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Affective appraisals of the daily commute: comparing perceptions of drivers, cyclists,  
walkers and users of public transport

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## Abstract

To date most research on travel behavior has been limited to studying utilitarian appraisals of travel mode choice. Studies on affective experiences are usually limited to commuter stress. Moreover, most studies focus on the use of a private car or public transport only. A survey among 389 University employees revealed that in support of previous research car commuters find their journey more stressful than other modes users. The main sources of this stress are delays and other road users. Although users of public transport also ‘complain’ about delays this does not necessarily result into stress but also into boredom. Walking and cycling journeys are the most relaxing and exciting and therefore seem the most optimum form of travel from an affective perspective. The affective appraisals of the daily commute are related to various instrumental aspects, such as journey time. However, they are also related to general attitudes towards various travel modes independently of such instrumental factors. These findings have implications for sustainable transport policy initiatives which aim to persuade people to abandon their car.

## Introduction

Behavioral research on travel mode choice to date has principally focused on examining instrumental cognitive appraisals of private car use and public transport, or the affective travel experience with an emphasis on commuter stress as experienced by drivers and users of public transport. There has been comparatively little research examining the positive as well as the negative affective experiences of different mode users. This is a significant shortcoming in the research literature as affective experiences can have an important impact upon people's overall attitudes towards a particular experience and therefore may influence their future behavioral intentions (Eagly, Mladinic & Otto, 1994). Moreover, most of the research to date has been limited to comparing private car use and public transport only. No comparisons have been made between these groups and commuters who walk or cycle. Research on people's experiences of using different travel modes can be divided into two categories: those studies undertaken by environmental psychologists which focus on drivers and users of public transport, and those undertaken by health-psychologists which focus on walkers and cyclists. From a sustainable transport policy perspective, which aims to persuade people to use their car less and other modes more often, limited comparisons will only provide a partial insight into the reasons why people prefer certain travel modes over others and how they can be persuaded to change their choices.

The present study seeks to address these shortcomings by examining how people feel when they travel to and from work and what factors contribute to the affective appraisals of their daily commute. Moreover, we discuss the extent to which such affective evaluations are related to other journey attributes such as journey distance and time, and how they are related to general attitudes towards their travel mode choice. Drawing on the theory of affect proposed by Russell and Snodgrass (1987), who have defined affective appraisals in terms of

attributing an affective quality to a thing, event or place, the focus of this paper will be on the affective appraisals of a commuting journey.

Between the mid 1980s and the late 1990s the average distance people commuted to work in the UK increased by 32% from 6.1 miles to 8.1 miles (DLTR, 2001). Approximately 61% of commuters in England and Wales now travel to work by car, 10% walk, 14% travel by bus, metro or train and 3% cycle (ONS, 2003). However, in the more affluent parts of the UK such as the South East the number of people traveling to work by car rises to 65%, with approximately 10% walking, 10% using the bus, metro or train and 3% cycling (ONS, 2003).

Attention is typically drawn to the negative effects of car use such as driving stress caused through congestion, speed and general over-stimulation, and acute poor health caused through air pollution (Godlee & Walker, 1992). There are, however, also positive effects such as improved accessibility, speed, and control over our lives. The possession and use of a car is positively related to psychological factors such as mastery and self-esteem (Ellaway, Macintyre, Hiscock & Kearns, 2003). Moreover, the use of a car can enhance feelings of autonomy, protection and prestige, whereas this is not the case for public transport. Steg, Vlek & Slootegraaf (2001) demonstrated by means qualitative non-obtrusive research methods that car users find their cars attractive not only because of their instrumental advantages (e.g., flexibility, cost and speed) but also for affective-symbolic reasons (e.g., driving thrill, excitement, feelings of power and status). Mokhtarian & Salomon (2001) even suggest that travel may have a positive utility of its own which is not necessarily related to the instrumental factor of reaching a destination. The phenomenon of 'taking the car out for a spin' is one of the best examples of this. The study of non-instrumental affective and symbolic costs and benefits of travel behavior, however, is limited. Most studies comparing evaluations of different travel modes focus on the cognitive beliefs people hold about

different travel modes. These studies have typically found that when people are asked why they use cars as opposed to other modes of transport they refer to the advantages of cars in terms of costs, flexibility, convenience, travel time and protection against the weather (e.g., Bamberg & Schmidt, 2001; Fujii, Gärling, Kitamura, 2001; Verplanken, Aarts, Van Knippenberg & Van Knippenberg, 1994; Van Lange, Van Vugt, Meertens & Ruiters, 1998). On the other hand, people indicate that they walk or cycle for reasons such as health, the enjoyment of doing so, the environment and costs (Hopkinson & Wardman, 1996). Research has shown that the use of more sustainable transport modes such as walking, cycling or the use of public transport is related to environmental awareness as well as social and personal norms (Nilsson & Küller, 2000; Joireman, Van Lange, Van Vugt, Wood, Leest & Lambert, 2001; Hunecke, Bloebaum, Matthies & Hoeger, 2001; Matthies, Kuhn & Kloeckner, 2002). According to Stradling (2002) making transport choices involves reconciling the anticipated demands of a journey with the physical (e.g., walking and waiting), cognitive (e.g., route planning and navigation) and affective (e.g., uncertainty) resources available to the traveler. Wardman, Hine & Stradling (2001) showed that bus travel is perceived to be more taxing and especially emotionally taxing than car use, largely because of the necessary interchanges.

