., & Rosenberg, F. (1995). Global self esteem and specific self esteem—different concepts, different outcomes. *American Sociological Review*, 60(1), 141–156.

- Scottish Executive. (1999). *Scottish household survey quarterly bulletin no. 1*. Edinburgh: Scottish Executive.
- Scottish Executive. (2001). *Scottish transport statistics no. 20*.
- Scottish Office. (1998). *Travel choices for Scotland. The Scottish integrated transport white paper*.
- Smith, J., & Harding, S. (1997). Mortality of women and men using alternative social classifications. In F. Drever, & M. Whitehead (Eds.), *Health inequalities*. London: Office for National Statistics.
- Steg, L., Vlek, C., & Slotegraaf, G. (2001). Instrumental-reasoned and symbolic-affective motives for using a motor car. *Transportation Research Part F*, 4, 151–169.
- Stokes, G., & Hallett, S. (1992). The role of advertising and the car. *Transport Reviews*, 12(2), 171–183.
- Suitor, J., & Reavis, R. (1995). Football, fast cars and cheerleading—adolescent gender norms. *Adolescence*, 30(118), 265–272.
- Timio, M., Saronio, P., Verdura, C., Schiaroli, M., Timio, F., & Monarco, C. (2001). A link between psychosocial factors and blood pressure trend in women. *Physiology and Behaviour*, 73(3), 359–363.
- Worthy, J., Moorman, M., & Turner, M. (1999). What Johnny likes to read is hard to find in school. *Reading Research Quarterly*, 34(1), 12–27.
- Wright, C., & Egan, J. (2000). De-marketing the car. *Transport Policy*, 7, 287–294.