Until now research that has specifically examined the affective elements of a journey has been limited to studying commuter stress. For instance, Schaeffer et al (1988) and Stokols, Novaco, et al (1978) showed that as traffic congestion increases people report more negative affect. Whether these people also report less positive affect is not clear. Clearly, the daily commute can be stressful and tiring (Evans, Wener & Philips, 2002; Koslowsky, Kluger & Reich, 1995). However, it can also provide an opportunity to read, to be alone, to daydream and fantasize or to unwind after a day at the office. This may be the one time in the day when individuals have any time to themselves, where no demands are being made upon them by others; it becomes 'their time'. Very little research has examined both the positive

and negative *affective* experiences of commuters and how these experiences are related to mode choice.

Affect ought to be an important consideration in examining commuter travel mode choice. Firstly, it is likely that people prefer a positive commuting experience and therefore gravitate to the travel mode most likely to provide that experience. Secondly, affect has been shown to be important for the formation of attitudes and may therefore indirectly influence intentions and behaviors (Eagly, Mladinic & Otto, 1994). Steg (2004) examined the affective experience of using the car for commuting journeys. She found that the more positively the affective experience of driving or being a car passenger was rated, the more often the car was used. She also found that respondents used their cars less often when car use was perceived as stressful.

From a policy perspective it is also important to know the sources of commuter experiences. Research to date on the factors which influence commuter affect largely comes from studies on commuter stress. These studies have either examined the factors causing such stress or the factors which may moderate stress. The most common sources of stress for car users found in these studies are the behavior of other road users (e.g., Gulian et al, 1989; Rasmussen, Knapp & Garner, 2000) and delays (e.g., Koslowsky & Krausz, 1993; Stokols et al, 1978; Schaeffer et al, 1988; Novaco, Stokols & Milanese, 1990). For users of public transport the most common sources of stress are unpredictability (e.g., Evans et al, 2002) and travel time (e.g., Wener, Evans, Philips & Nadler, 2004). An important mediator of stress is perceived control (Evans & Carrere, 1991), although Schaeffer et al (1988) showed that increased control in terms of route choice increased commuting stress levels: control over the indoor environment of the car (i.e., driving alone versus car sharing) was related to lower stress levels. Parson et al (1998) showed that roadside aesthetics can have a mediating effect

on stress. Drottenborg (1999) found that in an environment that is aesthetically pleasing, drivers' speeds are significantly reduced.

Unfortunately, as with research on the cognitive evaluation of travel behavior, studies on driving stress have been limited to comparing drivers and users of public transport only. This study seeks to address this shortcoming and compares the affective appraisals of the daily commute of walkers, cyclists, car users and users of public transport, thereby focusing on positive as well as negative affect. The research explores what people see as the main sources of positive or negative affect when they use different travel modes for their journey. Moreover, to what extent are affective evaluations of a journey related to other more instrumental journey attributes such as commuter time and distance as well as the perceived effort in making a journey? To what extent are affective evaluations of a person's daily commute by a particular travel mode related to their general attitude towards that travel mode as well as behavioral intentions? How does this compare in salience to the other cognitive predictors of attitudes and intentions such as the difficulty in using each mode and the expected physical, cognitive and affective effort involved in making the journey by this mode?

## Questionnaire

In October 2000 an e-mail was sent to all staff at the University of Surrey informing them about and inviting them to participate in the study. The questionnaire was available on the University's website and could be completed on-line. After two weeks a reminder e-mail was sent to all University employees.

The complete questionnaire consisted of 11 sections and took about 45 minutes to complete. Five sections (on car attitudes, on cycling, on a specific cycle route in the study area, on the university's transport plan and on the fuel crisis in September 2000) were not

relevant for this paper. The remaining sections asked respondents to provide information on their commute; travel mode, time and distance. Affective appraisals of the commute were measured by asking respondents to indicate on a 5-point Likert-type scale, based on the two-dimensional model of affect proposed by Russell & Lanius (1984), to what extent their journey to work is usually stressful, exciting, boring, relaxing, pleasant, and depressing. Six items were selected from the four quadrants of the two-dimensional model (2 pleasant and arousing, 1 pleasant and not arousing, 1 unpleasant and arousing and 2 unpleasant and not arousing) as well as one item measuring the pleasure dimension. Next respondents were asked what is the most pleasant and the most unpleasant thing that they regularly encounter when they travel to/from work. In the following section respondents were asked how much physical, cognitive and affective effort would be involved in making their usual journey to work for each of six travel modes (driving ones own car, sharing a car, cycling, bus, train and walking). After that they were asked how often they use each of these modes, to what extent they would like to use each mode, how difficult it is or would be for them to use each mode for their daily commute, and how likely it is they would use the mode in the future. Five-point scales were used for all these items. In the context of the theory of planned behavior (Fishbein and Ajzen, 1975) these questions sought to measure general use, attitude, perceived behavioral control and intentions. The last section of the questionnaire collected demographic information.

On a scale from 1 (not at all) to 5 (very) the respondents rated the questionnaire not very difficult ( $M = 1.44$ ,  $SD = 0.74$ ), average to quite interesting ( $M = 2.86$ ,  $SD = 1.02$ ) and average to quite long ( $M = 2.69$ ,  $SD = 1.06$ ).

## Respondents

A total of 389 questionnaires were completed (a response rate of 28%). On average, the respondents had worked at the University for eight years (ranging from a few months to 40 years). The respondents lived in a variety of household situations: 16% were single, 3% were single with children, 36% were couples with no children, 31% were couples with children and 14% lived in another type of household (mainly sharing with other adults). The mean age of the respondents was 41 (ranging from 19 to 64 years). There were slightly more women (51%) than men. Predictably, given the high educational qualifications of a large proportion of the respondents, the sample is not representative of the UK population. Transport statistics for the area are already somewhat different than for the rest of the UK. Moreover, the university has its own transport policy which has strongly impacted upon the travel mode choices of its employees. For instance, people who live within the two closest postal (zip) code areas are not allowed a parking permit (i.e., within approximately a 2 – 3 mile radius). Due to the selection procedure and the low response rate the sample is also unlikely to be totally representative for the University population, which should be taken into account when interpreting the findings.

## Results

Most respondents usually traveled to work by car; 42% of the respondents drove alone and 14% drove with others. This is considerably less than the national (61%) or regional (65%) average. A total of 16% of the respondents walked to work, again considerably higher than the national (10%) and regional average (10%). Another 13% used public transport (6% traveled by bus and 7% by train) which is 2% higher than the national average. About 11% of the respondents cycled (national average, 3%). Walking and cycling were the most popular options for people who lived within 2.5 miles of the University, which is probably partly due

to the fact that a large number of these people are excluded from acquiring a parking permit. Cars and public transport were more often used for longer distances (8 – 108 miles), although 24% of those who lived between 1.0 and 2.5 miles from the university drove to work by car.

For further analyses in this paper no distinction is being made between different modes of public transport or between people who travel alone versus those who travel with others. Only four groups (i.e., walk, cycle, car, public transport) are distinguished in order to ensure reasonable group sizes.

On average, the respondents evaluated their journeys fairly positive; they found their journey not very stressful ( $\bar{x} = 2.16$ ,  $SD = .95$ ; 1 = not at all stressful, 5 = very stressful), not at all exciting ( $\bar{x} = 1.53$ ,  $SD = .74$ ), a little boring ( $\bar{x} = 2.53$ ,  $SD = 1.14$ ), a little relaxing ( $\bar{x} = 2.47$ ,  $SD = 1.04$ ), a little pleasant ( $\bar{x} = 2.80$ ,  $SD = .96$ ), not very interesting ( $\bar{x} = 2.19$ ,  $SD = .99$ ) and not very depressing ( $\bar{x} = 1.76$ ,  $SD = .99$ ).

The relationship between the affective appraisals of the daily commute and travel mode use was examined by means of discriminant analysis which identifies those variables that best discriminate the four commuter groups. With this analysis we tried to predict the mode of transport used for commuting from the respondents' affective appraisals of their journey to work.

--Figure 1 about here ----

The analysis revealed two significant discriminant functions (Figure 1). The first function, represented by the horizontal axis in Figure 1 explains 70% of the variance ( $\chi^2 = 71.11$  (9),  $p < .001$ ). It distinguishes people who feel relaxed when traveling to work *versus* people who feel stressed when traveling to work. Figure 1 suggests that people who find their journey relaxing are more likely to be walkers or cyclists, whereas people who perceive their

journey to be stressful are more likely to be car users. The second function, represented by the vertical axis in Figure 1, explains 18% of the variance ( $\chi^2 = 19.72$  (7),  $p < .01$ ). It distinguishes people who find their journey depressing and boring from people who find their journey exciting; the first are more likely to be users of public transport, the latter are more likely to be walkers, drivers and especially cyclists. The scores of each respondent on these two dimensions were saved for further analyses.

When respondents were asked about their most pleasant and unpleasant experiences during their daily commute journey most people mentioned at least one feature. Eighteen respondents (4.6%) did not report anything unfavorable. Fifty respondents (12.9%) did not report anything good about their journey.

A content analysis was undertaken to code the respondents' answers into meaningful categories. To ensure large enough group sizes for further analyses a specific category was only created when something was mentioned by at least 40 respondents. For the most unpleasant experiences three categories were created referring to the respondent's experiences: danger (e.g., being cut-off by other drivers, crossing dangerous roads, walking along dark unlit paths), delays (e.g., traffic queues, waiting for buses or trains) and inconveniences other than delays (e.g., narrow roads, encountering noisy, smelly people). Interestingly all these aspects appeared to refer to potential sources of negative arousal or stress. Three categories were created describing the causes of these experiences: traffic (e.g., traffic volume, queues, accidents), others road users (e.g., dangerous driving), transport provisions (e.g., unsafe cycle paths, bad road planning, bad bus services). Most respondents, but not all, mentioned both experience and cause (Table 1).

For the most pleasant experiences most people merely referred to the causes of pleasant experiences (Table 2). Five categories were created: scenery, listening to music or

reading, flexibility (not being stuck in traffic), the presence and behavior of others and the mere enjoyment of the travel activity (I like cycling, walking etc).

A series of Chi-square tests were undertaken to assess how the sources of pleasure and displeasure varied between users of various transport modes (Tables 1 and 2). Table 1 shows that danger was especially a worry for cyclists and pedestrians. Fewer car users worried about safety and no public transport users. Delays were particularly salient issues for public transport users and drivers, whereas inconvenience was an issue for pedestrians and cyclists. The most unpleasant experience for drivers also tended to be related to traffic queues. For cyclists unpleasant experiences were mainly caused by other road users and for public transport they were mainly related to provisions. For pedestrians, the main sources of displeasure were provisions (overgrown, unlit paths and a lack of safe crossings) and the sheer volume of traffic causing noise, pollution and danger.

--Insert Table 1 about here ---

--Insert Table 2 about here ---

The most pleasant experiences of respondents did not vary as much between different mode users as the most unpleasant experiences (Table 2). Beautiful scenery was relevant for all commuters. Users of public transport and drivers were more likely to mention music and literature as sources of pleasure, and cyclists and pedestrians were more likely to say that they simply enjoyed the activity itself.

Table 3 shows that walkers and cyclist traveled much less far in distance than drivers or users of public transport; the latter spend by far the most time traveling. Even though their travel distance was similar to that of car commuters, public transport users' journeys took nearly 20 minutes longer than that of car drivers. Not surprisingly therefore, users of public

transport were more likely to feel that their journey took too long. Table 3 also shows that walkers and cyclists felt that their journeys involved significantly more physical effort than drivers and users of public transport. Cognitive effort was seen to be highest for journeys by public transport. Affective effort was significantly lower for journeys on foot than any of the other journeys. The perceived difficulty of making the journey did not vary between the respondents, perhaps because, for each journey, difficulty is related to other factors, as the analysis of effort would suggest. Users of public transport had a less positive attitude towards their own travel mode than did walkers or cyclists. Finally, no differences were found between mode users in their intentions to use their travel mode (again) in the future. Most of the respondents (84%) indicated they would use their mode again.

--Insert Table 3 about here ---

Correlations between the affective and cognitive appraisals of the daily commute revealed that the stressfulness of a journey was positively correlated with travel distance ( $r = .34, p < .001$ ), travel time ( $r = .29, p < .001$ ) and perceived travel time ( $r = .29, p < .001$ ). Moreover, the more stressful respondents rated their daily commute, the more likely they were to say that their journey involved some cognitive effort ( $r = .14, p < .01$ ) as well as some affective effort ( $r = .23, p < .01$ ); they were less likely to say that their journey involved physical effort ( $r = -.23, p < .01$ ). Finally, the more difficult (i.e., less easy) a journey was perceived to be, the more stressful it was perceived to be ( $r = -.39, p < .01$ ). The extent to which a journey was experienced as exciting or boring was, to some extent, also related to actual travel time ( $r = .16, p < .01$ ) but not to travel distance ( $r = .09, p < .05$ ). It was equally strongly related to perceived travel time ( $r = .24, p < .001$ ). It seems that long journeys are not necessarily more boring, but boring journeys are perceived to take longer. The perceived

excitement of a journey was not related to perceived effort or difficulty. As there was very little variance in the questionnaire item measuring intention no significant correlations were found between affect and intentions.

A regression analysis was employed to attempt to explain people's general attitude towards their usual travel mode from their cognitive and affective evaluations. Due to small numbers it was not possible to conduct separate analyses for each travel mode. Some 26% of the variance in people's overall attitude towards their travel mode could be explained ( $F = 22.95(6,362)$ ,  $p < .001$ ), with the best predictor being the perceived ease of use ( $\beta = .37$ ,  $p < .001$ ). The easier people find it to use their travel mode, the more likely they are to evaluate it positively. Moreover, the less cognitive ( $\beta = -.12$ ,  $p < .05$ ) and emotional ( $\beta = -.11$ ,  $p < .05$ ) effort people felt to be involved in making a journey, the more positive their attitude towards that mode. Finally, the less stressful and more relaxing ( $\beta = -.13$ ,  $p < .01$ ) and the less boring and more exciting ( $\beta = -.12$ ,  $p < .01$ ) respondents evaluated their experience the more likely they were to have a positive attitude towards their travel mode.

## Discussion

The results of this study support previous research which has shown that commuter journeys by car and public transport can be stressful and that the main sources of this stress are delays caused by traffic volume, the behavior of other road users (for car users) and poor infrastructure provision (for users of public transport; e.g., Wener et al., 2004; Evans et al., 2002; Rasmussen, et al., 2000; Novaco et al, 1990; Schaeffer et al, 1988). Significantly, however, the study also suggests that a focus on stress as the most important affective factor related to the commuting experience may be too limited and that other factors such as boredom also need to be taken into account. Generally, the data propose that each travel mode elicits a different affective response: driving is relatively unpleasant and arousing,

public transport is unpleasant and not arousing, cycling is pleasant and arousing and walking is pleasant and not arousing. Each travel mode serves to discriminate on the two affective dimensions developed by Russell and Snodgrass (1987). The study also revealed the main sources of positive and negative affect for respondents; they appeared to be closely linked to both pleasure and arousal. Berlyne (1974) suggests that people strive for an optimum level of arousal. This study suggests that the use of private cars may be too arousing (stressful), while the use of public transport may be not arousing enough (boring). Walking and cycling, however, score positively on arousal as well as pleasure (i.e., exciting and pleasurable) and therefore seem an optimum form of travel from an affective perspective.

The attitudes of public transport users towards their daily commute are more negative than the attitudes of other mode users. This appears to be related to stress as well as boredom caused by delays and waiting times. Previous research had already suggested that public transport journeys may be stressful due to unpredictability (e.g., Evans et al, 2002) and travel time (e.g., Wener, Evans, Philips & Nadler, 2004). However, future research on public transport may need to focus not exclusively on stress but also on boredom and on the opposite positives relaxation and excitement. In policy terms, especially in relation to the promotion of sustainable transport behavior, this may have important consequences. The main sources of pleasure for public transport users appear to be reading, listening to music, interacting with other people or looking at the passing scenery. Perhaps improvements in public transport provision which enhance people's ability to do these things might significantly improve people's attitudes towards the use of public transport.

It is interesting to note that many previous studies on travel mode choice suggest that people tend to prefer a car over other forms of transport for reasons such as flexibility and control. Stradling, Meadows and Beatty (1999), for example, showed that almost all of their respondents felt that the car provides freedom and control (90%). In this research, however, it

was found that *a lack of control* (e.g., in terms of getting stuck in traffic jams) was an important source of stress for drivers. Moreover, perceived control did not appear to be an important source of stress reduction for non car users. Only a few of those who did not experience any commuting stress (i.e., cyclists and walkers) mentioned control or flexibility, such as not getting stuck in traffic jams, as one of the most important positive aspects of their journey. To what extent are flexibility and control real advantages of car use and to what extent do drivers report these when making cognitive evaluations merely to justify their choice? As the number of cars on the roads is increasing we can expect that both actual and perceived control is likely to decrease.

Journeys by bicycle are evaluated to be the most interesting and exciting. Journeys on foot are perceived to be the most relaxing journeys. Walkers travel the shortest distance and they enjoy the activity itself. These research findings have important policy implications, particularly in relation to the promotion of walking and cycling to work. It is well documented that commuting stress can lead to emotional and behavioral deficits upon arriving home or at work (Cohen, 1980; Novaco, Kliwer and Broques, 1991). In order to inform the development of organizations' transport plans it seems worthwhile to further examine the potential positive affective consequences of walking and cycling as well, especially in relation to performance and health and sustainability (see Hu, Pekkarinen, Haenninen, Yu, Guyo and Tian, 2002; Oja, Vuori, Paronen, 1998; Lumsdon and Tolley, 2001). Obviously, walking and cycling are not always an option for commuters, due to commuting distances or responsibilities such as a school run. However, it was shown that in this study 35% of those who drive to work live within cycle distance of the university (3 miles or less), more than half of these respondents are young and have no children. It seems worthwhile to examine how these people can be persuaded to use a bicycle more often.

The affective appraisal of respondents' journeys appeared to be significantly related to their attitudes towards these modes. Unfortunately, it was not possible to examine how these evaluations are related to respondents' future intentions to use each mode. Moreover, due to the correlational nature of the study it is not possible to draw any causal conclusions. In order to examine the relative importance of affective evaluations in more detail it is necessary to ask people to evaluate the modes they do not usually use. A more thorough comparison of used and unused travel modes, using both experimental or longitudinal data and with a greater range of cognitive and symbolic evaluations of travel experiences (e.g., Steg, Vlek and Slootegraaf, 2001) would provide a better insight into the relative importance of the various motives underlying travel mode choices. An obvious bias of cross-sectional research such as this is that where someone chooses to live is likely related to mode choice. Those who live close to work have the privilege of walking or cycling. However, as trip time matters a short drive may also be pleasant for these people. Furthermore, due to the data collection procedure adopted in this study the findings are unlikely to be representative for the commuting population as a whole. More research among different and larger samples is necessary to verify and corroborate the findings of this study.

This research was exploratory in that it sought to identify the potential sources of commuter affect by drawing on self-reports by commuters. The inevitable biases of self-report could be reduced by using a triangulated research design in which Likert-type scales could be complemented with physiological stress measures of walkers, cyclists, drivers, and users of public transport. A more comprehensive and multi-modal measure of commuter affect may also enable a distinction to be drawn between pleasure and arousal as two independent factors.

The study did reveal that it may be useful to examine affective aspects of travel behavior in more detail. Most studies on travel mode choice have focused on utilitarian and

cognitive evaluations. These studies show that the advantages of private cars far outweigh the advantages of other travel modes. Unfortunately, these studies are invariably limited to studying the use of private cars and public transport, while the use of bicycles and walking is often ignored. The study presented here demonstrates that from an affective perspective the car may not always be the most optimum travel mode to use.

## References

Bamberg, S. & Schmidt, P. (2001). Theory-driven subgroup-specific evaluation of an intervention to reduce private car use. *Journal of Applied Social Psychology*, 31(6), 1300-1329.

Berlyne, D.E. (1974). *Studies in the new experimental aesthetics: steps toward an objective psychology of aesthetic appreciation*. New York, Halstead press.

Cohen, S. (1980). Aftereffects of stress on human performance and social behaviour. *Psychological Bulletin*, 88, 82-108.

DTLR (Department of the Environment, Transport, Local Government and the Regions, 2001). *Focus on personal travel 2001*. London: The Stationary Office.

Drottenborg, H. (1999). *Aesthetics and safety in traffic environments*. PhD Thesis, School of Architecture, Lund Institute of Technology, Sweden

Eagly, A. H., Mladinic, A. & Otto, S. (1994). Cognitive and Affective Bases of Attitudes toward Social Groups and Social Policies. *Journal of Experimental Social Psychology*, 30, 113-137.

Ellaway, A., Macintyre, S., Hiscock, R. & Kearns, A. (2003). In the driving seat: psychosocial benefits from private motor vehicle transport compared to public transport. *Transport Research Part F*, 6, 217-231.

- Evans, G. Wener, R. & Phillips, D. (2002). The morning rush hour: predictability and commuter stress. *Environment and Behavior*, 34(4), 521-530.
- Evans, G.W. & Carrere, S. (1991). Traffic congestion, perceived control and psycho-physiological stress among urban bus drivers. *Journal of Applied Psychology*, 76, 658-663.
- Fishbein, M. & Ajzen, I. (1975). *Belief, attitude and behaviour: an introduction to theory and research*. Reading: Addison – Wesley Publishing Company.
- Fujii, S. Gärling, T. & Kitagamura, R. (2001). Changes in drivers' perceptions and use of public transport during a freeway closure: effects of temporary structural change on cooperation in a real-life social dilemma. *Environment and Behavior*, 33(6), 796-808.
- Godlee, F. & Walker, A. (1992). *Health and the Environment*. British Medical Journal, London.
- Gulian, E., Matthews, G., Glendon, A., Davies, D.R. & Debney, L.M. (1989). Dimensions of driver stress. *Ergonomics*, 32(6), 585-602.
- Hopkinson, P. & Wardman, M. (1996). Evaluating the demand for new cycle facilities. *Transport Policy*, 3, 241-249.

Hu, G., Pekkarinen, H., Haenninen, O., Yu, Z., Guyo, Z. & Tian, H. (2002). Commuting, leisure-time physical activity and cardiovascular risk factors in China. *Medicine and Science in Sports and Exercise*, 34(2), 234-238.

Hunecke, M., Bloebaum, A., Matthies, E. & Hoeger, R. (2001). Responsibility and environment: ecological norm orientation and external factors in the domain of travel mode choice behavior. *Environment and Behavior*, 33(6), 830-852.

Joireman, J., Van Lange, P., Van Vugt, M., Wood, A., Leest, T. & Lambert, C. (2001). Structural solutions to social dilemmas: a field study on commuters' willingness to fund improvements in public transit. *Journal of Applied Social Psychology*, 31(3), 504-526.

Koslowsky, M., Kluger, A. & Reich, M. (1995). *Commuting stress: causes, effects and methods of coping*. New York, Plenum Press.

Koslowsky, M. & Krausz, M. (1993). On the relationship between commuting, stress symptoms, and attitudinal measures: a LISREL application. *Journal of Applied Behavioral Science*, 29(4), 485-492.

Lumsdon, L. & Tolley, R (2001). The national cycle strategy in the UK: to what extent have local authorities adopted its mode strategy approach? *Journal of Transport Geography*, 9, 293-301.

Matthies, E., Kuhn, S. & Kloeckner, C.A. (2002). Travel mode choice of women: the result of limitation, ecological norm or weak habit? *Environment and Behavior*, 34(2), 163-177.

Mokhtarian, P.L. & Salomon, I. (2001). How derived is the demand for travel? Some conceptual and measurement considerations. *Transportation Research A*, 35, 695-719.

Nilsson, M. & Küller, R. (2000). Travel behaviour and environmental concern. *Transportation Research, Part D*, 5(3), 211-234.

Novaco, R.W., Kliewer, W. & Broquet, A. (1991). Home environmental consequences of commute travel impedance. *American Journal of Community Psychology*, 18, 881-909.

Novaco, R.W., Stokols, D. & Milanese, L. (1990). Objective and subjective dimensions of travel impedance as determinants of commuter stress. *American Journal of Community Psychology*, 18, 231-257.

ONS (Office for National Statistics, 2003). *Census 2001. National report for England and Wales*. London, TSO (The Stationary Office). Summary available at: [www.statistics.gov.uk/census2001/profiles/727-A.asp](http://www.statistics.gov.uk/census2001/profiles/727-A.asp).

Oja, P., Vuori, I. & Paronen, O. (1998). Daily walking and cycling to work: their utility as health-enhancing psychical activity. *Patient Education and Counseling*, 33(suppl1) s87-s94.

Parsons, R., Tassinary, C.G., Ulrich, R.S., Hebl, M.R. & Grossman-Alexander, M. (1998). The view from the road: implications for stress recovery and immunization. *Journal of Environmental Psychology*, 18, 113-139.

Rasmussen, C., Knapp, T. & Garner, L. (2000). Driving –induced stress in urban college students. *Perceptual and Motor Skills*, 90(2), 437-443

Russell, J. & Lanius, A. (1984). Adaptation levels and the affective appraisal of environments. *Journal of Environmental Psychology*, 4, 119-135.

Russell, J.A. & Snodgrass, J. (1987). Emotions and the environment. In: D. Stokols & J. Altman, Eds. *Handbook of Environmental Psychology*, Vol 1. Wiley and Sons, New York, 245-280.

Schaeffer, M.H., Street, S.W., Singer, J.E. & Baum, A. (1988). Effects of control on the stress reactions of commuters. *Journal of Applied Social Psychology*, 18(11), 944-957.

Steg, L. (2004). Car use: lust and must. In: T. Rothengatter & R.D. Huguenin (eds). *Traffic and Transport Psychology. Theory and Application*. Proceedings of the ICTTP 2000. Elsevier, Oxford, 443-452.

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.

Stradling, S. (2002). Transport user needs and marketing public transport. *Municipal Engineer, Special issue on sustainable transport policy*. 151(1), 23-28.

Stradling, S., Meadows, M. & Beatty, S. (1999). *Factors affecting car use choices, A report to the Department of Environment, Transport and the Regions*, Transport Research Institute, Napier University, Edinburgh, December 1999.

Stokols, D., Novaco, R.W., Stokols, J. & Campbell, J. (1978). Traffic congestion, Type A behavior and stress. *Journal of Applied Psychology*, 63 (4), 467-480.

Van Lange, P., Van Vugt, M., Meertens, R. & Ruiters, R. (1998). A social dilemma analysis of commuting preferences: the roles of social value orientation and trust. *Journal of Applied Social Psychology*, 28(9), 796-820.

Verplanken, B., Aarts, H., Van Knippenberg, A. & Van Knippenberg, C. (1994). Attitude versus general habit: antecedents of travel mode choice. *Journal of Applied Social Psychology*, 24(4), 285-300.

Wardman, M., Hine, J. & Stradling, S. (2001). *Interchange and travel choice, Volumes 1, 2 and executive summary*. Scottish Executive Central Research Unit, Edinburgh, 2001.

Wener, R., Evans, G., Philips, D. & Nadler, N. (2004). Running for the 7:45: The effects of public transit improvements on commuter stress. *Transportation*, 30(2), 203-220.

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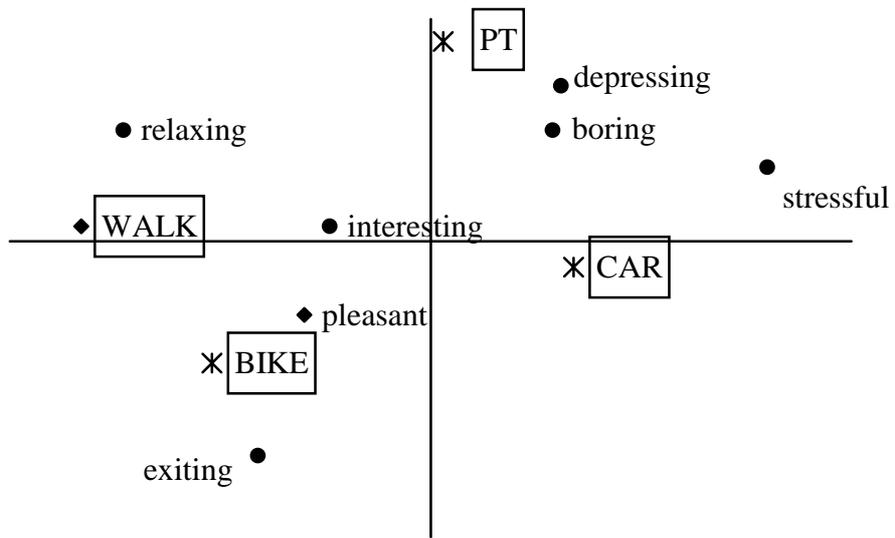


Figure 1. Two-dimensional plot of a discriminant analysis examining the affective appraisals of the daily commute by walkers, cyclists, drivers and public transport users.

Table 1. The most unpleasant aspect of the daily commute: percentages of respondents mentioning each aspect by travel mode.

	Walk n=63	Bicycle n=43	Car n=216	PT n=51	$\chi^2$
<b>Experience</b>					
Danger	33	44	15	0	38.75***
Delays	5	0	61	80	122.37***
Inconvenience	59	42	13	28	61.56***
<b>Cause</b>					
Traffic	29	23	62	10	65.19***
Others	10	42	25	8	22.57***
Provisions	27	19	7	76	121.39***

Note. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ . Totals do not add up to 386 due to missing values.

Table 2. The most pleasant aspect of the daily commute: percentages of respondents mentioning each aspect by travel mode.

	N	Walk n=63	Bicycle n=43	Car n=216	PT n=51	$\chi^2$
Scenery	136	44	37	37	22	6.26ns
Music/reading	53	2	0	19	24	22.53***
Flexibility	45	6	14	14	0	10.42*
Other people	44	6	9	10	20	5.90ns
Enjoyment	41	26	21	5	10	25.26***

Note. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ . Totals do not add up to 386 due to missing values.

Table 3. Differences between mode users in their travel time and distance for their daily commute, the perceived physical, cognitive and affective effort involved in making the journey, the perceived difficulty of making the journey, general attitudes towards the journey and intentions to use their mode.

	Walk	Bicycle	Car	Pt	F
Travel time	21.23 <sub>b</sub>	16.14 <sub>b</sub>	33.66 <sub>a</sub>	52.18 <sub>c</sub>	32.00(3,365)***
Travel distance	1.27 <sub>b</sub>	2.59 <sub>b</sub>	15.26 <sub>a</sub>	15.06 <sub>a</sub>	325.55(3,365)***
Perceived time	3.25 <sub>bc</sub>	2.95 <sub>b</sub>	3.55 <sub>c</sub>	3.98 <sub>a</sub>	15.22(3,368)***
Physical effort	2.86 <sub>b</sub>	3.26 <sub>b</sub>	1.34 <sub>a</sub>	2.22 <sub>c</sub>	103.47(3,368)***
Cognitive effort	1.38 <sub>b</sub>	1.44 <sub>b</sub>	1.72 <sub>b</sub>	2.46 <sub>b</sub>	13.87(3,368)***
Affective effort	1.56 <sub>a</sub>	2.26 <sub>b</sub>	2.28 <sub>b</sub>	2.64 <sub>b</sub>	10.72(3,368)***
Difficulty	4.71	4.67	4.40	4.20	2.94(3,365)*
Attitude	4.56 <sub>b</sub>	4.74 <sub>b</sub>	4.32	3.84 <sub>a</sub>	5.11(3,365)**
Intention	4.78	4.67	4.53	4.88	1.77(3,366)ns

Note. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .